Diagnosing reading and writing in a second or foreign language

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AILA 2011 – The 16th World Congress of Applied Linguistics
Beijing, August 23–26, 2011
Outline of talk

- DIALUKI research project
  - aims, sub-studies, instruments

- Findings from DIALUKI Study 1
  - predictors of writing in English as FL for 3 age groups (based on regression analyses)
  - complementary analyses of the relative weight of the predictors

- Conclusions
  - including some comparison with results on reading in L2

Preliminary results – please do not quote
Attempts at understanding and operationalising constructs that may be relevant to understanding reading and writing in L2

Paves way for more and better diagnostic tests in the future by increasing our understanding of diagnosing L2 reading and writing
DIALUKI – Diagnosing reading and writing in SFL

- Research project 2010–2013: work in progress
- Can different L1 and L2 linguistic & psycholinguistic measures predict difficulties in SFL R/W?
- How does SFL proficiency in R/W develop in psycholinguistic and linguistic terms?
- Which features or combinations of features characterise different CEFR proficiency levels?
- Cooperation between language testers, other applied linguists and psychologists (L1 reading)

Preliminary results – please do not quote
DIALUKI - Diagnosing reading and writing in a second or foreign language

The Research Project is funded by the Academy of Finland, the University of Jyväskylä and the UK Economic and Social Research Council (ESRC).

Aims
Studies
People
Related projects
Links

Seminar and network for L2 reading researchers
Presentations and publications

MORE INFORMATION FOR HOMES AND SCHOOLS >>

Preliminary results – please do not quote
DIALUKI informants

- Finnish-speaking learners of English as FL
  - primary school 4th grade (age 10)
  - lower secondary school, 8th grade (age 14)
  - gymnasium (academically oriented upper secondary school), 2nd year students (age 17)

- Russian-speaking learners of Finnish as SL
  - primary school (3–6th grade)
  - lower secondary school (7–9th grade)

- From 111 schools around Finland
Three major studies

**Study 1** (in 2010): A cross-sectional study with 3 x 200 + 250 students.
- Exploring the value of a range of L1 & L2 measures in predicting L2 reading & writing, in order to select the best predictors for further studies.

**Study 2** (in 2011/12): Several training / experimental studies, each a few weeks in length
- The effects of training on SFL reading and writing
- Using computerized learning games in L1 and L2.
  - *Graphogame* for diagnosing & treating dyslexia

**Study 3** (in 2011 – 2012/13): Longitudinal, 2–3 years.
- The development of literacy skills, and the relationship of this development to the diagnostic measures.

Preliminary results – please do not quote
DIALUKI Study 1 outline

**INDEPENDENT (PREDICTOR) VARIABLES**

- Cognitive / psycholinguistic tasks in L1 and L2 (17 tasks)
- Motivation measures (7 factor scores)
- Reading test in L1 (PISA or other)
- Reading test in L2 (DIALANG and/or Pearson)
- Self-assessment of L1 & L2 reading
- Self-assessment of L1 & L2 writing
- Other linguistic tasks:
  1) L1 & L2 vocabulary
  2) L1 & L2 segmentation
  3) L2 dictation
  4) L1 spelling error correction

**DEPENDENT VARIABLE**

- Writing in FL (English)
  (Measure of writing ability from FACETS)

**Background information**

- 1) parents’ questionnaire
- 2) student’s questionnaire
L2 writing measures

- 4th graders: one task
  - writing a letter to a friend describing what they like and why (CEFLING)

- 8th graders: three tasks
  - writing e-mail to friend on everyday matters using a previous reading text (Pearson PTE General)
  - writing an opinion to a college magazine on an everyday topic, stating what he/she likes / dislikes about it (Pearson PTE General)
  - writing an opinion on a topic relevant to young people; giving reasons for one’s view (CEFLING)

- Gymnasium: three tasks
  - writing and justifying an opinion on everyday topic, using a previous text (Pearson PTE General)
  - writing an article to a magazine (describe and argue) (Pearson PTE General)
  - writing an opinion on a topic relevant to young people; giving reasons for one’s view (CEFLING)
Rating of writing

