

Williams, A.R. and Koppenhaver, D.A. (2014). When scientifically-based instruction may not be: Employing theory to reinterpret student failure to respond to intervention. *American Reading Forum Annual Yearbook* [Online]. Vol. 34.

**When Scientifically-Based Instruction May Not Be:
Employing Theory to Reinterpret Student Failure
to Respond to Intervention**

Amy R. Williams
University of North Georgia

David A. Koppenhaver
Appalachian State University

Abstract

In this article, the limited progress of four students who participated in a pilot study of a phonics intervention is analyzed. The students, who had a diagnosis of Down syndrome and moderate to severe intellectual disabilities, received research-based instruction over a period of five weeks. After analyzing the scientific basis and fidelity of the intervention, a theory of reading development for beginning readers is explained as a way to understand the failure of the instruction. Finally, a three-step process for educators is proposed as a method for reducing potential errors in identifying students as non-responders and reducing instruction that is ill matched with students' needs.

When Scientifically-Based Instruction May Not Be: Employing Theory to Reinterpret Student Failure to Respond to Intervention

“You spelled the word, cat, Mark. We want the word, cap. What letter do you need to change in cat so that it spells cap? He wears a baseball cap.” Mark repeated both his word and the target word aloud and then carefully examined his word and the remaining letter cards. Finally he removed the -t and replaced it with a -p. He looked up and said, “Cap.”

“You’re right, Mark. You spelled the word, cap. Here’s the word card that spells cap, c-a-p. Just like yours. Let’s put cap in the pocket chart with the other three-letter words.”

Mark’s face changed from a look of concentration to that of celebration, and he cheered himself on with a self-congratulatory, “Woohoo! Gooooo Mark!”

Introduction

The lesson snapshot above is representative of classroom interactions throughout a five-week pilot study of a phonics intervention for students with significant intellectual disabilities. Students were highly engaged and made every attempt to do what the teacher requested. The teacher provided intensive feedback and guidance, and she held high expectations of success. Each day, Mark and three of his classmates met one-to-one with the first author for 20-minute sessions in which they engaged in systematic, guided, invented spelling with targeted letters and words. The curriculum, *Making Words* (Cunningham & Cunningham, 1992; Cunningham & Hall, 2007), was based on scientific research evidence (National Reading Panel, 2000). The instruction, implemented with fidelity, was scientifically-based (Cunningham & Cunningham, 2002).

Despite these factors that should have contributed to successful learning, student progress was negligible. Across multiple measures, results suggested students’ failure to increase awareness or use of letter-sound correspondences in decoding or spelling. For example, on a kindergarten spelling list, the four students represented 10 of 48 initial letter sounds logically or conventionally at pretest and eight of 48 at posttest (e.g., *watk* for *wish*). They represented eight medial or final letter sounds logically at pretest and 11 at posttest.

Perspectives

We found the above student outcome both surprising and troubling for two reasons. First, it played to an existing bias in the field regarding literacy instruction appropriate to students with a diagnosis of Down syndrome and moderate to severe intellectual disabilities. Predominant instructional materials and approaches are designed on the belief that such students cannot learn phonics and should be taught exclusively through sight word approaches (e.g., Browder & Spooner, 2006; Edmark, 2011; Oelwein, 1995). Methods textbooks identify students like Mark and his classmates as those “who

will not achieve the outcome of literacy," although they "can benefit from sight word instruction" (Browder, 2001, pp. 179-180).

Second, Mark and his classmates attended high school in a state adhering to the Common Core State Standards. In just a few years they are supposed to be reading at levels sufficient for college or career readiness, although at present they are best characterized as emergent readers. Mark and his classmates are soon to be engaged in higher-order thinking and rigorous content, although, despite the best efforts of schools for more than 10 years, they cannot currently spell words like *cap* without guidance and feedback.

As educators, we found that attributing the failure to Mark and his classmates provided an uncomfortable dead end. While it relieved us of responsibility for the students' failure to respond, it also failed to suggest directions for future interventions. The RTI model provided no guidance, since the tiers of instruction had been exhausted, and Mark and his classmates were already receiving special education services. We feared the self-fulfilling prophecy of assuming that students like Mark could not learn phonics. Clearly they would not if we ended phonics instruction and pursued a functional sight word approach (e.g., Browder & Spooner, 2006).

