

Learning to read and the development of phonological awareness: Altering our pedagogical approach

Lyra Magloughlin
University of Victoria
lyra@uvic.ca

Despite a century of effort aimed at identifying and implementing effective strategies for teaching reading, children from every demographic, learning in a broad range of environments, continue to demonstrate below grade-level reading performance (e.g. Dechant, 1991; Sherman & Ramsey, 2006; Jacobs, 2008). The research presented in this paper explores the relationship between the development of phonological awareness and the process of learning to read. Several aspects of awareness are discussed, and one developmental model is considered. Two intervention studies demonstrating improved performance following phonological awareness training are examined. Proposed is a move away from labels such as ‘developmental dyslexia,’ and a shift toward research aimed at providing educators with the tools needed to more adequately meet the developmental needs of struggling readers.

1 Introduction

Unlike language acquisition, the process of learning to read requires more than just exposure to language through social contact. Building the skills necessary for reading demands not only immersion in language and print, but also guided, focused attention and determination on the part of both learner and instructor. As experimental psychologist Steven Pinker (1997) once suggested, “[c]hildren are wired for sound, but print is an optional accessory that must be painstakingly bolted on” (p. ix). In this paper, I will explore the relationship between sound and print. More specifically, I will present evidence to support the notion that children’s developmental awareness of language sounds and patterns plays a vital role in their reading success. I will suggest that research aimed at understanding the nature of this role may lead to more effective strategies for teaching reading. I will also suggest that freely assigning labels such as ‘dyslexia’ warrants more careful consideration. I will argue that children who are struggling with reading

provide us with a tremendous opportunity to rethink conventional pedagogical approaches.

In order to support these contentions, I will first provide background information (§2) in order to position current research in reading. I will then present an overview of the role of phonological awareness in reading (§3) and describe how this awareness involves more than just sounds (§4). Next I will discuss modeling phonological awareness development (§5) and present evidence in support of phonological awareness training and intervention (§6). Finally, I will briefly discuss phonological awareness and dyslexia (§7) and present my conclusion and summary comments (§8).

2 Background

For over a century, researchers have been exploring the mysteries of how our brains learn to read (Quantz, 1897; Huey, 1900; Gates, 1921; Wilson, 1942; Austin & Morrison, 1963; Davis, 1971; Goodman, 1976; Chall, 1983; Ehri, 1995; Jacobs, 2008), with many seeking to identify progressive stages of reading development. In 1995, for example, reading researcher Linnea C. Ehri introduced a model that organized stages of reading into pre-alphabetic, partial alphabetic, full alphabetic and consolidated alphabetic phases. This model provided a flexible framework for researchers attempting to understand the reading process (Beech, 2005). While earlier views have held that instruction in reading should commence when a child demonstrates a certain degree of ‘readiness’ (see Pearson, 1984, for an historical overview), more recent evidence suggests that the process starts in infancy, and that pre-alphabetic exposure to rhyme and print is a critical part of a child’s later reading success (Wagner, Piasta & Torgesen, 2006).

In the mid-1960s a “Great Debate” was waged (Chall, 1967) over how to teach children to read, and in the early 1990s, mainstream media coined the term “Reading Wars” (Vacca, Vacca, et al., 2009) to reflect this ongoing battle. Yet decades of disagreement over reading have not led to the development of a single, wholly effective instructional model. There are researchers who suggest that bottom-up, phoneme-based approaches to teaching reading are critical for helping children make phoneme (sound) to grapheme (symbol) connections (LaBerge & Samuels, 1974; Rayner & Pollatsek, 1989). Others argue for top-down, concept-based approaches, which call on children to identify whole words rather than parts of words (Goodman, 1967; Smith & Goodman, 1971; Goodman, 1996). Still others have advocated for interactive models that engage many different approaches (Perfetti, 1985; Dechant, 1991). These strategies and other variations have been implemented in classrooms across North America, with different instructional models coming in and out of fashion over time. One of the latest of these trends occurred in 2001, when the United States government

enacted legislation calling for the implementation of a phonics-based approach to reading instruction following recommendations made by a government-appointed National Reading Panel (NRP, 2000). Yet, despite a century of effort aimed at identifying and implementing effective teaching strategies, children from every demographic, learning in a broad range of environments, continue to demonstrate below grade-level reading performance (Dechant, 1991; Sherman & Ramsey, 2006; Jacobs, 2008).

