Multiculturalism, Migration, Mathematics Education and Language

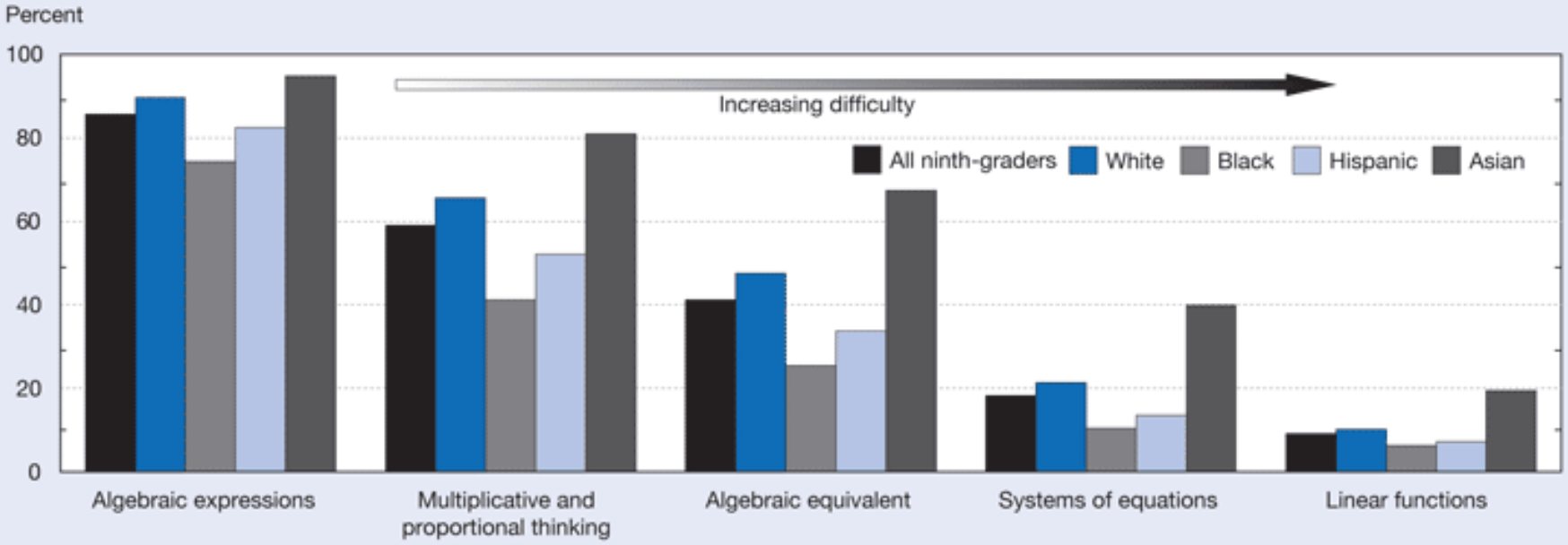
M³EaL Project International Workshop

Lucca, 19 September 2014

Mathematics, Language and Brain

Roberto Barale, Pro-Rector for the Research
University of Pisa

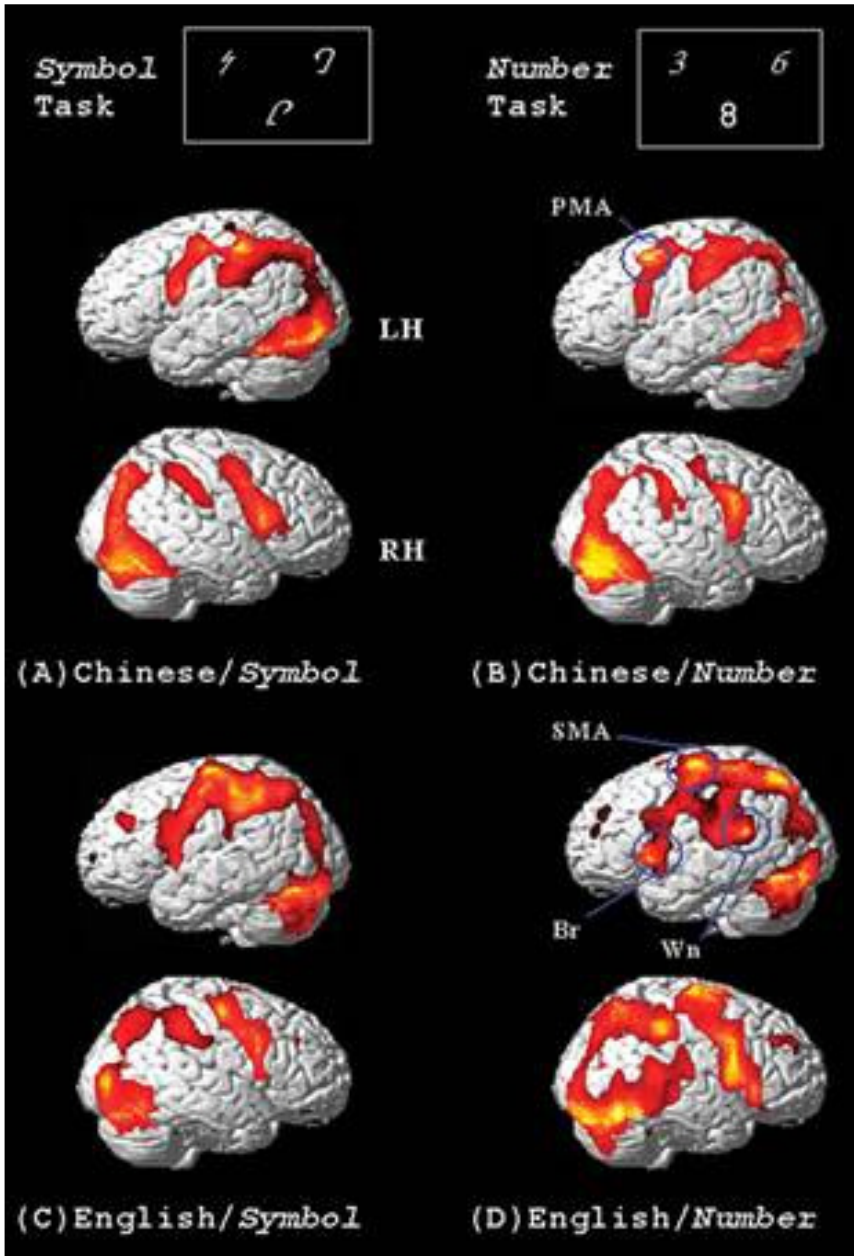
Figure 1-3
Ninth-graders proficient in various algebra skill areas, by race/ethnicity: 2009



NOTES: Skill areas are arranged in a hierarchy such that proficiency in a given area assumes proficiency in all lower areas. "All ninth-graders" bars also include students in other racial/ethnic categories that are not shown separately.

