

DIALUKI – diagnosing reading and writing in S/FL

Children in the 4th grade: How do
cognitive skills and reading ability
interrelate?

Lea Nieminen, CALS

Charles Alderson, Lancaster University, UK

Ari Huhta, CALS

Riikka Ullakonoja, CALS



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

DIALUKI (2010 – 2013)

- **DIA**gnosing reading (**LU**keminen) and writing (**KI**rjoittaminen) in a second or foreign language
- Academy of Finland, University of Jyväskylä, ESRC (Economic & Social Research Council, UK)
- Principal investigator: J. Charles Alderson (Lancaster University, UK)
- Development of reading and writing in S/FL
- Can different L1 and L2 linguistic measures predict difficulties in S/FL R/W ?
- How does S/FL proficiency in R/W develop in psycholinguistic and linguistic terms?
 - Helps to develop diagnostic instruments

Preliminary results - please do not quote



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Participants

| L1 | Grade/age | Second/foreign language | |
|--------------|-------------------------|-------------------------|------------|
| | | English | Finnish |
| Finnish | 4th grade / 9-10 years | 210 | |
| | 8th grade / 13-14 years | 208 | |
| | Gymnasium/17-18 years | 219 | |
| Russian | 3rd – 6th grades | | 186 |
| | 7th – 9th grades | | 78 |
| Total | | 637 | 264 |

Preliminary results - please do not quote



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Tests and tasks in DIALUKI Study 1

Questionnaires

- Background information
- Motivation for learning a language

Linguistic measures (L1 and S/FL)

- Reading tasks
- Writing tasks
- Vocabulary
- Segmentation tasks

Cognitive and psycholinguistic tasks (L1 and S/FL)

- working memory, phonological awareness, letter-sound correspondence, word recognition, speed of lexical access etc.

Preliminary results - please do not quote

Reading tasks

■ Finnish as L1

- Reading comprehension
- 12 multiple choice questions based on a text *Turhat tavarat (Unnecessary things)*
- Lindeman, J. (2005). *Ala-asteen lukutesti (Reading test for Primary School)*.

■ English as FL

- Reading comprehension
- Pearson Test of English for Young Learners
- Number of (mixed format) items = 24

Preliminary results - please do not quote



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Cognitive and psycholinguistic tasks (1)

- Backwards digit span L1 & FL
 - L1: 2-8 digits, numbers 1-9
 - FL: 2-5 digits, numbers 1-6
- Common unit in a pair of non-words L1
 - *vapi* – *lumpe*
- Phoneme deletion L1
 - *Tauk* – *auk*

Preliminary results - please do not quote



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Cognitive and psycholinguistic tasks (2)

- Non-word reading L1
 - *viepere, ahkontalsi*
- Non-word spelling L1
 - *peunumiile, moinipuuli, lantureeli*
- Non-word repetition L1
 - *kletsoma, vörellytti*

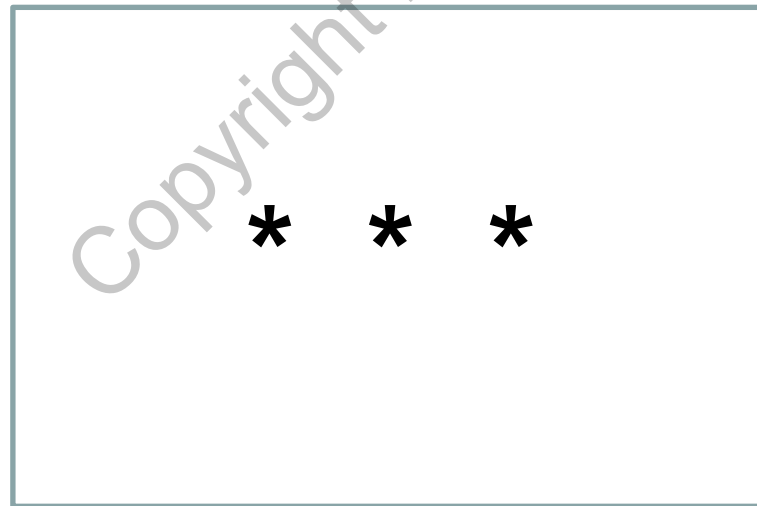
Preliminary results - please do not quote



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Cognitive and psycholinguistic tasks (3)

- Word list reading (L1 & FL), 105 words/60sec
- Rapidly presented words (L1 & FL)
 - L1: 14 words (length 2-8 letters)
 - L2: 8 words (length 2-9 letters)