Failure has been defined in the business literature as "termination of an initiative that has fallen short of its goals" (McGrath, 1999, p. 14). Business leaders and scholars have learned to value failure for the learning opportunity it provides. Thoughtful analysis of failure resolves uncertainty and enables more systematic progress based on broader and deeper understanding, more thoughtful planning, and purposeful action (Shepherd, 2004). In fact, it is such analysis that leads to the concept of *intelligent failures*, those in which expectations are not met but something useful is derived (Sitkin, 1992).

The objective of this paper, then, is to turn this pilot study into an intelligent failure by sharing the process of reflection engaged in to understand the failure to improve decoding and spelling in adolescents with significant intellectual disabilities. The important contribution of theory will be addressed as a means of interpreting the results and redesigning the intervention.

Failure Analysis Methods

If we do not assume that the failure to learn is centered in the students, what remains is an assumption that the instruction we offered must be the source of the problem. How was that possible when we had selected scientifically-based instruction and implemented it diligently with fidelity? In order to answer this question, we began a thorough review of our preparations for the intervention study. First, we reviewed the literature to make sure the intervention was indeed evidence-based.

Review of the Intervention's Scientific Basis

We had selected *Making Words First Grade* (Cunningham & Hall, 2007) as the

intervention to be implemented, because we knew the students, while adolescents, were beginning readers. Making Words is described as a “guided invented spelling instructional strategy” (Cunningham & Cunningham, 1992, p. 107). It is organized on evidence-based practices in phonics that suggest explicit and systematic phonics instruction is superior to nonsystematic approaches, but that no specific approach fitting those criteria is superior to others (National Reading Panel, 2000; Stahl, Duffy-Hester, & Stahl, 1998). It employs evidence-based practices in phonemic awareness also, requiring students to blend and segment sounds and to do so by using letters, which increase the efficiency of acquisition of phoneme awareness and phonics (National Reading Panel, 2000).

Review of Fidelity of Implementation

Confident that the intervention was scientifically-based, we next reviewed our teaching procedures to make sure that we had implemented the intervention with fidelity. Each Making Words lesson consisted of three steps. First, in the guided invented spelling step, students were given a pre-determined set of six to eight letters of the alphabet and led in spelling 10-15 words of increasing length. Students were directed initially to form two-letter words and systematically guided through spelling increasingly longer words. For example, students with the letters *a, t, m, s, r,* and *h,* were told, “Take two letters and spell the word *at*. We are *at* school. *At*.” The students were then shown the word card and asked to compare their attempts to the model. If they were correct, they then put the word in a pocket chart. If they were incorrect, they self-corrected or were directed to self-correct (as in the vignette above) before putting the word in the pocket chart. Then they were directed, “Add one letter and spell *hat*. You have a baseball *hat*. *Hat*.” For each new word, the students were guided to add or change one letter or to rearrange the existing letters (e.g., rearrange *rat* to spell *art*).

Next, in a sorting step, the students were supported in identifying patterns in the words they had spelled. For example, they might sort the words they spelled into those that rhymed (e.g., *at, sat, hat, rat, mat* and *am, ram, ham, Sam*). In a final transfer step, students were directed to spell specific new words that shared patterns with the words they had previously sorted. That is, the intent was to teach them to generalize the use of patterns by comparison and contrast in order to read and spell unfamiliar words. The students might be given directions such as, “If this is how you spell *am, ram, ham,* and *Sam,* how do you think you could spell *bam? Jam?*” or “Which sorting pattern would help you spell *bam? Jam?*” Typically three to four new words were attempted in this way.

We found that our procedures were consistent with previous descriptions of the approach, directions in the front matter of the book, and sample scripted lessons (Cunningham & Cunningham, 1992; Cunningham & Hall, 2007).

Reviewing Theories of Reading Development

We identified an explanation of the failure of our scientifically-based intervention when we returned to the literature to explore theories of how students become beginning readers. We considered many models, but found that Morris and colleagues’ theory of

reading development (Morris, 1993; Morris, Bloodgood, Lomax, & Perney, 2003) provided the most specific implications for teaching and learning. It provided evidence that beginning reading understandings develop in a predictable order.

