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[\[Cognitive Sciences\] Cognitive Neuroscientists Find the Cross-cultural Universality of Brain Networks for rReading](#)
[Cognitive Sciences] Cognitive Neuroscientists Find the Cross-cultural Universality of Brain Networks for rReading
([Chinese Version](#))

Academia Sinica Newsletter (2012/12/28) The research team of cognitive neuroscientists jointly led by Academician Dr. Ovid J. L. TZENG in Academia Sinica and Dr. Stanislas DEHAENE (correspondence author) in INSERM, France has found cross-cultural universality of brain networks for recognizing word shapes and handwriting gestures during reading. The findings shed light on the neurobiological circuitry for reading, confirming the “one brain for all written language” view proposed by Academician TZENG and suggest a neuronal recycling mechanism in the human brain. The research was published in the Proceedings of National Academy of Sciences of the United States of America (PNAS) on December 11, 2012.

The mature cerebral reading networks were identified to comprise both a visual shape analysis system (i.e., occipitotemporal visual word form area) and a motor gesture decoding system (i.e., Exner’s area). However, reading of logographic writing system such as Chinese has been proposed to rely on brain areas outside the classical left-hemisphere cerebral networks for alphabetic reading. Such cultural variations may reflect a neuronal recycling mechanism that novel cultural acquisitions (e.g., writing and arithmetic) encroach on preexisting and innate neural circuits. In this cross-cultural neuroimaging study, researchers used functional magnetic resonance imaging (fMRI) to measure the brain activation of both Chinese and French readers while they performed a semantic task with words written in cursive font. The researchers found that the large-scale neural network for reading is in fact invariant across cultures and modulated by culture-specific processing demands of writing system. The study suggests that cultural variation in the cerebral reading network lies primarily in the different weighting of the universal visual and gestural neural pathways, thus resulting in modulations of the spatial extent and amplitude of brain activity within culturally universal brain circuits.

Related Website:

<http://www.pnas.org/content/109/50/20762.full.pdf+html?sid=e9b06698-8e83-4117-8f64-33a24db31445>

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