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## Preface

In 1848, while working with Phineas Gage, a young man who miraculously survived a severe injury to his brain, physician John Martyn Harlow observed that Gage had lost the balance between his “intellectual faculties and animal propensities.” He had difficulty making plans and his loss of control led him to be disrespectful and profane. Gage cared little as to how his behavior and actions affected others. He went from being a model railroad foreman to an out-of-work stable hand and eventually 12 years after his injury passing away at the age of 36 following a series of seizures.

It is now well accepted that the injury Gage suffered adversely impacted the frontal lobes governing the efficient operation of his brain. In the last 50 years, an interest in this part of the brain and its operation has come to the forefront for many researchers and clinicians. The frontal lobes have become increasingly conceptualized as a governor or executive. In the 1890s, Oppenheim associated personality changes with the orbital and mesial frontal lobes (Oppenheim 1890, 1891). The term “executive” was used some 40 years ago by Luria as he described the functions of the frontal lobes or his third functional unit as serving an executive role (Luria, 1980). Executive functioning has come to represent a number of mental processes which allows individuals to use thought to govern behavior and to perform complex activities involving planning, organizing, strategizing, controlling, and sustaining attention and self-management. Executive dysfunction has been documented in a diversity of conditions, including dementia, traumatic brain injury, white matter lesions, borderline personality disorder, substance abuse, multiple system atrophy, multiple sclerosis, schizophrenia, autism, attention deficit hyperactivity disorder, progressive supranuclear palsy, CADASIL, and Korsakoff syndrome. Ironically, individuals experiencing executive function problems, the result of either atypical development or trauma, often retain their memory and capacity to master academic skills but they struggle how to efficiently use what they know. They are inconsistent, unpredictable, and often poorly self-governed. They are inefficient in their ability to make plans, keep track of time, evaluate their behavior, and socialize appropriately. Typically they struggle in many critical aspects of life.

In this textbook, we have sought to bring together the leading theoreticians, researchers, and clinical practitioners involved with the scientific examination, assessment, and clinical and educational application of executive

function. We have sought to provide a wide breadth and scope of theory and ideas but, most importantly, to provide ample resources to begin the process of creating efficient and effective strategies to help individuals across the life span struggling with executive function impairments.

Our book begins with a short history of executive function as a theoretical and clinical construct. Jin Chung and colleagues provide an overview in the next chapter of the physiology of executive function and the brain. Chapter 3 by respected scientist and researcher, Nick Goldberg, discusses executive function and the operations of the frontal lobe. The first part providing conceptualization of executive function ends with a chapter by Marilyn Welch and Bruce Pennington describing the normative developmental changes in executive function as children mature.

Part II provides an overview of issues related to what we have placed under an umbrella titled Practical Implications. Lisa Weyandt and her colleagues review the use of executive function tasks and externalizing and internalizing disorders. Cecil Reynolds and Arthur Horton provide an overview of the neuropsychology of executive function as it relates to the Diagnostic and Statistical Manual of the American Psychiatric Association. Kevin Antshel and Russell Barkley discuss executive function theory and ADHD. Hilde Geurts discusses executive function and autism. Finally, Melissa DeVries and Dana Princiotta describe executive function as a mediator of age-related cognitive decline in adults.

Part III, by far the largest part of this text, contains 12 chapters providing overviews of the most widely used neuropsychological tests and questionnaires to evaluate executive function. This part begins with a chapter by Andrew Livanis discussing evaluation and treatment integrity, an often overlooked but critical issue in clinical practice. Well-respected researchers and clinicians were invited to write chapters about the instruments they have developed. Peter Isquith and colleagues have provided contributions concerning their Behavior Rating Inventory of Executive Function. Russell Barkley has written about his Deficits in Executive Function scales, and Dawn Flannagan and Sam Ortiz have provided a summary chapter describing their cross battery approach and the utilization of diverse tools to measure EF. We provide a chapter on the Comprehensive Executive Function Inventory.

The text concludes with a part of six chapters, the result of our efforts to gather strategies and ideas to facilitate the development and functioning of executive function. Such programs are still in their infancy, with many frequently recommended strategies untested. This part begins with a chapter by Jack Naglieri covering psychometric issues and the evaluation of treatment effectiveness. Peg Dawson, Lynn Meltzer, Milt Dehn, Bonnie Aberson, and Kathleen Kryza have all provided a framework for the work they are doing to facilitate and develop executive function in children.

Richard Dawkins has written, “by all means let’s be open minded but not so open minded that our brains drop out.” The science of executive function is truly in its infancy. Theories and tests are many; however, scientific findings

are only slowly emerging. It is our hope this volume adds to the breadth and scope of knowledge about executive function and provides a sourcebook for future researchers and clinicians.

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