3 The role of phonological awareness in reading

Over the past several decades, a large body of evidence has been gathered in support of a reciprocal (Adams, 1990; Bentin & Leshem, 1993; Blachman, 2000), even causal (Bradley & Bryant, 1983; Wagner & Torgeson, 1987; Wagner, Torgeson & Rashotte, 1994; Lundberg, 2009) relationship between children's development of phonological awareness and the process of learning to read. In fact, the term 'phonological awareness' has almost become mainstream and is now frequently referenced in literacy pamphlets, on websites, and in school newsletters as one of the critical components of reading success. But what is phonological awareness and how does it develop? Wagner, Piasta and Torgeson (2006) define phonological awareness as "an awareness of and access to the sound structure of one's oral language" (p. 1114). Pinker (1994) describes phonology as "...the sound patterns of a language, including its inventory of phonemes, [and] how they may be combined to form natural-sounding words..." (p. 480). For the purposes of this paper I will build on Pinker's description in order to define phonological awareness as a conscious understanding of language-specific sound patterns, including how phonemes (sounds) are combined and manipulated to form 'natural-sounding' syllables, rhymes, and words.

In the context of reading, it follows that an awareness of language-specific patterns and combinations may be critical for making important reading connections. Learning to use an alphabetic system, for example, requires early readers to develop an awareness of the connections between phonemes and graphemes. Languages such as German have predictable patterns with one-to-one (phoneme-to-grapheme) correspondences, but languages such as English have complex, often unpredictable, many-to-one (phoneme-to-grapheme and grapheme-to-phoneme) relationships. For English readers, developing an awareness of these unpredictable relationships can be difficult when common English words such as 'do', 'too', 'blue', and 'few' all end in the same phoneme, but are represented by different graphemes. Individuals who experience difficulty with reading frequently have trouble discriminating between phonemes found in the everyday words of their language and tend to perform poorly on blending and

segmenting tasks that require awareness of these language-specific patterns (Siegel & Faux, 1989; Mann, 1993; Oudeans, 2003).

4 More than just sounds

Awareness of the phonological structure of one's language, however, is not limited to audible sounds. It is, perhaps, not surprising that the average deaf individual is only reading at a third- or fourth-grade level by high school graduation (Moores, 1996; Paul, 1998; Gallaudet Research Institute, 1996), given the physical limitations of making an auditory connection between symbols and sounds (Gravenstede, 2009; Paul, 1998). What may be surprising is that profoundly deaf readers who do succeed in reading at or above grade-level seem to exhibit an awareness of phonological patterning during reading. Research in this area (Hanson et al., 1984; Hanson, 1992; Nielsen & Luetke-Stahlman, 2002; Diagle & Armand, 2008; Wang et al., 2008; Aparicio et al., 2009) suggests that although cognitive mapping of symbols to auditory sounds may not be possible for deaf readers, other forms of mapping may be conceivable through exposure to oral speaking, lip reading or 'speechreading', fingerspelling, articulatory feedback, and attentiveness to the ways in which speech sounds are physically articulated in the vocal tract.

Additional evidence in support of the notion that phonological awareness is not limited to audible or acoustic information comes from studies with infants as young as four months old, who are able to discriminate between languages of different rhythmical classes (e.g. stress-timed languages such as English and syllable-timed languages such as French) simply by watching speakers' silent facial movements (Werker & Byers-Heinlein, 2008). As well, some educators now believe that the act of physically articulating sounds while attempting to construct or encode words may have longer-lasting neuronal stability with early readers (Herron, 2008).

Findings such as these require a reshaping of our understanding of phonological awareness to encompass more than just acoustic or auditory information. As the research with profoundly deaf readers suggests, attentiveness to the particular ways in which sounds are physically articulated or visually represented may play an important role during the phoneme-grapheme mapping process – a necessary part of reading proficiency.

