

WHAT WORKS?

Research into Practice

A research-into-practice series produced by a partnership between the Literacy and Numeracy Secretariat and the Ontario Association of Deans of Education

Research Monograph # 41

What can classroom teachers do to develop word knowledge in children who need it most?

Morphology Works

by Dr. John R. Kirby and Peter N. Bowers
Queen's University

Vocabulary knowledge is an important aspect of cognitive development. It contributes to success in word reading and reading comprehension¹ and thus has implications for learning in *all* subjects.

Children's vocabulary achievements are staggering. By age 10, average children know about 40,000 root words² – learning about 4,000 words per year, the majority coming during school years. By contrast, children from disadvantaged backgrounds are likely to be challenged with respect to vocabulary development and to fall further and further behind over time. Some studies suggest that disadvantaged children acquire vocabulary at about one-third to one-half the rate of more advantaged children, which contributes to widening the gap³. This presents a huge challenge: even if taught ten new words a week for 40 weeks for each year from Grade 1 to Grade 5, this represents only 2,000 additional words compared to the 20,000+ words that an average student would learn over this same period. And because children with low vocabulary scores learn new words more slowly,³ it is unlikely that those who need vocabulary development the most will remember even half of these words.

Morphology Works

Morphology describes how words are composed of meaningful parts. It is fundamentally related to semantics, but it also provides clues about how words should be written and pronounced.

1. *Both the quantity and quality of word knowledge are very important.*
2. *Morphological awareness predicts reading development.*
3. *Teaching morphology increases vocabulary and reading achievement.*

JOHN R. KIRBY is a professor of Educational Psychology in the Faculty of Education at Queen's University. His research concerns the cognitive processes involved in learning to read and in learning from reading. He is the co-editor of the forthcoming book, *Enhancing the Quality of Learning* (Cambridge University Press).

PETER N. BOWERS is a PhD student in the Faculty of Education at Queen's University. His research focuses on morphology, morphological instruction and literacy learning. He was a classroom teacher for 10 years and continues to work regularly with students and teachers as founder of the WordWorks Literacy Centre.

What Research Tells Us

The research literature makes three important points:

1. *Both the quantity and quality of word knowledge are very important.*

Recent research and theory have emphasized the importance of word knowledge in language and literacy development. Word knowledge goes far beyond knowing a simple definition of a word or being able to pronounce it. All aspects of word knowledge (word meanings, syntactic roles, how the word sounds, and how the word is written) are linked in mental representations and the quality of those mental representations determines how well the word knowledge can be used.⁴ Word knowledge is of higher quality, for instance, if the aspects are strongly linked and if deeper or alternative meanings or syntactic roles are known.

The Student Achievement Division is committed to providing teachers with current research on instruction and learning. The opinions and conclusions contained in these monographs are, however, those of the authors and do not necessarily reflect the policies, views, or directions of the Ontario Ministry of Education or the Student Achievement Division.

Some free websites for teachers

Real Spellers

- a forum used by teachers, students and linguists to discuss investigations of the spelling and meaning of words with the aid of matrices and word sums
www.realspellers.org

WordWorks

- free resources, including lessons and videos, illustrating morphological instruction with matrices and word sums in classes from K-8
www.wordworkskingston.com

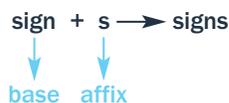
Word Building and Spelling Experiments in English Morphology

- various free tools, including the Word Searcher, that are designed to help teachers create lessons and help children investigate the spelling and meaning of words
www.neilramsdens.co.uk/spelling

Vocabulogic

- blog for educators and researchers addressing vocabulary instruction that includes an emphasis on morphology
www.vocablog-plc.blogspot.com

An important component of word knowledge is morphology which describes how words are composed of meaningful parts. A morpheme is the smallest meaningful unit of language. Some words consist of only one morpheme (e.g., *sign*, *table* and *have*), while many others are composed of two or more morphemes (e.g., *signs*, *design*, *resign*, *signature* and *designation*). A helpful way to represent the morphological structure of words is to use word sums. For instance, *signs* is composed of two morphemes as illustrated in the following word sum:



Similarly, the word *designation* is composed of four morphemes, as shown below:



In both examples, the <sign> unit is the base (also referred to as the root) and the others are affixes. See Table 1 for a list of common affixes.

