Chapter 11

- Paiget and Beyond
  - Piaget's theory emphasizes the development of more advanced reasoning
  - Studies of learning and strategic thinking emphasize growth in problem-solving skills
  - Models of information processing emphasize changes in the sequential processing of information
  - The Concrete Operational Period (Age 7-12)
    - Concrete operations: the third stage of cognitive development, according to Piaget, when mental activities become more logical with respect to actual objects and materials
    - Conservation: the understanding that some characteristics of objects don't change despite changes in form or appearance
    - Children's thinking is qualitatively different from the preoperational period
  - Hallmarks of Concrete Operational Thinking
    - Five interrelated competencies:
      - Classification: the ability to divide or sort objects into different sets and subsets and to consider their interrelationships
      - Class inclusion: a logical operation that recognizes that a class, or group, can be part of a larger group
        - Attribute blocks in math classes help learn the above TWO
      - Seriation: the ability to arrange items in a sequenced order according to particular properties
        - Require children to be able to recognize two-way relations
      - Transitive inference: builds on seriation, requires that two relations are combines to derive a third relation
      - Reversibility: the understanding that relations can be returned to their original state by reversing operations, as long as nothing has been added or taken away
        - Key to understanding conservation
    - Horizontal decalage: differences in performance on conceptually related Piagetian tasks
  - Experiences that Foster Advances in Concrete Operations
    - Piaget believed that concrete operational thinking is a natural outgrowth of children's opportunities to manipulate materials and objects and to experiment with these materials
    - He did not think that logical operations needed to be explicitly taught
    - Other researchers find that concrete operations can be fostered by particular experiences
    - Formal schooling fosters concrete operation thinking
      - Math- reversibility and transitive inference
      - Language Arts- class inclusion
    - Piaget's overarching goal was to describe the structure or organization of children's thinking in different developmental periods
    - More recently, others have sought to understand how children process info
  - Learning and the Development of Strategic Thinking

- The Microgenetic Approach
    - Changes in strategic thinking within a session and across sessions are documented using a research strategy called microgenetic analysis
        - Research strategy that involves frequent, detailed observations of behavior
    - Microgenetic analyses have been applied to a wide variety of domains, including mathematical reasoning, scientific thinking, and memory
- Research Findings
    - In contrast to Piaget's stage-like theory, microgenetic studies show that individual children's behavior is much more variable at any given time
    - Individual variability in performance is greatest during periods of rapid learning
    - In general, as children learn, their strategic thinking is characterized by a greater reliance on more advanced strategies, improved choices among strategies, and improved execution of strategies over time

- Information Processing
    - Info-processing approach provides an additional perspective to understanding cognitive development in middle childhood
    - Researchers are studying how children come to attend to relevant info, retain the info, and then use that info to reason and solve problems
    - Processing Speed
        - Ways to study processing speed and accuracy:
            - Visual matching
            - Cross out
        - Kail and Ferrer found that children's processing speed showed greater improvements in middle childhood than adolescence
            - Similar to the pattern of development of gray matter in the temporal region of the brain
        - Development of most info-processing abilities is especially rapid during the school years, and tends to plateau in adolescence
    - Working Memory
        - Conscious, short-term representations of what a person is actively thinking about at a given time (short-term memory)
        - Can be measured with the digit-span test (a research procedure in which people are asked to repeat in order a series of rapidly presented items)
            - 2 YO- 2 items
            - 5 YO- 4 items
            - 7 YO- 5 items
            - 9 YO- 6 items
            - Adults- 7 items
        - "Chunking" helps remember more items, such as phone numbers
            - Can be seen as 10 items individually or 3 items when chunked
    - Long-Term Memory
        - Info that is mentally encoded and stored, potentially with no time limits
        - Different forms:
            - Declarative memory: memory of facts
            - Procedural memory: memory of complex motor skills

        - Verbatim memory: detailed memories of specific events
        - Gist memory: a generalized, rather than specific, memory of common occurrences
    - Several factors influence whether or not a piece on info held in working memory is moved to long-term memory
        - Length of time info is actively attended to
    - Steady increases in memory found between age 6 and 18 with sharper increases between 6 and 11
    - Memory Strategies
        - Mental or behavioral activities that can improve recall and recognition of material
        - Simplest is rehearsal or repetition
        - Practice distributed over several days is more effective than cramming
        - Written notes can also improve memory
        - Explicitly relating new information to prior knowledge increases the likelihood that new material is remembered
        - Organize pictures or words into meaningful categories
            - Creates chunks and category labels act as retrieval cues
        - Microgenetic Analyses of Memory Strategies
            - Recent microgenetic analysis of individual children's performance suggest that the development of strategies is not the result of slow, steady growth
    - False Memories
        - A memory that is a distortion of an actual experience, or a confabulation of an imagined one
        - Deese-Roediger-McDermott (DRM) procedure: an experimental task that demonstrates the creation of false memories
        - Misinformation paradigm: research that demonstrates that memories can be changed when misleading information is provided after the fact
        - The wording of questions can create and modify memories over time
        - Gist memories are more likely to be distorted
    - Children's Testimony
        - Researchers are studying ways to improve interview techniques to decrease the likelihood of distortions or false memories
        - Becoming more important as children are being called to the stand in high-stakes legal proceedings
        - False memories are affected by the amount of time that transpired between the event and the interview, the number of times the child is interviewed, and by having a highly biased interviewer
        - Lamb devised a protocol for interviewing children
            - First, interviewer has child provide free recall narrative in their own words, followed by neutral prompts that are found to improve recall
            - If neutral prompts fail, the interviewer moves to cued recall that names a reference point the child has already mentioned
            - If that fails, the interviewer moves to paired recall
            - KEY: the interviewer does not add information that the child hasn't volunteered
- Intelligence