Concept Checklist – Lecture 7 + Literature

- Gazzaniga
  - Chapter 3: methods of cognitive neuroscience
    - Methods to perturb neural function
    - Structural analysis of the brain
    - Methods for the study of neural function
    - The marriage of Function and Structure: Neuroimaging
    - Converging methods

Concepts

- Research design
  - Correlational
  - Experimental
- Computer modeling
  - Symbolic modeling
  - Connectionism
  - Realistic neuronal modeling
  - Braitenberg vehicles
  - Pro's and Con's
- Lesion Studies
  - Dissociations
    - No dissociation
    - Single dissociation
    - Double dissociation
  - Pro's and Con's
- Structural Imaging
  - CT / CAT
  - Structural MRI
    - MRI system
      - Magnet (1.5T – 9.4T)
        - Why higher fields?
      - Gradient coils
      - Radio frequency coil
    - Protons / spins
    - Larmour frequency
    - Gyromagnetic ratio
    - T1 weighted, T2 weighted, T2* weighted
    - Diffusion MRI / DTI

            - Anistropic diffusion
        - Pro's and Con's
- Functional Imaging
    - Single cell recording
        - Pro's and Con's
    - EEG
        - ERP
        - Time-frequency analysis
        - ECoG
        - Pro's and Con's
    - MEG
        - Pro's and Con's
    - PET
        - Anihilation & gamma rays
        - Subtraction method
        - Pro's and Con's
    - fMRI
        - BOLD, oxyHb and deoxyHb
        - Block design & event-related design
        - Rt-fMRI, BCI & Neurofeedback
        - Pro's and Con's
    - Spatial & temporal resolution
        - Relative resolutions of modalities
            - Log size vs. log time plot
- Methods to perturb function
    - Pharmacological studies
    - TMS
        - Pulsed TMS
        - Repetitive TMS
    - tDCS
    - Genetic manipulation
        - Knockout procedures