Table 1: A selection of affixes

Prefixes	Suffixes	
	Vowel suffixes	Consonant suffixes
a-, ad-, al-, be-, bi-, com-, contra-, de-, di-, dia-, dis-, en-, ex-, in-, inter-, intro-, mis-, non-, ob-, para-, per-, pre-, re-, se-, sub-, syn-, tele-, trans-, un-	-ability, -acle, -acy, -al, -ance, -ate, -ed, -eer, -ence, -er, -ery, -ian, ibility, -icle, -ing, -ion, -ique, -ism, -ity, -ive, -ize, -or, -ory, -ous, -ule, -ure	-cy, -dom, -ful, -hood, -less, -let, -ling, -ly, -ment, -ness, -ry, -s, -ship, -some, -st, -th, -ty, -war

The basic problem in learning to read words is associating semantics (what words mean), orthography (how words are written) and phonology (how words are pronounced). Morphology is fundamentally related to semantics, but it also provides important clues about how words should be written and pronounced. For example, morphology helps us know that the “un” sound at the end of *designation* is not written <un>, because it stands for the <-ion> suffix. Morphology also provides clues about how to pronounce words; for example, the <ea> in *reach* represents one sound because it is within a morpheme, whereas in *react* these letters represent two sounds because they are in separate morphemes.

2. Morphological awareness predicts reading development.

Morphological awareness is the term used to describe one’s sensitivity to morphological structure and one’s ability to manipulate that structure.⁵ Our prior research has explored the possibility that morphology provides a key to developing both word knowledge and high quality mental representations and that knowledge of morphology contributes to success in reading in children from Grades 1 to 6.^{6,7,8} We and others have shown that it contributes to word reading and to reading comprehension.^{9,10}

In these studies, other important predictors of reading development (such as phonological awareness and intelligence) were controlled. This means that the effects of morphological awareness were not inadvertently due to the other variables. Furthermore, the effect of morphological awareness was as strong as that of those other predictors, and often stronger.

3. Teaching morphology increases vocabulary and reading achievement.

Our review of 22 studies, with participants from preschool to Grade 8, found that instruction that targeted morphology resulted in higher literacy and language achievement (in word reading, spelling, reading comprehension, and vocabulary) than instruction that did not.⁷ Morphological instruction was more effective with children in early grades (pre-K–2 compared with 3–8) and with children with underdeveloped skills (compared to those who were more advanced). Morphological instruction was more effective when it was combined with other aspects of language arts instruction; this makes sense, because morphology helps to integrate other aspects of reading (semantics, orthography and phonology).

Implications for Classroom Practice

Although many children develop considerable morphological awareness on their own, explicit instruction is much more likely to result in extensive, accurate and generalizable morphological awareness. This, in turn, is more likely to contribute to reading success.¹¹ We suggest that it is well worth teachers’ time to engage in morphological instruction from kindergarten onwards. There are opportunities in every subject to demonstrate morphological regularities. Though instruction should be primarily oral at the beginning, written morphology should soon become involved. We emphasize that morphology should be used to augment, not to replace, current instructional practices.

English makes use of three kinds of morphological construction: inflections, derivations and compounds. Inflections are word endings that change grammatical roles: plurals, past tenses, gerunds, etc. English has far fewer inflections than many other alphabetic languages and therefore children should be expected to master them early, first orally and then in writing. Derivations are ways of creating new words, often in new grammatical categories; thus *happy* (adjective) becomes *happily* (adverb). Derivations are so numerous and many are so obscure that few adults will master them; for example, *duct* (for “lead, bring”) is the base of *educate* and *reduction*. Further, some bases are not words by themselves (for instance, the *struct* in *construction*). Compounds are made when two bases are joined to make a new word, such as *deadline* or *handbag*. We think that children should be exposed to these ways in which English works, gently at first, of course, but then more formally.

Two tools that we have used to help children learn morphology are the word sums introduced earlier and word matrices.¹² Each word matrix provides a concrete representation of the interrelation of written morphemes in a morphological family (see Figure 1).

Figure 1: A matrix representing members of the <sign> morphological family

un		sign	s	
			ed	ing
re	de	sign	al	
			ate	ure ion

In teaching to increase morphological knowledge and awareness, the texts that are used should be considered. Expository texts provide exposure to a wider variety of members of morphological families than narrative texts.¹³ Thus, increased attention to expository texts may facilitate the development of morphological and vocabulary knowledge.

Some sources on morphology ...

Bowers, P. (2009). *Teaching how the written word works*. (Available from www.wordworkskingston.com)

Henry, M. K. (2003/2010). *Unlocking literacy: Effective decoding & spelling instruction* (2nd ed.). Baltimore, MD: Brookes.

Ganske, K. (2000). *Word journeys: Assessment-guided phonics, spelling, and vocabulary instruction*. New York, NY: Guilford Press.

Invernizzi, J., Johnston, F. R., Bear, D. R., & Templeton, S. (2008). *Some* (2nd ed.). Indianapolis, IN: Prentice Hall.