SOURCE: Ingels SJ, Dalton B, Holder TE, Lauff E, Burns, LJ, *High School Longitudinal Study of 2009 (HSLS:09): A First Look at Fall 2009 Ninth-Graders*, NCES 2011-327 (2011). See appendix table 1-5.

Science and Engineering Indicators 2012

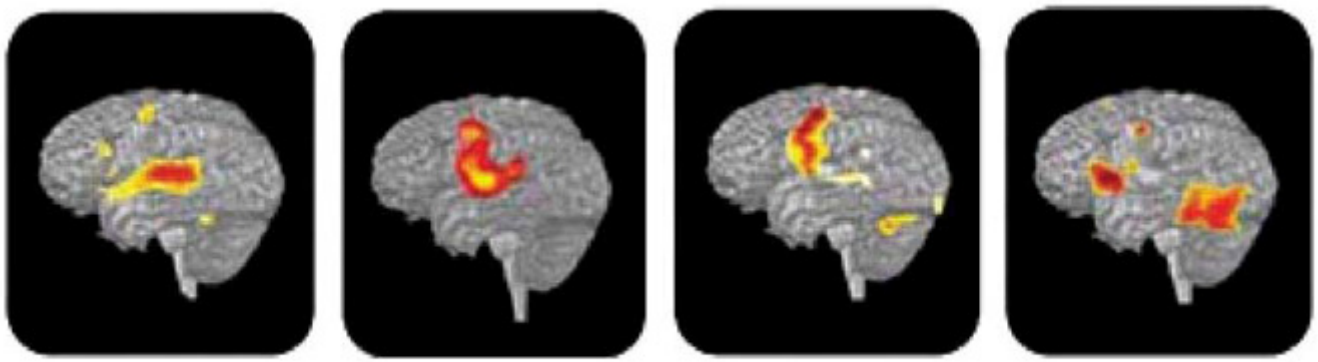


Functional magnetic resonance images show which areas of the brain are activated when native Chinese speakers (top row) and native English speakers (bottom row) take on tasks involving symbols (left column) and numbers (right column).

