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Neurocognitive development of magnitude processing

One of the prerequisites of learning mathematics is the proper development of number sense. The concept of number sense used by researchers varies; meaning of numbers, number representation, the relationship or relative magnitude of numbers. The results of recent studies on the development of early mathematics contributed to the broadly accepted view that number sense is not a discrete set of skills and some of its components emerge early. It is quite clear that formal teaching of mathematics contributes to the changes due to the children's daily mathematical activities. Moreover, in many mathematics curricula the development of number sense is closely tied to problem solving, so that the numbers become central to make sense of a problem.

However, the development of basic skills is a result of concerted actions in the neurocognitive system. Studies focusing on the dynamics of neurocognitive development aim to follow the changes of the cortical network responsible for magnitude representation. Therefore, the concept of number sense does not only have different interpretations, it also has a different understanding in neuroscience. One of the most influential models called the 'triple code model' (see Dehaene and Cohen, 1998) gave impetus to intensive studies on the representations of numbers: visual code, verbal code and magnitude code. The results of our studies on magnitude processing shed light on the complexity of this seemingly simple skill. The presentation will focus on our recent data, showing that visual discrimination tasks relying on magnitude comparison have a particular load on the executive function network (EFN).

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