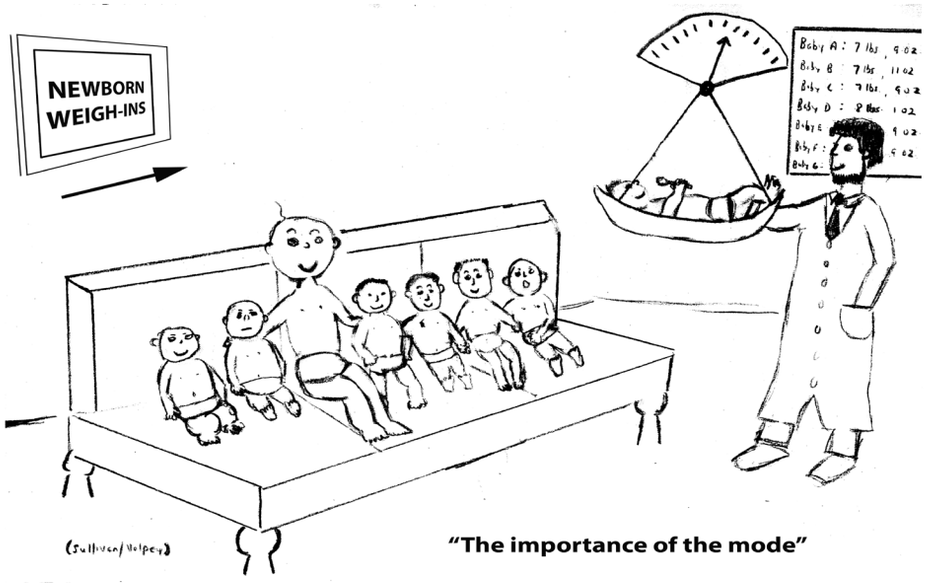

In addition to knowing the measures of central tendency it may be useful to look at the variability or spread of scores in your data. The **range** and **standard deviation** are basic measures of variability. You calculate the range by simply subtracting the lowest number in your data set from the highest number in your data set. This number gives you a general idea of variation in your data but it only takes into account the two most extreme scores. A more informative measure is the standard deviation, which tells you the typical difference between any one score and the mean of all of the scores. The formula for standard deviation is the square root of the **variance,** which is a calculation of the differences between each score and the mean. A low standard deviation tells you that the data points were clustered around the mean and there were relatively few outliers. Here's a quick example of the calculation of variance and standard deviation in reference to the fictional data for two home run hitters in baseball supplied below. Without doing any calculations, ask yourself – which player's performance over the years will have the higher standard deviation?

Season	Homeruns-Player A	Homeruns-Player B
1	10	19
2	34	20
3	17	25
4	36	17
5	11	15
6	13	20
7	40	24

Measures of Central Tendency

	Player A	Player B
N	7	7
Mean	23.0	20.0
Median	17.0	20.0
Mode	None	20.0

Calculating the Variance and Standard Deviation

Player A			Player B		
Value	Difference from mean	Square of the difference	Value	Difference from mean	Square of the difference
10	-13	169	19	-1	1
34	+11	121	20	-	-
17	-6	36	25	+5	25
36	+13	169	17	-3	9
11	-12	144	15	-5	25
13	-10	100	20	-	-
40	+17	289	24	+4	16
Total of squares of difference = 1028 Divide total by n-1 = 1028/6 = 171.33 Variance = 171.33 S.D. is the square root of the variance = 13.09			Total of squares of difference = 76 Divide total by n-1 = 76/6 = 12.67 Variance = 12.67 S.D. is the square root of the variance = 3.56		

On the average, Player A hits more homeruns year-to-year, but his performance is more variable, as we can see from the statistics above. If you were looking for a homerun hitter, which player would you prefer to have?

A well-prepared student should also have a basic grasp of **normal and skewed distributions**, and **percentiles**. If data about a variable are graphed and fall on a symmetrical, "bell shaped" curve, the distribution is referred to as a "normal distribution" or a "normal curve". In a skewed distribution, scores tend to cluster in one direction or another. The "skewedness" of such a curve is determined by the rare scores, the outliers. Thus, if a distribution is pushed to the right, with the hump of the curve at the high end of scores, this

Learning Theory

"BEHAVIORISM"
focusing on observable behaviors and how they're learned is more important than guessing about inner experiences or mental processes

Classical Conditioning

- CS
- UCS
- UCR
- CR
- Pavlov's dogs
- Watson & Little Albert
- contingency
- blocking
- 2nd or higher order conditioning
- classically conditioned taste aversions

•Acquisition
•Generalization
•Discrimination
•Extinction
•Spontaneous Recovery

• Biological Predispositions?
•Instinctual drift?

