Neuropsychological Perspectives on Learning Disabilities in the Era of RTI: Recommendations for Diagnosis and Intervention

Edited by:
Elaine Fletcher-Janzen
Cecil R. Reynolds

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Neuropsychological Perspectives on Learning Disabilities in the Era of RTI
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We dedicate this book to the lifetime of work in learning disabilities of Dr. James C. Chalfant whose seminal work with Margaret A. Scheffelin, *Central Processing Dysfunctions in Children*, inspired and directed the research of generations in furthering the understanding of learning disabilities.
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Knowing Is Not Enough—We Must Apply. Willing Is Not Enough—We Must Do.
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This is a book about the future—the future of education, the future of our children—and how best to integrate the advances of modern neuroscience into an educational framework for teaching all children to read, particularly those with a learning disability. The future is now, certainly the next minute and the next day; the point is the future is close at hand and the burning question is how do educators best use the 21st century tools available to provide the most effective reading instruction to all readers, typical and struggling. This book asks a series of central questions of a diverse group of researchers and educators, who not surprisingly have always interesting and not always converging perspectives. The questions are six in all, with responders asked to address at least four. The initial series of queries grapple with how to translate the avalanche of progress in neuroscience into educational actions that will advance the state of the art of diagnosing and providing effective interventions to students with learning disabilities. Accordingly, we have:

1) What do you think neuroscience has to offer laws and policies associated with learning disability determination?;
2) What do you think neuroscience has to offer the assessment and identification of learning disabilities?;
3) How will future developments in neuroscience affect how we classify and intervene with learning disabilities?

Given the extraordinary progress in understanding reading at the level of the brain itself, it is imperative that we take the next step in the process that has progressed from first doubting if neuroscience research and findings belong in the education equation to an almost giddy, glowing appreciation for the remarkable advances in the ability to “see” the brain at work to the serious questions posed in this volume of what is the most effective application of these wondrous advances. Briefly, these advances include the identification of the neural systems used in reading and how these systems differ in good and poor readers; the pinpointing of neural systems serving fluent reading and the identification of those systems used in compensation. The demonstration, for example, of decreased activation in struggling readers of the “word form” area necessary for rapid, fluent reading now provides both
a target for reading interventions and a neurobiological explanation of the necessity for extra-time for dyslexic readers. Brain imaging studies suggest that there are two specific subtypes of struggling readers, one based on more inherent influences, the other reflecting more environmental influences. Of direct practical relevance, our and other neuroimaging studies demonstrate the plasticity or malleability of the neural systems for reading. Specifically they indicate that teaching matters and that the neural circuitry for reading is responsive to evidence-based intensive reading interventions—with effective instruction, the brain can change and reading can improve. Recent evidence also points to differences in the development of the neural circuitry for reading in good and struggling readers; good readers appear to develop a sound-based system while dyslexic readers develop a system that seems to be more tuned to memory.

Wow—yes, but the basic question is what does this progress mean for education. How do we most wisely use this sophisticated, new neurobiological knowledge to further education in the classroom? At its most critical level—how does the educational enterprise productively integrate neurobiological evidence into classroom and school practices.

And so, having considered the implications of the extraordinary possibilities now offered by neuroscience, the contributors are asked to consider timely, critical issues of how to reconcile these advances with current and proposed educational policies and practices. Specifically, as we consider the future of education, how do we reconcile and maximize the contributions of neuroscience, Neuropsychology, and Response to Intervention (RTI) to the development of the most accurate, efficient, and effective identification and intervention model:

1) How do you reconcile RTI as a means of diagnosis of LD with knowledge from the clinical neurosciences?
2) What role does Neuropsychology have to play in the diagnosis of LD?
   and
3) What role does Neurospychology have in designing interventions in the context of RTI?

This exceptional volume offers timeliness, relevance, and the added pleasure of the insightful responses of a range of researchers, including Alan Kaufman who provides a context and historical perspective and Virginia Berninger whose work has contributed to our new knowledge of the reading brain and who sees much benefit in, for example, the potential of RTI to inform educational policy. Other contributors, while acknowledging the potential utility of RTI approaches for example, as a pre-intervention strategy, also raise important questions regarding its readiness for acceptance and widespread implementation as a diagnostic tool or as an intervention
strategy. Striking in this respect are the cogent, and, what I found to be, often compelling arguments made by thoughtful and highly knowledgeable contributors such as Cecil Reynolds and H. Lee Swanson, who raise serious, constructive questions about what they perceive is a less than critical examination and acceptance of RTI.

