1
Response to Intervention at School: The Science and Practice of Assessment and Intervention

Shane R. Jimerson, Matthew K. Burns, and Amanda M. VanDerHeyden

Shane R. Jimerson, PhD is a Professor in the Department of Counseling, Clinical, and School Psychology at the University of California, Santa Barbara. Jimerson@education.ucsb.edu
Matthew K. Burns, PhD is an Associate Professor of Educational Psychology with the School Psychology program at the University of Minnesota. burns258@umn.edu
Amanda M. VanDerHeyden, PhD is a private Researcher and Consultant living in Fairhope, Alabama. amandavande@gmail.com

Promoting the success of students is the primary focus of educational professionals. Systematically identifying individual needs and subsequently providing appropriate interventions is central to the task of enhancing student outcomes. With the reauthorization of the federal *Individuals with Disabilities Education Act* (IDEA), referred to as the *Individuals with Disabilities Education Improvement Act* (IDEIA; signed into law in December 2004), the process of identifying students with learning disabilities (LDs) is at the forefront of education issues in the United States. Regulations accompanying the reauthorized IDEIA permit the use of data (*response*) obtained when scientifically based intervention is implemented with a student (*to intervention*) to make eligibility decisions under LDs. The regulatory provision reflects a fundamental paradigm shift that closes the gap between instruction and assessment.

Although response to intervention (RTI) was only recently defined in federal regulations, the concept is well established in other fields, such as medicine, which focus on response to treatment. Therefore, this chapter and handbook addresses research and application of RTI in K-12 schools by identifying the importance of RTI as related to IDEIA, discussing the functions of RTI, examining the historical basis for RTI, providing contemporary definitions of RTI, and, finally, emphasizing the essential role of research in advancing the science and practice of assessment and intervention (critical components of RTI).

1.1 Importance of Response to Intervention at School

The *Individuals with Disabilities Education Improvement Act* (IDEIA, 2004) allows local education agencies to use a student's response to intervention (RTI) as part of the evaluation procedure for identifying students with specific learning disabilities [PL 108-446, Part B, Sec 614(b)(6)(b)]. The following excerpts from IDEIA highlight key changes regarding the assessment and identification of children with specific learning disabilities (portions in italic for emphasis).

SPECIFIC LEARNING DISABILITIES—(IDEIA; 614, b, 6, A, B)

(A) IN GENERAL—Notwithstanding section 607(b), when determining whether a child has a specific learning disability as defined in section 602, *a local educational agency shall not be required to take into consideration whether a child has a severe discrepancy between achievement and intellectual ability* in oral expression, listening comprehension, written expression, basic reading skill, reading comprehension, mathematical calculation, or mathematical reasoning.

(B) ADDITIONAL AUTHORITY—In determining whether a child has a specific learning disability, *a local educational agency may use a process that determines if the child responds to scientific, research-based intervention* as a part of the evaluation procedures described in paragraphs (2) and (3).

To further examine the role of RTI within special education, it is important to consider what exactly is special education? Federal special education mandates since P.L. 94-142 have all defined special education as "Individualized instruction, at no cost to the parents or guardians, to meet the unique needs of a child with a disability." Thus, assessing student needs and designing instructional modifications to meet those needs is at the very core of special education. Moreover, the definition of specific learning disability within special education law has always included the provision that prior to consideration for special education it must be demonstrated that "the child was provided appropriate instruction in regular education settings" (§§ 300.309, *Individuals with Disabilities Education Act* (IDEA), 2004). This latter mandate has often been overlooked in practice, until RTI entered the national vernacular that is.

1.2 Functions of Response to Intervention at School

Although RTI was included in the federal definition of specific learning disabilities, to view it as only a diagnostic tool is too limiting. We suggest that RTI be considered the systematic use of assessment data to most efficiently allocate resources in order to enhance student learning for all students and to effectively identify those who are eligible for special education services.

1.2.1 Brief Background

Gresham (2007) provides a brief summary of the historical antecedents of RTI, including: the National Research Council (NRC) report (see Heller, Holtzman, and Messick, 1982) in which the validity of the special education classification system was evaluated; the LD Initiative that was sponsored by the Office of Special Education Programs (U.S. Department of Education), which resulted in a national conference held in Washington, DC, in 2001 (entitled the *LD Summit*); and the President's Commission on Excellence in Special Education (2002) that recognized RTI as an alternative to IQ-achievement discrepancy in the identification of SLD.