Chinese speakers perform problems in a different manner than do English speakers," said lead author Yiyuan Tang of Dalian University of Technology in Dalian, China.

In part that might represent the difference in language. It could be that the difference in language encourages different styles of computation and this may be enhanced by different methods of learning to deal with numbers,

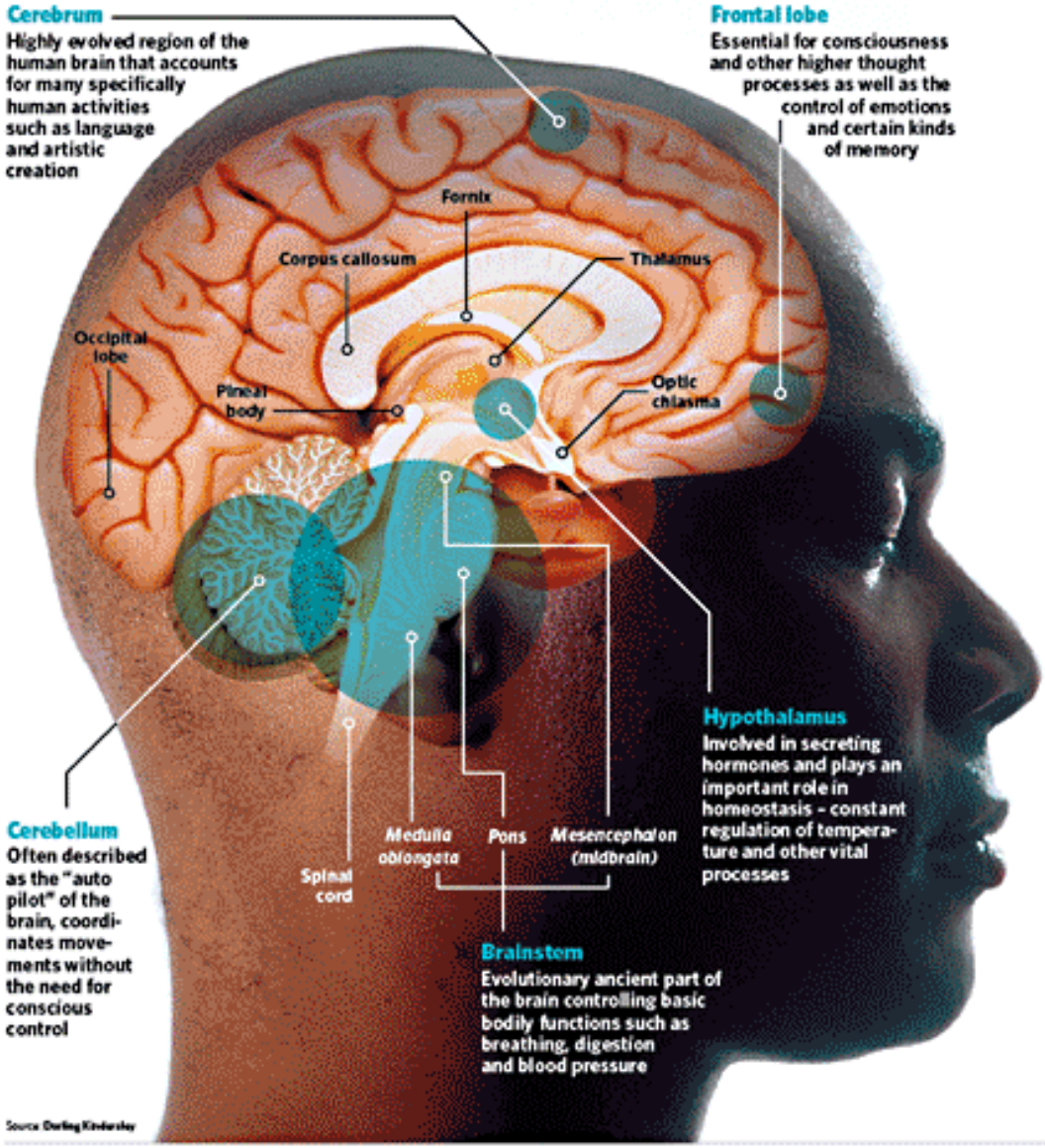
Proc Natl Acad Sci U S A. Jul 11, 2006; 103(28): 10775–10780



