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### L'origine des nombres

**Mardi 9 avril**

**The ontogenesis and genetics of mathematical disabilities and abilities**

par Brian Butterworth, Professeur de neuropsychologie cognitive, University College de Londres



Brian Butterworth is Professor of Cognitive Neuropsychology at the Institute of Cognitive Neuroscience at University College London. He taught at Cambridge for 8 years and is Professorial Fellow at the Melbourne University, and has held visiting appointments Padua, Trieste, MIT and the Max Planck Institute at Nijmegen. He was elected Fellow of the British Psychological Society in 1993 and of the British Academy in 2002. He has been the coordinator of two European networks to research the neural basis of mathematical abilities, *Neuromath: Mathematics and the Brain* (2000-2003) and *Numbra: Numeracy and Brain Development* (2004-2007). He has published many articles and books on mathematical cognition and on topics in the neuropsychology of language. Examples can be found on his website,

<http://www.mathematicalbrain.com>.

#### Résumé de la conférence

Here I describe an ongoing study of 260 twins between 8 and 14 years. We found that both basic numerical abilities and the area of the parietal lobe that supports them is significantly heritable. Our Cross-Twin Cross-Trait genetic analysis shows that relationship between the ability to enumerate dot displays and simple arithmetic shows is highly heritable, suggesting that the basic capacity to estimate numerosity is closely tied to the ability to learn arithmetic.



*Photo: Ioanna Berthoud Papandropoulou*

*[Résumé de la conférence de B. Butterworth, suite]*

The age range of the participants enabled us to estimate the developmental trajectory of the relevant brain areas. An analysis of all the participants suggests that developmental trajectory of grey-matter density is different for high and low attainers.

Furthermore, in a sample of dyscalculics and matched controls, we found that a significant increase in white matter volume increases in some regions for the matched controls, but not for dyscalculics. I discuss the theoretical and practical implications of these findings.

### **Lecture proposée**

Butterworth, B., Varma, S., & Laurillard, D. (2018). Dyscalculia: From brain to education. *Science*, 332, 1049-1053.