

Excerpt from Gregory Hickok, 2009, Journal of Cognitive Neuroscience: “Eight Problems for the Mirror Neuron Theory of Action Understanding in Monkeys and Humans“

“... we understand action because the motor representation of that action is activated in our brain.”

-Rizzolatti, Fogassi, and Gallese (2001) p. 661

“The [motor] theory is so simple and so easy to present that every one is glad to believe it. The only question that any one cares to raise is how much of it will the known facts permit one to accept.”

-Walter B. Pillsbury (1911) p. 84

5. Action understanding in humans dissociates from neurophysiological indices of the human “mirror system”

- we can understand action (and speech), that we have never produced ourself
- „it would be surprising, maladaptive even, if all observed actions resulted in the activation of the exact same motor program in the observer.“
- with speech: we normally do not echo what we hear, but reply on it. Therefore it would not make sense to activate motor-programs when hearing speech.

8. Generalization of the mirror system to speech recognition fails on empirical grounds

Prediction of MT: „Damage to the motor speech areas should produced deficits in speech recognition“

- „In fact, damage to motor speech areas [...] do not typically lead to speech recognition deficits“
- Most Broca's aphasics can understand anything
 - They „can be impaired on syllable discrimination tasks“
 - The conclusion: [...] syllable discrimination [...] tap some abilities [...] that are not necessary for normal, ecologically valid speech recognition [...] “
 - syllable discrimination tasks „therefore are not valid measures for assessing speech recognition“
- mixed transcortical aphasics can repeat speech without understanding anything
 - reverse dissociation to Broca's aphasia
 - „This pattern of damage leaves sensory-motor functions of speech intact (explaining repetition ability), while apparently disrupting systems involved in mapping speech onto conceptual-semantic representations“
 - „preservation of motor speech functions is neither necessary nor sufficient for speech understanding.“
- „This is not to say that sensory-motor circuits cannot contribute to speech recognition. [...] But this influence is modulatory, not primary.“