RTI is most often conceptualized as falling into two basic approaches to delivering interventions: (a) problem-solving approaches and (b) standard protocol approaches (Fuchs, Mock, Morgan, and Young, 2003). The problem-solving approach is conceptualized as a systematic analysis of instructional variables designed to isolate target skill/subskill deficits and shape targeted interventions (Barnett, Daly, Jones and Lentz, 2004). In the standard protocol approach, a standard set of empirically supported instructional approaches is implemented to remediate academic problems.

Although this dichotomous view of RTI is somewhat common, most RTI models described in literature combine the two approaches (Burns and Coolong-Chaffin, 2006; Reschly, 2003), which appears to indicate that this dichotomy is somewhat artificial (Christ, Burns, and Ysseldyke, 2005). Problem solving is a term with a more general meaning than that presented by Fuchs et al. (2003). Deno's (2002) seminal paper described problem solving as any set of activities that are designed to "eliminate the difference between 'what is' and 'what should be' with respect to student development" (p. 38). There is a fundamental difference between problem-solving and standard protocol approaches to RTI regarding the depth of problem analysis that occurs prior to the designing and implementing an intervention (Christ et al., 2005). However, both approaches are consistent with problem solving as described by Deno (2002), because both seek to reduce or eliminate the difference between what is and what should be. Thus, both approaches to RTI are actually problem solving and probably function optimally when integrated into one three-tiered service delivery system (O'Shaughnessy, Lane, Gresham, and Beebe-Frankenberger 2003).

What are commonly referred to as standard protocol interventions are actually standardized small-group interventions that can be implemented with 15% to 20% of the student population. This grouping and standardization allows for more intensive interventions that are provided in typical classroom instruction through a relatively cost efficient manner. Only when children fail to succeed in

these standardized approaches is it necessary to isolate and manipulate individual environmental variables through a problem analysis approach, or what is commonly referred to as problem solving. An effective general education core curriculum and quality instructional methodology, and an effective small-group standardized intervention should result in only approximately 5% of the student population requiring such an intensive data collection and analysis procedure (VanDerHeyden, Witt, and Gilbertson, 2007; VanDerHeyden, Witt, and Naquin, 2003).

1.3 Essential Role of Research in Advancing Science and Practice

Rather than attempting to identify how RTI models differ, it is time to examine what they have in common, because language regarding RTI within federal special education regulations is quite limited and vague. Some of the core concepts of RTI as identified by the National Research Center on Learning Disabilities (2002) include (a) students receive high-quality instruction in their general education setting, (b) general education instruction is research based, (c) school staff conduct universal screenings and continuously monitor progress, (d) school staff implement specific, research-based interventions to address student difficulties and monitor progress to determine if they are effective, and (e) the fidelity or integrity with which instruction and interventions are implemented is systematically assessed.

Whereas information provided by National Research Center on Learning Disabilities is helpful, clearly the operationalization and implementation of RTI requires further research and clarification. The U.S. Department of Education, Institute of Education Sciences (Institute of Educational Sciences, 2006) emphasizes the importance of systematic and experimental application of RTI: (a) across the full range of school curricula and content areas at the preschool, primary, elementary and secondary schooling levels; (b) in which empirically established interventions are implemented with high fidelity in various combinations under a range of task and performance conditions within a three-tiered framework across the full range of grade levels or age groups; (c) across all levels of instructional intensity, frequency, and duration (e.g., high, moderate, or low levels of intensity, frequency, and duration in the presentation of stimuli and opportunities to respond within fixed or varied amounts of instructional time); and (d) across a range of measures designed for initial screening and progress monitoring (p. 29).

Additionally, further research is needed regarding the implementation of RTI at the district and/or school levels. Burns and Ysseldyke (2005) identified several questions regarding RTI implementation including: (a) are there validated intervention models; (b) are there adequately trained personnel; (c) what leadership is needed for success; (d) when should due process protection begin; (e) is RTI a defensible endpoint in the identification process; (f) what implementation procedures are needed at the secondary level; (g) what role should parents have in the process; and (h) how should implementation integrity be viewed and assessed? Previous studies have addressed some of the questions, but others remain unanswered.

