Emi’s 9.00 Midterm Review Sheet

The Brain

• Disorders associated with damage to very specific areas

  – Broca’s area: region of left front lobe. Damage causes nonfluent aphasias where the patient has trouble speaking; there is great loss of vocabulary, speech is labored, finding/articulating words takes special effort.

  – Wernicke’s area: region borders on the auditory primary projection area. Damage causes fluent aphasias, where the patient can produce speech but do not understand what is said to them. Reasonably grammatical sentences are produced, but are “word salad” and mostly little filler words, provide little information.

  – prefrontal area: responsible for response inhibition; use of rules to control behavior.

• Other Disorders

  – prosopagnosia: a complex form of agnosia, where one cannot identify familiar objects using the sense that has been affected. In this particular case, a person is unable to identify human faces. it involves areas of temporal and parietal lobes.

  – apraxia: produced by lesions in the frontal lobe of the cortex. Disturbance in initiation or organization of voluntary action. Sometimes patient is unable to salute, wave goodbye when asked to do so. Trouble putting actions in correct sequence.

  – agraphia: inability to write

• Hemispheres

  – Difference between two seems related to language.

  – Right-handed people with lesions in left hemisphere tend to have aphasia.

  – Left-handed people with lesions in right hemisphere have difficulty in the comprehension of various aspects of space and form; right-handers with the same lesions see details but not the overall picture.

  – (Note: aphasia is not really a matter of speaking or hearing; is the result of disruption in specific processing steps needed for language.)

• Structures

  – Hindbrain

    * Medulla: lies directly above the spinal chord. Regulates cardiovascular and respiratory systems.
* pons: regulate brain’s level of attentiveness, sleep, dreaming. Other parts integrate movements and sensations from facial muscles, tongue, eye, ear.
* Cerebellum: Skilled movement, balance, timing, all intuitive memory–muscle memory.
  - Midbrain: Tracking small movements–this part of the brain is large in birds.
  - Forebrain
    * Thalamus: Relay stations for nearly all the sensory information going to the cortex.
    * Hypothalamus: regulatory organ–responsible for hunger, thirst
    * Basal Ganglia: Regulating muscular contractions; keep us from jerking around (think of the gangly teenager).
    * Cortex: The outermost layer of the cerebral hemisphere, most developed in primates and higher order mammals.
    * Medial Forebrain Bundle (MFB): Pleasure center of the brain, perhaps. It triggers the activity of cells that rely on dopamine as a neurotransmitter, which some believe is a positive reinforcer.
  - Myelin is only found in vertebrates, which move much faster than invertebrates. They are specialized glial cells that help neurons communicate faster. Made of fatty substances, wrapped around long axons.

• Action-Potentials and nerve cells
  - Action-potential refers to the whole destabilization-stabilization process the cell goes through.
  - Stimulus is not detected by strength of action-potential; nerve firing follows the all-or-nothing rule; if a stimulus is over the threshold, the action-potential occurs. Intensity is detected by the number of nerves that end up firing.

• afferent pathway: information (bottom-up) lots of stuff in front of you, not looking for anything in specific.

• efferent pathway: information (top-down) searching specifically for something– “where are my pants?”

Motivation
• Schools of thought (I’m not sure if this really belongs here)
  - Dualists: Plato, believed that there is a body and a soul
  - Gestalt: Nothing is caused by individual neurons; everything is a sum of lots of neurons’ activity.
  - Behaviorists: There is only behavior to be seen.
Vision

• Color Vision
  – Light mixes additively: We see the sum of the wavelengths. Remember that the wavelengths of each color being mixed does not change! If we took a spectrometer, we would see a mixture of the constituent wavelengths. More than two colors in the right proportions forms white. The complements turn into gray (ie blue and yellow light).
  – Paint mixes subtractively: Each pigment or filter absorbs its own set of wavelengths, and the only wavelengths that emerge are those absorbed by none of the pigments or filters. So a mixture of three different paints/filters is a dark gray.
  – Hue distinguishes blue from green from red; corresponds to our word for “color.”
  – Brightness is dimension that differentiates amount of black.
  – Saturation is the purity of a color; extent to which it is chromatic rather than achromatic. The lesser the saturation, the more gray a color.

Memory

• “Disordered Memories”
  – anterograde amnesia: caused by lesions in the temporal cortex (hippocampus and subcortical regions). One common cause is malnutrition associated with alcoholism: Korsakoff’s syndrome. Symptoms are inability to form new memories—ie H.M.. Working memory but no ability to add to long-term memories.
  – retrograde amnesia: Patient suffers loss of memory for some period prior to brain injury. Perhaps related to trace consolidation? Maybe trace consolidation is a more drawn out process than thought to be? (Since some memories lost in this way go back years or so.)

• Memory Errors
  – Bias: Your general knowledge intrudes on specific memories and reshapes them—ie the European children hearing about the Native American stories and retelling them slightly altered, changing the parts they didn’t understand.
  – Context: ie leading questions; example about the car crash using the words bump, hit, smash causes the subjects to put different estimates of the car’s speed.
  – False memories:
  – Failure in source monitoring:
  – Becoming plastic again: Retelling of memories causes subjects to become confused about what actually happened and what they made up later. This may happen with flashbulb memories; you have heard it retold by so many people.
Hypnosis does not reliably summon up old memories; we do not retain every bit of sensory knowledge that we have encountered. Hypnosis simply makes us more likely to believe the person giving us hypnosis; we are convinced we are reliving childhood, but really it is just a pretense (comparison of “recreated” child’s drawing and actual child’s drawing.)

**Child Development**

- Piaget’s four stages
  - Sensorimotor (birth to 2 months): lack of distinction between “me” and “not me”, fleeting thoughts of the world—categorized into suckables and swallowables. No object permanance.
  - Pre-Operational (2-7 years): egocentrism, have representational thoughts but not able to interrelate them in a coherent manner, no conservation of quantity (failing the M&M experiment).
  - Concrete operations (7-11 years): Can understand concepts relating to specific examples, but lack abstract thought.
  - Formal operations (≥11 years): Ability to reason, problem solve, entertain the possible as well as the real.

- Piaget disproved
  - Distinct Stages may not be the best way of looking at it—there is evidence in younger children that they have the rough, undeveloped skills of older children—stages of formation may be more continuous.
  - Children have more skills than Piaget thought—think of the habituation tests, ie the broken rod and the stage being swung back and the numerosity counting tests with screens.

- **schema**: Sets of organized expectations about the real world and different behaviors.
- **assimilation**: Applying schema to the world—interpreting world.
- **accommodation**: Updating schema based on experience.

**Counting**

- Numerosity: Adding up small numbers ie 1+1 = 2; this is seen even in newborns
- Subitizing: Glancing at items that number from 1-4 and being able to count them instantaneously (more or less).