Finishing last lecture:
- Ingestive Behaviors: Bulimia Nervosa
  - Definition:
    - Recurrent episodes of **binge eating** (2 binge eating episodes/week for at least 3 months)
    - Feeling of lack of control over eating during binges
    - Regular use of either: self-induced vomiting or laxatives, diuretics, strict dieting/fasting or vigorous exercise
    - Persistent concern with body shape and weight
  - No correlation with net nutrient intake: “over-eating”, “under-eating” or “balanced” eating habits all equally likely. Not necessarily associated with obesity.
  - Possible mechanisms: neurochemical
    - Deficiency in satiety mechanisms (CCK)
    - Imbalance of 5HT and NE
  - Treatments: Cognitive behavioral therapy and manipulation of 5HT levels

Memory
- Class demonstration
- Numbers
  - Most of class could remember 5-7.
  - Limit was 11.
- Words
  - One person could remember 7.
  - No one could do 8.
- Conclusion: Words are more difficult to remember than numbers.
- Why?:
  - Numbers are from the same category but different words are not.
    - Brain can’t make such a fast automatic link with words as numbers unless the words are part of a sentence or of similar categorization.
  - Word association
    - Semantic net: brain is designed to make links (creates a “web” of association)
    - Basis of false memories (EX: testimony)
  - Not all memories have a purpose
    - Some things stored are absolutely useless
    - Eventually we forget them
  - Some characteristics
    - Short-term memory
      - Limited in span (on average, people remember 7, plus one or two)
      - Object dependent (item dependent)
        - Numbers, words, animals, foods (all different)
      - State dependent
- We remember less under stress than in controlled conditions
  - Short-lived
  - Won't remember it for a very long time
- Immediate form of memory
  - Not all items are necessarily useful
- Sensory info > short-term > Long-term (12.21)
  - Consolidation: can happen by itself (sleep)
  - Rehearsal: repetition until committed to memory
- Working memory
  - Memory for immediate USE
  - Memories you have to pull out upon request
    - EX: speaking, adding numbers, etc.
- Long-term memory
  - Scales of days, years and decades
  - Declarative (explicit) vs. Non-declarative (implicit)
    - Verbalize vs. can't verbalize
- Declarative
  - "Remembering"
  - Can show memory behaviorally
    - 1. Semantic (factual) memory
    - 2. Episodic ("when", order of events)
- Non-declarative
  - "Knowing"
    - 1. Skills, habits
    - 2. Priming
    - 3. Simple classical conditioning
- Memory Processes
  - Encoding
    - Stimuli input being transformed into understanding
  - Storage
    - Committing to memory
  - Retrieval
    - Not always used
  - Both encoding and storage combined are learning
- Learning
  - Perceptual (sensory) learning (12.14): Recognition, modality specific (visual, auditory...)
    - Animals very good at it
    - Identify and categorize objects using “perception”
    - Learning “about” objects. No association with actions.
      - EX: Vision: inferior temporal cortex: faces and objects
    - Video: Rio uses exclusion for # sign. She knows it doesn’t going with letters so she correctly puts it with numbers
      - Perceptual because she’s differentiating shapes
Dorsal stream (posterior parietal cortex): memories of moving objects
Ventral stream (inferior temporal cortex): memories of “static objects”

Stimulus-response learning
Classical conditioning
  - EX: conditioning of a reflex (12.1), puff of air (unconditional stimulus) in eye causes blink (unconditional response)
  - EX: Tone (conditional stimulus) played, blinking response synapse weak
  **Hebb Learning Rule**: If presynaptic and postsynaptic sites are active simultaneously, the synapse is strengthened (sound blinking synapse strengthens; new association) (Dwight with computer start-up sounds creates physical response for altoids = Pavlovian conditioning)

Different types of Classical Conditioning
  - Fear conditioning (12.16) (conditioned emotional responses)

Where’s the memory?
  - In the synapse, between communications of neurons

Memory can be unconditioned (forgotten, erased)
  - Extinction
    - Repeated presentations of conditioned stimulus alone leads to extinction
    - PTSD

Instrumental (operant) conditioning (12.2)
  - Learning an association between an action and its consequence
  - Action-response learning. Reinforcement (< ex)
  - How we learning from doing
    - Requires reinforcement or punishment stimulus
    - EX: Rat pressing lever that simply stimulates pleasure center and nothing else (no reward to associate. Just action)

Stimuli > perceptual system > motor system > behavior
Basal ganglia (12.17)
  - Motor learning: modality specific (ex: playing piano)

Relational learning
  - Learning to associate things
  - EX: spatial learning

Meta-learning
- Learning to learn
- Basal Ganglia

Sensory cortices → Transcortical → Motor cortices

Neostriatum

Globus Pallidus

Basal ganglia

- Transcortical: “instruction” learning
- Basal ganglia: automatic behaviors
- Behaviors initially use the transcortical pathway, then, later use the Basal ganglia pathway
- Parkinson’s disease: Basal ganglia deficit
  - Problem with implicit memory