



Spelling Connections®

Current Research on Spelling Instruction
by J. Richard Gentry, Ph.D.



Introduction

Dr. J. Richard Gentry, a nationally acclaimed expert in literacy with particular research focus in spelling and beginning reading development, began his career as a classroom teacher. He earned his Ph.D. in reading education from the University of Virginia and served as professor of elementary education and reading at Western Carolina University. Dr. Gentry's research, writing, and extensive work with students and teachers for more than 30 years have had a powerful impact on the promotion of literacy.

In addition to writing popular books such as *The Science of Spelling*, *Spel...Is a Four-Letter Word*, *Teaching Kids to Spell*, *My Kid Can't Spell!*, and *Breakthrough in Beginning Reading and Writing*, Dr. Gentry conducts workshops that have helped thousands of school districts adopt better practices for spelling instruction. He blogs for the prestigious *PsychologyToday.com* website, offering commentary on a range of topics, including education and policy, reading and the brain, baby/toddler reading, and the Common Core State Standards.

Dr. Gentry is the author of *Spelling Connections*, which provides the curriculum and resources you need to deliver effective, explicit, research-based instruction in spelling. More than 30 years of spelling research and research synthesis have contributed to the success and effectiveness of *Spelling Connections*. No other program offers the extensive research perspective outlined below.

Spelling Connections: Current Research A Conversation

What does the latest research say about teaching spelling in the 21st century?

The latest research shouts out “spelling matters!” There’s more evidence today than ever before that spelling is foundational for reading. Advanced research in cognitive science, including brain scan science, is demonstrating that spelling may be the missing link to reading success in America, where 66% of fourth graders read below proficiency levels (Annie E. Casey Foundation, 2014)—almost all of these kids are poor spellers.

Spelling may
be the missing
link to reading
success.

There’s a direct connection between poor spelling and poor reading (Adams, 2011; Gentry & Graham, 2010; Moats, 2005; Reed, 2012), and a disconnect between the latest spelling research and what’s happening in many schools. The disconnect is that research calls for explicit spelling instruction, and many of our nation’s schools are potentially harming children by not teaching spelling explicitly. When we don’t teach spelling well, children struggle or fail with reading, as evidenced by our nation’s fourth-grade reading scores.

The latest research is unequivocal that spelling matters for reading. Take, for example, renowned cognitive psychologist Dan Willingham, author of the highly regarded book *Raising Kids Who Read* (2015). He says that spelling is, in fact, the spark that ignites the reading circuitry in our brains. Willingham calls for teaching spelling to raise reading achievement and help solve America’s reading problems.

Using clear and straightforward language to describe the central role of spelling in the reading brain, Willingham posits *two processes of decoding*: sounding out words using phonics, which research shows is essential for beginning reading, and matching letters on the page with the spelling representations in the brain. These representations are processed in the occipitotemporal region, which houses the visual word form area (Dehaene & Cohen, 2011).

As readers mature, they do not read letter-by-letter but instead process ordered pairs of letters (common spelling pieces such as *th*, for instance); morphemes; and small words. Spelling representations in the mind match with the print on the page and jumpstart the reading circuitry, automatically activating sound and meaning. Ideally, in Dr. Willingham’s words, “[U]sing word spellings to read requires very little attention, if any. You see it in the same way you just see and recognize a dog.” He continues, “As your child gains reading experience, there is a larger and larger set of words that he can read using the spelling, and so his reading becomes faster, smoother, and more accurate. That’s called *fluency*” (p. 133).

Solid recent research studies on spelling agree that spelling is foundational for reading (Abbott, Berninger, & Fayol, 2010; Gentry & Graham, 2010; Moats, 2005; Reed, 2012) as well as for writing (Kandel & Perrett, 2015; Graham & Santangelo, 2014; McCutcheon & Stull, 2015). The takeaway is that here at the beginning of the 21st century, we've learned much more about spelling as a brain-building boon for effective reading and writing, creating a "dictionary in the brain" for every reader and writer. Fluent reading is a process of instantly matching the words on the page with the dictionary of spellings in the brain, and fluent writing is getting thoughts on paper as fast as you can think them (Gentry, 2004; Paulesu et al., 2001; Willingham, 2015).

