Retrieval of irregular Polysemes: Evidence from Priming, Eye-Fixations, and Evoked Potentials

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We provide behavioral and electrophysiological evidence that readers do not initially commit to a particular interpretation when retrieving irregular biased polysemes like OIL (car; cooking), whose senses differ in frequency and cannot be related via productive rules. We compared biased polysemes with biased homonyms (BANK: financial institution; side of river) whose meanings are semantically unrelated. Eye-tracking investigations of homonyms (Duffy, Morris, & Rayner, 1988) show that lexical access is affected by the relative frequency of meanings. While only a homonym’s dominant meaning is accessed in the absence of context, prior contexts supporting subordinate meanings lead to meaning competition. Evidence regarding irregular polysemes is mixed. Some studies support separate entries (Klein & Murphy, 2001) while others support a single entry (Beretta, Fiorentino, & Poeppel, 2005). Crucially, most studies failed to carefully control the relative frequency and degree of semantic relatedness of irregular polysemes senses, issues addressed in this study.

In Experiment 1, experimental trials consisted of a homonymous or polysemous prime (BANK, OIL) and a target instantiating the dominant (ROB, TRADE) or subordinate (SWIM, KITCHEN) reading. Targets following unrelated words served as baselines. Participants made lexical decision to both primes and targets. Priming was only observed for dominant targets of homonyms. The 20 ms priming effect for both polysem targets was not significant. This suggests that, in contrast to homonyms, readers do not commit to either sense of polysemous words.

We next examined whether non-commitment to one polyseme sense persists in sentence reading by eye-tracking clauses containing homonyms or irregular polysemes preceding contexts biased toward their subordinate readings. Relative to when they followed control words, subordinate contexts were read more slowly only when they followed homonyms. Reading times following polysemes and controls did not differ, again suggesting lack of commitment to either polyseme sense. Importantly, not committing to one sense led to processing costs in the 2-word spillover region between polysemes and their sense disambiguating contexts.

Experiment 3 examined N400s associated with semantic integration to investigate the electrophysiological correlates of sense non-commitment in sentences structurally identical to those we eye-tracked. Compared to matched controls, we observed larger N400s for homonyms but smaller N400s for polysemes. No differences were observed in spillover regions. Additionally, larger N400s were observed on disambiguating words when they followed polysemes or homonyms instead of control words. That differences spilled over to the next word for homonyms reflects the shift from dominant to subordinate readings. Smaller N400s and lack of spillover for polysemes indicate that prior to encountering disambiguating contexts, readers only access and integrate shared semantic features. When context requires full interpretation, semantic processing is increased compared to unambiguous controls but is less costly than for homonyms.

Taken together, our results show that irregular polysemes are processed differently than homonyms. This suggests that they are represented differently. Our results are most consistent with a single-entry account where shared semantic features allow for non-commitment to either sense of biased irregular polysemes in the absence of disambiguating context.

References