Many equate implementation integrity with treatment fidelity, but the former term is more accurate to use in RTI because data are needed to assess the integrity with which interventions are developed *and* implemented (Noell and Gansle, 2006). For example, previous research has examined the predictive validity of RTI data and early reading measures in predicting future reading difficulties and disabilities (Jenkins, 2003; McMaster, Fuchs, Fuchs, and Compton, 2005; Ritchey and Foley, 2006). However, Institute of Educational Sciences (2006) recommends further studies examining how the accuracy of risk prediction is affected by: (a) the assessment approaches (i.e., static, dynamic, progress monitoring) or combination of assessment approaches implemented within a classroom or school; (b) the measures administered and skills assessed within a specified domain at particular grade levels and times of the school year; and (c) decision rules for defining cut-scores and statistical techniques for analyzing student performance data that determine inadequate response, predict future difficulties, and result in acceptable levels of *sensitivity* (e.g., indicates percentage of children who will be identified as having a specific learning disability out of all the children who actually have one), *specificity* (e.g., indicates percentage of children who will be identified as not having a specific learning

disability out of all of the children who do not have one), *false positive rates* (e.g., indicates percentage of students who will be identified as having a specific learning disability out of all the children who actually do not have one), and *false negative rates* (e.g., indicates the percentage of children who will be identified as not having a specific learning disability out of all of the children who actually do have a specific learning disability) (p. 29).

Based on the extant empirical evidence, a number of key questions and principles are evident.

Key questions regarding the implementation of RTI models. There are many questions that remain to be addressed regarding wide-scale implementation, including:

1. What will the effects be on student and systemic outcomes? Although research has been conducted on the effects of RTI approaches on both student (e.g., increasing student reading, decreasing student difficulties) and systemic (e.g., reducing the number of referrals to and placements in special education) with positive effects (Burns, Appleton, and Stehouwer, 2005), these studies focused primarily on existing models with little experimental control. Thus, additional research is needed that examines the effects of RTI on systemic outcomes in tightly controlled studies. Moreover, very few studies used randomization or control groups.

2. What will the effects be on educational professionals? Reschly (2003) presented data regarding the effect that practicing in an RTI model had on the functions of school psychologists and Burns and Coolong-Chaffin (2006) discussed specific activities that school psychologists should engage in when using an RTI model. However, few data have been published regarding the roles and outcomes for other personnel. Moreover, how will RTI affect training programs? Do training programs graduate professionals with the skill set necessary to competently participate in RTI; and if not, how should the training change? Previous studies demonstrated that training preservice special education teachers in reading tutoring and curriculum-based measurement led to improved knowledge about reading instruction (Al Otaiba and Lake, 2006), but little is known about the frequency with which these skills are taught in training programs.

Principles regarding the implementation of RTI models. Successful wide-scale implementation will take considerable, time, resources, leadership, planning, preparation of professionals, and empirical evidence.

Time. Efforts to implement various RTI models (including Florida, Idaho, Iowa, Michigan, Ohio, Pennsylvania, and Minnesota) reveal that the process typically takes years, or even decades, and is better characterized as a dynamic ongoing process, rather than an event that is completed on a given date. Moreover, the more comprehensive the RTI model, the greater the duration to prepare, implement, and evaluate. School districts may benefit from implementing RTI procedures on a small scale with high quality while building local capacity for implementation on a wider scale.

Resources. States that appear to have made the most progress in implementing RTI models have also invested considerable resources. For example, Florida implemented a series of initiatives and invested millions of dollars during the past decade that have set the foundation for current efforts to implement RTI models state-wide, and the current funds invested in the implementation efforts involve millions of dollars each year. Other states have implemented smaller grant initiatives.

Leadership. Each of the states that have made significant efforts to implement RTI models (e.g., Florida, Michigan, and Ohio) includes strong leadership at the state level. This leadership is typically reflected at multiple levels of education in the state (e.g., State Department of Education, university faculty, and school administrators). Representation, buy-in, and contributions of multiple stakeholders are each important facets that may be facilitated by leaders. Moreover, successful state initiatives have been supported with considerable technical support from the State Department of Education, often in collaboration with a university.

Planning. Strategic plans for the preparation of professionals involved and implementation procedures are important for implementing RTI models. Research and focus are needed on pre-service professionals. In-service training was critical to previously successful RTI implementation, and this will continue to be critical to successful RTI implementation as professionals working in the field acquire the skills necessary to successfully implement RTI.

Preparation of professionals. Implementation requires training to provide essential knowledge and skills to educational professionals who will be responsible for implementing RTI models. Curricula of general education teachers, special education teachers, and school psychologists should address effective instruction in general and across multiple topical areas, data-based instructional decision making, involvement in effective problem-solving teams, individual differences for learners, school–home collaboration, and making instructional modifications to accommodate diversity within general education. Some of the specific skills associated with RTI (e.g., curriculum-based assessment and measurement, reading interventions) are perhaps best learned through case-based and service-learning activities (Al Otaiba, 2005). Thus, internships in teaching and school psychology training programs should include an RTI focus.