According to the model, knowledge of letter names (ABC) is the earliest developing understanding. As parents and educators sing the alphabet song and point out letters in books, children's names, and the environment, children acquire letter name knowledge in predictable ways (Justice, Pence, Bowles, & Wiggins, 2006). This knowledge of the alphabet leads children to attend to beginning consonant sounds (BC) in words, possibly because most letter names carry the sound they represent at the beginning (e.g., /b/, /k/, /t/) or ending (e.g., /f/, /m/, /r/) of the letter name (Foulin, 2005).

As children increase their knowledge of the alphabet and awareness of beginning consonant sounds, they are able to attend more specifically to print on the page when parents and teachers read aloud to them and point to words on the page. Children begin to attend to the spaces between words, and they develop concept of word (CW), an understanding that words are groups of letters on the page (Henderson, 1980). Additionally this growing attention to white space and understanding of beginning consonant sounds facilitates attention to the relationship of letters to sounds at the beginning and end of words (SPBE) (Morris, 1992, 1993).

These understandings, in turn, assist beginning readers in attending more fully to the letters and sounds within words (PS), and, as this understanding is firmed up through additional print experiences, to gain sight word knowledge (WORD) (Adams, 1990) and increase independence as beginning readers of text (READ).

Results: From Theory to Understanding

When we looked at Mark's skills and understandings, and those of his classmates, relative to the model, the problem became clear. Prior to the intervention, Mark was able to name 19 letters of the alphabet and 10 initial phonemes represented by pictures (e.g., seeing a picture of a ball and saying /b/). However, he was unable to apply that knowledge in spelling or segmenting words. He spelled words like *trap* as *HoKicike*, *wish* as *othewewei*, and *ship* as *Hatthew*. He was able to identify just four words from the *Qualitative Reading Inventory-3* (Leslie & Caldwell, 2000), and he had no strategies for reading or spelling words he had not memorized. He was able to read short texts composed of these memorized words, if they were accompanied by supportive illustrations (e.g., reading aloud "The boy is in the red car" beneath a picture accompanying this sentence).

If Morris and colleagues' (Morris, 1993; Morris, Bloodgood, Lomax, & Perney, 2003) theoretical model were conceptualized as a bookshelf, Mark and his classmates possessed bookend knowledge. They knew most letters of the alphabet and some sight words, but they had few strategies or understandings between those bookend skills. The students had little knowledge of letter-sound relations and seemed to understand concept

of word only in short, memorized texts. They were unable to look within words at letter-sound relationships, because they had little meaning to attach to abstract phoneme awareness and insufficient practice reading, writing, or listening to texts.

What we learned from our failure and the review process described above is that scientifically-based interventions in the absence of a theory of learning are insufficient. They are neither better nor worse than random selection of interventions, and they may be worse than eclectic instruction, which sometimes offsets the impact of poor instructional choices by providing a wide variety of learning experiences and opportunities. With instructional choices in classrooms increasingly restricted to the well-worn paths of evidence-based instruction, if the instruction does not match the needs of the students, then there are fewer opportunities to balance out the error during the instructional day.

Conceptualizing the theoretical model as a planning tool, we learned that the kind of intervention more likely to yield positive literacy outcomes for Mark and his classmates would look quite different than what we had provided. Our intervention emphasized guided invented spelling of two- to six-letter words along with sorting and transferring of rime patterns. It was too difficult given the students' existing understandings of print. A more successful intervention might have instead built on the letter-sound knowledge available in letter names already known to the students. Such an intervention might have emphasized invented spelling in writing along with reading of a greater variety of easy texts to promote student connection-making between concept of word and attending to letter-sound relationships in the beginning and final positions in words. A successful intervention might have provided greater opportunities to explore and apply letter-sound knowledge in reading and spelling new words.

Educational Importance: From Understanding to Application

The mistake we committed may be common in many classrooms that select evidence-based practices in hopes of assisting beginning readers in learning to read at supplemental tiers or in special education placements. The problem this causes is then placing students in Tier 2, Tier 3, or special education placements on the mistaken assumption that they did not respond to scientifically-based instruction. In fact, they might well have responded to scientifically-based instruction had it addressed their needs. A three-step process provides a solution to reducing the potential for such: use of the theoretical model of beginning reading, assessment referenced to that model, and selection of evidence-based practices that address the students' identified needs.

