



Fakultät für Ingenieurwissenschaften und Informatik

Informatik-Fachvortrag

Donnerstag, den 27. August 2009, 14 Uhr c.t.
Universität Ulm, Oberer Eselsberg
Gebäude O28, Raum 1002

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spricht zum Thema

Somatotopic Motor Systems are Critical for Category-Specific Semantic Processes

Imaging work has shown that the cortical motor system reveals information about the meaning of action words and sentences under processing, even of abstract idioms. When hearing or reading words such as “*pick*” or “*kick*”, which usually refer, respectively, to hand or foot actions, the precentral areas controlling arm or leg actions light up specifically in fMRI. As somatotopic activation of the motor system reflects the meaning of symbols, this effect has been called *semantic somatotopy*. Somatotopic semantic motor system activations are rapid, emerging within 200 ms after critical language units become identifiable (MEG, EEG), thus suggesting rapid semantic access. One may however, still ask, whether this activation of the cortical motor system is (a) just *associated with* the access to, comprehension of, and memory for action words, or in fact (b) *critical to* these processes? We here review and present data from patients and healthy subjects that clarify this now much debated issue.

TMS studies support a critical role of the hand/leg motor cortex for the processing of hand-/leg-related words. In addition, we tested healthy right-handed monolingual native speakers of English in a memory task where action words related to the arm (*pick*) and leg (*kick*) had to be read and reproduced after a delay. During the delay, subjects had to rest or perform a complex motor task with either their hands or their feet. We found strong body-part specific interference effects: Foot motor activity led to error enhancement in leg-word memory as compared with arm words. Conversely, the hand-task yielded stronger interference with arm-word memory relative to leg words. These results are discussed in the context of differential involvement of lexical and semantic categories in patients with stroke, Motor Neuron Disease, Parkinson’s Disease and, critically, Semantic Dementia. We conclude that body-part specific motor area activation in cortex is crucial for processing and memorizing word categories with concordant body-part specific action meaning.

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Es laden ein die Dozenten der Fakultät für Ingenieurwissenschaften und Informatik.

Ulm, den 10.08.2009

gez. Prof. Dr. G. Palm