Hearing Words | Speaking Words | Seeing Words | Thinking about Words

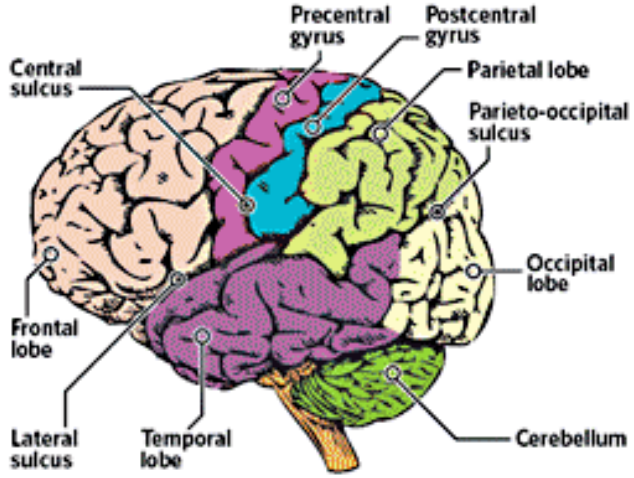
What we know about the human brain

MIDLINE SECTION

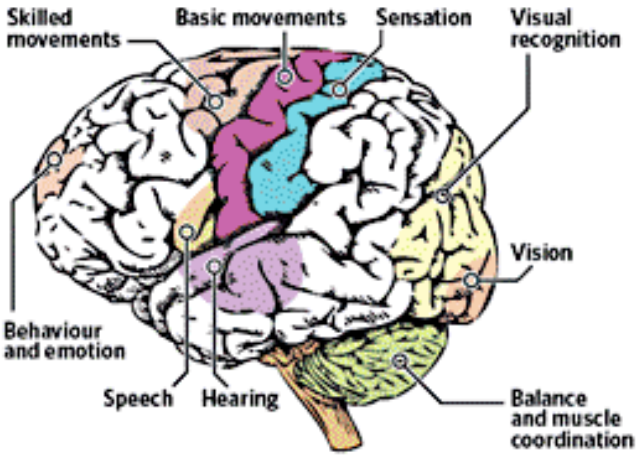


Source: Dorling Kindersley

EXTERNAL ANATOMY OF THE BRAIN



...AND WHAT HAPPENS IN THESE AREAS

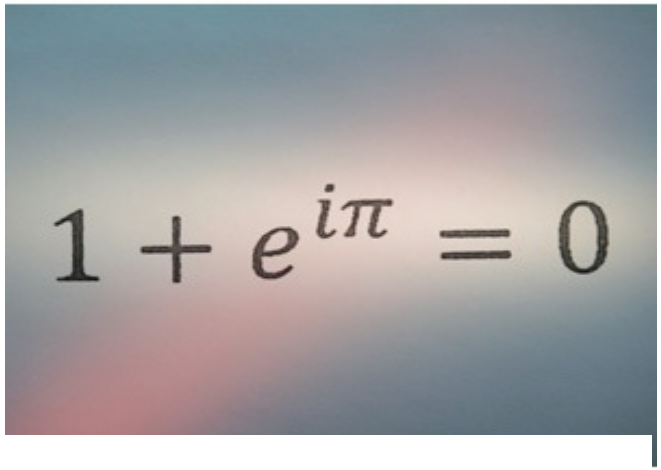


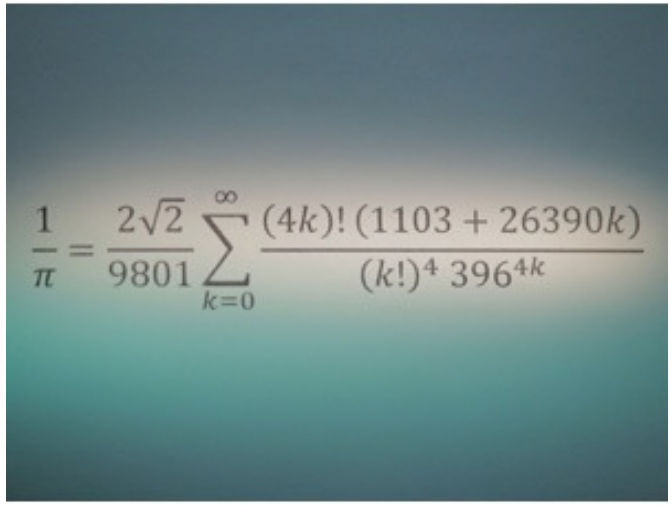
Graphic: John Bradley, Rob Brooks

