Priming Of Homographs: The Effect Of Context Location

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Abstract

Theories of ambiguity processing offer different predictions as to the effect of the locus of semantic context on the post-meaning selection accessibility of alternative meanings of the homograph. Two experiments were performed to test these predictions. In one of these the homographic items were selected to include relatively balanced homographs with respect to out of context meaning, while in the other homographs were chosen so that the probability of the more probable meaning was quite high. Employing a relatedness decision task the, location of context was manipulated by placing a word that elicited a particular meaning of the homograph either before or after the homograph. Transfer to same or different meaning pairs was tested at long lags following the initial relatedness decision for the homograph. Results are discussed in relation to several models of homograph processing.
Overview

Duffy, Morris, and Rayner (1988) that participants showed more conflict as measured by eye fixation time when a balanced homograph occurred in a sentence prior to its disambiguating context than when the same homograph was preceded by a disambiguating context. Simpson and Adamopoulos (2001) proposed that the need to inhibit alternative meanings of an ambiguous word is a function of the degree of conflict. Specifically, they propose that when the homograph occurred in a context already biased toward one meaning the need for an inhibitory would be minimized. The activation-selection model (ASM) offers predictions (see below) as to the role of the placement of disambiguating context. The present study was designed to test these alternative predictions for the processing and reprocessing of ambiguous words in the relatedness-decision task.
The dominant view in the field of lexical ambiguity processing is that some type of cognitive inhibition between meaning representations is involved in selecting the meaning of an ambiguous word.

Gernsbacher (1990)
Onifer & Swinney (1981)
According to the standard view, when a homograph is presented in the absence of a biasing context, both meanings are activated.
According to the standard, view the non-selected meaning is suppressed or inhibited.
The activation-selection model (ASM) proposes that meaning selection does not require inhibitory processing.
Activation-Selection Model

Words are represented by a weighted set of attributes.

For modeling purposes “attributes” are just abstract features, but presumably they constitute the visual, phonological, and semantic aspects of a word’s representation.

Dominant Attributes
seal (animal)

Secondary Attributes
seal (shut)
Activation-Selection Model

Processing a word “activates” a subset of attributes.

Attributes are activated in proportion to their current weight (baseline weights for dominant-meaning attributes are higher than baseline weights for secondary-meaning attributes).

The number of attributes activated is determined by task constraints, such as the type of response required and the processing time available.
The meaning of a word is assigned based on the majority of its active attributes.

Activation of an attribute decays fairly quickly to a resting level. That is, “activation” is a short-term property of an attribute.
Activation Selection Model


Each time a meaning is selected, the weights of active attributes associated with that meaning are increased.

Incrementing the weight of an attribute has the effect of increasing the likelihood the attribute will be activated on subsequent encounters with the word.

Thus, the weights are a long-term (but not permanent) property of an attribute.
Ambiguous words are represented by attributes associated with both dominant and secondary meanings.

In a neutral context, attributes are activated in proportion to their baseline weights.

The weights of attributes that contribute to meaning selection in the current context are increased.

Reweighted Dominant Attributes  Secondary Attributes Not Reweighted
In an experiment designed to test the contrasting predictions, participants were asked to judge whether a word in UPPERCASE was related to the previous word in lowercase as shown below.
* * * * *

500 ms

table

200 ms

CHAIR

3000 ms

256 trials
Homographs were presented twice. Homographs on initial presentation could be presented before a related word (HG → RW) or after a related word (RW → HG).

The meaning context could either be maintained or changed across the two presentations.

- glue → SEAL
- seal → SHUT
- or
- seal → GLUE
- prior to
- or
- seal → WALRUS
Predictions of the Standard View
When the homograph precedes the disambiguating context, both meanings are activated, and the required suppression of the unselected meaning should carry over to subsequent presentations of that homograph.
When the related word precedes the homograph, meaning selection is straightforward, and the unprimed meaning receives little activation (and therefore doesn’t need to be inhibited).
Predicted performance when meaning context is changed on the second occurrence of a homograph: Standard View.

First Occurrence Presentation Order

Performance on Second Occurrence

HG→RW

RW→HG
The predictions of ASM:

1) In the RW$\rightarrow$HG order, the related word serves as a prime which pre-activates attributes related to a particular meaning of the homograph.

2) This activation produces weight changes which carry over to the second presentation of the homograph.

3) Thus, a benefit is observed when the related word represents the originally primed meaning of the homograph.

4) And costs are observed when the related word represents the other meaning of the homograph.
Conclusion

The activation-selection model can account for the long-term effects of meaning selection without assuming inhibition between meaning representations.