Revisiting a study of callosal apraxia: the right hemisphere can imitate the orientation but not the position of the hand.

Callosal disconnection can reveal asymmetrical contributions of the two brain hemispheres to praxis. In this paper, we revisit a study of a patient with callosal disconnection (Goldenberg et al., 2001, Neuropsychologia, 39:1432-1443), who perfectly imitated meaningless gestures when imitation was controlled only by the left hemisphere, but was severely impaired when the right hemisphere was in charge of motor control. We decomposed the gestures into a set of geometric variables that were to be reproduced, such as the orientation of the hand and the position of contact between the hand and the face. Whereas orientation of the hand in extrinsic coordinates was replicated correctly by both hemispheres, only the left hemisphere reproduced correctly the position of contact between the hand and the face. This goal-dissociation as well as several partial perseveration errors speak against the hypothesis of a direct route from perception to motor replication of gestures, as interruption of a direct route would probably impair all the features of the gesture. We speculate that incorrect coordination between the reproductions of multiple goals may be the core deficit underlying callosal apraxia.