Visual Word Recognition (II)

Chapter 6 (pp. 185-201)

C&C 2001 (pp. 54-60)

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Previous Class: Visual Word Recognition (I)

- The Nature of the Visual Stimulus
  - Logographic, syllabic, and alphabetic writing systems.
  - Shallow vs. deep orthography.
- The Analysis of Visual Features
  - Word superiority effect.
- Two Routes to Visual Word Recognition
  - Semantic (whole word)
  - Phonological (phonics)
    - One or two sub-routes within the phonological route?

The Role of Frequency in Visual Word Recognition

- Frequency Effect
  - High-frequency words are recognized more easily than low-frequency words.
    - RT: *cat* < *platypus*.
- Frequency x Regularity Interaction
  - The regularity of the spelling-to-sound mapping matters.
  - Regular low-frequency words are recognized more easily than irregular low-frequency words.
    - RT: yak < yacht.
  - Regularity doesn't affect the recognition of high-frequency words.
    - RT: cat ≈ have.

Neighborhood Effects in Visual Word Recognition

- Neighborhood Effects Interact with Frequency:
  - Low-frequency words from large neighborhoods are recognized faster.
    - *mail: rail, bail, tail, wail, sail, hail.*
  - BUT words with high-frequency neighbors are recognized more slowly.
    - *bog: dog, log.*
  - High-frequency words: No effect of neighborhood size.
- Homographs (words with multiple meanings) provide a neighborhood for each other
  - $bank_{river}$ vs. $bank_{finance}$.

The Role of Context in Visual Word Recognition

- The Role of Sentence Context:
  - *The pirate found the treasure.*
  - *The person liked the treasure.*
  - *The house was destroyed by the treasure.*
- RTs for *treasure*:
- Top-down information from semantic context affects the processing of individual words.

The Logogen Model (I) (Morton, 1964, 1969, 1982)

- Words:
  - Logogens activated depending on orthographic, phonological and contextual input information.
    - Logogens = word demons.
- Word Recognition:
  - A word is recognized when its activation exceeds some threshold.
- Frequency Effect:
  - Logogens have resting activation levels according to frequency.

The Logogen Model (II) (Morton, 1964, 1969, 1982)

- No Neighborhood Effect:
  - Logogens cannot affect the activation of each other.
- Context Effect:
  - Initial activation is bottom-up – top-down information from context comes later.
    - Limited top-down interaction in lexical access.

The Autonomous Search Model (I) (Forster, 1976, 1979)

- Words:
  - Locations in ordered access files (lists).
    - A location points to an entry in the mental lexicon.
- Word Recognition:
  - Serial search (entry-by-entry) through an access file until the word is found.
    - Check for precise match (nonword-check).
- Frequency Effect:
  - Access files are ordered according to frequency.

The Autonomous Search Model (II) (Forster, 1976, 1979)

- No Neighborhood Effect:
  - Only one order (frequency) in an access file
    - orthographic similarity is ignored.
- Context Effect:
  - Only bottom-up information affects recognition – top-down information affects subsequent decision processes.
    - No top-down effects on lexical access.

A Connectionist Model (I) (Seidenberg & McClelland, 1989)

- Words:
  - Patterns of activation across orthographic and phonological (+ hidden) units.
- Word Recognition:
  - Activating the appropriate phonological output given the orthographic input
    - *make* → /mAk/.
- Frequency Effect:
  - The more an input/output pair is activated the more the connections between them are strengthened → better activation.

A Connectionist Model (II) (Seidenberg & McClelland, 1989)

- Neighborhood Effect:
  - Visually similar words are represented by similar orthographic input patterns.
- Context Effect:
  - Top-down information can affect word recognition (but this is not implemented in the model).
    - Top-down interaction (assumed) in lexical access.

Dyslexia and Word Recognition

- Dyslexia: Reading ability below appropriate level compared to age and IQ.
  - Education definition: Reading ability that is two grades below current grade, with no general intellectual impairment.
- Many dyslexics have phonological problems.
  - Phonological ability the best predictor of reading ability up through 4th grade.
    - Task: "Say *split* without the /p/." → *slit*.
- Dyslexic readers have longer fixations and more regressions.

Forms of Dyslexia

- Phonological Dyslexia:
  - Decent reading of high-frequency words
  - Poor reading of low-frequency words
    - Especially words.
- Surface Dyslexia:
  - Decent reading of regular words.
  - Poor reading of irregular words.
- Training in letter-to-sound mappings can help many dyslexics.

Next Class

Sentence Processing

Chapter 7 (pp. 203-213)
C&C 2002 (pp. 43-48)

- Psycholinguistic approaches to sentence processing
- The processing of complex sentences
- Lexical ambiguity