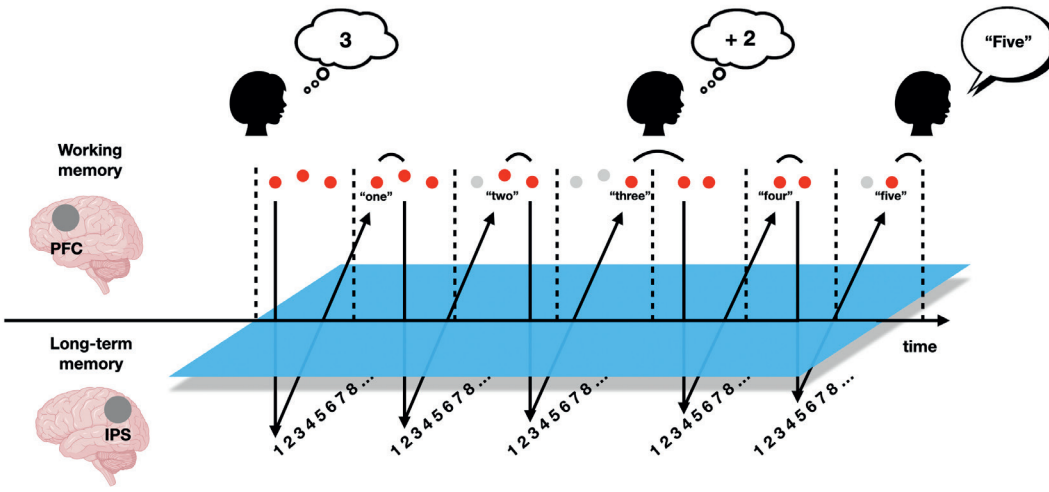

Invité par le Pr Stanislas DEHAENE

Jérôme PRADO

CENTRE DE RECHERCHE EN NEUROSCIENCES DE LYON
CNRS, INSERM, UNIVERSITÉ CLAUDE BERNARD LYON 1

jeudi 5 novembre 2026

Conférence en anglais
Amphithéâtre Maurice Halbwachs de 11 h à 12 h

How do we learn that 2 + 3 = 5?

Behavioral and neural evidence for the automatized counting theory of mental arithmetic

Counting is fundamental to the invention of arithmetic and to its development in children. Yet dominant models of mental arithmetic typically assume that counting is abandoned over the course of learning, replaced by the retrieval of associations between operands and answers from long-term memory. In this presentation, I will use mental addition as a test case and challenge that assumption. I will instead argue that counting remains at the heart of arithmetic fluency, even in adults. Drawing on behavioral and neuroimaging studies conducted in my lab with both adults and children, I will show that the counting procedures children initially use to solve simple addition problems are not abandoned but rather automatized, i.e., accelerated through practice until they become fast, effortless, and operate unconsciously and obligatorily alongside associative retrieval. I will present the automatized counting theory of arithmetic that Catherine Thevenot and I have recently put forward, together with a model that we tested in a large cross-sectional neuroimaging study of arithmetic development. More broadly, this view suggests that automaticity may not necessarily rely on associative retrieval. It also raises the possibility that the automatization of sequential procedures may support fluency in other symbolic skills such as reading.

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