What specific new research developments are reflected in the new *Spelling Connections*?

One of the most influential research reports of this decade, *Improving Students' Learning With Effective Learning Techniques: Promising Directions From Cognitive and Educational Psychology* (Dunlosky et al., 2013), supports *Spelling Connections'* strategic approach to teaching spelling. We use a strategic five-day lesson plan in every unit and include all five strategies psychologists have found to be the best learning strategies for students: self-testing, self-explanation, elaborative interrogation, distributed practice, and interleaved practice. No other spelling program that I am aware of can make this claim.

Here's how *Spelling Connections* uses all five effective learning techniques:

1 Self-testing

In every weekly unit, students take a pretest on the very first day. They find out what words they need to learn, focus on studying these unknown words, and take a Friday test to find out if they have mastered the unknown words. Our research-based test-study-test cycle is an example of self-testing, which the study by Dunlosky and colleagues found to be the single most effective learning technique. Although simply assigning and memorizing words for a Friday test is certainly *not* supported by research, our strategic methods for the "study" component of the weekly test-study-test cycle ensure that list words aren't simply being memorized—they are being committed to deep levels of learning.

2 Self-explanation

In weekly word sorting activities, we have students "explain to yourself" how a particular spelling pattern works for English spelling. For example, we have them explain how a word sort relates to what they already know. If they already know how to read the sight words *hop* and *hope*, they learn to "explain to themselves" how to spell other words similar to *hop* and *hope* with the respective C-V-C short vowel pattern, and the C-V-Ce (consonant-vowel-consonant-silent e) long vowel pattern. With self-explanation, students are building on what they already know and relating it to what they are learning.

3 Elaborative interrogation

Each week we have students explain to themselves *why* patterned words are spelled in certain ways. In other words, they “interrogate” themselves and ask, “Why is *hop* spelled h-o-p and *hope* spelled h-o-p-e?” Note that the strategies of self-explanation and elaborative interrogation in this list—the *how* and *why*—are similar; both are included because self-explanation and elaborative interrogation grew out of two separate lines of cognitive psychological research.

4 Distributed practice

With each unit in our five-day lesson plan, *Spelling Connections* distributes practice across the instructional week by offering strategies for students to practice their words in different ways. For example, they can choose from the multi-modal flip folder, meaningful activities on each of the five practice pages, self-testing with a partner, four different computer practice games, and other options. Research shows that practicing new words in different ways is the second most effective learning technique for students.

5 Interleaved practice

Each weekly unit contains efficient, daily practice activities: the student revisits the words every day. This “leave it and come back to it” approach is a very effective learning technique.

Spelling Connections is proud to be on the cutting edge of what cognitive psychologists and educators have found to be best learning practices. We challenge you to find any spelling program that does it better.

How does the foundational research for *Spelling Connections* differ from other methods of teaching spelling?

Comprehensive is the key word. *Spelling Connections* is based on a comprehensive synthesis of research underscoring the fact that learning to spell is complex. Other methods often focus on a single research-based principle or a gimmick that is not research based. For example, memorizing high-use words alone or using word sorting alone is referred to as a single strategy system, in contrast to *Spelling Connections*, which is a multi-strategy system. Multi-strategy systems are more robust (Sharp, Sinatra, & Reynolds, 2008). The deep research base for *Spelling Connections* covers a wide range of spelling strategies and research-based practices; it also reflects the complexity of spelling and

The deep research base for *Spelling Connections* covers a wide range of spelling strategies and research-based practices.

the important connection of spelling to reading and writing (Gentry, 2004). Research clearly documents that knowledge of spelling is connected to reading, writing, and vocabulary development because they all depend upon the same underlying language abilities (Snow, Griffin, & Burns, 2005; Alstad et al., 2015).

Can schools afford to purchase research-based spelling books?

