

## NEURAL SYSTEMS INVOLVED IN THE COMPREHENSION OF AMERICAN SIGN LANGUAGE AND MEANINGFUL NONLINGUISTIC GESTURE: AN FMRI STUDY

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Signed languages, such as American Sign Language (ASL), present unique opportunities to further our understanding of the factors underlying the neural bases of language. An important question concerns the relationship between the neurocognitive systems used in the comprehension of sign language compared to meaningful non-linguistic gestures. In separate event-related fMRI runs, deaf native signers and hearing non-signers viewed movies of a native signer producing ASL classifier constructions (including what has been termed “spatial syntax”) and movies in which non-signers described the same events, using only gesture without accompanying speech. Deaf native signers showed highly similar patterns of left-lateralized activation for ASL and nonlinguistic gesture, comprising the left hemisphere (LH) inferior frontal gyrus (IFG), anterior superior temporal sulcus (STS), and angular gyrus (AG). Additionally ASL, but not gesture, activated the LH posterior STS in deaf signers. Hearing non-signers showed bilateral activation of the same LH regions as signers and their RH homologues, and no differences between activation patterns for ASL and gesture. The LH posterior STS region activated exclusively by ASL in signers was activated by both ASL and gesture in non-signers. These results suggest neuroplastic changes in deaf native signers, whereby the perception of meaningful body movements, both linguistic and non-linguistic, become reliant on a more left-lateralized network of regions compared to the strongly bilateral activations observed in hearing non-signers. As well, a region of the left posterior STS appears to become specialized for language processing only in ASL signers.