Structure of Language System 15E

1. The language processing system (Caplan)
   1. Not a unity structure, divided into a number of modules
      1. These modules are informationally encapsulated – each one only takes a particular representation as input and delivers only one type of output (pizza place)
      2. Language does appear to be mostly modular with some cross referencing
   2. Processes are mandatory and automatic
      1. Word reading is automatic – stroop task!
      2. Mostly this is supported, but in extreme overload we can shut them off – attention situations
   3. Language processes are unconscious
      1. We don’t know they are going on
      2. Such as feature combination of letters to make words
   4. These processes are very quick and very accurate
      1. Usually indicates automatic processing
      2. Some processes are the combination of multiple modules, which can be slow and error prone (speaking)
2. What are the modules of language?
   1. Semantic conceptual system – organizes and accessing our world knowledge
      1. Interactions with perceptual system
      2. How are word meanings represented? – decomposed into semantic features, probably abstract
      3. Meanings of words are connected in a propositional network, using schemas
   2. Reading versus Speech production
      1. Both of these are separate due to the different brain impairments, especially with lesions and disease (Alzheimer’s versus Parkinson’s)
      2. Mental lexicon in one part of the brain while general grammar rules in the other
   3. Visual versus auditory modules – input and output are very different
      1. We can backtrack while reading but not listening
      2. We are able to hold onto visual stimuli for longer
      3. Although they develop at the same time
   4. Speech recognition versus speech production
      1. Recognition – very bottom up process data drive
      2. Production involves lots of feedback
      3. Why different? Think about the task – in production you are having to put together a lot of different information
   5. Inner speech
      1. How is it different from actual speaking? Is it a separate representation system?
      2. Articulatory suppression – talking out loud, stops inner speech so must be a different system than speaking out loud.
3. How many lexicons?
   1. Are there different lexicons for each different modality?
   2. Obviously feature recognition is a different system, so the real question is about lemmas (abstract lexical units)
   3. Options
      1. Four lexicons – writing, reading, speaking, listening
      2. Two lexicons – visual language (written) and verbal language (spoken)
      3. Two lexicons – one for input and one for output – both cover written and spoken language
   4. Data
      1. Malapropisms – word substitution speech errors, indicates two different processes speech production and comprehension
      2. Tscope recognition of printed words helped by reading aloud the word, but not for pictures or definitions
         1. Indicates these are different systems
      3. Separating priming results – priming in the visual modality helps visual but not auditory and vice versa
      4. Logogen model – one representation for each word, now revised to have logogen stores that are modality specific, and separated the input and output systems
         1. When we are monitoring a list of auditory words for a target, we can also produce words out loud
         2. Listening to a word does not activate the same areas of the brain as reading
         3. Shows that speech input and output systems are different
      5. One problem with all this research is that you can’t tell the difference between access problems and storage problems
      6. Some research that supports the interaction between input and output units
         1. Generating a word facilitates word recognition – producing that word activated its representation for recognition also accessed/activated
         2. These interactions may at a sublexical level in the phonological buffer used in working memory
      7. PAGE 467 PICTURE
   5. Neuro data
      1. Neuro data strongly suggests four different lexicons – speaking, writing, visual and spoken word recognition and that they communicate
      2. Model has a system with word meanings that interfaces with other cognitive processes – the semantic system
   6. Speaking
      1. Going from the semantic store to the phonological output store (sounds of words)
      2. Auditory analysis of incoming speech goes into the phonological input store
      3. Anomia – cannot retrieve the name of an object, but show comprehension of the words auditory or reading (EE) – shows there are different input and output systems
      4. Pure word deafness – can speak read and write normally but cannot understand speech
      5. Word meaning deafness – can repeat words but can repeat them – shows that repetition does not depend on lexical access
      6. Repetition – can go though the lexical repetition route (input phonological to output phonological), through semantics, or sublexical phonological buffer
      7. Deep dysphasia – disorder of repetition with semantic repetition errors – can only repeat words that are imaginable (MK)
      8. If only the lexical route is intact, we wouldn’t be able to repeat nonwords (since they don’t have a lexical entry) (Dr. O).
      9. Different combinations of aphasias
         1. Transcortical sensory aphasia – only sublexical route, repeat words/nonwords but no comprehensions
         2. Conduction aphasia – no sublexical route, no nonwords, poor repetition
   7. Reading and writing
      1. MH – impaired spelling but intact lexical reading
      2. WMA – inconsistent oral and written naming responses
         1. Shown peppers – wrote tomato said artichoke, if these two systems were the same, he would have said the same thing to both
      3. PW – write names of words but can’t define or say aloud
4. Model – talk about the model here with pictures
5. Language and STM
   1. STM – limited memory for recent events
      1. Baddeley’s working memory model – has a central executive, visuo-spatial sketch pad and phonological loop
      2. Central executive – semantic integration, comprehension
      3. Phonological loop – phonological processes of language
      4. Span – the number of items that a person can keep in STM / WM
         1. Reading span related to IQ, reading ability, comprehension
   2. ST verbal memory
      1. Phonological loop is a phonological store linked with speech perception and articulatory control process linked with speech production – both of these maintain and control contents
      2. Auditory STM loop – short term story for spoken material
      3. Tasks
         1. Single word repetition task – repeat single words aloud
         2. Two word repetition task – repeat pairs aloud
         3. Pointing span task – person hears words and then has to point in sequence to pictures of those words
         4. Matching span – person has to say whether two lists are the same or not
         5. These tasks sometimes involve different systems (semantics for pictures)
      4. Separate input and output buffers?
         1. JB – poor on memory span tasks so bad input, but normal speech production (normal output system)
         2. Subject with poor sentence and word repetition (output) but good probe recognition (input)
         3. MS – poor STM tasks with verbal output good with STM tasks that required remembering verbal input
         4. LT – very poor at output tasks, good STM span (input)
   3. Phonological loop and vocabulary learning
      1. Strong correlation between learning and verbal STM span in kids
      2. People with impaired ST phonological memory have a difficult time learning a new language
      3. Phonological loop basically helps you repeat the new phoneme combinations so you can make them more permanent representations
   4. WM and parsing
      1. Phonological representations are stored in buffer, while the semantic representations are stored in the central executive
      2. Capacity theory of comprehension – working memory constrains language comp
         1. These individual differences can lead to differences in reading ability
      3. Comprehension is two tasks – integrating components and keeping track of syntactic structures, longer structures require more load and we prefer the structures with the least load
      4. Mixed results on if parsing and phonological buffer are related. Several cases of neuro damage with low spans, but excellent comprehensions
      5. Could just be practice in the system…reading comprehension is highly related to the amount you read.