As the RTI approach rolls into schools and classrooms across the nation, it is indeed timely, in fact, essential that the kinds of questions and concerns raised in the chapters of this book are made part of an informed national discussion. Is RTI the answer to the search for the most effective strategy for the early identification and accurate diagnosis of a reading disability and for providing effective reading instruction and timely intervention services? Or is RTI more of a Trojan horse, outwardly appealing but filled with risky, unproven, and in the end, potentially harmful, practices; or, is it somewhere in-between? If RTI is problematic, are there modifications or constructive approaches to improving this model? Perspectives on each of these possibilities are well-represented in this volume. For example, Swanson reminds the reader that RTI is not a new, but rather an old, concept going back three decades and goes on to provide an in-depth discussion of the weak experimental basis for RTI. He cites the lack of controlled randomized studies of RTI’s effectiveness as an identification model or as an intervention strategy; the lack of consistent (standardized), reliable and valid applications of evidence-based instruction using RTI; and the lack of a proven expert teaching model for such instruction. Swanson asks the fundamental question: What is meant by “non-responsiveness”—how is it defined and how is it measured? How this question is addressed brings with it significant, practical consequences; for example, lack of a consistent approach to determining responsiveness will identify different children and report varying prevalence rates, dependent on methods used rather than something innate within specific groups of children.

Swanson also brings to the reader’s attention the lack of solid empirical support for the use of RTI as an identification model. An often stated advantage of RTI is its lack of reliance on IQ measurement and with it, the elimination of the necessity of demonstrating an IQ-achievement discrepancy. However, the question raised here asks if RTI represents an instance of just a different form of discrepancy model; here, based on discrepancy from grade level performance. A central assumption of RTI models is that intelligence is irrelevant to the acquisition of reading. Consequently, the argument goes, intelligence needn’t be considered in the identification or approach to reading disability; if provided equal opportunity (high quality instruction) there will be equality of outcomes for all children. What is often not stated, but noted in this volume, are the flaws embedded within such an assumption. The reader is reminded that empiric data indicate that such equality of instruction will result in greater, not lesser, variability in
educational outcomes. Equality of educational opportunity may perhaps result in equality of performance on phonological measures, but far less so on measures of reading comprehension or vocabulary. Swanson notes that while outcomes may be similar in groups of struggling readers identified as discrepant or as non-discrepant, meta-analyses indicate that verbal IQ is a significant factor in moderating the effect size or the magnitude of the difference in performance of the two groups and further, that IQ accounts for a significant amount of the explainable variance in reading. Clearly, the empiric data as to the relevance of IQ in interpreting treatment outcome is complicated and at times, contradictory; in any event far more nuanced than its detractors often present. At the least, the extant empiric evidence does not seem to support the exclusion of aptitude from assessment of response to intervention or certainly, from diagnosis of a learning disability.

An important, not to be missed, discussion concerns the role of RTI as a strategy for the identification of children as learning disabled. Reynolds, for example, asks the question, is failure to progress at the same pace as their classmates in response to “appropriate instructional methods” sufficient for a diagnosis of a learning disability. He reviews data strongly suggesting that it is not. Such an approach where a child could be labeled as learning disabled in one classroom, but not in another, “fundamentally alters the concept of disability at its very roots.” Interestingly, the further argument is made that RTI is fundamentally a special case of discrepancy—here, between the response and progress of a classroom and that of an individual child. Such a context-dependent approach based on the relative progress of a child compared to a class seems to completely deny the most basic tenet and underlying concept of a learning disability as a disparity between academic aptitude and academic achievement residing within the individual child. Reynolds notes that implementation of an RTI model will result in the disproportionate identification of students with lower IQs (below 90) bringing with it the re-introduction of the old notion of the child who is a “slow learner.” As a corollary, failure to consider aptitude, will result in a failure to identify and consequently, will ignore the needs of those students who are in the higher deciles for academic aptitude. For example, a very bright child who struggles in reading, but whose performance is close to the average level of performance of his/her classmates (who are of generally lower academic aptitude), and at the same time, excels in other academic areas, would be overlooked if an RTI model were to be implemented at that child’s school. Reynolds voices concern that in this type of implementation, RTI “denies the historical concept of the specificity of a learning disability . . .” and replaces a “wait to fail” model with a “watch them fail” model. Noting the recent convergence of neurobiological and behavioral data indicating differences in processing of information in individuals with a learning disability, he expresses concern that RTI seems to ignore demonstration of a processing disorder—a key
element critical to the theoretical concept and practical implementation of a diagnosis of a learning disability. These and other important concerns are raised, including the potential of the RTI model, which by-passes the assessment of the individual child, to lead to misdiagnosis and without information about a child’s neuropsychological profile, to lead to mis- or inadequate treatment of a learning disability.

This represents but a small sampling of the often intense, often controversial, but always interesting and highly informative discussions to be found in the succeeding pages. Not to despair, the contributors all offer highly constructive and feasible approaches, for example, to developing improved models combining neuropsychological and neurobiological findings together with elements of RTI.

