

Bilingual processing of ambiguous nouns with cognate and non-cognate meanings: Evidence from synchronous recording of eye movements and EEG

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Ambiguous words offer us the chance to study how two different meanings which share the same form (e.g. “bank”) are processed. Monolingual studies have established several well-known phenomena, among which the subordinate bias effect in eye movements. Bilingual studies of homonym processing, which have been much more scarce and recent, show some deviations from the monolingual patterns both in reaction times and in ERPs. The current study aims to investigate whether the subordinate bias effect will still hold for proficient Bulgarian-English bilinguals when half the stimuli are partial cognates, i.e. only one of their meanings overlaps in form in English and Bulgarian. A unique integration of technologies was used – combined recording of eye movements and EEG.

Ambiguous nouns were embedded in the middle of English sentences, with the preceding context supporting either their dominant or subordinate meaning. Participants read the sentences for comprehension and their eye movements and EEG were recorded synchronously. The subordinate bias effect states that when the less frequent (subordinate) meaning is supported, the first pass and the regression-path times for the ambiguous noun should be longer than when the more frequent (dominant) meaning is instantiated. The synchronous recording of EEG allows us to establish neuro-physiological correlates of this effect in the ERPs triggered by the beginning of the first pass, an integration of eye tracking and EEG technologies known also as Fixation Related Potentials.

Apart from replicating monolingual eye movement studies of ambiguous nouns and finding more sensitive EEG correlates for the subtle cognitive processes involved, this study also focuses on understanding better some aspects of word representation and access in the bilingual lexicon. Thus, stimuli were selected so that half of the ambiguous nouns have a meaning that is cognate, while the other one is not. For example *bank* (money) – *банка* [banka] is a cognate in Bulgarian, while *bank* (river) – *бряг* [briag] is not. If the form of the English word activates a meaning of a cognate both in L2 and L1, this should lead to cumulative higher activation, thus inducing increased subordinate bias effect when the cognate meaning is the more frequent one and reduced subordinate bias effect when the cognate meaning is the less frequent of the two. On the other hand, if the cognate meanings affect bilingual reading only when the meaning is dominant, this would show that the links between L1 and L2 are weaker for the subordinate meanings.

In discussing the experimental results, various theories and models will be presented and compared, as well as the advantages and benefits will be pointed out of using a combination of technologies for the purpose of investigating aspects of bilingual lexical access during sentence processing.