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Delay or deficit? Spelling processes in children with specific language impairment

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ABSTRACT

Few studies have explored the phonological, morphological and orthographic spellings skills of children with specific language impairment (SLI) simultaneously. Fifteen children with SLI (mean age = 113.07 months, *SD* = 8.61) completed language and spelling tasks alongside chronological-age controls and spelling-age controls. While the children with SLI showed a deficit in phonological spelling, they performed comparably to spelling-age controls on morphological spelling skills, and there were no differences between the three groups in producing orthographically legal spellings. The results also highlighted the potential importance of adequate non-word repetition skills in relation to effective spelling skills, and demonstrated that not all children with spoken language impairments show marked spelling difficulties. Findings are discussed in relation to theory, educational assessment and practice.

Learning outcomes: As a result of this activity, readers will describe components of spoken language that predict children's morphological and phonological spelling performance. As a result of this activity, readers will describe how the spelling skills of children with SLI compare to age-matched and spelling age-matched control children. Readers will be able to interpret the variability in spelling performance seen in children with SLI.

1. Introduction

Children with specific language impairment (SLI) fail to develop language skills in line with their age, despite normal non-verbal ability, no known hearing, physical or emotional problems and being exposed to an adequate learning environment (Bishop, 1992). Furthermore, it is widely recognised that children with a history of SLI are at substantial risk of later literacy impairments (e.g., Goulandris, Snowling, & Walker, 2000; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998). However, very few studies have explored the morphological, phonological and orthographic spelling skills of children with SLI in relation to chronological and spelling-level controls, and considered how oral language skills might predict different aspects of spelling performance. The present study seeks to address these research questions and reflects on the implications of the findings for classroom learning.

1.1. Oral language as a predictor of spelling performance

In order to begin making plausible spelling attempts, children need to be able to consolidate the links between speech sound representations and graphemic units (e.g., Bruck & Treiman, 1990). Using mappings between phonemes and

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graphemes to produce phonetically plausible spelling attempts can be considered to be a phonological spelling strategy. However, as children progress through the stages of spelling development (Frith, 1985, see Apel, Masterson, & Niessen, 2004, for a discussion of a non-stage conceptualisation of spelling development), they begin to draw on their knowledge of orthographic rules and common letter sequences to enable more rapid and accurate spelling production. Thus there tends to be a shift from using a predominately phonological spelling strategy to an orthographic spelling strategy (Ehri, 1997). Morphological spelling strategies (e.g., understanding that regular past tense verbs end with the spelling *–ed*) are contingent on understanding orthographic rules alongside having clear mappings between phonemes and graphemes, and can therefore be considered to be a more advanced spelling strategy. However, a number of studies have now shown that typically developing children can use morphological spelling strategies from a relatively young age (Bourassa, Treiman, & Kessler, 2006; Treiman & Cassar, 1996). Similarly, recent research has also highlighted the role of broader language skills outside of phonology in predicting spelling performance. Grammatical awareness (Kim, 2010; Muter & Snowling, 1997; Nagy, Berninger, & Abbott, 2006; Ouellette & Sénéchal, 2008; Tong, McBride-Chang, Shu, & Wong, 2009), expressive language (Gallagher, Frith, & Snowling, 2000), vocabulary knowledge (San Francisco, Mo, Carlo, August, & Snow, 2006), and phonological memory (Muter & Snowling, 1997) have been found to be key predictors of children's spelling development.

The language and cognitive deficits experienced by individual children with SLI vary considerably; yet significant difficulties with morphological awareness (e.g., Leonard, Bortlini, Caselli, McGregor, & Sabbadini, 1992; Rice & Oetting, 1993) phonological memory (Botting & Conti-Ramsden, 2001; Ebbels et al., 2012) and expressive language (Marchman, Wulfeck, & Weismer, 1999) are frequently cited as being deficits of the disorder, particularly in English speaking children. Furthermore, many children with SLI seem to show global phonological awareness deficits (Briscoe, Bishop, & Norbury, 2001; Claessen & Leitão, 2012), which would inhibit their ability to grasp the early stages of spelling development. Considering the potential role of spoken language in spelling proficiency, and the range of oral language deficits seen in SLI, it is unsurprising that studies have found children with a history of SLI to be at risk for later spelling difficulties (Stothard et al., 1998).