What makes this book so interesting is that here we have, brought together in one place, from a broad range of respected educators and researchers, contrasting and alternative views—views that can be compared and contrasted as the reader goes through the volume. I know that I particularly enjoyed going back and forth as I read each response, assimilating the points made by each contributor and often, a contrasting view expressed by another contributor. Fascinating, helpful, important reading—clearly a work that should be read by researchers, policy makers, and educators.

Sally E. Shaywitz, M.D.
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Co-Director, Yale Center for Dyslexia and Creativity
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narrow application of RTI creates LD identification by default: An unnecessary practice in the face of neuroscientific evidence of the dynamic localization of attention, executive functions, and specific areas of the brain related to reading.

This volume of work was created to illuminate the contribution of neuroscience and neuropsychology to learning disability identification. Translational research about the brain was very limited (mainly by technology) years ago when the identification of LD was formalized for the first time. This is not the case today. Translational research that seeks to take robust research results from the laboratory and reform them into classroom intervention is becoming the benchmark for evidence-based intervention. It is very important that educational professionals and policy makers understand the implications of the latest neuroscientific research because it has direct application to how we think about learning and the brain.

The authors in this book are practicing neuroscientists, neuropsychologists, clinical psychologists, and school psychologists with training in brain-behavior relationships. All of the authors bring a wealth of research and experience to their chapters. All of these authors are concerned about how the future of education will embrace neuroscientific findings.

It is questions like those found in this book that lay bare the worldviews and professional personalities of the authors. On the surface everyone is talking about the same issues. Indeed, we were worried about the possible redundancy of the text, but deep down we knew that the diverse nature of neuroscience would show the individual differences and rich experiences of our authors. If there was any doubt in the reader’s mind that neuroscience and neuropsychology does not have an important part to play in current educational reform, this book will dispel that doubt. This is the statement we aimed to make, and we trusted that the process of going inside the minds of those who embrace neuroscience would be an interesting read indeed—and it is! We also want to note that we did not suggest to authors that they take a specific tact with their answers. We requested chapters of individuals from all points of view and the contributor’s list indicates those who wished (or had the time) to participate.

We would like to thank all of the authors for their hard work. We asked that the manuscript be written in less than 4 months knowing full well that it would place stress on these very busy individuals. Nonetheless, they came through and created a strong and eloquent message. We would like to also thank Alan Kaufman for his sage description of the history of neuroscience and neuropsychology in the study of learning disabilities—it sets the stage beautifully. We would also like to thank Sally Shaywitz for adding her foreword to this book—we could not think of a stronger individual to lead this endeavor. We must also thank the “pit crew” at John Wiley and Sons, led by our editor Isabel Pratt, who turned this manuscript around on a dime so that
It is nearly 30 years since we began editing and writing about childhood brain-behavior relationships. When we started producing special education reference works, the field was just beginning to be defined by laws and practice guidelines and there was excitement about research illuminating what was going on in the brains and minds of children with learning disabilities (LDs). At that time, vitriolic arguments about IQ and the nature of intelligence were front and center, researchers were sure that learning disabilities were neurobiological in origin, reading curricula sought to rectify processing deficits, and the right of all children with disabilities to a free, appropriate public education that reflected individual learning needs was supported by all. In this sense, not much has changed over the years. The same could be said of today’s popular discourse about learning disabilities; however, we have observed that the numerous and wondrous advances in neuroscience and neuropsychology appear to be absent from the current federal efforts to create a behaviorally oriented Response-to-Intervention (RTI) method of identifying learning disabilities. There is no doubt that, while not new, RTI is a promising method to assist children with reading problems in the early grades. Professionals who support the RTI approach to LD determination are well intentioned and tireless in their dedication to these children. Unfortunately, supporting a methodology that ignores important confounding variables (such as the common comorbidity of LD with other neurobiological disorders) defies the scientific method that binds all scientific inquiry. Intervening in the lives of unidentified children with learning disabilities without the benefit of well-constructed, standardized, norm-referenced assessment instruments ignores the inherent objectivity, fairness, and wealth of information these instruments provide. Insisting that all reading problems are remediated by phonologically based curricula and the occasional confusion of reading fluency with reading comprehension ignores many of the brain processes that bring full reading comprehension in later grades.

Ignoring neuroscience’s and neuropsychology’s contribution to understanding the brain processes involved in multiple learning tasks disregards a body of research literature that has a direct and important impact on policies and practice. We also believe that a disregard of neuroscientific contributions at this critical time may well expose many children who have learning disabilities and other comorbid conditions to unnecessary stress and failure. A
the message could get out into the world in a timely manner. Elaine would like to thank her family, David, Emma, and Leif, for supporting yet another project. Cecil never tires of thanking Julia for her support and concern and continues to wish he had the same gifts to return.

