brain; applied to reading, this reflected a philosophy of "wait and see" until the child appeared "ready" for instruction. Research and writings in the 1950s and 1960s by cognitive psychologists such as Bruner (Bruner, Olver, & Greenfield, 1966) provided powerful evidence that early childhood was crucial in the cognitive development of an individual. This conclusion led to designing new opportunities to engage children in early learning.

Similarly, a number of myths have been perpetuated about oral vocabulary development, which in many ways have stymied efforts to promote quality teaching early on. Recent evidence has called into question these notions. This new research suggests that we can not only improve children's vocabulary—we can *accelerate* it with instruction. These new findings have powerful implications for further reading development and content learning.

The following myths are at the top of our list.

Myth 1: Children Are Word Sponges

Children seem to pick up words prodigiously and quite effortlessly. It looks natural. In their classic study, for example, Carey and Bartlett (1978) taught preschoolers a new color word simply by requesting, "You see those trays over there? Bring me the *chromium* tray. Not the red one, the *chromium* one." When their memory for the new word was assessed 1 week later, the majority of children (63%) were able to correctly identify which color was chromium. Since this experiment, the term *fast mapping*—the notion that words can be learned based on a single exposure—has become common parlance to explain the extraordinary rate at which children seem to pick up words early on.

Today, however, there is ample evidence to suggest that children do not learn words through "fast mapping" (Bloom, 2000). Rather, they learn words by predicting relationships between objects and sounds, which become more accurate over time. Word learning is incremental (Nagy, Anderson, & Herman, 1987). Evidence for this comes from children's struggles to understand color words. Although infants can distinguish between basic color categories, it is not until about age 4 that they can accurately apply these individual color terms (Rice, 1980). Typically, words such as *red* or *yellow* may appear in their vocabulary; however, their application of these words to their referents may be haphazard and interchangeable.

Children, then, may have knowledge of these words, but this knowledge will be far from complete. Rather, word learning in most cases requires many exposures over an extended period of time (Biemiller & Boote, 2006). With each additional exposure, the word may become incrementally closer to being fully learned.

Myth 2: There Is a Vocabulary Explosion

It is often said that word learning starts rather slowly, then at about 16 months or when a child learns about 50 words, all of a sudden things begin to happen (Gopnik, Meltzoff, & Kuhl, 1999). Word learning begins in earnest. Variously called the "vocabulary explosion" or "word spurt," it reflects the apparent dramatic ability of young children to acquire new words—on the scale of learning ten or more new objects and names within a 2- or 3-week period. This notion of a vocabulary explosion may suggest that the optimal time for oral vocabulary development is in these toddler years.

Recent evidence (McMurray, 2007), however, suggests that the "spurt" in word learning does not correspond to any change in rate of word learning, but in the acquisition of vocabulary that students actually integrate into their speech and writing. In other words, it suggests that the vocabulary explosion is a by-product of the variation in the time to learn words. Although children are accumulating words at a constant rate, the written and verbal use of the words accelerates. We see, for example, a similar pattern with receptive and expressive language, with children demonstrating far greater capacity to understand meaning before they are able to effectively express ideas in words.

The course of word learning, therefore, has little to do with vocabulary explosions, bursts, or spurts. In contrast, word learning is cumulative (Nagy & Scott, 2000). The high-performing student who knows many thousands of words has learned them not by having received a jolt of oral language early on, but by accruing bits of word knowledge for each of the thousands of words encountered every day. By the end of high school, one estimate is that college-ready students will need to acquire about 80,000 words (Hirsch, 2003). This means that we should immerse students for extended periods in oral and written vocabulary experiences throughout their instructional years.

Myth 3: Storybook Reading Is Sufficient for Oral Vocabulary Development

Reading books aloud to children is a powerful and motivating source for vocabulary development (Bus, Van Ijzendoorn, & Pellegrini, 1995). We now have a large corpus of research showing that children learn words through listening to and interacting with storybooks. Nevertheless, recent studies have begun to question whether incidental instruction through book reading may be substantial enough to significantly boost children's oral vocabulary development (Juel, Biancarosa, Coker, & Deffes, 2003). Several meta-analyses (Mol, Bus, & deJong, 2009; Mol, Bus, deJong, & Smeets, 2008; National Early Literacy Panel, 2008), for example, have reported only small to moderate effects of book reading on vocabulary development. Mol and her colleagues (2008) examined the added benefits of dialogic reading, an interactive reading strategy, on children's vocabulary growth and reported only modest gains for 2- to 3-year-old children. Further, these effects were reduced to negligible levels when children were 4 to 5 years old or when they were at risk for language and literacy impairments.

