

# 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

# 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



# 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

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

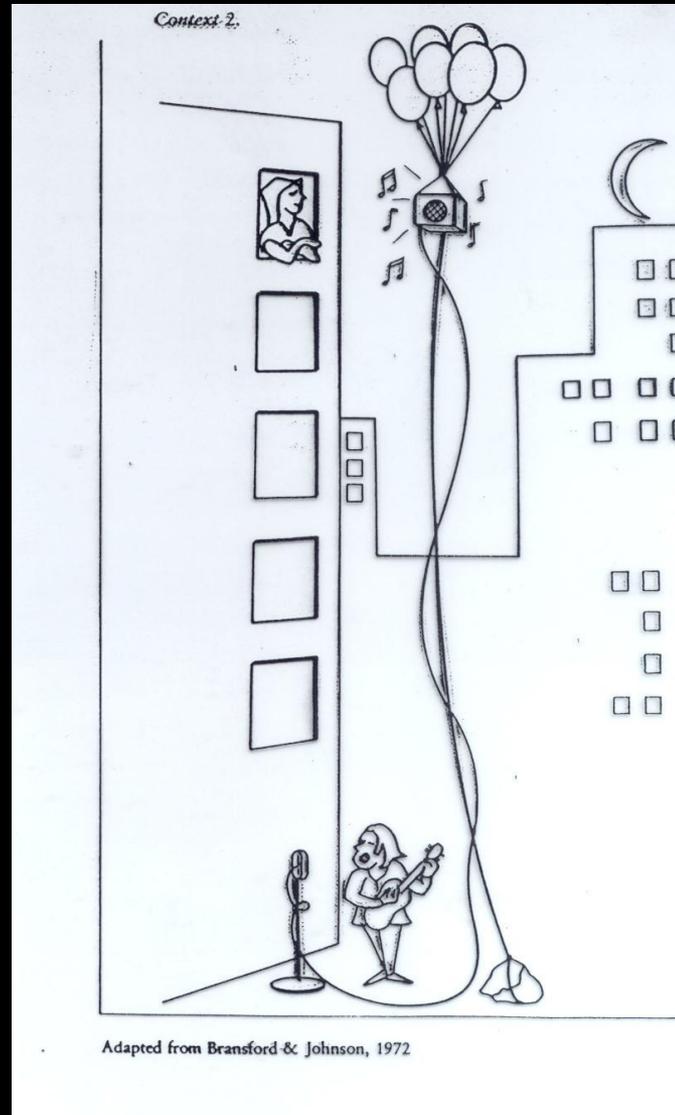
e.g.2: The horse **raced** past the barn fell.

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

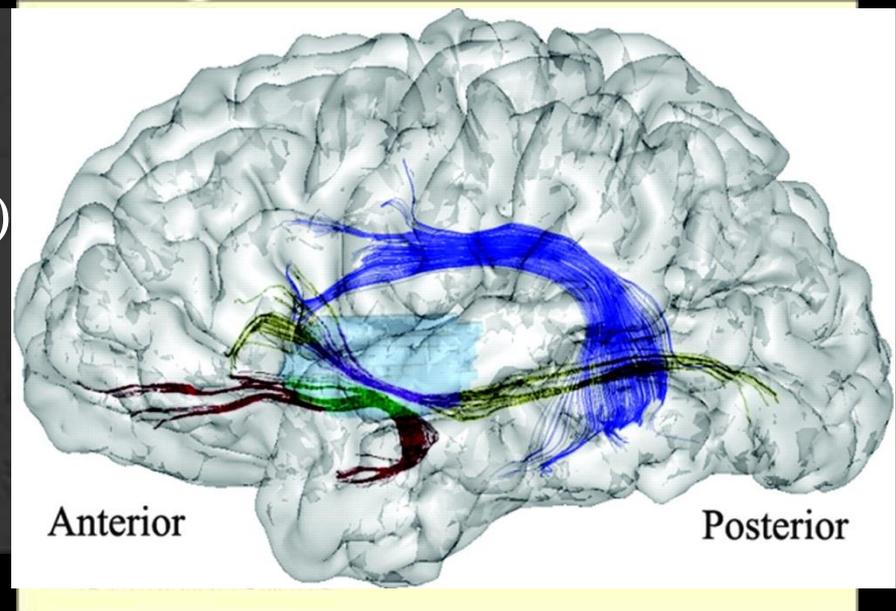
-factors that influence likelihood of skipping a word:

- 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

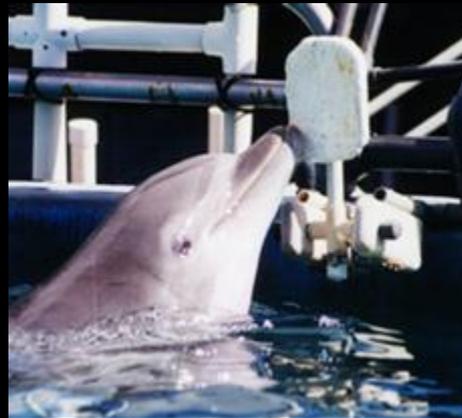
# Animal language

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?

2) Can we teach animals to talk?

-was there anything with peer-reviewed publications supporting it?

-Kanzi

-Irene Pepperberg and Alex



# Animal language

1) do animals naturally use language?

2) Can we teach animals to talk?

- was there anything with peer-reviewed publications supporting it?

- Irene Pepperberg and Alex

- Alan and Beatrix Gardner and Washoe