Operant Conditioning

- Thorndike's "law of effect"
- B.F. Skinner
- contingency
- immediacy
- the Premack Principle
- overjustification
- shaping: chaining
- positive reinforcement
- negative reinforcement
  - escape, avoidance learning
- punishment/aversion
- primary reinforcers
- secondary reinforcers
- Schedules of reinforcement
  - continuous vs. intermittent
    - fixed ratio (F.R.)
    - variable ratio (V.R.)
    - fixed interval (F.I.)
    - variable interval (V.I.)

Social Learning

Also known as:
- observational learning
- "modeling"

- Bandura and "Bobo"
- role of reinforcement
- role of self-efficacy

Cognitive Learning

- Kohler, chimps and insight learning
- Tolman, rats & mazes
  - latent learning
  - cognitive maps
- Seligman and learned helplessness
- positive and negative transfer of learning

Chapter 6
Cognition, Part 1: Memory

"You have to begin to lose your memory, if only in bits and pieces,
to realize that memory is what makes our lives. Life without memory is no life at all...
Our memory is our coherence, our reason, our feeling, even our action.
Without it, we are nothing."
(Luis Bunuel)

Introduction

According to psychologist Ulric Neisser cognition can be defined as, "How people learn, structure, store and use knowledge." Seven to nine of the one hundred multiple choice items on the AP Psychology Exam will involve Cognition, which in turn is broken into two parts: Memory and Thought and Language. Many of the concepts you will encounter in studying Memory can be demonstrated for you, and they'll thus be easy to retain. This topic also contains reference to the use of **mnemonic devices**. Learning about such memory aids will help you in this unit and also in retaining information from future chapters and other courses.

In this chapter we will explore questions like: To what extent can memory be relied upon? Under what conditions is it most and least reliable? Is it a benefit to remember everything, or are there some things that are desirable to forget? What accounts for forgetting trivial or even important information? Lastly, how can we apply our understanding of the basics of human memory function to facilitate recall and recognition of information, events, people and places?

What if you were given the option of taking a "memory improvement drug", would you do it? Or would you fear unforeseen side effects? If such a drug worked on the hippocampus, how might it affect the hippocampus in performing its numerous other functions? Also, would such a drug leave you overwhelmed by information?

Consider the flip side. What if you were offered a drug that erased memory? You might well want such a medication if you were tortured by memories of a romantic relationship gone wrong, or a terrible accident, or a wartime trauma. Would erasing such memories be desirable in the short, medium and long term?

You might wish to ponder questions such as these as you explore human memory.

Development Over the Lifespan: Adolescence

When individuals enter **puberty**, the point at which they are sexually mature and can reproduce, they acquire primary and secondary sex characteristics. **Primary sex characteristics** are directly involved with reproduction. Females mark the start of puberty with their first menstrual cycle, which is called **menarche**. At that point they are able to conceive and bear a child. Meanwhile, puberty is a time of astonishing sperm production in males. Some estimates indicate that males produce upwards of 1,000 sperm per second in this period. Examples of **secondary sex characteristics** include the deepening of the voice and growth of pubic and body hair in males, and breast and pubic hair development in females.

In regard to adolescence, you may find it interesting and relevant to learn about theories of the personal fable and the imaginary audience. **David Elkind** argued that adolescents tend to create a story of "specialness" about themselves, a **personal fable** in which the teenager feels a sense of invulnerability, believing that the rules of safety don't really apply to them. This is why teenagers seem so much more likely than others to engage in high risk, potentially destructive behaviors.

One might interpret the personal fable as a form of egocentrism. Some make the same connection to the adolescent sense of an **imaginary audience**, which was also proposed by David Elkind. It reflects the teen's belief that others are constantly monitoring the adolescent, watching for mistakes, moments of embarrassment, and so on. Of course, many would argue that this phenomenon is not exclusive to the teenage years.

During adolescence the frontal lobes of the brain continue to develop. Throughout the teens and early twenties, the axons of neurons in the prefrontal lobes are being wrapped in myelin, allowing for faster neural communication. Importantly, adolescence is also a key period for the pruning of unused synaptic connections. This may account for differences between teenagers and adults in their judgments, inhibitions, level of social awareness, and ability to understand how decisions in the short-term can have lasting long-term consequences.

In the past, developmental theories have transitioned from adolescence directly into adulthood, but there has been significant research in recent years on an intermediate stage that psychologists are terming **emerging adulthood**. Turning eighteen once meant that one was expected to take on the responsibilities of an adult, but as more and more teenagers go to college there has been a noticeable change in the length of time "twenty-something's" remain reliant on their parents. Likewise, people generally get married later than they typically did in the past. The transition to 'adulthood' is thus less abrupt than it once was. You may find it interesting to discuss with your classmates the extent to which *emerging adulthood* is occurring across cultures.