



The Oxford Handbook of Numerical Cognition (Oxford Library of Psychology)

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How do we understand numbers? Do animals and babies have numerical abilities? Why do some people fail to grasp numbers, and how we can improve numerical understanding?

Numbers are vital to so many areas of life: in science, economics, sports, education, and many aspects of everyday life from infancy onwards. Numerical cognition is a vibrant area that brings together scientists from different and diverse research areas (e.g., neuropsychology, cognitive psychology, developmental psychology, comparative psychology, anthropology, education, and neuroscience) using different methodological approaches (e.g., behavioral studies of healthy children and adults and of patients; electrophysiology and brain imaging studies in humans; single-cell neurophysiology in non-human primates, habituation studies in human infants and animals, and computer modeling).

While the study of numerical cognition had been relatively neglected for a long time, during the last decade there has been an explosion of studies and new findings. This has resulted in an enormous advance in our understanding of the neural and cognitive mechanisms of numerical cognition. In addition, there has recently been increasing interest and concern about pupils' mathematical achievement in many countries, resulting in attempts to use research to guide mathematics instruction in schools, and to develop interventions for children with mathematical difficulties.

This handbook brings together the different research areas that make up the field of numerical cognition in one comprehensive and authoritative volume. The chapters provide a broad and extensive review that is written in an accessible form for scholars and students, as well as educationalists, clinicians, and policy makers. The book covers the most important aspects of research on numerical cognition from the areas of development psychology, cognitive psychology, neuropsychology and rehabilitation, learning disabilities, human and animal cognition and neuroscience, computational modeling, education and individual differences, and philosophy. Containing more than 60 chapters by leading

specialists in their fields, the Oxford Handbook of Numerical Cognition is a state-of-the-art review of the current literature.

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Editorial Review

Review

Roi Cohen Kadosh and Ann Dowker bring together the most recent cutting edge research from various fields of numerical cognition.[This book]is definitively the most comprehensive book on numerical cognition to date Matthias Hartmann, Perception ...this book offers detailed and diverse discussion of the different research areas underpinning numerical cognition... excellent for anyone who is undertaking a PhD in mathematical cognition or anyone who has an interest in this field and wants to learn more Charlotte R. Pennington, Psychology Postgraduate Affairs Group

About the Author

Roi Cohen Kadosh, *Wellcome Trust RCD Fellow and University Research Lecturer, Department of Experimental Psychology, University of Oxford, UK*, Ann Dowker, *University Research Lecturer, Department of Experimental Psychology, University of Oxford, UK*

Roi Cohen Kadosh is a Wellcome RCD Fellow at the University of Oxford. His work combines basic and applied science, with focus on high level cognitive abilities and cognitive enhancement. At the theoretical level, his work challenges and revises previous theories in mathematical cognition with implications to psychology, neuroscience and education. At the translational level his work is in the forefront in integrating brain stimulation with enhancement of high-level and complex cognitive functions, such as mathematical abilities. His work does not only focus on research but also discusses the ethical implications of his research. He is actively involved in policy making. His pioneering work has received prestigious awards in the fields of neuroscience and psychology, and coverage by leading media channels (e.g., BBC, CNN, Science Magazine, Nature, Scientific American, Time Magazine).

Ann Dowker is a University Research Lecturer at the Department of Experimental Psychology, University of Oxford, UK. She has carried out extensive research on developmental psychology and individual differences, especially with regard to mathematical learning. Her interests include the effects of culture and language on mathematics; mathematics anxiety; links between neuroscience and education; and the development of intervention programs for children with mathematical difficulties. She is the lead researcher on the Catch Up Numeracy Intervention project.

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