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October, 2007
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Sangeeta Dey, Psy.D., is a neuropsychologist and currently serves as Chair of the Child and Adolescent committee at the Massachusetts Psychological Association. She maintains a private practice in Lexington, Massachusetts, and is a staff member at the North Shore Children’s Hospital. She conducts research and provides neuropsychological evaluation for children with developmental vulnerabilities, attentional problems, and learning disorders and has particular interest in understanding the neuropsychological profiles of children from other cultures.

Colin D. Elliott, Ph.D., is the author of the Differential Ability Scales (DAS) and its second edition, the DAS-II. For over 20 years he was the director of the program for training school psychologists at the University of Manchester in England. He is a NASP member and is a Fellow of APA and of the British Psychological Society. He now lives in southern California and is an Adjunct Professor at the University of California, Santa Barbara.

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Learning disabilities and neuropsychology have always been intertwined, even before Ralph Reitan put neuropsychology on the map in the 1950s or Sam Kirk coined the term learning disabilities in 1963. The history of specific learning disabilities (SLDs) is steeped in the tradition of brain damage and brain dysfunction, whether one traces the roots of SLD to the perceptual processing disorder approach of Kurt Goldstein and Alfred Strauss or to the developmental language disorder conceptualization of Samuel Orton and James Hinshelwood (Shepherd, 2001). And if the past endorses the strong relationship between SLDs and neuropsychology, that endorsement is no less powerful than the impact of present research or future applications of technology on the essential role of neuropsychology on the assessment of SLD.

The history of SLD is not a linear or chronological one but rather an uneasy amalgam of two traditions that are conceptually distinct and seemingly resistant to integration. The Goldstein-Strauss-Werner history—based initially on Kurt Goldstein’s (1942) studies of the perceptual, cognitive, attentional, and mood disorders of soldiers who sustained head injuries—emphasizes disorders of perception, especially visual perception. Indeed, it is the deficit in perceptual processing that is considered the specific learning disability (there is no room in this model for specific learning disabilities). However, a different history of SLD that predates Goldstein first began
appearing in Europe in the 1890s with accounts of an adult patient who lost the ability to read following a stroke, though he could speak and write fluently, remember details, and understand easily (Dejerine, 1892); and accounts of a 14-year-old nonreader, Percy F.: “I might add that the boy is bright and of average intelligence in conversation. . . . The schoolmaster who has taught him for some years says that he would be the smartest lad in school if the instruction were entirely oral” (Morgan, 1896, p. 1,378). This tradition, popularized by Orton and Hinshelwood, produced an impressive literature following Dr. Pringle Morgan’s 1896 account of Percy, which depicted clear-cut cases of individuals with learning disabilities specific to reading and writing (e.g., Kerr, 1897; Morgan, 1914) and later on specific to arithmetic (Schmitt, 1921). Hinshelwood (1917) believed the problem to be a congenital lesion in the left angular gyrus, which impaired the ability to store and remember visual memory for letters and words; Orton (1937) hypothesized a functional brain disorder associated with the inability of one hemisphere to become dominant over the other for handling language, but he nonetheless “accepted the notion of the origin of dyslexia in the angular gyrus region” (Spreen, 2001, p. 285). Both agreed that SLD was a function of a developmental disorder of written language.

Occasionally, neuropsychologists who write about the history of SLD blend the Goldstein-Strauss-Werner tradition with the Hinshelwood-Orton approach: “Orton’s theory remained a theory until, in 1947, Strauss and Lehtinen called attention to the frequent appearance of neurological signs in learning-disabled children” (Spreen, 2001, p. 286). But usually the two traditions are treated separately.

Indeed, the two historical roots of SLD could not be more different in conception, origination, or research methodology. Yet they converge in their basic premise that neurology and neuropsychology are the keys for understanding learning problems and ultimately treating them. Even the founding fathers of the developmental language disorder approach, while relying on a field of neuroscience that was in its infancy, did not agree on the neurological causation of the problem. Yet the fact remains that, regardless of the orientation of the early SLD pioneers, and regardless of whether one’s intuitive understanding of SLD is more aligned with a specific perceptual disorder or an array of specific disorders in language development, all paths to the present field of SLD come through the fields of neurology and neuropsychology.

THE GOLDSTEIN-STRAUSS-WERNER VISUAL PERCEPTUAL APPROACH TO SLD

The Goldstein-Strauss-Werner theory posited that a disorder of visual perception, along with the concomitant attentional problems, impairs learning on tasks that depend on perception and attention. Fix the perceptual disorder.