



## Specific language impairment affects the early spelling process quantitatively but not qualitatively

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### ABSTRACT

The present study investigated whether children with Specific Language Impairment (SLI) need a special spelling education program, by examining whether the early spelling of children with SLI is quantitatively and qualitatively different from the spelling of typically developing children. Two groups of first grade children participated: 39 children with a typical language development between the age of 73 and 88 months, and 59 children with SLI between the age of 71 and 97 months. The results indicated that children with SLI do have a quantitative delay in both grapheme knowledge and spelling during first grade. However, there was no qualitative difference between the early spelling of children with SLI and typically developing children. This indicated that children with SLI have the same spelling processes as typically developing children, although they develop slower. For clinical practice, this means that teachers of children with SLI can practice the same skills as with typically developing children, but they have to practice substantially more than typically developing children.

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### 1. Introduction

Specific Language Impairment (SLI) is a condition of substantially delayed language development that cannot be attributed to a mental or physical handicap, hearing impairment, emotional disorder, or environmental deprivation (Bishop, 1992; Leonard, 1998). Children with SLI run a higher risk than typically developing children of developing reading (Catts, 1993; Catts, Fey, Tomblin, & Zhang, 2002; Catts, Fey, Zhang, & Tomblin, 1999) and spelling problems (Kamhi & Catts, 1986; Kamhi, Catts, Mauer, Apel, & Gentry, 1988). Why this is the case, is not clear yet.

To be able to provide adequate help it is necessary to establish whether children with SLI learn to read and spell differently than typically developing children. This paper focuses on the acquisition of early spelling knowledge to investigate the differential nature of the spelling process in both children with SLI and children whose language develops more typically. If the spelling process of children with SLI is different, spelling education for children with SLI has to be adapted to their specific needs. If, however, the processes involved in spelling appear to be the same for both groups, there is no need for differential instruction. The goal of the present study was, therefore, to investigate whether there are differential effects of a language delay on the spelling processes of children with SLI.

We will compare the spelling process of children with SLI to that of typical developing children both quantitatively and qualitatively. A quantitative difference is revealed when children with SLI make more rather than different types of spelling errors, whereas a qualitative difference is shown by a difference in types of errors. Findings from earlier studies strongly

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suggest that children with SLI are prone to a developmental delay in spelling acquisition (Lewis, Freebairn, & Taylor, 2000; Nathan, Stackhouse, Goulondris, & Snowling, 2004; Naclér, 2004; Snowling, Bishop, & Stothard, 2000). Whether this delay is also qualitatively different is as yet unknown.

To study the nature of the spelling errors, we will investigate five word characteristics that have been known to affect the difficulty of spelling a word (e.g., Bosman, 2004). These word characteristics are (1) *word length*, the more graphemes the more difficult it is to spell the word (Jansen & Luurtsema, 1986; Treiman, 1993; Wilson & Bock, 1985); (2) *type of grapheme*, children generally have more problems spelling vowels than consonants (Stage & Wagner, 1992; Treiman, Berch, & Weatherston, 1993; Wimmer & Landerl, 1997); (3) *grapheme position*, children tend to find the spelling of the beginning easier than that of the end and the middle (Treiman et al., 1993); (4) *word structure*, words with single consonants at the beginning and the end of the word are easier to spell than words with consonant clusters at the beginning or end (Kerstholt, van Bon, & Schreuder, 1994, 1997; Schreuder & van Bon, 1989; Treiman & Weatherston, 1992); (5) *word frequency*, high-frequency words are usually easier to spell than low-frequency words (Kreiner & Gough, 1990; van Diepen & Bosman, 1999).

Dutch-speaking beginning spellers from Grade 1 with and without SLI participated in the study. They were asked to spell all Dutch graphemes at the beginning of Grade 1 and at the end. In the middle and at the end of Grade 1 they had to spell 22 words from a standardized spelling test. All five characteristics were represented in the words of the spelling test. This allowed us to test for a quantitative difference (i.e., a spelling delay) as well as for qualitative differences (i.e., differences in word spellings).

## 2. Methods<sup>1</sup>

### 2.1. Participants

Both a group of typically developing children and a group of children with SLI participated. The children with typical language development were recruited from two schools for regular education. The children with SLI were recruited from three special-education schools for children with SLI. Deaf and hearing-impaired children were excluded from the study. To obtain a sufficient number of participating children, we had to invite different schools to participate.

Because of illness or absence, 21 children were excluded.<sup>2</sup> The final sample consisted of 39 children with a typical language development (22 girls, 17 boys) between the ages of 73 and 88 months at the beginning of first grade ( $M = 79.7$ ,  $SD = 4.1$ ), and 59 children with SLI (21 girls, 38 boys) between the ages of 71 and 97 months at the beginning of first grade ( $M = 82.2$ ,  $SD = 5.8$ ).

All participating children spoke Dutch. Children who attended regular education, all had Dutch as their native language. In the group of children with SLI there were children with a mother tongue other than Dutch. In School A this pertained to 19% of the children, at School B it was 56%, and in School C all children were native Dutch speakers. To make sure that linguistic diversity was not responsible for the differences in School B, we tested whether performances on grapheme knowledge and word spelling were different between native and non-native Dutch children. There were no significant differences in performance on grapheme knowledge at the beginning and the end of first grade, and on word spelling at the middle and the end of first grade, all  $F$ 's  $< 1$ . The descriptive statistics for both groups are presented in Table 1. We also computed the percentage of typically developing children and children with SLI that reached the criterion of full grapheme knowledge ( $n = 34$ ), and who were able to write 20 or more words correctly. These percentages are presented in Table 2.

In the Netherlands, almost all children with SLI attend a special-education school for children with SLI. Each child is re-evaluated every two years by a team of experts to determine whether or not the child still fits the criteria for SLI (van Weerdenburg, 2006). At these schools, there are smaller classes than in mainstream education. Children receive literacy education in kindergarten to initiate phonological awareness and grapheme knowledge. Formal reading starts in first grade in both regular and in special education.

### 2.2. Materials

#### 2.2.1. Grapheme knowledge

Active knowledge of phoneme-grapheme relationships was measured by a grapheme-knowledge test. The child had to write a grapheme named by the experimenter. The experimenter named the grapheme and a word that contained this grapheme. The graphemes used in this test are: b, d, f, g, h, j, k, l, m, n, p, r, s, t, v, w, z, a, e, i, o, u, aa, ee, oo, uu, oe, eu, ui, ou, au, ie, ei, and ij. The score equaled the number of correctly written graphemes. The lowest possible score was zero and the highest possible score was 34.

#### 2.2.2. Word spelling

This skill was measured by a standardized word-spelling test 'Schaal Vorderingen in Spellingvaardigheid 1 Dictee 2' [Scale Progression in Spelling Abilities 1 Dictation 2] (van den Bosch, Gillijns, Krom, & Moelands, 1991). The child had to write 22 monosyllabic words with consistent phoneme-to-graphemes relations. That is, no confusion should exist about which

<sup>1</sup> A part of these data were already used in a previous paper (Cordewener, Bosman, & Verhoeven, 2012).

<sup>2</sup> The scores of the group of children that dropped out of the study did not differ significantly from the scores of the remaining group on the grapheme and word spelling tasks.

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