5 Modeling phonological awareness development

Interest in understanding and defining stages of phonological awareness is not new, and many developmental models have been proposed over time (e.g. Stanovich et al., 1984; Yopp, 1988; Adams, 1990; Stahl & Murray, 1994; Smith et al., 2007). Although the sequencing of stages tends to vary between models, most identify rhyming, blending, segmenting, deleting, and substitution stages of phonological or sound pattern awareness. In 2007, a group of researchers (Smith, Cassady, Bottomley & Popplewell, 2007) introduced the Standardized Assessment of Phonological Awareness (SAPA) model, which was designed to address some of the gaps and overlaps of earlier models. In order to test SAPA, Cassady, Smith & Putman (2008) developed fourteen discrete tasks that incorporated rhyming, oddity identification, blending, segmenting, phoneme deletion, and substitution. Participants were asked, for example, to blend body-coda or onset-rime segments, and select words in a series with different beginning, middle, or ending sounds.¹ The SAPA tasks were administered longitudinally to participating kindergarten children during the fall, winter and spring of one school year. These discrete tasks enabled Cassady et al. (2008) to measure the sequence of particular aspects of phonological awareness at very specific stages of development. Results strongly supported the researchers' contention that acquisition of phonological awareness occurs in discrete, measurable, developmental stages.

6 Phonological awareness training and intervention

In an attempt to answer the question of whether reading skills could be improved by stimulating phonological awareness, Danish researchers Lundberg, Frost, & Petersen (1988) provided 235 preschool children with 15–20 minutes of phonological awareness training per day, over a period of eight months. The training involved metalinguistic games and exercises, which were designed to help the children develop an awareness of the phonological structure of their language. In Denmark, children do not begin formal reading instruction using an alphabetic script until the age of seven. Following the eight months of training and during their first two years of school, Lundberg, Frost & Petersen tracked the children's reading and spelling progress. Children who had been exposed to explicit phonological training during preschool demonstrated significantly stronger reading and spelling skills during Grades 1 and 2 than did children in the control group, who had received no early phonological awareness training.

¹ While a description of each of these tasks is outside the scope of this paper, a comprehensive list has been included as Appendix A.

Results suggested that phonological awareness training administered prior to formal reading instruction may, in fact, facilitate the process of learning to read.

In another study, Richards & Berninger (2008) scanned the brains of 18 dyslexic and 21 non-dyslexic children at two different times during their performance of an fMRI phoneme mapping task. The first brain scan occurred prior to any intervention, and the second scan occurred after dyslexic participants had received three weeks of phoneme awareness and alphabetic training. The first brain scan for both dyslexic and non-dyslexic children showed very different patterns of fMRI connectivity: the children with dyslexia exhibited greater functional connectivity in bilateral regions of the inferior frontal gyrus, whereas children without dyslexia showed no significant activity in these regions. However, following the second brain scan, which was performed after dyslexic children had received three weeks of phonological training, fMRI connectivity patterns in dyslexic children more closely resembled those of the non-dyslexic children. While the researchers in this study acknowledged that findings are preliminary, they suggested that dyslexic brain connectivity results may be linked to impairment in working memory, and argued that instructional intervention may help children to “overcome” specific temporal deficits (Richards & Berninger, 2008).

Findings such as these are intriguing: if explicit instruction in phonological awareness can lead to improved performance in reading, then a deeper understanding of phonological awareness development could lead to better instructional design.

7 Phonological awareness and dyslexia

Deficits in phonological processing are central to reading difficulties (Ziegler & Goswami, 2005). Since 1887, the term ‘dyslexia’ has been used to describe individuals who have difficulty reading (Pollak, 2005). The *Oxford English Dictionary* defines dyslexia as “a difficulty in reading due to affection of the brain...word-blindness.” Within the reading research community, the term dyslexia is commonly employed and generally classified as either ‘acquired’ or ‘developmental’. Acquired dyslexia is used to refer to individuals who experience difficulty in reading as a result of brain injury or illness, whereas developmental dyslexia is often used categorically to describe individuals who show unexpectedly poor performance in reading. Of critical importance in the classification of developmental dyslexia is that an individual’s poor performance in reading is *unexpected*. There is an assumption that individuals with developmental dyslexia do not perform poorly as a result of overt physical or mental impairments, low socioeconomic status, or lack of access to good instruction, but rather due to neurobiological factors that interfere with their

acquisition of sufficient reading skills (Wagner, Piasta & Torgesen, 2006). Developmental dyslexia has been described as a ‘disorder’, a ‘syndrome’, a ‘disability’, and a ‘deficit’, but regardless of the terms used to describe it, dyslexia generally is considered to be a problem inherent within the individual, rather than a failing on the part of educators. As described above, a number of studies have demonstrated the positive effects of phonological awareness training in addressing certain phonological deficits. The ability to isolate very specific areas of phonological processing difficulties could prove beneficial for those individuals ‘diagnosed’ with dyslexia.

