

Pronouncing a gesture or producing a word: an N400 EEG study

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Abstract:

What happens if you see a person gesturing a “stop” while pronouncing the word “go”? Symbolic gestures (emblems) are communicative signals so conventionalized that they can be effortlessly understood in the absence of speech, thus representing an autonomous communication form. Previous studies proposed that gesture and speech belong to a unique communication system linking to the same mental processes despite differing in expression modality. The present study aimed at determining the spatiotemporal dynamics of cortical activation during the integration between symbolic gestures and words using high-density EEG. A N400 modulation was detected, showing larger negativity when gesture and speech were incongruent. The source localization in the time

window corresponding to N400 evidenced the activation of different portions of temporal cortex according to the gesture and speech congruence. After the N400 effect, both conditions presented an EEG activity whose source localization returned a left inferior frontal activation. These data suggest that the temporal cortex is involved in the genesis of the N400 potential, whereas frontal cortex is involved in the following integration. Our findings support the hypothesis that gestures and words take part to a unique communication system, shedding light on the development and evolution of human language.