Top-down processing of language

- necessary due to the noisy and variable nature of the stimulus
  - e.g.: coarticulation

- luckily, we tend to engage in categorical perception of phonemes
  (b-d-g, or pah-bah example)
Evidence of top-down/contextual processing:

1) at the phonemic level: phonemic restoration effect

2) At the word level: words in/out of context

3) “context” refers to ANYTHING the brain can use: McGurk effect
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3) “context” refers to ANYTHING the brain can use: McGurk effect

4) This process has limits (thick accents) but learning can occur
Unusual words are problematic when trying to adapt to new phonemic boundaries
e.g.: Ghost voices

“come back?”

“Did we die?”

do you believe?”
Another example of the flexibility of language:

Musical Mondegreens
Sentence structure: syntax and semantics

Chomsky’s “Transformational Grammar”

-sentences consist of a surface and deep structure
-analyse sentences into functional components: (noun phrases, verb phrases, object phrases, etc) to discern meaning
-in other words, surface structure aids in getting to deep
-one problem: sometimes that isn’t possible
-e.g.: “The shooting of the hunters was terrible”
    “visiting relative can be incredibly annoying”

-transformational grammar theories postulate the rules used to go from deep to surface or the other way around (these days referred to as “logical form” and “phonetic form”)
Case Grammar

-based on Chomsky’s notion of parsing into functional phrases
- phrases are created on a word-by-word basis, with ‘late closure’
- accounts for our perception of ‘garden path’ sentences

e.g.: The cotton shirts are made from comes from Arizona
    Seeing this as an adjective instead of a noun is the problem.

e.g.2: The horse raced past the barn fell.
    Seeing this as the main verb of the sentence, instead of as a past participle, is the problem.
    The man shot outside the convenience store died.

Separate from this ‘local structure’, there is the idea that global structure plays a role.
Separate from ‘local structure’, there is the idea that global structure plays a role e.g.: balloon example
Reading
-on average, only 1/3 of words are fixated
-factors that influence likelihood of skipping a word:
  1) Predictability
  2) Word frequency
  3) Word length

-what about speed reading?
Language deficits

- production (Broca’s area)
- receptive (Wernicke’s area)
- conduction (arcuate fasciculus)
- transcortical sensory
- anomia
- agraphia
- alexia
- dyslexia
Theories of speech perception

1. Speech is “special” (modular)
   - only humans can speak
   - only humans can truly understand language
   - perception is fast, categorical, precise, effortless
   - development seems largely biologically determined
Theories of speech perception

1. Speech is “special” (modular)

2. Speech isn’t special (pdp/nonmodular)
   - speed issue depends on the unit of perception (phone? phoneme?)
   - categorical perception not as strong as we might think
   - it is this debate that led researchers to seek for evidence of language in animals
Animal language

1) do animals naturally use language?

- many species examined, not much success
  
  John Lilly and dolphin vocalizations
  
  Louis Herman and artificial languages
Animal language

1) do animals naturally use language?

2) Can we teach animals to talk?
Animal language

1) do animals naturally use language?

2) Can we teach animals to talk?

Koko:
Animal language

1) do animals naturally use language?

2) Can we teach animals to talk?

Koko:
Po2JGdx9WBI

Gorillas are an endangered species.
Animal language

1) do animals naturally use language?

2) Can we teach animals to talk?
   - was there anything with peer-reviewed publications supporting it?
   Kanzi
Animal language

1) do animals naturally use language?

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   - Kanzi
   - Irene Pepperberg and Alex
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   -Irene Pepperberg and Alex
   -Alan and Beatrix Gardner and Washoe