Chapter 11: Music and Speech

* Key terms-
  + Pitch- the psychological aspect of sound related mainly to the fundamental frequency. Basically how we sense frequency of sounds.
  + Octave- the interval between two sound frequencies having a ratio of 2:1.
  + tone height- a sound quality corresponding to the level of pitch. Tone height is monotonically related to frequency.
  + tone chroma- a sound quality shared by tones that have the same octave interval.
  + Chord- a combination of three or more musical notes with different pitches played simultaneously.
  + Melody- an arrangement of notes or chords in succession.
  + Tempo- the perceived speed of the presentation of sounds
  + Syncopation- a variety of rhythms which are in some way unexpected which makes part or all of a tune off-beat.
  + Rhythm- the temporal pattern of sound. Sounds that are louder, longer or higher pitches are perceived as being accented and leading a group.
  + vocal tract- the airway above the larynx used for the production of speech. Includes the oral and nasal tracts.
  + Phonation- the production or utterance of speech sounds. Basically when the vocal folds produce certain sounds through vibrations. (associated with vocal chords)
  + Articulation- the act or manner or producing a speech sound using the vocal tract (associated with vocal tract). Also has to do with the movement of the tongue, lips, jaw, and other speech organs.
  + Formant- a resonance of the vocal tract. Formants are specified by their center frequency and are denoted by integers that increase with relative frequency.
  + Spectrogram- a pattern for sound analysis that provides a 3-D display plotting time on the horizontal axis, frequency on the vertical axis and intensity on a color or gray scale.
  + coarticulation- the phenomenon in speech whereby attributes of successive speech units overlap in articulatory or acoustic patterns.
  + categorical perception- human speech is discriminated. This is also seen in vision. We perceive gradual shifts between phonemes as distinct.
  + Encephalogram-an image, trace, or other record of the structure or electrical activity of the brain (EEG)
* How is speech sounds produced?
  + Through the coordination of three main components.
    - Respiration (lungs)
    - Phonation (vocal chords)
    - Articulation/Resonance (vocal tract)
    - It is important to note that we are able to make such sounds because of where our larynx’s are located in relation to other mammals. Our larynx’s are very low in the throat, this gives us language but also makes us susceptible to choking.
* How does culture affect perception of music?
  + Octaves are universal
  + Infants are equipped to learn whatever scale is used in their environment
  + Musical scales and intervals vary widely across cultures. Some notes are more loosely tuned in other cultures. Therefore we detect mistakes and intervals between notes according to how well those notes correspond to our western view of scales.
* components of articulatory dimension
  + air from lungs🡪 through vocal folds (stiffness and mass of the folds influences resonant frequency)🡪fundamental frequency and harmonics are generated🡪 muscle adjustments can change the frequency.
  + Children and woman have lighter folds so they created higher pitches.
  + \*\*\* Just a guess, but I would study the “generating speech” slide and know the different letters and how to make them. Especially which are voiced and which are voiceless.
* Theories involving speech?
  + Motor theory of speech (liberman)- processes used to produce speech sounds can be run in reverse to understand the acoustic speech signal.
  + Problems:
    - Speech production is as complex as speech perception
    - Acoustic signal is complex because the production is complex
  + Theories about how we learn words
    - Is the ability to learn language innate or taught by repetition.
  + McGurk effect-
    - Perception of speech is aided by visual system.
* Know about the chimpanzee experiments that attempted to teach them language (e.g. Vicki and Washoe)
  + Humans have physiological adaptations for speech production and neurological adaptations for speech and language.
  + Genetic differences between humans and chimps is 1/10 that between mice and rats. Are we the 3rd chimpanzee?
  + Communication is a huge advantage.
* Broca’s and Wernicke's area’s
  + You should know this from the previous chapters.
* Study the "Musical pitch" slides
* How do infants react to sounds and sentences? Think about the studies done with infants.
  + This is slide 31 in the notes. “native perception”
* Watch the youtube video on monkeys (Robert Seyfarth: Can Monkeys Talk”)