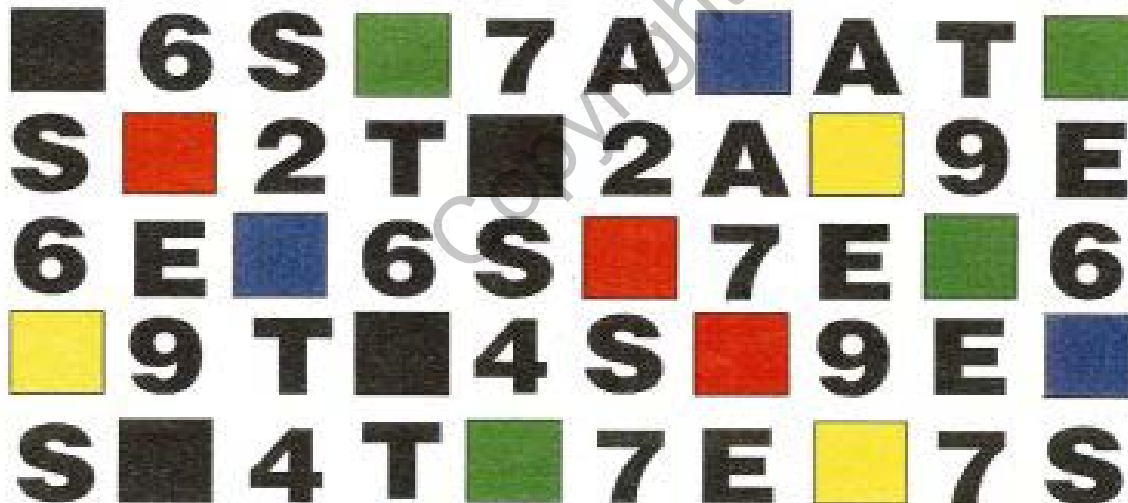


Preliminary results - please do not quote



Cognitive and psycholinguistic tasks (3)

- RAN Rapid Automated Naming L1 and FL
- Mixed stimuli:
 - numbers, letters and colours (L1)
 - numbers, objects and colours (FL)



Preliminary results - please do not quote



Descriptive statistics

| Task | N | Mean (Max score) | SD |
|-----------------------------|-----|------------------|--------|
| B digit span L1 | 179 | 5.14 (14) | 1.679 |
| B digit span FL | 176 | 4.02 (8) | 1.402 |
| Rapid words L1 | 168 | 10.58 (14) | 3.395 |
| Rapid words FL | 175 | 4.97 (8) | 2.160 |
| NW reading L1 | 200 | 8.76 (10) | 1.530 |
| NW spelling L1 | 200 | 9.04 (12) | 1.993 |
| NW repetition L1 | 199 | 6.04 (10) | 1.410 |
| Word list reading L1 | 202 | 62.11 (105) | 12.353 |
| Word list reading FL | 203 | 62.06 (105) | 13.882 |
| Phoneme del L1 | 199 | 21.32 (24) | 2.536 |
| Common unit L1 | 200 | 6.06 (10) | 2.448 |
| RAN L1 | 203 | 43.41 s | 8.950 |
| RAN FL | 201 | 36.13 s | 12.484 |
| Reading L1 | 201 | 9.89 (12) | 2.156 |
| Reading FL | 202 | 11.35 (20) | 3.578 |

Preliminary results - please do not quote

Factor analysis: L1 cognitive variables

| Factors | Variables |
|---|---|
| <u>Factor 1</u> Lexical access | RAN Word list reading Rapidly presented words |
| <u>Factor 2</u> Grapheme-phoneme correspondence | Non-word reading Phoneme deletion Common unit |
| <u>Factor 3</u> Working memory | Non-word repetition Rapidly presented words Non-word spelling |
| <u>Factor 4</u> Manipulation of information | Backwards digit span Common unit |

Preliminary results - please do not quote



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Factor scores and L1 Finnish reading

| Factors | L1 Finnish reading |
|---|--------------------|
| <u>Factor 1</u> Lexical access | .179 |
| <u>Factor 2</u> Grapheme-phoneme correspondence | .124 (NS) |
| <u>Factor 3</u> Working memory | .139 (NS) |
| <u>Factor 4</u> Manipulation of information | .186 |

Preliminary results - please do not quote



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Factor scores and FL English reading

| Factors | English reading |
|---|-----------------|
| <u>Factor 1</u> Lexical access | .201 |
| <u>Factor 2</u> Grapheme-phoneme correspondence | .079 (NS) |
| <u>Factor 3</u> Working memory | .228 |
| <u>Factor 4</u> Manipulation of information | .019 (NS) |

Preliminary results - please do not quote



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Stepwise Multiple Regression: cognitive variables and L1 reading