Empirical evidence. Quantifying the empirical base for RTI presents considerable challenges, as it is essential to identify the standards or criteria that will be used in determining evidence-based practices. One source of information is the extant literature base, but future RTI efforts must incorporate emerging empirical evidence regarding assessment and intervention strategies. There is a strong research base for many practices within the areas of reading instruction, reading assessment, and interventions for exceptional learners. However, more is needed regarding: small-group interventions for children at risk for reading failure; effective problem-solving practices; effective school-based screening and interventions for youth with social, emotional, and behavioral problems; and effective interventions for youth in secondary schools.

Evaluation. Systematic formative and summative evaluation of RTI implementation is essential to further understanding critical features of models. Establishing evaluation measures and processes to be shared throughout and across states would be especially valuable in advancing knowledge of processes and student outcomes associated with various RTI models.

The findings of the President's Commission on Excellence in Special Education (2001) emphasized that special education needs to focus on outcomes rather than processes. In addition, we believe process data are important when it comes to RTI. There is a growing consensus that implementation integrity will be the most significant obstacle to overcome when implementing RTI on a national level (Burns, Vanderwood, and Ruby, 2005; Burns and Ysseldyke, 2005; Noell and Gansle, 2006; Ysseldyke, 2005). Thus, assessing the fidelity with which RTI models are implemented will be critical to its success.

1.4 Conclusions

Educational practices are already being modified; however, there is a paucity of resources that synthesize essential knowledge regarding the conceptual and empirical underpinnings of RTI and actual implementation. In many ways, it appears that recent legislation and many RTI initiatives during the past decade serve as a catalyst for further efforts and future scholarship to advance understanding of the science and practice of assessment and intervention at school. *The Handbook of Response to Intervention* (Jimerson, Burns, and VanDerHeyden, 2007) provides a collection of chapters that address essential aspects of RTI.

RTI models have considerable promise for screening, intervention service delivery, and catalysts for system change. Research is needed to articulate purposes, operationalize procedures and judgments, and evaluate the decision-making utility of the models in practice. It is important to articulate how RTI can be judged (which behaviors to measure, how frequently, for how long, under what stimulus conditions, and compared with what reference group using what units of measurement) and demonstrate that this judgment is functionally meaningful (VanDerHeyden and Jimerson, 2005). Whereas the roots of RTI are discernible in a research base that stretches back over the last 30 years in the areas of behavior analysis, precision teaching, direct instruction, curriculum-based assessment, measurement, and evaluation, and effective teaching, RTI remains today an evolving science of decision-making. Over time, consensus may emerge about the purposes of RTI, the best ways to operationalize the independent variable or variables under RTI, and how technical adequacy of RTI implemented in schools can best be evaluated (VanDerHeyden, Witt, and Barnett,

2005). Today's schools operate within a challenging context that is best addressed by adherence to scientific principles and consistent implementation of the scientific method to examine system and individual variables (Ysseldyke et al., 2006). In other words, science should inform practice and practice should inform science. It is our intent that this handbook will do just that for RTI in order to advance both science and practice, and enhance the lives of the children we serve.

References

Al Otaiba, S. (2005). Response to early literacy instruction: Practical issues for early childhood personnel preparation. *Journal of Early Childhood Teacher Education, 25*, 201–209.

Al Otaiba, S. & Lake, V. E. (in press). Preparing special educators to teach reading and use curriculum-based assessments. *Reading and Writing Quarterly*.

Barnett, D. W., Daly, E. J., Jones, K. M., & Lentz, F. E. (2004). Response to intervention: Empirically based special service decisions from single-case designs of increasing and decreasing intensity. *The Journal of Special Education, 38*, 66–79.

Burns, M. K., Appleton, J. J., & Stehouwer, J. D. (2005). Meta-analytic review of response-to-intervention research: Examining field-based and research-implemented models. *Journal of Psychoeducational Assessment*, *23*, 381–394.

Burns, M. K. & Coolong-Chaffin, M. (2006). Response-to-intervention: Role for and effect on school psychology. *School Psychology Forum*, *1* (1), 3–15.

Burns, M. K., Vanderwood, M., & Ruby, S. (2005). Evaluating the readiness of prereferral intervention teams for use in a problem-solving model: Review of three levels of research. *School Psychology Quarterly, 20*, 89–105.