8 Conclusion

In this paper, I have provided evidence to support the idea that phonological awareness development is central to reading. This idea is generally accepted within the reading research community, yet the debate continues over the efficacy of various instructional models for teaching reading. I propose a move away from this long-standing debate and toward a deeper understanding of the development of phonological awareness.

As many of the studies discussed in this paper suggest, phonological awareness is not limited to the perception of acoustic information, but also involves an awareness of more subtle cues that are produced during the articulation of speech sounds. If profoundly deaf readers and infants are capable of discerning these phonological cues, then hearing children and adults may also be able to access them. Explicit attentiveness to the specific articulatory movements that distinguish one phoneme from another may prove useful in building phonological awareness.

Phonological awareness development models such as SAPA can provide researchers with exciting new avenues for exploring the relationship between awareness and reading. Although existing models do not include aspects of physical articulation as relevant cues for accessing phonological awareness, incorporating this aspect of development into future working models may be an important next step. The evidence pointing to improved reading ability following phonological intervention is encouraging, and tools that enable educators to pinpoint specific areas of developmental difficulty in children who are struggling to read may facilitate the creation of improved instructional materials that succeed in meeting individual learning needs.

Children who struggle with reading face a broad range of challenges that can often be compounded when labels like ‘dyslexia,’ or ‘learning disabled’ are used to describe them. As the famous anthropologist Edward Sapir (1929) argued, “[w]e see and hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of

interpretation” (p. 210). Children who are ‘diagnosed’ as dyslexic carry with them labels that can influence performance and have long-lasting socio-emotional consequences, as these labels are often introduced at a time when children are working to define self-concept (Pollak, 2005). If we assign labels like dyslexia, we run the risk of approaching each child from the perspective of there being a problem inherent within the child, rather than a failing on our part to adequately meet the child’s developmental needs. I propose that struggling readers may provide us with a tremendous opportunity to alter our pedagogical approach. If we can maintain a research focus that is rooted in identifying discrete stages of phonological awareness development, we may be able to more accurately target areas for instructional intervention and more adequately meet the learning needs of children experiencing reading difficulties. This approach seems a promising step in the right direction.

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Appendix

SAPA representative items and abridged instructions (from Cassady et al., 2008, p. 521)

Subtest	Basic Task Requirement	Sample Item(s)
Rhyme recognition	Rhymes are words that sound the same at the end.	Tell me if these words rhyme ape-knee; dip-hip
Rhyme application	Tell me a word that rhymes with:	Star (accept any word or nonsense word that rhymes)
Oddity tasks: Beginning	Listen to the names of these pictures. Tell me which one has a different beginning sound.	duck, door, foot
Oddity tasks: End	Listen to the names of these pictures. Tell me which one has a different ending sound.	seal, cat, pail
Oddity tasks: Mid	Listen to the names of these pictures. Tell me which one has a different middle sound.	jack, cap, run
Blend body-coda	I am going to say a word in two parts. When you have heard both parts, you need to say what the whole word is.	/tu/ g
Blend onset-rimes	I am going to say a word in two parts. When you have heard both parts, you need to say what the whole word is.	/w/ eek
Blend phonemes	I am going to say a word in parts. When you have heard all the parts of the word, you need to say what the whole word is.	/s/ /a/ /ve/
Segment onset-rimes	Separate the word by saying the first sound and then the rest of the word:	boat
Segment phonemes	Say each sound you hear in the word	job
Phoneme deletion	Listen to the word _____. Take away the first sound, what is left?	Listen to the word book. Take away the /b/ sound, what is left?
Phoneme substitution: Beginning sounds	If I say the word man and change the first sound to /p/, the new word is pan.	Change the first sound in cat to /h/. What is the new word?
Phoneme substitution: End sounds	If I say the word rat and change the last sound to /g/, the new word is rag.	Change the last sound in can to /p/. What's the new word?
Phoneme substitution: Mid sounds	If I say the word pan, change the middle sound to /i/, the new word is pin	Change the middle sound in cat to /o/. What's the new word?