According to renowned researcher Virginia Wise Berninger, Ph.D., Professor of Educational Psychology at the University of Washington, schools can't afford *not* to! Dr. Berninger has over twenty years of NICH-funded research. Here's what she has to say:

In an era of limited financial resources, it is important to keep in mind that systematic handwriting AND spelling instruction can reduce the number of children needing special education services. With appropriate, systematic, and sustained handwriting and spelling instruction K to 5, many specific learning disabilities involving some aspect of writing (estimated one in five students) can be prevented, reducing costs for more expensive special education services. (Berninger, 2015)

Fiscal responsibility continues to be important in our nation's schools, so the real question becomes, if, according to the U.S. Census Bureau, the U.S. spends \$321 billion a year on instructional material, and the system is producing 65% of fourth graders who are *NOT* proficient readers, are we being fiscally responsible? The harsh reality is that school systems are spending billions of dollars on current reading programs and solutions that often do not offer the research-backed, explicit spelling instruction that our children need today.

Why is explicit spelling instruction essential?

There are two theories regarding instructional approaches for spelling acquisition that basically come down to explicit instruction versus Whole Language approaches (Allal, 1997). *Spelling Connections* is comprehensive and includes explicit instruction as well as best practices that grew out of Whole Language, such as connecting spelling to writing and word sorting. The pure Whole Language approaches such as teaching spelling in mini-lessons in writing workshop or allowing words from the basal reading program to drive spelling instruction are not supported by empirical research (Allal, 1997; Gentry, 2013). Although relegating spelling to the writing workshop or basal reading program might seem desirable, research has not come forth to

- support abandoning explicit, standalone spelling instruction.
- support abandoning a research-based curriculum for an inquiry-based word sorting program.
- validate nonsystematic spelling instruction in the context of "writer's workshop" or writing lessons (Joshi et al., 2008/2009; Allal, 1997).

Spelling Connections teaches spelling explicitly and also recognizes the functional, social, and contextual advantages to connecting spelling to writing and reading. Every unit helps teachers make these powerful connections to reading and writing.

Where did the spelling list come from?

The spelling word list and its organization for study are vital to a good spelling program. Students need the right words at the right time. We used an algorithm to identify foundational, grade-appropriate words that writers and readers use at every grade level. Teachers should avoid using randomly generated lists from the Internet or from a reading program. We know from research that we should choose words and patterns to connect spelling to reading. Research also demonstrates that a spelling program must teach the words that students use in writing (E. Horn, 1960; Hollingsworth, 1965; T.D. Horn, 1969; Graves, 1981; Smith & Ingersoll, 1984). A good spelling program will identify these words by using both studies of children's writings (Rinsland, 1945; Smith & Ingersoll, 1984) and studies of how often particular words appear in print (Thorndike & Lorge, 1944; Kucera, Francis, Carroll, & Waddell, 1967; Carroll et al., 1971; Fry et al., 1985; Venezky, 1999; Moats, 2005). Other considerations should include the word's degree of difficulty, universality, permanence, and application to other areas of the curriculum.

We know from research that we should choose words and patterns to connect spelling to reading.

We conducted the most thorough word analysis ever accomplished to develop the word lists in *Spelling Connections*. In all, 22 published word lists and vocabulary studies were analyzed. The result was a list of more than 7,800 words organized in these word categories: on grade level, above grade level, below grade level, review, and assessment. Word selection criteria included words most frequently used at specific grade levels for writing (writing level), words most frequently used for reading (reading level), difficulty level for students at particular grade levels (proficiency level), and other criteria such as frequently misspelled words in each grade.

How can I be sure words are presented at the appropriate grade level?

Research provides clear evidence that spelling should be taught systematically (T.D. Horn, 1969; Joshi et al., 2008/2009). The right words and patterns must be presented at the right time. Because spelling growth is a developmental process, the organization of words and their placement make a difference in how easily students learn to spell them. Word lists are organized so that students are first assessed to determine what words they already know (the pretest). The lists are sequenced so that new learning is built upon previous lessons and what children already know (Bear et al., 2000; Ganske, 2000).

