The mirror neuron system and aphasia therapy

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Aphasia is a long-term sequela of stroke that has a profound negative impact on quality of life. Current treatment methods for aphasia are primarily educational and do not address the need for repair of the damaged brain and reorganization of the neural circuits for language.

We have peformed several research studies to investigate the role of action observation in speech perception and language comprehension, and have shown the important role of the human homologue of the macaque “mirror neuron system” in language. We have subsequently started investigating ways to take advantage of these neural circuits to improve language production and comprehension in aphasia. We are currently running a long-term study using a computer-based therapy program, IMITATE, that is based on this preliminary research in action obervation and imitation.

In this lecture, we will discuss aphasia treatment generally, outline a framework for such therapy that depends on knowledge of human neurophysiology, describe the role of the “mirror neuron system” in speech perception, and then demonstrate how observation of speech can be used to ameliorate aphasia by affecting specific neurophysiological circuits.