■ L1 cognitive variables and L1 reading

| | Adjusted R Square | Variance accounted for | First variable | Second variable |
|--------------------|-------------------|------------------------|---------------------------------|------------------------------|
| L1 Finnish reading | .093 | 9% | Backwards digit span in Finnish | Non-word repetition, Finnish |

■ L1 & FL cognitive variables and L1 reading

| | Adjusted R Square | Variance accounted for | First variable | Second variable | Third variable |
|--------------------|-------------------|------------------------|---|--------------------------------------|------------------------------|
| L1 Finnish reading | .124 | 12% | Rapidly presented words in FL (English) | Backwards digit span in L1 (Finnish) | Non-word repetition, Finnish |



Preliminary results - please do not quote

Stepwise Multiple Regression: cognitive variables and FL reading

■ L1 & FL cognitive variables and FL reading

| | Adjusted R Square | Variance accounted for | First variable | Second variable | Third variable |
|--------------------|-------------------|------------------------|---|-----------------|------------------------------|
| L2 English reading | .220 | 22% | Rapidly presented words in FL (English) | RAN FL English | Non-word repetition, Finnish |

■ FL cognitive variables and FL reading

| | Adjusted R Square | Variance accounted for | First variable | Second variable |
|--------------------|-------------------|------------------------|---|-------------------|
| L2 English reading | .192 | 19% | Rapidly presented words in FL (English) | RAN in FL English |

Preliminary results - please do not quote



Weaker performers

- If you perform poorly in cognitive and psycholinguistic tasks is your performance in reading task poor as well?
- Is there a difference between L1 and FL reading achievements?
- Weaker performers=
Score ≤ 1 SD below the group average



Weaker performers

= scores ≤ 1 SD below the group mean

| Variable | N | Mean | SD | L1 R weaker | | FL R weaker | | 4th grade | |
|------------|----|--------------|------|-------------|-------|-------------|-------|-----------|-------|
| | | | | Mean | SD | Mean | SD | L1 R | FL R |
| BDS L1 | 20 | 2.65 (14) | .489 | 9.45 | 2.205 | 11.55 | 3.471 | 9.89 | 11.35 |
| BDS FL | 25 | 1.96 (8) | .200 | 9.36 | 2.307 | 10.20 | 2.646 | 9.89 | 11.35 |
| RPW L1 | 30 | 4.30 (14) | 2.25 | 9.46 | 2.027 | 9.14 | 3.270 | 9.89 | 11.35 |
| RPW FL | 28 | 1.36 (8) | .780 | 8.85 | 1.975 | 8.81 | 3.187 | 9.89 | 11.35 |
| NW read L1 | 43 | 6.35 (10) | 1.23 | 9.73 | 2.013 | 10.79 | 3.250 | 9.89 | 11.35 |

Preliminary results - please do not quote

Weaker performers – more descriptive statistics

| Variable | N | Mean | SD | L1 R weaker | | FL R weaker | | 4th grade | |
|-------------|----|---------------|------|-------------|-------|-------------|-------|-----------|-------|
| | | | | Mean | SD | Mean | SD | L1 R | FL R |
| RAN L1 | 29 | 58.06 | 4.78 | 9.73 | 1.780 | 11.48 | 3.365 | 9.89 | 11.35 |
| RAN FL | 23 | 63.30 | 13.9 | 9.30 | 2.077 | 9.48 | 3.160 | 9.89 | 11.35 |
| NW Rep L1 | 28 | 3.68 (10) | .548 | 8.78 | 3.226 | 10.00 | 3.813 | 9.89 | 11.35 |
| Phon Del L1 | 22 | 16.00 (24) | 2.55 | 9.27 | 2.995 | 10.50 | 3.622 | 9.89 | 11.35 |
| ComU L1 | 35 | 2.14 (10) | .833 | 9.60 | 2.354 | 10.50 | 3.149 | 9.89 | 11.35 |

Preliminary results - please do not quote

Conclusions

- The cognitive and psycholinguistic variables do not explain much variance in the scores in Finnish or English reading tasks.
 - Tasks are designed to detect severe reading problems
 - The participants are not beginners in reading
- Weak performance in cognitive and psycholinguistic tasks does not automatically mean weak performance in reading tasks in L1 or even in FL. However, lower scores in Rapidly Presented Words and RAN (FL) coincide with low scores in English reading task.
 - The role of language in context of cognitive tasks?
 - The role of lexical access in reading?

Preliminary results - please do not quote



JYVÄSKYLÄN YLIOPISTO
UNIVERSITY OF JYVÄSKYLÄ

Thank you for your attention!

To learn more about DIALUKI,
please visit our website

www.jyu.fi/dialuki

