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Research Paper

Early development and predictors of morphological awareness: Disentangling the impact of decoding skills and phonological awareness



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ABSTRACT

Background: Morphological Awareness (MA) has been demonstrated to be influential on the reading outcomes of children and adults. Yet, little is known regarding MA's early development. **Aim:** The aim of this study is to better understand MA at different stages of development and its association with Phonological Awareness (PA) and reading.

Methods and procedures: In a longitudinal design the development of MA was explored in a group of pre-reading children with a family risk of dyslexia and age-matched controls from kindergarten up to and including grade 2.

Outcomes and results: MA deficits were observed in the group with literacy difficulties at all time points. PA was only found to make a significant contribution to MA development at the early stages of formal reading instruction. While first-grade decoding skills were found to contribute significantly to MA in second grade.

Conclusions: Evidence supporting a bidirectional relation was found and supports the need for adequate MA intervention and explicit instruction for “at risk” children in the early stages of literacy instruction.

1. Introduction

Reading is a vital skill acquired in the first years of formal education and has been argued to be an essential skill learned in early elementary school (e.g. Lyon & Moats, 1997). For most children, the transition from an oral to a written language system is relatively effortless. However, for a small proportion of children, in the absence of any explanation, this transition presents some difficulties. In cases where these literacy struggles remain unexplained and persistent, they are referred to as the developmental condition of dyslexia (Snowling, 2000). Research has been unsuccessful in identifying a single causal variable associated with the expressed literacy difficulties of individuals with dyslexia which has led to the adoption of a multi-deficit approach in examining the root causes of dyslexia (Pennington, 2006). While not denying the often observed phonological impairments associated with the literacy struggles of individuals with dyslexia, research has begun to explore alternative cognitive variables which may account for additional variance in explaining the literacy struggles of these individuals. One such variable, morphological awareness (MA), which is the explicit awareness and ability to manipulate and reflect upon the morphemic structure of words, is a cognitive variable that has been suggested as both a potential risk and/or protective factor. As the orthography of English embodies both phonological and morphological information (Chomsky & Halle, 1968), it is reasonable to assume that an explicit awareness of both morphological

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awareness and phonological awareness would be required in the development of adequate reading abilities (Berninger, Abbott, Nagy, & Carlisle, 2010; Deacon & Kirby, 2004; Rastle, Davis, Marslen-Wilson, & Tyler, 2000).

Although a few studies have demonstrated that MA is acquired prior to the onset of formal reading instruction (Berko, 1958; Casalis & Louis-Alexandre, 2000; Law, Wouters, & Ghesquière, 2016), little is still known about MA's development and early attainment. As children who later are found to develop dyslexia exhibit early literacy struggles and pre-reading phonological awareness (PA) deficits, an understanding of how these deficits influence MA's early development is crucial in understanding MA's role in dyslexia. Thus, in a longitudinal design of children with and without literacy difficulties, this study investigates morphological awareness' development and association with phonological awareness and early literacy acquisition in children. A better understanding of early MA will help in addressing MA's role as a risk and/or protective factor in the development of dyslexia and reading difficulties of children.

1.1. Dyslexia

Dyslexia is a lifelong neurodevelopmental disorder characterized by severe reading and/or spelling impairments (Vellutino, Fletcher, Snowling, & Scanlon, 2004). It has been well established in the literature that a major contributing variable of the expressed literacy problems lay within a deficit in the development of—or access to—phonological representations (Snowling, 2000; Tønnessen, 1997). Manifestations of this phonological deficit have been observed in: difficulties with the retention of information in the phonological loop of working memory; reduced speech in noise perception; poor lexical retrieval, and a reduced capacity to manipulate the phonemic structure of words (Wagner & Torgesen, 1987).