A larger question may be whether the goals of the Common Core are realistic for students with significant intellectual disabilities. At least one large-scale research and development project currently is exploring this question, the Dynamic Learning Maps at Kansas University (<http://dynamiclearningmaps.org/>). In an attempt to make the Common Core more relevant to and achievable by this population, project team members have identified essential elements of each standard, developed an alternative assessment, and

posted professional development materials online for teachers and administrators (<http://secure.dynamiclearningmaps.org/unc/facilitated/>).

Use of the Theoretical Model

Evidence-based practices answer the question of what to teach, but provide little guidance in the case of struggling readers or students in special education about whom, when, or why. RTI provides guidance for whom and when to modify instruction (i.e., those who fail to thrive at one or more tiers of instruction) but no explanation as to why. The theoretical model answers the neglected question of why. Educators or program directors, who begin with the theoretical model, will understand whom, what, when, and why to teach.

Assessment Referenced to the Theoretical Model

A diagnostic assessment that aligns directly with the model is the *Early Reading Screening Instrument* (ERSI; Morris, 1998). Originally designed as a tool for screening at-risk beginning readers for additional assistance, the ERSI requires approximately 20 minutes to administer individually. Students' relative performance on the sub-tests can be compared in order to answer the question, "What is preventing this student from progressing as a beginning reader?" The student's greatest needs can be identified and subsequently addressed more intensively and specifically than previous instruction or tiered interventions that may not have assisted that student in progressing satisfactorily. The ERSI has been demonstrated to be both valid and reliable for the use proposed here (Lombardino, Morris, Mercado, DeFillipo, Sariskey, & Montgomery, 1999; Morris, Bloodgood, Lomax, & Perney, 2003; Perney, Morris, & Carter, 1997).

ERSI materials, with additional directions and suggestions, can be found in Tyner (2004) or Lombardino, Morris, Mercado, DeFillipo, Sariskey, & Montgomery (1999). Copies of the two short texts used for finger-point reading, that include color photo illustrations instead of the original black-and-white line drawings, are available online: *Katie* (<http://tarheelreader.org/2009/02/11/katie/>) and *My Home* (<http://tarheelreader.org/2009/02/11/my-home/>).

Selection of Evidence-Based Instruction

Armed with knowledge of a theory of beginning reading and student performance data, teachers and schools are prepared to consider what kind of scientifically-based instruction will be most likely to address their students' needs at appropriate levels. One source of information about evidence-based practices in beginning reading is the What Works Clearinghouse (<http://ies.ed.gov/ncee/wwc/>). Numerous additional sources can be found by Internet searches using terms like, "reading instruction best practices," "reading instruction that works," or "evidence-based reading instruction."

Intelligent Failure

We are hopeful that others can learn from our failure and gain a new appreciation of the role of theory in informing instructional decision-making. We are concerned that

schools may be selecting scientifically-based interventions without considering the match or mismatch to student needs. As we discovered, while many types of phonics instruction are scientifically-based, not all are equally appropriate. We are concerned that students may fail to respond, not because they cannot learn, but rather because the chosen instructional approach is not the best fit to their needs or existing skills and understandings. The resulting, and unnecessary, waste of increasingly scarce resources in response to failures incorrectly attributed to students would be unfortunate at best.

We are not suggesting that theory solves all instructional difficulties, and we recognize that there are a good many theories that might be considered in trying to develop more thoughtful approaches to student learning difficulties. It is important, however, that policy makers, school administrators, program coordinators, and teachers recognize that instruction cannot be considered high quality unless it addresses the needs of intended students at appropriate levels of support and challenge. Likewise, an intervention cannot be considered an intervention until and unless it addresses a student's needs. Assumptions of student literacy learning incapability will remain failures of instruction or program administration until and unless questions of the (mis)match of intervention and student needs are carefully considered.

