Unit 7B: Thinking, Problem Solving, Creativity, and Language

I. Introduction
   A. Humans can somehow be amazingly brilliant, yet amazingly stupid. We're both rational and irrational.
   B. Thinking is also known as cognition. Cognitive psychologists study thinking or mental processes.

II. Concepts
   A. **Concepts** are simplified mental groupings of similar objects, events, ideas, and people. A concept deal's less with the specific than with the underlying parts of whatever you're talking about.
   B. On purpose or not, we organize concepts into hierarchies. We like order.
   C. We create **prototypes** which are ideal examples that sum up the concept. A "bicycle prototype" brings up a picture of a typical bike. If a new bike is introduced that's radically different in design, it throws us for a while because it doesn't fit.
      1. A face-recognition study found that people tend to place a person's ethnicity into their "ethnic prototypes."

III. Solving problems
   A. There are different methods to problem-solving…
      1. The most basic technique is simply **trial-and-error**. It might work but it is very random and usually takes lots of time.
      2. An **algorithm** is where you go through step-by-step procedures and are guaranteed to find the correct answer. This will work, but also often takes lots of time. For example, suppose you were given the scrambled letters YOBS and asked to unscramble them into a word. You could start with the Y and write down each letter afterwards. Then move to the O, B, etc. You'd get the answer eventually.
      3. The method called **heuristics** is essentially where you "use your brain." It depends on the problem as to how it works, but heuristics usually gets you to the answer quicker. In the example above, you might guess that few words start with Y. Therefore you'll start with another letter, say the B. A vowel would likely follow, giving you BO. With a Y and S left, the answer is pretty obvious.
         a. The main problem with heuristics is that sometimes you can be fooled. What's worked before may trick you at times.
      4. In **insight learning**, the answer comes all-at-once. It happens when you're stuck, but then for whatever reason, the entire answer just comes to you.
         a. When this "light bulb moment" occurs, fMRI or EEG brain scans show a spot in the right temporal bulb light up.
   B. **Creativity** is the ability to create ideas that are novel and valuable.
      1. Creativity and intelligence are not necessarily the same. People who score high on intelligence (IQ) tests are not always creative, and vice versa.
         a. IQ tests measure a single correct answer, this is **convergent thinking**.
         b. Creativity tests measure multiple answers, this is **divergent thinking**.
      2. Five parts to creativity have been identified, they are:
         a. Expertise – To be creative, people must first know something, or lots of things, from which to build. # Imaginative thinking skills – Creative folks think of things in new ways.
         b. A venturesome personality – Creative folks don't follow the crowd.

c. Intrinsic motivation – Creative folks move forward for its own sake, not money, or fame, etc.
d. A creative environment.

3. Creativity has its obstacles.
    a. **Confirmation bias** is the tendency to seek out evidence that confirms our findings more eagerly than seeking evidence that refutes (or argues against) our findings. Thus, we're more likely to think we're right because the evidence we've found tends to support us.
    b. **Fixation** is being unable to see a problem from a fresh perspective. While thinking on a problem, we can get stuck in our thinking. It often helps to take a time-out, clear our heads, then come back to it in a different state-of-mind.
        i. The concept mental set influences how we think. **Mental set** is our tendency to try to solve a problem in a manner that has worked in the past. This can be helpful to solve similar problems, but it can be hurtful when we think a problem is similar, but really isn't.
        ii. The idea of **functional fixedness** can stop us. It's where we think of things as only having their normal function. For example, we may feel we need a butter knife to cut the butter, but a fork would do just the same.

