HANDBOOK OF MATHEMATICAL COGNITION

EDITED BY

JAMIE I.D. CAMPBELL

PSYCHOLOGY PRESS
NEW YORK AND HOVE

Contents

ABOUT THE EDITOR CONTRIBUTORS PREFACE ACKNOWLEDGMENTS		IX XI XIII XVII
Part	1: Cognitive Representations for Numbers and Mathematics	
1	ABOUT NUMERICAL REPRESENTATIONS: INSIGHTS FROM NEUROPSYCHOLOGICAL, EXPERIMENTAL, AND DEVELOPMENTAL STUDIES Michel Fayol and Xavier Seron	3
2	NUMBER RECOGNITION IN DIFFERENT FORMATS Marc Brysbaert	23
3	SPATIAL REPRESENTATION OF NUMBERS Wim Fias and Martin H. Fischer	43
4	AUTOMATICITY IN PROCESSING ORDINAL INFORMATION Joseph Tzelgov and Dana Ganor-Stern	55
5	COMPUTATIONAL MODELING OF NUMERICAL COGNITION Marco Zorzi, Ivilin Stoianov, and Carlo Umiltà	67
6	WHAT ANIMALS KNOW ABOUT NUMBERS Elizabeth M. Brannon	85
7	THE COGNITIVE FOUNDATIONS OF MATHEMATICS: THE ROLE OF CONCEPTUAL METAPHOR Rafael Núñez and George Lakoff	109

Part	2: Learning and Development of Numerical Skills	
8	THE YOUNG NUMERICAL MIND: WHEN DOES IT COUNT? Sara Cordes and Rochel Gelman	127
9	DEVELOPMENT OF ARITHMETIC SKILLS AND KNOWLEDGE IN PRESCHOOL CHILDREN Jeffrey Bisanz, Jody L. Sherman, Carmen Rasmussen, and Elaine Ho	143
10	LEARNING MATHEMATICS IN CHINA AND THE UNITED STATES: CROSS-CULTURAL INSIGHTS INTO THE NATURE AND COURSE OF PRESCHOOL MATHEMATICAL DEVELOPMENT Kevin F. Miller, Melissa Kelly, and Xiaobin Zhou	163
11	MAGNITUDE REPRESENTATION IN CHILDREN: ITS DEVELOPMENT AND DYSFUNCTION Marie-Pascale Noël, Laurence Rousselle, and Christophe Mussolin	179
12	DEVELOPMENT OF NUMERICAL ESTIMATION: A REVIEW Robert S. Siegler and Julie L. Booth	197
13	UNDERSTANDING RATIO AND PROPORTION AS AN EXAMPLE OF THE APPREHENDING ZONE AND CONCEPTUAL-PHASE PROBLEM-SOLVING MODELS Karen C. Fuson and Dor Abrahamson	213
14	STEREOTYPES AND MATH PERFORMANCE Talia Ben-Zeev, Seth Duncan, and Chad Forbes	235
<u> </u>	3: Learning and Performance Disabilities in Math and Number Processing	
15	LEARNING DISABILITIES IN ARITHMETIC AND MATHEMATICS: THEORETICAL AND EMPIRICAL PERSPECTIVES David C. Geary and Mary K. Hoard	253

16	MATH PERFORMANCE IN GIRLS WITH TURNER OR FRAGILE X SYNDROME	269
	Michèle M. M. Mazzocco and Michael McCloskey	
17	NUMBER PROCESSING IN NEURODEVELOPMENTAL DISORDERS: SPINA BIFIDA MYELOMENINGOCELE Marcia A. Barnes, Brenda Smith-Chant, and Susan H. Land	299 dry
18	MATH ANXIETY AND ITS COGNITIVE CONSEQUENCES: A TUTORIAL REVIEW Mark H. Ashcraft and Kelly S. Ridley	315
Part	4: Calculation and Cognition	
19	WHAT EVERYONE FINDS: THE PROBLEM- SIZE EFFECT	331
	N. Jane Zbrodoff and Gordon D. Logan	
20	ARCHITECTURES FOR ARITHMETIC Jamie I. D. Campbell and Lynette J. Epp	347
21	MATHEMATICAL COGNITION AND WORKING MEMORY Jo-Anne LeFevre, Diana DeStefano, Benjamin Coleman, and Tina Shanahan	361
22	MATHEMATICAL PROBLEM SOLVING: THE ROLES OF EXEMPLAR, SCHEMA, AND RELATIONAL REPRESENTATIONS James A. Dixon	379
23	AGING AND MENTAL ARITHMETIC Sandrine Duverne and Patrick Lemaire	397
24	CALCULATION ABILITIES IN EXPERT CALCULATORS Mauro Pesenti	413

Part	5: Neuropsychology of Number Processing and Calculation	
25	THREE PARIETAL CIRCUITS FOR NUMBER PROCESSING Stanislas Dehaene, Manuela Piazza, Philippe Pinel, and Laurent Cohen	433
26	DEVELOPMENTAL DYSCALCULIA Brian Butterworth	455
27	REHABILITATION OF ACQUIRED CALCULATION AND NUMBER-PROCESSING DISORDERS Aliette Lochy, Frank Domahs, and Margarete Delazer	469
	OR INDEX	487 501