

## Word Recognition

## What is a Word?

- Things in a dictionary?
- The smallest unit of meaning in language?
- The things we put spaces between when we write?
- The things we could pause between when we talk?

## What is a Word?

Things in a dictionary?

- Which dictionary?
- Who decides?
- Why do they decide?

—>Recent additions to Oxford Dictionary: cray, side boob, neckbeard, vape, bae

- (Psst. New words get added because *they're ALREADY words.*)

## What is a Word?

The smallest unit of meaning in language?

- No, that would be the morpheme
- -ed, -s, ... [←are these words?]

## What is a Word?

The things we put spaces/pauses between when we write or talk?

- party animal, blackboard [←two words?]
  - ('cupboard' used to be a board for storing cups)
- dog, dogs [←one word or two?]
- student, student's [←one word or two?]
- the **student's** desk
- the **student** in the back row's desk [← ???]

## What is a Word?

American Heritage Dictionary:

*A sound or a combination of sounds, or its representation in writing or printing, that symbolizes and communicates a meaning and may consist of a single morpheme or of a combination of morphemes*

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What does "of" mean?

You don't need it: "morpheme combination"  
Is it not a word then?

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This whole paragraph is a "combination of morphemes"  
Is that a word?

## Not all words are the same

- We don't process them all the same. Some *types* of words are treated quite different from others.

## How many F's? Count them:

FINISHED FILES ARE THE  
RESULT OF YEARS OF  
SCIENTIFIC STUDY  
COMBINED WITH THE  
EXPERIENCE OF YEARS.

## How many F's? Count them:

?

## How many F's? Count them:

**There are 6!**

FINISHED FILES ARE THE  
RESULT OF YEARS OF  
SCIENTIFIC STUDY  
COMBINED WITH THE  
EXPERIENCE OF YEARS.



## The Word Wide Web

- How do you spell *shop*?

## The Word Wide Web

- I say *doctor*, you say \_\_\_\_\_
- I say *table*, you say \_\_\_\_\_

## Priming

- form/phonological: shop-stop (similar sounding)
- semantic: doctor-nurse (similar meaning/category)
- associative: marshmallow-campfire

Common task: Lexical decision

## Priming

- Word recognition is affected by the words we hear previously.
- Facilitation (typically semantic/associated based)
- Inhibition (typically form based)

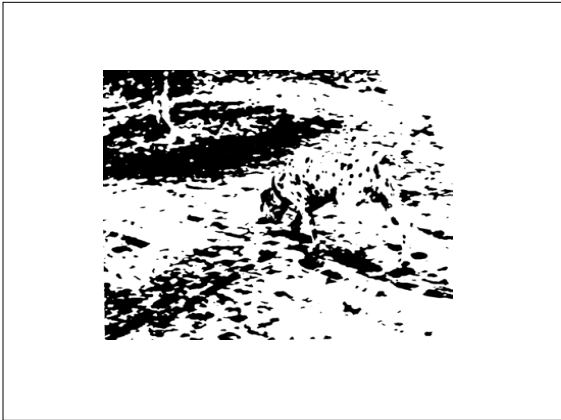
## Other things that affect word recognition

- Lexical frequency — dog faster than bog
- Neighborhood density — cat *slower* than orange

Check out web activity 7.2

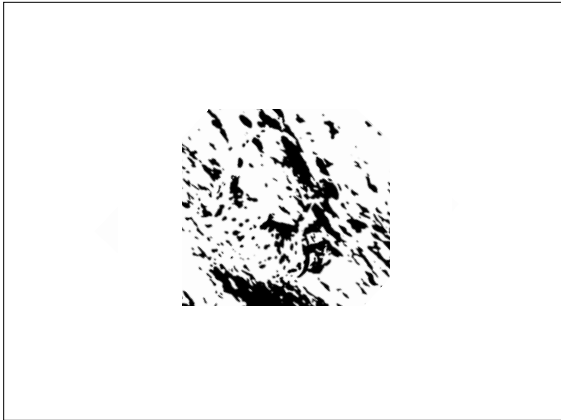
*Ambiguity*






SIGHT FOR SHARP EYES

Who wouldn't want to be invisible, to have the ability to vanish altogether when the mood strikes, to become green grass on a summer hillside and reap gold on an autumn morning, to be eternally a mystery, a shadow, a ghostly wing where once there was a tangible thing? A tangible thing like, say, Woody the Dalmatian. For three seasons of the year Woody hangs around his master's house in East Lansing, Mich., intimidating the mailman, chasing squirrels and generally making his presence widely known. But in the winter, when the sun bums patches in the snow and polka dots of dark earth show through, Woody becomes a new dog, an invisible dog, a dog with magic powers, a dog who can lose himself and everyone else in the dappled winter landscape.



### Word Recognition Models

- Fundamental principles of perception
  - Bottom-up or top-down?
  - Research question: does higher-level info influence the perception of lower-level features?

Bottom  
up

↑

Context  
Phrase  
Word  
Syllable  
Phoneme  
Acoustic features

↓

Top  
down

### Bugs, Bugs, Bugs

The man was not surprised when he found several spiders, roaches, and other bugs in the corner of the room

Priming:

spy  
ant

↑

NO

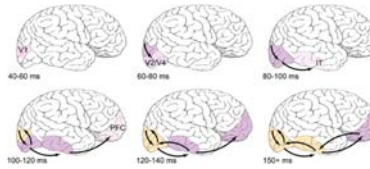
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↑

YES

Most researchers now agree that processing is both bottom up and top down

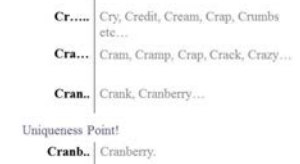
Brain evidence also supports top-down + bottom-up



There are as many feedback as feedforward connections

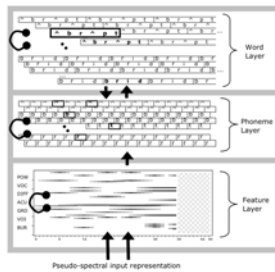
## The Cohort Model

- Word onset driven recognition (onsets are special)
- Word recognition happens at the "uniqueness point"



## The TRACE Model

- An application of "connectionist modeling" to speech recognition
- Within layer competition (lateral inhibition)
- Top-down activation from word to phoneme layers



## Connectionism

- processing based on interaction of simple units
- system 'settles' on solution (equilibrium)
- no explicit rules or algorithms
- connection strengths change
- determine unit activation
- units represent items or pieces of items
- distributed representations
- Parallel Distributed Processing (PDP)



## The Neighborhood Activation Model (NAM)

- Attempts to deal with frequency and neighborhood effects on word recognition
- Goal is not to identify phonemes but recognize words