The *Spelling Connections* word list is organized according to principles set forth by linguistic, cognitive, and developmental theory research. We have incorporated massive research evidence for teaching letter recognition, the alphabetic principle, and phonics (Adams, 1990; National Research Council, 1998; National Reading Panel, 2000) at the appropriate age. This is much more effective than pulling random lists from the Internet or choosing words based on weekly reading exercises. Such approaches ignore the critical foundational spelling skills that children must master in the correct order.

Our curriculum is informed by phase observation and developmental research on the development of sound, pattern, and meaning (Ehri, 1997; Gentry, 1982, 2007; Templeton & Morris, 2000). It includes morphological development for prefixes and suffixes, Greek and Latin bases or roots, and word histories and origins (Venezky, 1999; Moats, 2005).

What are the best strategies for teaching spelling?

Spelling Connections includes all the best practice strategies for teaching spelling: The pretest-study-posttest cycle, word sorting, teaching a few spelling rules, and interleaved practice of meaningful exercises offers correct balance and variety. In a comprehensive review of spelling research, Steve Graham (1983) validated the use of the language-based, standalone program with the pretest-study-posttest word lists (Graham, 1983, p. 563, reported in Allal, 1997, p. 135). Graham outlined five research-based principles in his synthesis that still hold today:

- 1 Use word lists but not arbitrary lists. Construct lists to reflect words and patterns likely to be used by writers at developmentally appropriate grade levels and teach a few key rules.
- 2 Pretest and have students self-correct.
- 3 Teach students to use a research-based word study technique. Our look-say-see-write-check technique is directly based on a multi-modal method validated by Ernest Horn (Horn, 1954).
- 4 Use the test-study-test cycle.
- 5 Use spelling games and other alternative activities such as word sorting to increase motivation and to take advantage of the social context of learning.

Each of these research-based strategies has been built into *Spelling Connections*. *Spelling Connections* enables students to build a deep and wide word-specific knowledge base to support the reading, writing, and communication skills needed for language proficiency.

References:

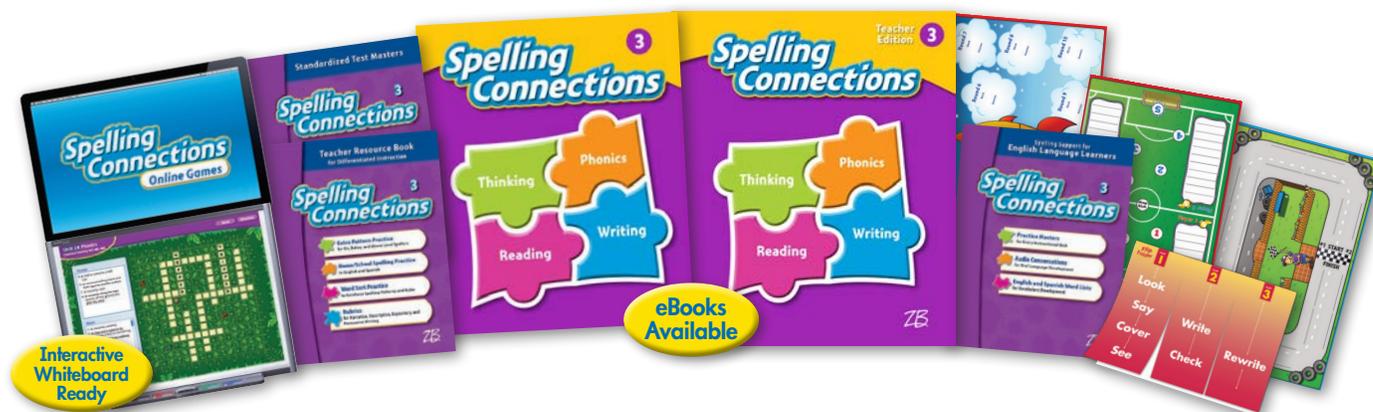
- Abbott, R., Berninger, V., & Fayol, M. (2010). Longitudinal relationships of levels of language in writing and between writing and reading in grades 1 to 7. *Journal of Educational Psychology*, 102, 281–298.
- Adams, M. (1990). *Beginning to read: Thinking and learning about print*. Cambridge, MA: MIT Press.
- Adams, M.J. (2011). The relation between alphabetic basics, word recognition, and reading. In S.J. Samuels & A.E. Farstrup (Eds.), *What research has to say about reading instruction* (4th ed., pp. 4–24). Newark, DE: International Reading Association.
- Allal, L. (1997). Learning to spell in the classroom. In C.A. Perfetti, L. Rieben, & M. Fayol (Eds.), *Learning to spell*. London, U.K.: Lawrence Erlbaum Associates.
- Alstad Z., Sanders, E., Abbott, R.D., Barnett, A.L., Henderson, S.E., Connelly, V., & Berninger, V.W. (2015). Modes of alphabet letter production during middle childhood and adolescence: Interrelationships with each other and other writing skills. *Journal of Writing Research*, 6(3), 199–231.
- Annie E. Casey Foundation. (2014). Fourth Grade Reading Achievement Levels [tables], National KIDS COUNT. Retrieved from <http://datacenter.kidscount.org/data>.
- Bear, D., Invernizzi, M., Templeton, S., & Johnston, F. (2000). *Words their way*. Columbus, OH: Merrill/Prentice Hall.
- Berninger, V.W. (2015). *Research support for Ohio House Bill 146*. Position paper submitted June 20, 2015, to Ohio State Legislature.
- Carroll, J., Davies, P., & Richman, B. (1971). *The American Heritage word frequency book*. Boston, MA: Houghton Mifflin.
- Dehaene, S., & Cohen, L. The unique role of the visual word form area in reading. *Trends in Cognitive Science*, 15(6), 254–262.
- Dunlosky, J., Rawson, K.A., Marsh, E.J., Nathan, M.J., & Willingham, D.T. (2013). Improving students' learning with effective learning techniques: Promising directions from cognitive and educational psychology. *Psychological Science in the Public Interest*, 14(1), 4–58.
- Ehri, L.C. (1997). Learning to read and learning to spell are one and the same, almost. In C.A. Perfetti, L. Rieben, & M. Fayol (Eds.), *Learning to spell*. London, U.K.: Lawrence Erlbaum Associates.
- Fry, E.B., Fountoukidis, D.L., & Polk, J.K. (1985). *The new reading teacher's book of lists*. Englewood Cliffs, NJ: Prentice Hall.
- Ganske, K. (2000). *Word journeys: Assessment-guided phonics, spelling, and vocabulary instruction*. New York, NY: Guilford.
- Gentry, J.R. (1982). An analysis of developmental spelling in GNYS at WRK. *The Reading Teacher*, 36, 192–200.
- Gentry, J.R. (2004). *The science of spelling: The explicit specifics that make great readers and writers (and spellers!)*. Portsmouth, NH: Heinemann.

References (continued)

