

THE EFFECT OF IMAGE SPATIAL LOCATION INFORMATION ON IMPLICIT AND METAPHORICAL LOCATION WORDS: AN ERP STUDY

Liu Xu (Beijing International Studies University)

liuxu91218@foxmail.com

Human beings rely on the perceptual system and the language comprehension system to acquire world knowledge. Symbolic cognition theory suggests that the information acquired by perceiving an object does not affect the processing of the words that refer to that object, but embodied cognition theory suggests that the information representation of words is derived from perceptual experience. Recent neuroimaging evidence has revealed that there are at least two forms of knowledge representation in the human brain, sensory-derived, language- and cognition-derived knowledge, supported by different brain systems. Whether language comprehension requires the involvement of the perceptual system is controversial. Using a picture-word priming paradigm and an implicit experimental task, this study aims to investigate the mechanism of automatic activation of image information for relevant semantic information in words and to further explore spatial representations in the word.

This study consisted of two experiments that investigated the effect of image location information on the semantic location information implied by implicit (e.g., “天空/sky”, “大地/ground”) and metaphorical location words (e.g., “奖金/bonus”, “坟墓/grave”). The experiment used a 2 (vertical spatial location: up vs. down) × 2 (congruency: congruent vs. incongruent) two-factor repeated measures within-subjects design. The behavioral results found that for implicit location words, the processing advantage of the “up” location information was greater than that of the “down”. However, the processing advantage of the metaphorical “down” location information was greater than that of the “up”. The results of the ERP experiments revealed that image location information does automatically and unconsciously affect the semantic location information of both implicit and metaphorical location words, as well as their early and late processing, but they are different in (1) activation time, with image location information activating the metaphorical location words earlier (~200ms) than the implicit ones (~450ms); (2) activation degree, with the activation of image location information on implicit location words being observed only in the “up” location information, while is significant on both “up” and “down” location information of the metaphorical ones; (3) activation effect, both facilitating (“down” location information as priming cue in metaphorical location words) and blocking (“up” location information as priming cue in both implicit and metaphorical location words) were observed.

In summary, this study found that although image location information can induce the activation of semantic location information in both implicit and metaphorical location words, the two enjoy separate activation mechanisms, which are reflected in the differences in activation time, activation degree, and activation effect, as well as the differences presented by the opposite location information (up vs. down) in vertical space.

Key words: word comprehension; spatial representation; implicit and metaphorical location words; ERP