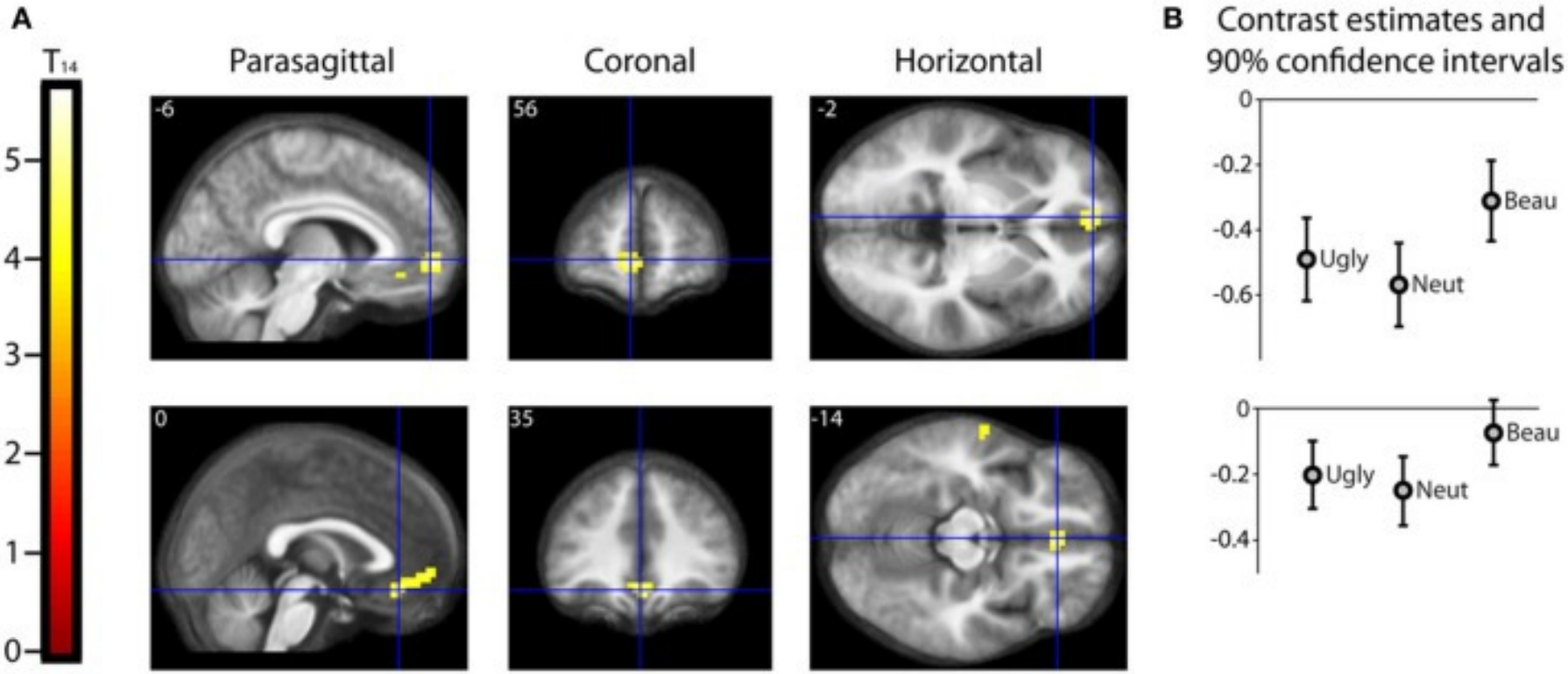
Front Hum Neurosci. 2014 Feb 13;8:68. doi: 10.3389/fnhum.2014.00068. eCollection 2014.

The experience of mathematical beauty and its neural correlates.

Zeki S[1], Romaya JP[1], Benincasa DM[2], Atiyah MF[3].






A
T14
5
4
3
2
1
0
Parasagittal
Coronal
Horizontal
-6
56
-2
0
35
-14
B
Contrast estimates and
90% confidence intervals
0
-0.2
-0.4
-0.6
Ugly
Neut
Beau
0
-0.2
-0.4
Ugly
Neut
Beau