

Morphological Priming Effect on Korean Inflectional Ending Production and Mental Representations: fMRI Study

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Abstract

Korean verbs have a different morphological structure from English verbs. For example, Both Korean and English verb have a stem and an ending. However the former, the ending part can be divided into a pre-final and a final ending. With these properties of Korean verbs, we could examine the morphological priming effect by overlapping the stem part or the ending part of the verb. The result showed that right hemisphere is more activated than left hemisphere. We concluded that although people use left hemisphere more when performing language related tasks, but this study revealed right hemisphere involved deeper when subjects were conducting the Korean morphological production task, especially generating an imperative form and an interrogative form.

Objective

The current study investigated the morphological priming effect on Korean inflectional ending production by using an event-related fMRI with Korean language specialty

Methods

14 healthy right-handed males without any neurological problem participated to the fMRI scanning in 1.5 T Simens MRI machine. There were three conditions in the verb production task. One was the ending overlapping condition in which the ending part of the prime verb was shared with that of the target verb. Another was the stem overlapping condition in which the first syllable was shared with that of target verb. The other was the control condition which had no overlapping between the prime and target words. Subjects

were instructed to speak out the verb by cueing. If the cue is a circle, subjects were asked to speak out the verb in an imperative form, whereas if the cue is a square, they should speak it out in an interrogative form. Subjects were getting skilled before the scanning through the practice. Statistical analysis was carried out on the data by using SPM2.

Result & Discussion

Inflectional ending production paradigm elicited various activations. The activation was not limited to language area. We could find that in producing the imperative form, left hemisphere(LH) Superior Frontal Gyrus [BA 8], Parahippocampal Gyrus [BA 36], including Broca's area, were activated. When subjects produced the interrogative form, right hemisphere(RH) Medial Frontal Gyrus [BA 6], RH Superior Frontal Gyrus [BA 8], RH Superior Temporal Gyrus [BA 38] and LH Lingual Gyrus [BA 18] were activated as well.

Conclusions

A number of behavioral, clinical and neurological studies claim that LH is dominant role for semantic processing with grammatical encoding in the language production. Although the production of inflectional ending in Korean words is considered as a grammatical encoding, our results showed that the RH involved into the processing rather than the LH did. Therefore, we suggest that productions of imperative form and interrogative forms evoke the RH activations.

References & Acknowledgement

1) Hwang, Y., G. Yu, H. Kang, & K. Nam. 2004. "Mental representation of Korean inflectional and derivational affixes." The Proceedings of conference of Korean Society for Experimental Psychology, 97-102.

2) Hwang, Y., J. Shin, S. Lim, K. Ryu, H. Kang, K. Yi, K. Nam. 2005. "Cerebral Activation related with morphological priming effect in production of Korean ending." The Proceedings of conference of Korean Society for Cognitive Science, 273-277.

This research was conducted by Korea and Japan joint research at Korea Science and Engineering Foundation(F01-2004-00-10276-0)