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Nota di contenuto	Abstract Mathematical Cognition / Philippe Chassy and Wolfgang Grodd -- A review on functional and structural brain connectivity in numerical cognition /Korbinian Moeller, Klaus Willmes and Elise Klein -- Mathematical difficulties as decoupling of expectation and developmental trajectories /Janet F. McLean and Elena Rusconi -- Considering digits in a current model of numerical development / Stephanie Roesch and Korbinian Moeller -- Of adding oranges and apples: how non-abstract representations may foster abstract numerical cognition / Andrea Bender and Sieghard Beller -- The neural bases of the multiplication problem-size effect across countries / Jerome Prado, Jiayan Lu, Li Liu, Qi Dong, Xinlin Zhou and James R. Booth -- Single-digit arithmetic processing--anatomical evidence from statistical voxel-based lesion analysis / Urszula Mihulowicz, Klaus Willmes, Hans-Otto Karnath and Elise Klein -- Young children's use of derived fact strategies for addition and subtraction / Ann Dowker -- Decimal fraction representations are not distinct from natural number representations - evidence from a combined eye-tracking and computational modeling approach / Stefan Huber, Elise Klein, Klaus Willmes, Hans-Christoph Nuerk and Korbinian Moeller -- Optimized gamma synchronization enhances functional binding of frontoparietal cortices in mathematically gifted adolescents during deductive reasoning / Li Zhang, John Q. Gan and Haixian Wang -- Development of abstract mathematical reasoning: the case of algebra / Ana Susac, Andreja Bubic, Andrija Vrbanc and Maja Planinic.

Sommario/riassunto

Despite the importance of mathematics in our educational systems little is known about how abstract mathematical thinking emerges. Under the uniting thread of mathematical development, we hope to connect researchers from various backgrounds to provide an integrated view of abstract mathematical cognition. Much progress has been made in the last 20 years on how numeracy is acquired. Experimental psychology has brought to light the fact that numerical cognition stems from spatial cognition. The findings from neuroimaging and single cell recording experiments converge to show that numerical representations take place in the intraparietal sulcus. Further research has demonstrated that supplementary neural networks might be recruited to carry out subtasks; for example, the retrieval of arithmetic facts is done by the angular gyrus. Now that the neural networks in charge of basic mathematical cognition are identified, we can move onto the stage where we seek to understand how these basics skills are used to support the acquisition and use of abstract mathematical concepts.