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Negation in the brain

Negation, consisting in reversing the truth value of affirmative sentences, is a unique human capacity: other animals can refute but not negate. What determines our ability to understand what is being negated? Using functional magnetic resonance imaging we measured brain activity in 18 healthy subjects during passive listening of sentences characterized by a factorial combination of polarity (affirmative vs. negative) and concreteness (action-related vs. abstract). Negation deactivated pallido-thalamo-cortical areas and, specifically for action-related sentences, reduced activity in the left mirror-neuron system. Thus, understanding negation may depend on the relative modulation of semantic representations.