IV. Making decisions and forming judgments
A. We usually make decisions based on intuition, our gut-feelings. This is using heuristics that we've developed over our lifetimes. Normally, this works well. Sometimes, this gets the wrong answer.
    1. **Representativeness heuristic** is the probability of how well something fits a prototype. Sometimes our pre-conceived prototype can throw us off. This has to do with numbers (it's a probability), not simply what we expect.
    2. **Availability heuristic** says that we make our evaluations based partly on the ease with which we get the information on which we make them. In other words, if we easily gain info on something, we're more likely to lean that way. However, if contrary info is tough to gather, we often don't lean that way. Simply put, we make lazy judgments.
B. **Overconfidence** can hurt our judgments too.
    1. Overconfidence occurs when we over-estimate our knowledge and abilities. It's aided by intuitive heuristics (gut feelings), our tendency to accept evidence that confirms our beliefs and reject evidence that disputes them, and our tendency to explain away our shortcomings.
        a. Overconfidence happens to politicians and to students and to everyone.
    2. Despite stumbling, people who are overconfident often do better than others.
C. **Belief perseverance** is holding to one's line of thinking despite overwhelming evidence to the contrary. Simply put, it's being set in your ways, or even simpler, it's stubbornness.
    1. To combat this phenomenon, a person should imagine that the evidence was the opposite. This tends to soften a person's old thinking.
D. **Intuition** plays a powerful role in how we think. It's our irrational, gut-feeling. It's making a decision without any evidence or support for the decision, but by simply saying, "I had a feeling."
    1. Intuition can often get us into trouble – decisions made without thinking usually do.

2. Intuition can also be right. Sometimes, there actually is a reason that we feel a certain way. Over time, we do learn things and they do lean us toward certain decisions and away from others.
    a. It seems that when facing a decision, taking a time-out and taking your time is the best approach.
    b. True intuition is a fast, automatic, habitual decision. You just know it, you're not sure how or why you know it, you just know it.

E. **Framing** is the way in which something is presented. It has a powerful impact.
1. Surveys easily illustrate framing. If a medical treatment has a 10% chance of killing a person, it's perceived as being a poor remedy. If it has a 90% success rate, it's perceived as being effective. (It's the same thing, only the perception differs due to the framing.)
2. To "make it personal," use numbers like "1 person out of 100." To downplay something, use less-personal percentages, like "1%."
3. This is the same as "wording." The phrase "aid to the needy" gets a better response than "welfare" and certainly a better response than "giving a handout."

V. Language structure
A. Introduction
1. Language consists of spoken, written, and signed words. Language appears to be so close to thinking that it might actually be thinking.
    a. It's amazing to think of it this way, but people can transfer thoughts through the air between us – when we speak, our voices travel the airways, enter another's ears, and into their brains.
2. This ability, perhaps above all others, helps separate us from the animals.

B. **Phonemes** are basic sounds. English has 26 letters, but 40 phonemes (40 sounds).
1. In English, consonants usually are more important than vowels.
2. People often have difficulty making sounds of languages that they didn't grow up speaking.

C. Phonemes are just sounds. **Morphemes** are the smallest units of language that *have meaning*.
1. In some cases a phonemes is a morpheme, like "I" or "cat."
2. Usually, morphemes are made up of two or more phonemes.

D. **Grammar** is a system of rules for a language.
1. **Semantics** is made of the rules that give us meaning from morphemes, words, and sentences. The focus here is on the meaning of the words.
2. **Syntax** is made of the rules we use to assemble sentences. The focus here is on how we assemble the words. For example, an English syntax rule is the adjective comes before the noun – white house. Spanish reverses it to *casa blanca*.
3. Semantics and syntax interplay with each other and can alter each other. The way the words are assembled affects the meaning.

VI. Language influences thinking
A. Our language strongly influence the way we think. This is called **linguistic determinism**.
B. This is most apparent in very different languages, like English and Japanese. Bilingual people reveal typical western or eastern traits when describing themselves in those languages.
C. Examples of this…
1. Hopi Indians' language has no verbs in past tense—they struggle thinking about the past.
2. A Brazilian tribe has no numbers above 2—they struggle replicating a pile of 7 nuts.
3. Words influence how we perceive colors—what we call it influences how we see it.

D. It’s hard to think about abstract ideas (respect, freedom) without language. It might even be impossible.

VII. Thinking in images

A. We can also precede ideas in words with images.

B. Watching an activity or envisioning an activity in one’s mind activates the same part of the brain as if the person were actually doing the activity.

1. The technique of visioning is often used effectively by athletes—they envision the perfect motions in their mind.
2. This works in other things too, if we envision ourselves going through the steps to achieve the goal.