Spelling with a language impairment: A meta-analysis across European languages

Nelly Joye[1], Lucie Broc[2], Thierry Olive[2], Julie Dockrell[1]

[1]UCL Institute of Education (United Kingdom), [2]University of Poitiers and CNRS (France)

Introduction

Language Impairment (LI) impacts on the development of written language, with particular difficulties reported in spelling, which can in turn affect writing productivity and quality (Connelly, Dockrell, Walter & Critten, 2012).

A meta-analysis of the relevant research literature was completed to examine patterns of spelling difficulties for children with LI across orthographies and spelling tasks.

Research objectives

1. Do children with LI experience difficulties with spelling across a range of European orthographies?

2. Do children learning to spell English experience more difficulties than their peers learning to spell in other European languages?

3. Do children with LI differ from their peers of the same language level (LA)?

4. To what extent does the spelling task influence spelling performance?

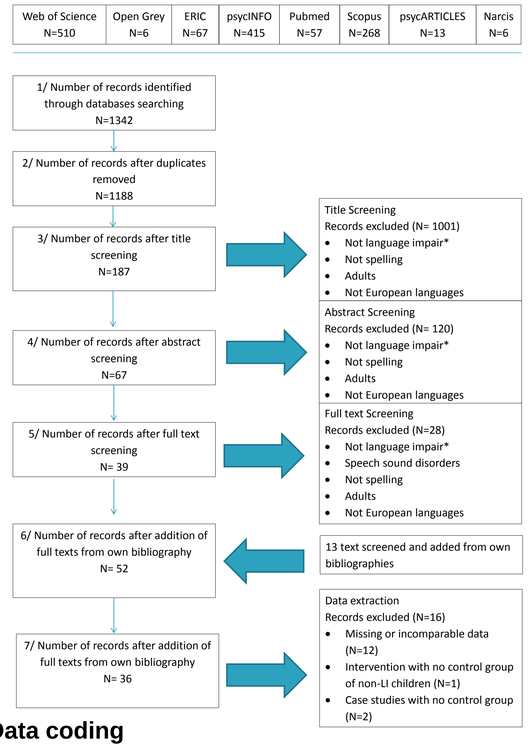
5. Do individual learners' characteristics impact on spelling performance?

- Phonological difficulties?
- Literacy difficulties?

Methods

Studies selection

Studies were selected from databases using a Boolean search. Their title, abstract and full text were screened to assess relevance for the review. 52 studies were retained for data extraction, of which 36 could be included in the meta-analysis.



Data coding

123 findings from the 36 studies were coded for characteristics of the study and outcomes.

Short title	Language	Mean Age	SD Age	School	Task	LI characteristics	N(LI)	Mean(LI)	SD(LI)	Control	N(Co)	Mean(Co)	SD(Co)
Bishop 2001 (1)	English	8.7	2.2	1ry	Word dictation	LI	39	77.4	13.92	Age-matched	15	89.2	13.67
Bishop 2001 (2)	English	8.7	2.2	1ry	Word dictation	LI + phono	9	68.3	8.29	Age-matched	15	89.2	13.67
Bishop 2003 (1)	English	9.3	1.6	1ry	Word dictation	LI without phono	47	82.66	13.51	Age-matched	9	95.22	14.45
Bishop 2003 (2)	English	9.3	1.6	1ry	Word dictation	LI without phono	47	82.66	13.51	Phono only	7	99.43	16.12
Bishop 2003 (3)	English	9.1	1.4	1ry	Word dictation	LI + phono	12	68.25	9.11	Age-matched	9	95.22	14.45
Bishop 2003 (4)	English	9.1	1.4	1ry	Word dictation	LI + phono	12	68.25	9.11	Phono only	7	99.43	16.12
de Bree	Dutch	8.6	5.9	1ry	Word dictation	LI	15	29	8.4	Age-matched	23	34.3	4.1
Brizzolara (1)	Italian	16.4	2.5	2ry	Word dictation	LI	16	48.5	3.18	Age-matched	32	51.75	1.52
Brizzolara (2)	Italian	16.4	2.5	2ry	Word dictation	LI + phono	10	-3.85	2.82	Phono only	6	-1.19	1.08
Brizzolara (3)	Italian	16.4	2.5	2ry	Word dictation	LI + phono	10	-3.85	2.82	Age-matched	32	0	1
Broc 2013 (1)	French	8.9	1.1	1ry	Word dictation	LI	12	0.59	0.24	Age-matched	24	0.27	0.15
Broc 2013 (2)	French	14.3	1.8	2ry	Word dictation	LI	12	0.36	0.21	Age-matched	24	0.07	0.07
Broc 2014 (1)	French	8.9	1.1	1ry	Written text	LI	12	0.19	0.18	Age-matched	24	0.14	0.1
Broc 2014 (2)	French	14.3	1.8	2ry	Written text	LI	12	0.14	0.09	Age-matched	24	0.06	0.06

Difference in scores between the LI and control groups were converted to an unbiased standardized mean difference (Hedges' *g*).

