

The spelling errors of French children with Developmental Language Disorder (DLD) at the end of primary school

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Introduction

Children with developmental language disorder (DLD) have difficulties with the development of their expressive and/or receptive language, in the absence of other known sensory or neurological conditions (Bishop et al., 2016). Spelling development is related to linguistic skills that may be hindered in DLD (Apel & Masterson, 2001).

Few studies have analysed written language in DLD, most of them in English. They point to difficulties with productivity and accuracy of written texts (Dockrell & Connelly, 2015), as well as specific difficulties with morphological inflections (Windsor, Scott, & Street, 2000). To our knowledge, only one study assessed the spelling errors of children with DLD in French (Broc et al., 2014). The data show phonological but not morphological difficulties in the spelling of French children with DLD as compared to age-matched peers in primary school. However, it is unclear whether the development of spelling abilities in DLD differs qualitatively from typical development in French.

By directly comparing the spelling errors of children with DLD in the last three year of primary school to that of younger children matched on spelling ability, the present study aims to assess the patterns of spelling development in DLD in French. Specifically, we explored the phonological, morphological, semantic and orthographic knowledge involved in spelling. We examined whether:

- The quality of spelling errors produced by children with DLD differed from those produced by a) age-matched and b) spelling-matched peers
- Specific mistakes are made by children learning to spell in French

Sample

75 children recruited from French mainstream schools in their 3rd, 4th and 5th year of education

- 25 children with DLD
- 25 typically-developing children matched on age (TD-AGE)
- 25 typically-developing children matched on spelling skills (TD-SPELL)

	DLD	TD-Age	TD-Spell	One-way ANOVA	Post-hoc Tukey test
Mean age (Years)	10.43 (1.14)	10.14 (0.79)	7.56 (1.07)	$F(2, 72) = 60.79, p < .001, \eta^2 = .62$	DLD = TD-Age > TD-Spell
Spelling (Raw)	17.68 (6.18)	30.32 (4.52)	20 (4.8)	$F(2, 72) = 41.56, p < .001, \eta^2 = .53$	DLD = TD-Spell < TD-Age
Spelling (Standard)	70.8 (10.62)	96.76 (9.98)	107.72 (10.17)	$F(2, 72) = 85.4, p < .001, \eta^2 = .70$	DLD < TD-Age < TD-Spell
Word Reading (Standard)	56.11 (24)	101.35 (13.61)	92.52 (11.64)	$F(2, 70) = 47.06, p < .001, \eta^2 = .57$	DLD < TD-Spell = TD-Age
Raven (Standard)	97.4 (12)	103.2 (11.54)	98.2 (13.84)	$F(2, 72) = 1.582, p = .213, \eta^2 = .04$	DLD = TD-Spell = TD-Age
Language (Standard)	68.45 (14.5)	99.1 (8.56)	101.95 (9.51)	$F(2, 72) = 69.21, p < .001, \eta^2 = .65$	DLD < TD-Spell = TD-Age

Procedures

Children were asked to produce a free text following the curriculum-based measures for writing (Dockrell, Connelly, Walter, Critten, 2014). They were given 5 minutes to write about their best or worst day at school.

la cantine je mange bien.
 Je ~~be~~ et de beau je ben une sortie
 je ra veille. Child aged 9 years, 6 months with DLD

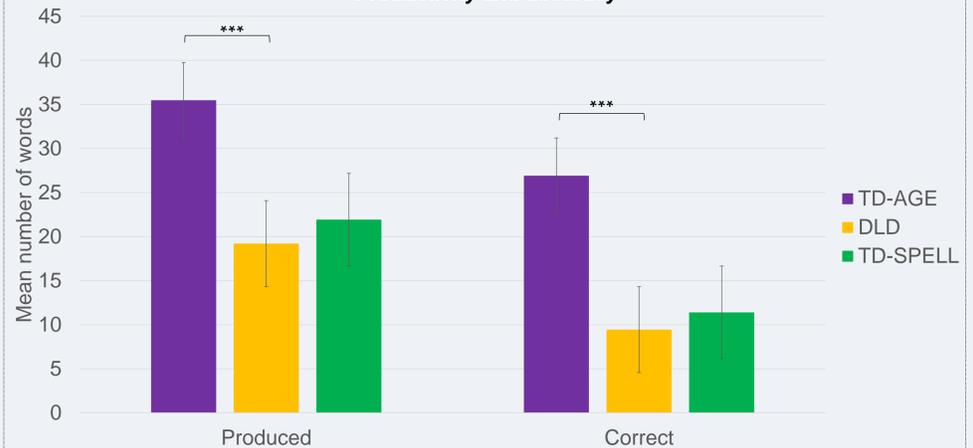
Ma pire journées sais quen je dispute avec
 ma copine Bélia et adèle et que tous les
 jour je me retrouve toute seul comme adèle
 à la fin de la journées je rentre chez moi
 et je dis à ma mère que ma copine
 Bélia et méchant avec moi. TD child aged 9 years 6 months

A multilingual framework of analysis was used to code their spelling errors. Error patterns were classified in 5 categories (adapted from Apel & Masterson, 2001 and McCarthy, Hogan, & Catts). 10% of the sample was recoded for interrater reliability. Cohen's kappa was .76.