Over the past several decades, reading research has amassed an impressive body of evidence demonstrating the importance of phonological awareness (PA) in literacy achievement. PA's strong association with reading has been observed across various alphabetic languages and has been found to exist despite individual differences in age, vocabulary knowledge, reading experience, and IQ (Bradley & Bryant, 1983; Kirby, Parrila, & Pfeiffer, 2003; Melby-Lervåg, Lyster, & Hulme, 2012). As a group, dyslexic readers have been shown to perform more poorly than normal reading controls on a variety of measures involving the perception, manipulation, production and retrieval of phonological information (e.g. Melby-Lervåg et al., 2012; Snowling, & Stackhouse, 2013). Yet, the presence of a phonological deficit is not capable of explaining all the behavior symptoms which define dyslexia, leading researchers to examine alternate cognitive deficits to aid in the explanation of the behavior symptoms (Pennington, 2006).

1.2. Morphological awareness

Of the metalinguistic processes available to readers, morphology, in contrast with phonology, has received noticeably less consideration and has often been treated as a consequence of the poor reading experience and/or a phonological defect associated with dyslexia (Snowling, 2000; Vellutino & Fletcher, 2005). Research across a multitude of languages and age groups has found that dyslexics often underperform across a variety of measures of MA when compared with chronologically age-matched peers while, at the same time, being found to perform similar to or better than younger reading age-matched controls (Casalis, Colé, & Sopo, 2004; Fowler, Liberman, & Feldman, 1995; Robertson et al., 2012; Tsesmeli & Seymour, 2006). These findings suggest that MA deficits are not causal to dyslexic's reading struggles and may be a consequence of poor reading experience or a more primary deficit, like the phonological deficit often associated with dyslexia. Alternatively, several studies have proposed that morphological awareness may be a relative strength in individuals with dyslexia, offering means of achieving some level of compensation (Burani et al., 2008; Cavalli, Cole, Duncan, Elbro, & El Ahmadi, 2016; Elbro & Arnbak, 1996; Law, Wouters, & Ghesquière, 2015). Although MA and dyslexia have been investigated across various ages, research examining the presence of MA deficits in children with dyslexia or literacy impairments prior to or during the early years of literacy acquisition are lacking, thus limiting our understanding of early MA development and its relation to early literacy difficulties.

Studies have demonstrated that an awareness of morphemes, the smallest linguistic units retaining meaning, contributes to word recognition, spelling, and reading comprehension, independent of orthographic processing, phonological awareness, RAN, and vocabulary (Carlisle, 2000; Casalis & Louis-Alexandre, 2000; Deacon & Kirby, 2004; Kirby et al., 2012; Roman, Kirby, Parrila, Wade-Woolley, & Deacon, 2009).

Theoretically, there are a number of reasons why MA would be a factor in reading success, and by extension, reading failure. Firstly, the majority of the vocabulary that individuals are daily exposed to are morphemically complex, with an estimated 60% of the new words acquired by school-aged children containing relatively transparent morphological structures (Nagy & Anderson, 1984). Furthermore, many multi-morphemic words in the English language exceed what can be read in a single fixation. It is thought that the decomposition of the morphological structure would enable, and thus speed up, processing while reading (Elbro 1989). Support for this has been provided by several priming studies that have suggested the lexicon be morphologically organized (Diependaele, Sandra, & Grainger, 2005; Feldman, 1991; Leikin & Zur Hagit, 2006). In addition to aiding lexical processing, such segmentation assists in the pronunciation of letter sequences. For instance, segmentation along the morpheme boundary supports the accurate pronunciation of the 'ea' in 'reach', where it is processed as one phoneme, versus the 'ea' in 'react', which is pronounced separately due to its placement in two adjacent morphemes (Bowers, Kirby, & Deacon, 2010).

Secondly, phonics alone cannot explain many of the linguistic inconsistencies in English, while inconsistencies may make sense from a morphological perspective (Nunes, Bryant, & Bindman, 2006). For instance, we do not spell *health* as *helth*, which would be consistent with phoneme-grapheme correspondence rules, but it is written as *health* to maintain the spelling of the root morpheme *heal*.

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