Very few studies have explored how effectively oral language skills predict spelling performance in children with SLI. In one such recent longitudinal study, Weerdenburg, Verhoeven, Bosman, & Balkom (2011) demonstrated that lexical-semantic skills, auditory perception, verbal-sequential processing and speech production each made a significant contribution to later spelling performance in Dutch children with SLI. The study by Weerdenburg et al. successfully highlights the impact of spoken language on spelling production in this population, but does not consider how oral language impacts on different spelling processes, for example, children's ability to produce phonetically plausible spellings. To our knowledge no study to date has explored the relative contribution of different aspects of spoken language to morphological and phonological spelling processes in a sample including children with SLI.

1.2. Spelling skills in children with SLI

Although several studies have recently focused on the output produced by children with SLI in free writing tasks (e.g., Dockrell, Lindsay, Connelly, & Mackie, 2007; Fey, Catts, Proctor-Williams, Tomblin, & Zhang, 2004; Puranik, Lombardino, & Altmann, 2006; Williams, Larkin, & Blaggan, 2013), we still know relatively little about the pattern of spelling development in children with SLI. Specifically, it is unclear whether children with SLI tend to follow a delayed yet typical pattern of spelling development, or exhibit more qualitative deficits in their spelling processes. This is largely because very few studies have included both age-matched and spelling-level matched control groups. If the children's spelling difficulties are a product of developmental delay, they will be impaired relative to the chronological-age controls but show a similar pattern of performance to a younger spelling-level matched control group. However, if the SLI group are making qualitatively different types of spelling attempts to younger children who are spelling at the same level, this indicates an atypical pattern of spelling development. Previous research which has included a spelling-level control group suggests English-speaking children with language impairments may be making qualitatively different spelling attempts to both age matched and spelling age matched control groups, indicating that their difficulties extend beyond a model of developmental delay. These qualitative deficits seemed to be particularly striking when the children were spelling inflectional morphemes, such as the English regular past tense morpheme *–ed* (Silliman, Bahr, & Peters, 2006).

Inflectional morphemes tend to be omitted in the spelling attempts of children with SLI (Rubin, Patterson, & Kantor, 1991; Silliman et al., 2006; Windsor, Scott, & Street, 2000), for example the target word *raced* may be spelled as *race*. These errors are likely to be a reflection of the children's spoken language skills since it is well established that children with SLI tend to omit inflectional morphemes in spoken language, particularly the regular past tense (e.g., Gopnik & Goad, 1997; Rice & Wexler, 1996). Researchers have proposed three theories to explain this pattern of behaviour. The Surface Hypothesis (Leonard et al., 1992; Leonard, 1989) suggests these errors are due to the low phonetic salience and short duration of particular morphemes and phonemes when spoken out loud. In contrast, the Extended Optional Infinity (EOI) theory argues the children with SLI are still engaged in an optional tense marking stage of development (Rice, Wexler, & Cleave, 1995), while Ullman and Gopnik (1994) advocated difficulty in acquiring the implicit rules of grammar. Whereas the third theory, outside of the linguistic domain, argues that the poor working memory skills often seen in children with SLI (e.g., Lum, Conti-Ramsden, Page & Ullman, 2012; Montgomery, 2003) may explain their difficulties with spelling inflectional morphemes. A child relying on a phonological spelling approach (Frith, 1985) would need to be able to store the phonetic sequence of the target word in working memory, segment the item into constituent phonemes, and allocate those phonemes to plausible graphemic units. The word would then need to be transcribed, drawing on letter knowledge and motor skills, before the final