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## Introduction

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If “child neuropsychology is the study of brain-behaviour relationships within the dynamic context of the developing brain” (Anderson, 2001, p. 3), then in order to understand the field and practice within it, one must possess a thorough understanding of what a brain does and how it develops. The process of change is key in child neuropsychology. This differs from adult neuropsychology, where the focus of study is on damage to an already developed brain. Robust models of adult brain-behavior relationships have developed over the past hundred years. Child neuropsychology is, in contrast, an emerging discipline. It requires the creation of new models based on the process of development. We need to understand how brains and behavior develop, what contributions genes make, and what happens when there are deviations from typical development. Many people from different backgrounds, including researchers in child development, neuroscientists, and clinicians, are developing their understanding of these processes. We felt that there was a need to bring together different voices to begin to define what a comprehensive theory of child neuropsychology should encompass.

The idea for this book came from our experiences as clinicians. As practicing neuropsychologists, we recognized that a clear formulation is the key to understanding and supporting children’s brain-based difficulties. For children, a neuropsychologically informed formulation requires a thorough understanding of how brain-behavior relationships develop over time (see Chapter 21). But how does one acquire this understanding? We realized that something was missing from our bookshelf, and it was at this point that the idea for the book began to materialize. By their very nature, textbooks can date very quickly, particularly in a fast-moving field. They can never reflect the most contemporary research findings; one must hit the journals for that level of recency. Yet textbooks can provide the conceptual framework within which newly acquired knowledge can be organized, understood, and integrated. This textbook aims to provide that architecture for child neuropsychology. We saw the need for a book that bridged cutting-edge science and clinical practice, a book that was developmentally



focused and not disorder based, a book that was academically grounded, but accessible to a range of students, clinicians, and researchers. We hope that this textbook addresses this need.

The first part of the book looks at key theoretical concepts and research evidence that underpins our current understanding of brain development and function. Dagmara Annaz, Annette Karmiloff-Smith, and Michael C. S. Thomas operationalize the term “developmental approach” by stressing the need to trace normal developmental trajectories. Hans J. ten Donkelaar describes basic brain development from conception onward, and discusses the influence of specific disorders that occur throughout this process, each capable of producing a wide range of deviations from the expected trajectories. Yulia Kovas and Robert Plomin discuss the contribution of genes in relation to learning disability and provide insight into the possible impact of genes on neuropsychological development. Judy S. Reilly and colleagues outline the fallout of early traumatic brain injury, highlighting the concept and constraints of neural plasticity. Brain imaging has brought forward our understanding of brain–behavior relationships, and Paramala J. Santosh and Ruksana Ahmed provide a helpful review of the technologies of brain imaging and their use with children. One key concept that is often missing from neuropsychology textbooks is that of general intellectual ability (IQ). Mike Anderson explores the concept of IQ and how this broad-based marker of brain functioning may develop.

Undoubtedly, a firm grounding in “normal” child neuropsychological development is the foundation for any efforts to evaluate and (most importantly) to improve those situations in which developmental progress has not proceeded smoothly. The field of child neuropsychology relies heavily on the theories and research of developmental and cognitive psychologists. Part II of the book gives an overview of current research regarding normal neuropsychological development and provides examples of deviations from these processes. Within the domain of cognitive development, Frederic Dick and colleagues take us through the emergence of language skills and the effect of different disorders on language development. Janette Atkinson and Marko Nardini look at visuospatial and visuomotor development; Arthur MacNeill Horton and Henry Soper outline the key factors that are important in understanding the development of memory; Maxine Sinclair and Eric Taylor discuss the development of attention; and Clare Hughes and Andrew Graham examine the development of executive function. But neuropsychological development is not confined to basic information processes: social, behavioral, and emotional development are key factors in clinical practice. Rebecca M. Todd and Marc D. Lewis provide a fascinating discussion of the development of the self-regulation of emotions and behavior. Simon Baron-Cohen and Bhismadev Chakrabarti review the state of our understanding in social neuroscience and, in particular, how empathy develops. No discussion of normal development would be complete without reference to education. The last two chapters of Part II are devoted to the development of academic skills: Usha Goswami summarizes the acquisition of reading, and Brian Butterworth provides insight into the often neglected areas of numeracy and dyscalculia.

Building on the first two parts of the book, Part III focuses on clinical practice. Ingram Wright and Peta Sharples discuss neuropsychological practice with neurological disorders. Ian Frampton illustrates the applicability of neuropsychological thinking to child and adolescent mental health issues. Sue Harrison and Jane Hood highlight the value of neuropsychological assessment in education. Sarah Helps demonstrates how the field can contribute to the understanding and management of other physical illnesses. The book concludes with an approach to neuropsychological assessment and formulation, based on the themes of this book and on our clinical experiences.

We hope that this book will enhance the clinical practice of our colleagues, and help to stimulate ideas and discussion for the next stage of research and practice within the exciting field of child neuropsychology.

### Reference

Anderson, V., Northam, E., Hendy, J., & Wrennall, J. (2001). *Developmental neuropsychology: A clinical approach*. Hove, East Sussex: Psychology Press.