Phonological	Orthographic	Morphological	Semantic	Mixed
Omissions, substitutions and additions affecting the phonological skeleton of the word.	- Irregular or long vowels - Unpredictable silent letters - Regular orthographic patterns	- Inflections : gender, tense, person, number - Derivations : word base, prefix, suffix - Word contractions	- Homophones within the same grammatical category - Segmentation	- PHON-ORTH (phoneme-grapheme conversion rules) - MOR-ORTH (rule-based inflections and derivations) - MOR-SEM (grammatical homophones) - PHON-SEM (near homophones)

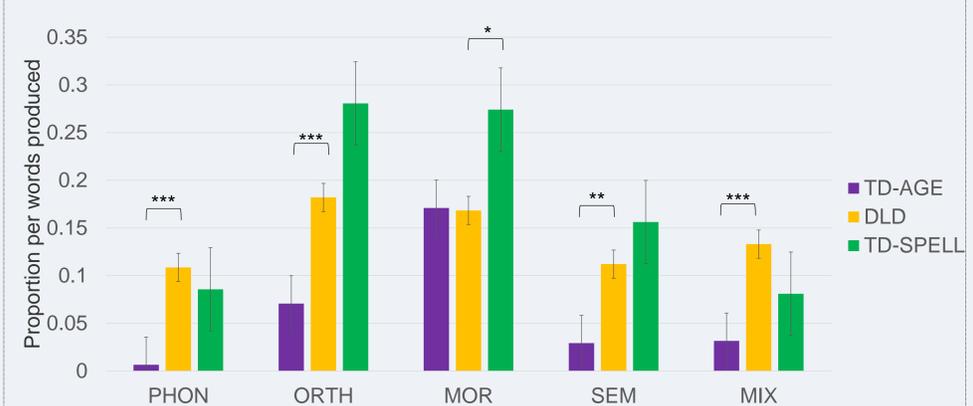
Results

Productivity and accuracy



Children with DLD produce shorter ($F(1, 48) = 15.4, p < .001, \eta^2 = .24$) and less accurate texts ($F(1, 48) = 32.6, p < .001, \eta^2 = .40$) than their age-matched peers. Their performance is commensurate with that of their younger spelling-matched peers.

Type of spelling errors



Children with DLD produce each error type in similar proportions to their TD-SPELL but in higher proportions than TD-AGE. However, in the morphological category, children with DLD and their age-matched peers have a similar proportion of errors ($F(1, 48) = .01, p = .94, \eta^2 = .01$) whereas TD-SPELL make a higher proportion of errors in this category ($F(1, 48) = 5.4, p < .05, \eta^2 = .10$).

Phonological errors were primarily to do with omissions and substitutions of phonemes. Orthographic errors were primarily to do with long vowels, silent letters and unmastered regular spelling patterns. Morphological errors were primarily related to contractions and tense and number marking. Semantic errors were to do with segmentation mistakes. The majority of mixed errors were on grammatical homophones

High proportions of errors were found across groups with:

- Grammatical homophones (à/a, est/et, etc.)
- Contractions (m'a/ma)
- Silent letters (quan/quand)
- Long and complex vowels (ou, oi, oin, ill, etc.)

in the DLD and TD-SPELL groups with :

- Segmentation (on n'était/on était)

in the TD-AGE group with:

- Tense marking (aller/allé)

Discussion

Quantitatively, children with DLD produce fewer words and a higher proportion of spelling errors per text, as compared to their age-matched but not their spelling-matched peers.

Qualitatively, children with DLD produce similar proportions of errors to younger spelling-matched peers, in all categories but the morphological category. In this category, children with DLD obtain a performance commensurate with that of age-matched peers. Children with DLD may have benefitted from a longer exposure to explicit teaching of morphological rules and/or a longer exposure to written language as compared to younger peers. Shorter and less complex texts in DLD children may also give fewer opportunities for morphological spelling errors. The complexity of inflectional morphology in French may also hinder spelling development in the oldest peers.

Future studies may focus on direct cross-linguistic analysis of spelling errors in order to assess the role of morphological skills in the spelling development of children with DLD.

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