

Cognitive Psychology (EXP3604): Final Review

- **Parallel distributed processing models (connectionist)**
 - Connectionist model of processing/ PDP: Units are interconnected and can excite/inhibit other units; theory that the cognitive processes can be explained by activation flowing through networks that link together nodes. Every new event changes the strength of connections among relevant units by altering the connection weights
- **Object recognition, recognition by components theory**
 - Two theories of object recognition
 - Recognition by components: theory by Biederman that any given view of an object can be represented as an arrangement of simple 3-D shapes called geons; 36 geons differ by edges, symmetry, sweep, axis, and comparative relations to other geons.
 - Feature Analysis theory: visual system is composed of a small number of characteristics or components called distinctive features; problem: features in nature are more complex
- **Bottom up and top down processing**
 - Bottom up: environment analyzed into visual features, build up into objects
 - Top down: expectations and knowledge guides perception
- **Speech perception-variability in phonemes, use of context, use of visual cues (McGurk effect)**
 - interaction between hearing and vision in speech perception
 - illusion occurs when the auditory component of one sound is paired with the visual component of another sound, leading to the perception of a third sound
 - The visual information a person gets from seeing a person speak changes the way they hear the sound

Attention

- **divided attention, selective attention**
 - Conjunctive search: search in which person must find two features which requires attention and takes longer; serial processing
 - Disjunctive search: search in which items have at least one set of similar characteristics; features should "pop out" during search and should be able to form illusory conjunctions; parallel processing
- **automatic versus controlled processing**
 - Automatic attention: parallel processing, fast, not attention demanding, produces interference because it is involuntary, does not require capacity

- o Controlled attention: serial processing, slow, attention demanding, consciously controlled, does not produce interference
- **need for attention in scene perception (change blindness)**
 - o Change blindness: changes in visual scenes are arranged to occur simultaneously with some kind of extraneous, brief disruption in visual continuity; we fail to detect a change in an object or scene due to overuse of top-down processing (ex: screen flickers between two presentations of scene, a major change between the two must be detected)

Working memory

- **Phonological loop, capacity of, components of Visuospatial sketchpad, uses, capacity. Central executive, characteristics, how to measure**
 - o *Baddeley and Hitch theory of working memory*
 - Thought that STM would have to be used for reasoning, comprehension, thinking
 1. visuo-spatial sketchpad
 2. phonological loop: Temporarily maintains acoustic information
 - Memory buffer of phonological loop is why acoustic confusions happen (e.g., mad man map mat cat cap very hard to hold in STM).
 - important in language processing (comprehend long sentences) and for acquiring vocabulary during first or second language learning
 - Studies of individual differences:
 - o children's span correlates with vocabulary acquisition in the next year
 - o patients with poor phonological loops have trouble learning new vocabulary in a second language
 - o regular folks who have to study vocabulary words while their phonological loop is busy saying la la la la or the the the do very poorly on new vocabulary words
 - 1) phonological store: memory store lasting 1-2 seconds
 - 2) subvocal rehearsal process: repeat to self
 - o Rehearsal process responsible for word-length effect in most short-term span tasks
 - o Articulatory suppression blocks the rehearsal process in phonological loop
 - 3. episodic buffer
 - 4. central executive:
 - Plans how to do cognitive tasks
 - Integrates information from LTM
 - Initiates retrieval and decision processes

- **Individual differences in working memory as measured by tasks such as OSPAN**
 - O-span requires you to switch between 2 tasks (math and memory storage)
 - Good predictor of:
 - Language comprehension, reading comprehension
 - SAT performance
 - Learning to spell, learning vocabulary
 - Writing, good note-taking, reasoning, complex learning
 - Fluid intelligence (correlates .70)

Long-term Memory

- **Encoding**
 - Importance: must attend to encode
 - Emotional significance determines whether we encode
 - human memories are more easily retrieved if external conditions (emotional cues) at the time of retrieval are similar to those in existence at the time the memory was stored
 - e.g., encode piano as something heavy versus something that plays music, different cues will be effective later
- **Levels of Processing**
 - Levels of processing effects (also called depth of processing) and their interpretation in terms of distinctiveness and elaboration
 - 1) Shallow processing (perceptual analysis)
 - leads to little memory
 - only involves maintenance rehearsal (repetition to help us hold something in the STM) and leads to fairly short-term retention of information.
 1. Structural processing (appearance) encode only the physical qualities of something. E.g. how the letters look.
 2. Phonemic processing – encode its sound.
 - 2) Deep processing (meaning analysis)
 - leads to more memory
 - elaboration rehearsal: more meaningful analysis (e.g. images, thinking, associations etc.) of information and leads to better recall
 - Creates greater differences among mini events or items, called “distinctiveness”
 - Semantic processing: when we encode the meaning of a word and relate it to similar words with similar meaning
- **Effects of context**
 - Context-dependent memory