Disambiguating the ambiguity advantage effect in word recognition: An advantage for polysemous but not homonymous words

Ekaterini Klepousniotou[a,b,c,*], Shari R. Baum[a,c]

[a]*Centre for Research on Language, Mind and Brain, McGill University, 1266 Pine Ave. West, Montreal, Qc, Canada H3G 1A8*
[b]*McConnell Brain Imaging Centre, MNI, McGill University, Canada*
[c]*School of Communication Sciences and Disorders, McGill University, Canada*

Abstract

Previous lexical decision studies reported a processing advantage for words with multiple meanings (i.e., the "ambiguity advantage" effect). The present study further specifies the source of this advantage by showing that it is based on the extent of meaning relatedness of ambiguous words. Four types of ambiguous words, balanced homonymous (e.g., "panel"), unbalanced homonymous (e.g., "port"), metaphorically polysemous (e.g., "lip"), and metonymically polysemous (e.g., "rabbit"), were used in auditory and visual simple lexical decision experiments. It was found that ambiguous words with multiple related senses (i.e., polysemous words) are processed faster than frequency-matched unambiguous control words, whereas ambiguous words with multiple unrelated meanings (i.e., homonymous words) do not show such an advantage. In addition, a distinction within polysemy (into metaphor and metonymy) is demonstrated experimentally. These results call for a re-evaluation of models of word recognition, so that the advantage found for polysemous, but not homonymous, words can be accommodated.
© 2006 Elsevier Ltd. All rights reserved.

Keywords: Lexical ambiguity; Homonymy; Polysemy; Metaphor; Metonymy; Word recognition

---

*Corresponding author. Centre for Research on Language, Mind and Brain, McGill University, 1266 Pine Ave. West, Montreal, Qc, Canada H3G 1A8. Tel.: +1 514 398 5106; fax: +1 514 398 8123.
E-mail address: ekaterini.klepousniotou@mail.mcgill.ca (E. Klepousniotou).

1. The ambiguity advantage effect

Lexical ambiguity, where a single string of letters or phonemes can lead to more than one interpretation, is very common in natural language. Usually, we select one of these different interpretations based on the context in which the ambiguous word occurs. Ambiguous words can also be recognized in isolation. Upon presentation of an ambiguous word in isolation, we are normally able to identify an appropriate meaning and we are often unaware of alternative meanings.

Most research that has compared the processing of ambiguous and unambiguous words in isolation has proposed that ambiguous words have a separate entry for each of their meanings (e.g., Forster & Bednall, 1976; Jastrzembski, 1981; Millis & Button, 1989; Piercey & Joordens, 2000; Rubenstein, Garfield, & Millikan, 1970). These studies reported faster reaction times for ambiguous words than for unambiguous words in visual lexical decision tasks, known as the ''ambiguity advantage'' effect. This result, which seems to be counter-intuitive, as one might expect ambiguous words that have competing meanings to take longer to process, was explained by hypothesizing that ambiguous words have more entries in the internal lexicon than unambiguous words do (Jastrzembski, 1981; Rubenstein et al., 1970). Furthermore, it was hypothesized that these multiple entries do not actually inhibit each other in the process of word recognition but rather work together to inhibit any other competing lexical items. Thus, the fact that ambiguous words have multiple entries would make it possible that one of their entries would be selected sooner than the entry of an unambiguous word and, therefore, they would be recognized faster than unambiguous words.

Regarding the representation of ambiguous words, based primarily on homonymy, studies on lexical ambiguity processing have proposed that ambiguous words have a single phonological/orthographic representation linked to multiple semantic and syntactic representations (e.g., Seidenberg, Tanenhaus, Leiman, & Bienkowski, 1982). Further support for the hypothesis that ambiguous/homonymous words have multiple semantic/syntactic entries in the mental lexicon has come from priming studies that showed that the facilitation effects observed for repeated words do not occur with ambiguous words when different meanings are primed on separate trials (e.g., ''runner-race'' followed later by ''ethnic-race'') (Masson & Freedman, 1990). This result, which is in contrast to the strong repetition priming effects that are usually seen in lexical decision tasks, suggests that separate entries of the ambiguous word are processed on the two trials (Kellas, Ferraro, & Simpson, 1988).

Parallel distributed processing (PDP) models, which have become the dominant descriptions of the word recognition process (e.g., Hinton & Shallice, 1991; Joordens & Besner, 1994; Kawamoto, Farrar, & Kello, 1994), have tried to explain the so-called ambiguity advantage effect by assuming that there is both feedforward and feedback activation between orthography/phonology and semantics. Hino and Lupker (1996) theorized that because ambiguous words (referring to homonymous words) have multiple semantic representations, corresponding to their multiple meanings, they create more semantic activation. This semantic activation, in turn, could provide stronger feedback to the orthographic units which would lead to higher activation levels for ambiguous than unambiguous words.

Joordens and his colleagues (Besner & Joordens, 1995; Joordens & Besner, 1994; Piercey & Joordens, 2000) actually suggested that the ambiguity advantage effect in word