McQuirter Scott, R. (2008). *Knowing words: Creating word-rich classrooms*. Toronto, ON: Nelson.

Example Morphological Instruction Practices

Learn More about LNS Resources ...

Online:
www.edu.gov.on.ca/eng/literacynumeracy/publications.html

Call:
416-325-2929
1-800-387-5514

Email:
LNS@ontario.ca

- *Use a Word Detective approach:* After a morphological pattern has been taught, encourage students to search for examples in class texts.
- *Incorporate word sums and word matrices:* Present words that might be related by a base (e.g., *interrupt*, *corrupt*, *eruption*) Have students identify a common base and test their hypotheses using word sums (e.g., inter + rupt, cor + rupt, e + rupt). Then construct a word matrix around this base.
- *Collect data banks of morphemes:* Create a sticky note morpheme chart in the class, adding affixes and bases as you encounter them.
- *Use expository texts from a variety of subjects:* For example, in a lesson on condensation in science, address the “density” of molecules in different states of matter. Use a word sum to identify the link in spelling and meaning between these words and their common base <dense> (con + dense/ + ate/ + ion → condensation; dense/ + ity → density).
- *Invite students to use a SMART Board:* This is good visual tool for matching morphemes with meanings and/or circling base words.
- *Have students create sets of colour-coded morpheme cards:* Students can use one colour for prefixes, another for suffixes. As new base words are introduced, have students create corresponding white cards, to use in conjunction with their affix cards.

In Sum

Many teachers are beginning to include morphological instruction in their language arts programs. They usually report that children find morphology exciting, especially if Word Detective approaches are used.^{6,14} It is possible that some children with reading disabilities will benefit from morphological instruction, even if they continue to struggle with phonological processing. We think morphological instruction offers students exciting opportunities for developing word knowledge, improving reading comprehension and increasing vocabulary.

REFERENCES

1. Biemiller, A. (2004). Teaching vocabulary in the primary grades: Vocabulary instruction needed. In J. F. Baumann & E. J. Kame'enui (Eds.), *Vocabulary instruction: Research to practice* (pp. 28–40). New York, NY: Guilford Press.
2. Anglin, J. M. (1993). Vocabulary development: A morphological analysis. *Monographs of the Society for Research in Child Development*, 58 (10, Serial No. 238), 1–166. Chicago, IL: University of Chicago Press.
3. Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore, MD: Brookes.
4. Perfetti, C. A. (2007). Reading ability: Lexical quality to comprehension. *Scientific Studies of Reading*, 11, 357–383.
5. Carlisle, J. F. (2003). Morphology matters in learning to read: A commentary. *Reading Psychology*, 24, 291–332.
6. Bowers, P. N., & Kirby, J. R. (2010). Effects of morphological instruction on vocabulary acquisition. *Reading and Writing: An Interdisciplinary Journal*, 23, 515–537.
7. Bowers, P. N., Kirby, J. R., & Deacon, S. H. (2010). The effects of morphological instruction on literacy skills: A systematic review of the literature. *Review of Educational Research*, 80, 144–179.
8. Kirby, J. R., Deacon, S. H., Bowers, P. N., Izenberg, L., Wade-Woolley, L., & Parrila, R. (2012, in press). Children's morphological awareness and reading ability. *Reading and Writing: An Interdisciplinary Journal*.
9. Nagy, W., Berninger, V. W., & Abbot, R. (2006). Contributions of morphology beyond phonology to literacy outcomes of upper elementary and middle-school students, *Journal of Educational Psychology*, 98, 134–147.
10. Nunes, T., & Bryant, P. (2006). *Improving literacy by teaching morphemes*. New York, NY: Routledge.
11. Nunes, T., Bryant, P., & Olsson, J. (2003). Learning morphological and phonological spelling rules: An intervention study. *Scientific Studies in Reading*, 7, 289–307.
12. Real Spelling at <http://www.realspelling.com>
13. Ebbers, S. M. (2008). Morphological word families in narrative and informational text. In Y. Kim, V. J. Risko, D. L. Compton, D. K. Dickinson, M. K. Hundley, R. T. Jimenez, et al. (Eds.), *57th Yearbook of the National Reading Conference* (pp. 203–218). Oak Creek, WI: NRC.
14. Berninger, V., Nagy, W., Carlisle, J., Thomson, J., Hoffer, D., Abbott, S., Aylward, E. (2003). Effective treatment for dyslexics in grades 4 to 6. In B. Foorman (Ed.), *Preventing and remediating reading difficulties: Bringing science to scale* (pp. 382–417). Timonium, MD: York Press.