Burns, M. K. & Ysseldyke, J. E. (2005). Comparison of existing responsiveness-to-intervention models to identify and answer implementation questions. *The California School Psychologist, 10*, 9–20.

Christ, T. J., Burns, M. K., & Ysseldyke, J. E. (2005). Conceptual confusion within response-to-intervention vernacular: Clarifying meaningful differences. *Communiqué, 34(3)*.

Deno, S. L. (2002). Problem solving as best practices. In A. Thomas & J. Grimes (Eds.), *Best practices in school psychology*, 4th ed. (pp. 37–56). Bethesda, MD: National Association of School Psychologists.

Fuchs, D., Mock, D., Morgan, P. L., & Young, C. L. (2003). Responsiveness-to-intervention: Definitions, evidence, and implications for the learning disabilities construct. *Learning Disabilities Research and Practice, 18*, 157–171.

Gresham, F. M. (2007). Evolution of the RTI concept: empirical foundations and recent developments. In Jimerson, S. R., Burns, M. K., and VanDerHeyden, A. M. (Eds.), *The Handbook of Response to Intervention: The Science and Practice of Assessment and Intervention*. New York: Springer.

Heller, K. A., Holtzman, W. H., & Messick, S. (1982). *Placing Children In Special Education: Theories and Recommendations*. Washington, DC: National Academy Press.

Institute of Educational Sciences (2006). Special Education Research Grants CFDA 84.324 (IES-NCSER-2007-01). Online at http://ies.ed.gov/ncser/funding/response/response.asp (downloaded 7.1.2006).

Jenkins, J. (2003). Candidate measures for screening at-risk students. Paper presented at the *National Research Center on Learning Disabilities Responsiveness-to-Intervention Symposium*, Kansas City, MO.

McMaster, K. L., Fuchs, D., Fuchs, L. S., & Compton, D. L. (2005). Responding to nonresponders: An experimental field trial of identification and intervention methods. *Exceptional Children, 71*, 445–463.

Noell, G. H. & Gansle, K. A. (2006). Assuring the form has substance: Treatment plan implementation as the foundation of assessing response to intervention. *Assessment for Effective Intervention, 32*, 32–39.

National Research Center on Learning Disabilities. (2002). *Core Concepts of RTI.* Online at http://www.nrcld.org/html/research/rti/concepts.html (downloaded 6.23.2006).

O'Shaughnessy, T. E., Lane, K. L., Greshman, F. M., & Beebe-Frankenberger, M. E. (2003). Children placed at risk for learning and behavioral difficulties: Implementing a school-wide system of early identification and intervention. *Remedial & Special Education, 24*, 27–35.

President's Commission on Excellence in Special Education (2001). *A New Era: Revitalizing Special Education for Children and their Families.* Washington, DC: US Department of Education.

Reschly, R. J. (2003). What if LD identification changed to reflect research findings? Paper presented at the *National Research Center on Learning Disabilities Responsiveness-to-Intervention Symposium*, Kansas City, MO.

Ritchey, K. D. & Foley, J. E. (2006). Responsiveness to instruction as a method of identifying at-risk kindergarten readers: a one-year follow-up. Paper presented at the *Council for Exceptional Children Annual Conference*, Salt Lake City, UT.

VanDerHeyden, A. M. & Jimerson, S. R. (2005). Using response to intervention to enhance outcomes for children. *The California School Psychologist, 10*, 21–32.

VanDerHeyden, A. M., Witt, J. C., & Barnett, D. A. (2005). The emergence and possible futures of response to intervention. *Journal of Psychoeducational Assessment, 23*, 339–361.

VanDerHeyden, A. M., Witt, J. C., & Gilbertson, D. A. (2007). A multi-year evaluation of the effects of a response to intervention (RTI) model on the identification of children for special education. *Journal of School Psychology, 45*, 225–256.

VanDerHeyden, A. M., Witt, J. C., & Naquin, G. (2003). Development and validation of a process for screening referrals to special education. *School Psychology Review*, 32, 204–227.

Ysseldyke, J. (2005). Assessment and decision making for students with learning disabilities: What is this is as good as it gets? *Learning Disabilities Quarterly, 28*, 125–128.

Ysseldyke, J., Burns, M., Dawson, P., Kelley, B., Morrison, D., Ortiz, S., et al. (2006). *School Psychology: A Blueprint for Training in Practice III*. Bethesda, MD: National Association of School Psychologists.