

## Abstract

The current study used the manipulation of visual field and the number of senses of the first character in Chinese disyllabic compounds to investigate the representation of senses and the hemispheric processing of semantic polysemy. The ERP results in experiment 1 revealed crossover patterns in the LH and RH, which resembled the MEG data in Pylkkänen et al.'s study (2006). The sense facilitation in the LH was in favor of the assumption of single entry representation for senses. However, the inhibition in the RH yielded two possible interpretations: (1) the nature of hemispheric processing in dealing with semantic ambiguity; (2) the semantic activation from the separate-entry representation for senses. To clarify these possibilities, the depth of the task was changed. Experiment 2 was designed to push subjects to a deeper level of lexical processing through the word class judgment task. The results revealed the sense facilitation effect in the RH and suggested that in a deeper level, the RH had more possibility to observe the sense facilitation due to different efficiency of cerebral hemispheres in dealing with ambiguity. By chance, planned comparisons of the sense effect in different word classes suggested different distributions of the sense effects for nouns and verbs. For nouns, the sense effects were located in central-to-parietal areas while for verbs, the sense effects mainly were from the frontal area.

In sum, the current study was in support of the account of single entry representation for senses, which was consistent with previous findings proposed by Beretta et al. (2005), Pylkkänen et al. (2006), and Rodd et al. (2002). Second, the research demonstrated that cerebral hemispheres played a role in semantic activation in a complementary way in which the LH was engaged in fine and focused semantic coding while the RH was more sophisticated in coarse coding and maintaining alternate meanings (e. g. Beeman & Chiarello, 1998; Burgess and Simpson, 1988). When the depth of tasks was changed, the RH advantage for the processing of semantically related senses was observed. Third, different distributions of the sense effects for nouns and verbs implied the distinct representations for different parts of speech in the brain.

Key words: Chinese compounds, polysemy, representation of senses, hemispheric processing, N400, ERP