- Gentry, J.R. (2006). *Breaking the code: The new science of beginning reading and writing*. Portsmouth, NH: Heinemann.
- Gentry, J.R. (2007). *Breakthrough in beginning reading and writing*. New York, NY: Scholastic.
- Gentry, J.R. (2013). New standards demand higher expectations or spelling: Standards and state tests focus new attention on spelling instruction. Retrieved August 15, 2015, from <https://www.psychologytoday.com/blog/raising-readers-writers-and-spellers/201302/new-standards-demand-higher-expectations-spelling>.
- Gentry, J.R., & Graham, S. (2010). *Creating better readers and writers: The importance of direct, systematic spelling and handwriting instruction in improving academic performance*. Columbus, OH: Saperstein Associates.
- Graham, S. (1983). Effective spelling instruction. *The Elementary School Journal*, 83, 560–567.
- Graham, S., & Santangelo, T. (2014). Does spelling instruction make students better spellers, readers, and writers? A meta-analytic review. *Reading and Writing*, 27, 1703–1743.
- Graves, D.H. (1981). A new look at research on writing. In S. Haley-James (Ed.), *Perspectives on writing research in grades 1–8*. Champaign, IL: National Council of Teachers of English.
- Hollingsworth, P.M. (1965). Spelling lists—outdated? *Elementary English*, 42(2), 151–152.
- Horn, E. (1954). *Teaching spelling*. Washington, DC: American Educational Research Association.
- Horn, E. (1960). Spelling. *Encyclopedia of educational research*. New York, NY: Macmillan.
- Horn, T.D. (1969). Spelling. *Encyclopedia of educational research* (4th ed.). New York, NY: Macmillan.
- Joshi, M., Treiman, R., Carreker, S., & Moats, L.C. (2008/2009). How words cast their spell: Spelling is an integral part of learning the language, not a matter of memorization. *American Educator*, 32(4), 6–16, 42–43.
- Kandel, S., & Perret, C. (2015). How does the interaction between spelling and motor processes build up during writing acquisition? *Cognition*, 136, 325–336.
- Kucera, H., Francis, W.N., Carroll, J.B., & Waddell, W.F. (1967). *Computational analysis of present day American English*. Providence, RI: Brown University Press.
- McCutcheon, D., & Stull, S. (2015). Morphological awareness and children’s writing: Accuracy, error, and invention. *Reading and Writing*, 28, 271–289.
- Moats, L.C. (2005). How spelling supports reading: And why it is more regular and predictable than you may think. *American Educator*, 29(4), 12, 14–22, 42–43.
- 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*. Retrieved from <http://www.nichd.nih.gov/publications/nrp/report.cfm>.
- National Research Council. (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

- Paulesu, E., Demonet, J.F., Fazio, F., McCrory, E., Chanoine, V., Brunswick, N., ... Frith, U. (2001). Dyslexia: Cultural diversity and biological unity. *Science*, 291(5511), 2165–2167.
- Reed, D.K. (2012). *Why teach spelling?* Portsmouth, NH: RMC Research Corporation, Center on Instruction.
- Rinsland, H. (1945). *A basic vocabulary of elementary school children*. New York, NY: Macmillan.
- Sharp, A.C., Sinatra, G.M., & Reynolds, R.E. (2008). The development of children's orthographic knowledge: A microgenetic perspective. *Reading Research Quarterly*, 43(3), 206–226.
- Smith, C.B., & Ingersoll, G.M. (1984). *Written vocabulary of elementary school pupils, ages 6–14*. Bloomington, IN: Indiana University.
- Snow, C., Griffin, P., & Burns, M.S. (2005). *Knowledge to support the teaching of reading: Preparing teachers for a changing world*. San Francisco, CA: Jossey-Bass.
- Templeton, S., & Morris, D. (2000). Spelling. In M. L. Kamil, R. Barr, P. D. Pearson, & P. B. Mosenthal (Eds.), *Handbook of reading research* (vol. 3, pp. 525-543). Mahwah, NJ: Erlbaum.
- Thorndike, E.L., & Lorge, I. (1944). *The teacher's word book of 30,000 words*. New York, NY: Teachers' College, Columbia University.
- Venezky, R.L. (1999). *The American way of spelling: The structure and origins of American English orthography*. New York, NY: Guilford.
- Willingham, D.T. (2015). *Raising kids who read*. San Francisco, CA: Jossey-Bass.

Spelling Connections



Interactive
Whiteboard
Ready

eBooks
Available

Spelling Connections provides complete, explicit instruction.

- Differentiated instruction every day
- Support for all four levels of English language acquisition
- Daily word sorts for on, below, and above level students
- Diagnostic, formative, and summative assessments, including integrated standardized test practice
- Integrated technology, including fun games and practice activities
- Spelling Tutor QR codes for using a mobile device to listen to spelling words being spelled out loud and used in sentences

Call 800.421.3018

Click www.zaner-bloser.com