References

- Adams, M. J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Browder, D. M. (2001). *Curriculum and assessment for students with moderate and severe disabilities*. New York, NY: Guilford.
- Browder, D. M., & Spooner, F. (2006). *Teaching language arts, math, and science to students with significant cognitive disabilities*. Baltimore, MD: Brookes Publishing.
- Cunningham, P. M., & Cunningham, J. W. (1992). Making words: Enhancing the invented spelling-decoding connection. *The Reading Teacher*, 46, 106-115.
- Cunningham, P. M., & Cunningham, J. W. (2002). What we know about how to teach phonics. In A. E. Farstrup & S. J. Samuels (Eds.), *What research has to say about reading instruction* (3rd ed., pp. 87–109). Newark, DE: International Reading Association.
- Cunningham, P. M., & Hall, D. P. (2007). *Making words first grade*. Upper Saddle River, NJ: Pearson.
- Edmark. (2011). *Edmark reading program: Level 1*. Austin, TX: Pro Ed.
- Foulin, J. N. (2005). Why is letter name knowledge such a good predictor of learning to read? *Reading and Writing*, 18, 129-155.
- Henderson, E. H. (1980). Developmental concepts of word. In E. H. Henderson & J. Beers (Eds.), *Developmental and cognitive aspects of learning to spell: A reflection of word knowledge* (pp. 1-14). Newark, DE: International Reading Association.
- Justice, L. M., Pence, K., Bowles, R. B., & Wiggins, A. (2006). An investigation of four hypotheses concerning the order by which 4-year-old children learn the alphabet letters. *Early Childhood Research Quarterly*, 21, 374-389.

- Leslie, L., & Caldwell, J. (2000). *Qualitative reading inventory-3* (3rd ed.). Boston, MA: Allyn and Bacon.
- Lombardino, L. J., Morris, D., Mercado, L., DeFillipo, F., Sarisky, C., & Montgomery, A. (1999). The early reading screening instrument: A method for identifying kindergarteners at risk for learning to read. *International Journal of Language and Communication Disorders, 34*, 135-150.
- McGrath, R. G. (1999). Falling forward: Real options reasoning an entrepreneurial failure. *The Academy of Management Review, 24*, 13-30.
- Morris, D. (1992). Concept of word: A pivotal understanding in the learning-to-read process. In S. Templeton & D. Bear (Eds.), *Development of orthographic knowledge and the foundations of literacy* (pp. 55-77). Hillsdale, NJ: Erlbaum.
- Morris, D. (1993). The relationship between beginning readers' concept of word in text and phoneme awareness in learning to read: A longitudinal study. *Research in the Teaching of English, 27*, 133-154.
- Morris, D., (1998). Assessing printed word knowledge in beginning readers: The early reading screening instrument (ERSI). *Illinois Reading Council Journal, 26* (2), 30-40.
- Morris, D., Bloodgood, J. W., Lomax, R. G., & Perney, J. (2003). Developmental steps in learning to read: A longitudinal study in kindergarten and first grade. *Reading Research Quarterly, 38*, 302-328.
- National Reading Panel (2000). *Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction* (National Institute of Health Pub. No. 00-4769). Washington, DC: National Institute of Child Health and Human Development.
- Oelwein, P. L. (1995). *Teaching reading to children with Down syndrome: A guide for parents and teachers*. Bethesda, MD: Woodbine House.
- Perney, J., Morris, D., & Carter, S. (1997). Factorial and predictive validity of first graders' scores on the early reading screening instrument. *Psychological Reports, 81*, 207-210.
- Shepherd, D. A. (2004). Educating entrepreneurship students about emotion and learning from failure. *Academy of Management Learning and Education, 3*, 274-287.
- Sitkin, S. B. (1992). Learning through failure: The strategy of small losses. In B. M. Staw & L. L. Cummings (Vol. Eds.), *Research in organizational behavior* (pp. 231-266). Greenwich, CT: JAI Press.
- Stahl, S. A., Duffy-Hester, A. M., Stahl, K. A. D. (1998). Everything you wanted to know about phonics (but were afraid to ask). *Reading Research Quarterly, 33*, 338-355.
- Tyner, B. (2004). *Small-group reading instruction: A differentiated teaching model for beginning and struggling readers*. Newark, DE: International Reading Association.