Visual Word Recognition
a ru
e ne ko

Japanese syllabary - Hiragana
Factors affecting speed and accuracy of visual word recognition:
1. Word frequency (also AoA, familiarity)
2. Stimulus quality - degraded stimuli slower
3. Length?
4. Lexical status - word vs. nonword
5. Priming - repetition, semantic, morphological
6. Neighborhood effects (LF)
Logogen Model (revised)
Morton (1979)

Visual word Analysis

Visual Logogens

Cognitive System

Auditory Logogens

Auditory word Analysis

Phonological Output
Tachistoscopic Word Recognition
parable
dinner
piano
xrlbn
Reicher-Wheeler paradigm for testing

Word Superiority Effect
XXXXXXXXXXXXXXXXX
talk
t

-

w
Test of Reicher-Wheeler
word
bdks
d

- - - -

k
Letters in words recognized more accurately than letters in nonsense strings
Interactive Activation and Competition
McClelland & Rumelhart (1981)
Comparison of Logogen and IAC

Similarities
  Word specific units
  Activation based model

Differences
  Greater scope for logogen
  Feedback at all levels in IAC
  Inhibition in IAC for representations inconsistent with input
Semantic Priming
Paired Presentation- read first item of pair
Make lexical decision to second

S1
**
** wrench
blim

S2
**
doctor
blim

**
doctor
wrench

nurse
nurse

540 ms 585
Semantic Priming
Single presentation
(Word naming, lexical decision)

S1
- table
- wrench
- blim
- doctor
- nurse

S2
- book
- plemp
- nasp
- wrench
- nurse

540 ms      565
Semantic Priming

DOCTOR - NURSE

vs.

WRENCH - NURSE

Automatic spreading activation vs. controlled processing?

Evidence for controlled processing:
Relatedness proportion
Larger priming with longer SOA
Backward priming (hop - bell)
   All greater in lexical decision than naming, greater with paired than single

Evidence for automatic spreading activation
Mediated priming in naming - winter - swim
Also, LD with low proportion, single presentation (Shelton & Martin, 1992)
Neely (1977) - Bird prime, expect bird. Body prime, expect building part

<table>
<thead>
<tr>
<th>Prime</th>
<th>Target</th>
<th>Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bird</td>
<td>Robin</td>
<td>yes</td>
</tr>
<tr>
<td>Body</td>
<td>Door</td>
<td>yes</td>
</tr>
<tr>
<td>Bird</td>
<td>Arm</td>
<td>no</td>
</tr>
<tr>
<td>Body</td>
<td>Sparrow</td>
<td>no</td>
</tr>
<tr>
<td>Body</td>
<td>Arm</td>
<td>no</td>
</tr>
<tr>
<td>XXXX</td>
<td>Robin</td>
<td>no</td>
</tr>
<tr>
<td>XXXX</td>
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Varied SOA between prime and target - 250 ms to 2000

Priming for Body - arm at short SOA not long
No inhibition at short SOA for unexpected (e.g., Bird - Arm, relative to baseline)
Inhibition at long SOAs

More recent work - inhibition at short SOAs (BLANK as neutral prime, highly expected target)
Semantic vs. Associative Priming
Shelton & Martin (1992)

Semantic, not associated: bread - cake

Semantic and associated: lion - tiger

Conditions favoring controlled processing (high proportion, paired presentation):

   Priming for both types

Conditions favoring automatic processing (low proportion, single presentation):

   Priming only for the associated pairs

Therefore, only associative priming is automatic

(controversial conclusion)
Lexical Ambiguity

“The stranger noticed the bugs in the apartment.”

Bugs: insects, listening devices

David Swinney (1979)
Cross-Modal Priming

auditory  "The stranger noticed the **bugs** in the apartment."

visual condition (time)

immediate      spy  ant  sew

3 syllables      spy  ant  sew

priming effect = unrelated - related
Swinney: Priming for both meanings initially

access to meanings

<table>
<thead>
<tr>
<th>time delay</th>
<th>priming effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>immediate</td>
<td>spy 50, ant 60</td>
</tr>
<tr>
<td>3-syll</td>
<td>spy 10, ant 40</td>
</tr>
</tbody>
</table>
“The filthy apartment had roaches and other **bugs** in the cupboards”

**auditory**

**visual condition**

immediate

(time)

spy
ant
sew

3 syllables

spy
ant
sew
Swinney: Even with strong context, priming for both meanings initially.
Later studies: Selective access to meaning with strong context and bias toward dominant (higher frequency) meaning

e.g., “date” girl-boy social event (dominant)
   “date” fruit (subordinate)

“The young couple went on their first date”
priming only for social related meaning

“The fruit plate included figs and a date”
priming for words related to both meanings
Finding:
With bias toward subordinate, eye fixations longer on ambiguous word than control word for unbalanced.
Equal to control word for balanced.
Priming from sentence context independent of word association?

The dog chewed on the ____

bone

cloud

Priming for bone due to dog-bone, chew-bone associations?

ERP effect - N400 component much larger for cloud than for bone
Van Petten (1993)

N400 to each word in a sentence - get smaller as more words processed. Hypothesis: reflects ease of integrating words into ongoing construction of meaning.

Congruent unassociated:

When the insurance investigators found out that he’d been drinking they refused to pay the claim.

Anomalous unassociated:

When the insurance supplies explained that he’d been complaining they refused to speak the keys.

Compare N400s to insurance and refused in two conditions. Reduction in N400 to refused much greater in congruent than incongruent, non-significant in incongruent.

Congruent associated:

When the moon is full it is hard to see many stars or the Milky Way.

Congruent unassociated:

When the moon is rusted it is available to buy many stars on the Santa Ana.

Compare N400s to moon and stars in two conditions. Reduction in N400 in both conditions, but larger in congruent associated. Therefore, two effects of context that are additive.