The organization of gesture and language, and their relationships to hand dominance. Evidence from functional magnetic resonance imaging (fMRI)

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In the vast majority of right-handers gesture and language are controlled by their left hemispheres, which also control their dominant right hands. In left-handers, conversely, the laterality of gesture, language and the control of their dominant hands often dissociate. Similarly to neuropsychology, where this phenomenon permits researchers to disentangle the association of apraxia with aphasia from that with handedness, the use of event-related fMRI in left-handers (individuals with right hemisphere motor dominance) allows to distinguish activity associated with planning familiar communicative gestures from sensorimotor mechanisms involved in gesture production, and to test for the association of the former with language functions. Having established that lateralization of gesture in key regions of inferior parietal and temporal cortices is more closely associated with the laterality of language, rather than motor functions, we recently went on to directly compare right- and left-handers during performance of several praxis and language tasks. These comparisons often demonstrate no differences in areas typically associated with gesture or language, but reveal that brain activity in regions located outside of the basic gesture, and language networks differentiates the two groups of participants. These outcomes will be discussed in the context of analogical comparisons in neuropsychological patients.

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