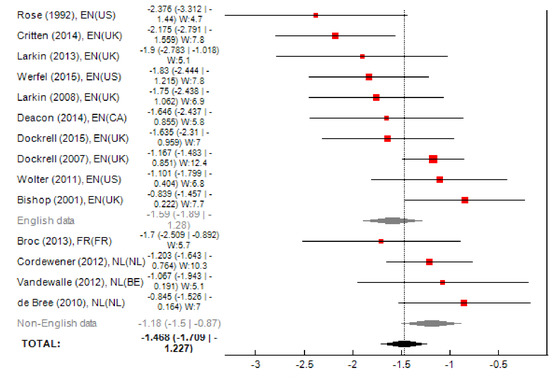
Statistical analysis

A random effects model was used to compute the overall effect size for each group of studies. Subgroups were also formed and *Z*-tests conducted to assess the variance explained by language, task, and individual learner's characteristics, using the EPPI-4 reviewer software (Thomas, Brunton, Graziosi, 2010). Only results from primary school students are reported in the present analysis.

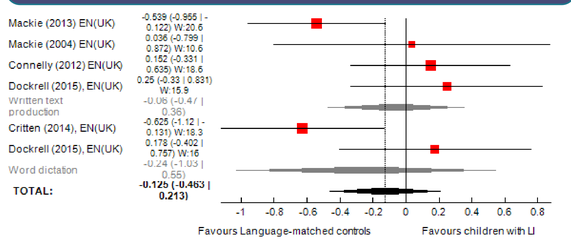
Results

1. The difference between children with LI and age-matched controls was large (*g*>|.8|). Children with LI performed more poorly than their peers on tasks of
   a) word dictation (*g* = -1.47, 95%CI [-1.71, -1.23]).
   b) written text production (*g* = -1.18, 95%CI [-1.5, -0.854]).

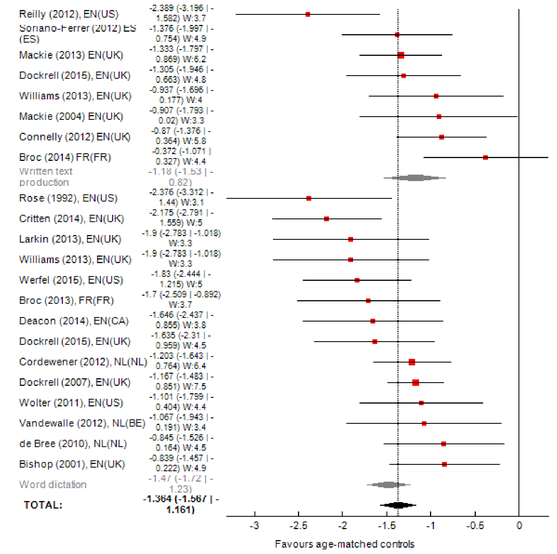
2. There was a trend towards a language difference: the spelling of English children with LI was marginally more affected than that of their peers learning to spell French or Dutch in word dictation (*Diff* = 0.401; *SE diff* = 0.224; *Z* = 1.79; *p* = 0.0729, two-tailed) but not in written text production (*Diff* = 0.379; *SE diff* = 0.541; *Z* = 0.701; *p* = 0.483; two-tailed).



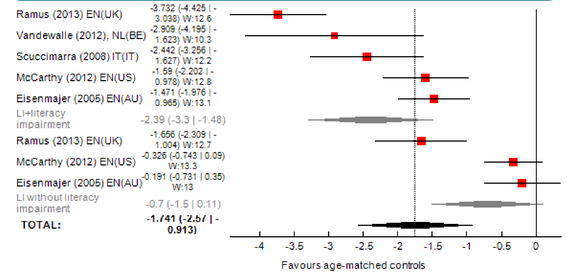
3. Spelling performance was commensurate with LA-matched peers, in both word dictation and written text production (*g* = -0.125, 95% CI [-0.463, 0.213]; *Diff* = 0.179; *SE diff* = 0.454; *Z* = 0.394; *p* = 0.694).



4. Differences in scores on written text production were in line with the differences in scores on word dictation, for both raw scores (*Diff* = 0.0358; *SE diff* =0.199; *Z* = 0.18; *p* = 0.857, two-tailed) and standard scores (*Diff* = 0.296; *SE diff* = 0.221; *Z* = 1.34; *p* = 0.18; two-tailed).



5. Learner's characteristics:
   a) The occurrence of phonological disorders in the LI profile did not account for significant variance in effect sizes (*Diff* =0.586; *SE diff* = 0.475; *Z* = 1.23; *p* = 0.217, two-tailed)
   b) The occurrence of literacy difficulties with the LI profile accounted for significant variance in effect sizes (*Diff* = 1.69; *SE diff* = 0.619; *Z*=2.74; *p* = 0.00621, two-tailed)



Conclusions

1. Primary school children with LI have significant problems in spelling.
2. Children with LI spelling in English have greater difficulties than their European peers
3. Spelling performance is commensurate with LA
4. The type of task did not explain significant variance in the overall sample.
5. Literacy levels explained significant variance in performance, but not phonological disorders, although these analysis included few studies.

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References

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The full list of references used for the meta-analysis can be requested from: nelly.joye.14@ucl.ac.uk