This means that exposure to words through storybooks is not likely to be potent enough to narrow the substantial gap for children who may be at risk for reading difficulties. Rather, to improve children's oral vocabulary development, teachers will need to augment the read-aloud experience with more intentional strategies that require children to process words at deeper levels of understanding.

Myth 4: We Do It All the Time

Most teachers try to consciously engage children in active experiences that involve lots of conversation throughout the day. In the course of a science activity, a teacher may explain a word to help children understand the context. She might briefly pause during the lesson and say, "That's the *predator.* That means he wants to eat the frog," providing a brief explanation that fits the context of the story. Or during a discussion around morning message, a teacher might use the word *celebrate* and then say, "*Celebrate* means to do something fun" when describing a birthday activity. These events represent important teachable moments—informal opportunities to engage in word learning, somewhat parallel to the types of language exchanges between parents and their children.

The problem is, however, that over the course of the 20,000 hours parents and children have spent together in the home *before* entering school, these words are likely to have been repeated frequently. Teachers do not have that luxury. In our study of 55 kindergarten classrooms (Wright & Neuman 2011), for example, we found that although teachers provided over eight of these word explanations per day, they were rarely if ever repeated more than one time. Further, words selected for teachable moments were different across classroom settings. Far too predictably, our study reported that children who attended schools in the most severely low-income neighborhoods were likely to hear far fewer explanations, with those explanations offered at lower difficulty levels, than children in middle- and upper-income areas.

With the implementation of the Common Core State Standards, children will be expected to understand content-related words in science and history. This means that we cannot rely on teachable moments alone to help children develop word meanings. Rather, we will need to be proactive in selecting words that have greater application to academic texts with increasingly complex concepts.

Myth 5: Just Follow the Vocabulary Scope and Sequence in Our Core Reading Program

Several years ago, my colleagues and I examined the prevalence of oral vocabulary instruction in core reading programs at the preK level (Neuman & Dwyer, 2009). We found a dearth of instructional guidance for teachers, despite some "mentioning" of words. Since then, we turned our attention to kindergarten and 1st-grade materials, focusing on the four most commonly used core curricula, to examine the breadth and depth of oral vocabulary instruction—the pedagogical features of instruction and how these features might align with research-based evidence on vocabulary development.

Despite greater attention to words in elementary curricula, our results indicated tremendous disparity across curricula (Wright & Neuman, in press). For example, one curriculum listed an average of 20 target vocabulary words per week to be taught, whereas another listed, on average, only 2. Further, the criteria for which words were selected to teach remained a mystery. In one curriculum, words were selected based on the weekly stories. In other curricula, we could find

no organizing principle for the selection of words at all. Finally, using three different criteria, we found that many of the vocabulary words selected for instruction were far too easy to warrant school-based instruction.

This means that until such materials are developed, teachers are going to have to rely on a set of research-based principles to ensure that all students receive the quality of oral vocabulary instruction they need. In the age of Common Core Standards, students will need a specialized language—some describe it as academic language—to convey their ideas and that facilitates the development of more complex concepts in multiple disciplines. And our efforts to enhance the ability of all children to communicate in academic language and academic thinking through oral vocabulary development must begin early.

KEY PRINCIPLES FOR TEACHING ORAL VOCABULARY DEVELOPMENT

Although there is certainly more to learn, we now have a growing research consensus about the characteristics of effective vocabulary instruction. Using evidence from our two recent meta-analyses synthesizing research from 75 vocabulary studies (Marulis & Neuman, 2010, in press), as well as our own studies examining some of the mechanisms for word learning (Kaefer & Neuman, 2011), five principles emerge to enhance oral vocabulary development, as described next.

Key Principle 1: Children Need Both Explicit and Implicit Instruction

Children benefit from explicit instruction. That is, children who are given teacher-friendly definitions of words or other attributes of the words to be learned are more likely to remember them. Prior to the beginning of a story, for example, a teacher might begin by introducing several words that are integral to the story. For example, the teacher might use a strategy developed by Coyne, McCoach, and Kapp (2007) to encourage children to listen for each of the "magic words" during the story reading, and to raise their hands whenever they hear one. A teacher might say to students, "Oh good. Some of you raised