- All scripts rated by 2 raters in Finland
  - practice rating
  - CEFR–based rating scale
  - benchmarks
  - 11 raters, overlapping design
- ... and by 3 Pearson’s raters in the Uk
- FACETS analysis of the ratings in Finland (so far)
  - no misfitting raters
  - a measure of writing ability was calculated for all learners
    - adjusted for rater severity / leniency and task difficulty (if relevant)
- our dependent variable for regression analyses
Predicting L2 writing – Part 1

PSYCHOLINGUISTIC / COGNITIVE TASKS ONLY

- Effectiveness of working memory (backward digit span score in L1)
- Effectiveness of working memory (backward digit span score in FL)
- Rapid recognition of words (accuracy of identifying rapidly presented words in L1)
- Rapid recognition of words (accuracy of identifying rapidly presented words in FL)
- Speed of lexical access (speed of reading a list of words in L1)
- Speed of lexical access (speed of naming in L1)
- Speed of lexical access (speed of reading a list of words in FL)
- Speed of lexical access (speed of naming letters, numbers & colours in FL)
- Spelling in L1 (accuracy of spelling non-words in L1)

Writing in FL (English)
(IRT-based measure of writing ability)
Backward Digit Span Memory Test in L1 and L2

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Rapid Automatic Naming (colours, letters and numbers)

- In L1 and L2
- Say these as fast and as accurately as you can
Stepwise multiple regression analysis, **cognitive variables with EFL writing**

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<thead>
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<th></th>
<th>Adjusted R Square</th>
<th>% variance</th>
<th>First variable</th>
<th>Second variable</th>
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<tbody>
<tr>
<td><strong>4th Grade</strong></td>
<td>.244</td>
<td>24%</td>
<td>Rapidly presented words in L1 Finnish (.427)</td>
<td>Rapidly naming of colours etc in English (-.398)</td>
<td>Rapidly presented words in English (.392)</td>
<td></td>
</tr>
<tr>
<td><strong>8th Grade</strong></td>
<td>.399</td>
<td>40%</td>
<td>Rapid naming of colours etc in English (.568)</td>
<td>Reading a word list in Finnish (.473)</td>
<td>Rapidly presented words in English (.331)</td>
<td>Rapid naming of colours etc in Finnish (-.276)</td>
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<tr>
<td><strong>Gym</strong></td>
<td>.225</td>
<td>23%</td>
<td>Rapid naming of colours etc in English (-.459)</td>
<td>Rapid naming of colours etc in Finnish (-.112)</td>
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Preliminary results – please do not quote
Why supplement regression analysis with analysis of relative weights (or with dominance analysis)?

- regression analysis tells us how much of the variance in the DV is predicted by the independent / predictor variables but not how much each of them contributes to the prediction
- the order of predictors in the regr.analysis can be misleading (and the 1st predictor is always the biggest)
- this is a problem with correlated predictors in particular

more, and more precise, information about predictors

can help in theory building

## Relative weights of the significant cognitive predictor variables (EFL writing)

<table>
<thead>
<tr>
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<tr>
<td>4th Grade</td>
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<td>Rapid naming of colours etc in English 34.8%</td>
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<tr>
<td>8th Grade</td>
<td>.399</td>
<td>40%</td>
<td>Rapid naming of colours etc in English 50.5%</td>
<td>Reading a word list in Finnish 28.3%</td>
<td>Rapidly presented words in English 14.7%</td>
<td>Rapid naming of colours etc in Finnish 6.5%</td>
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<tr>
<td>Gym</td>
<td>.225</td>
<td>23%</td>
<td>Rapid naming of colours etc in English 92.4%</td>
<td>Rapid naming of colours etc in Finnish 7.6%</td>
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</table>

Preliminary results – please do not quote
Stepwise multiple regression analysis, motivation factors with EFL writing

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<thead>
<tr>
<th></th>
<th>Adjusted R Square d</th>
<th>% variance explained</th>
<th>First variable</th>
<th>Second variable</th>
<th>Third variable</th>
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<tbody>
<tr>
<td>4th grade (10-year-olds)</td>
<td>.205</td>
<td>21%</td>
<td>English Self-concept (.410)</td>
<td>Intrinsic interest (.326)</td>
<td>Self-regulation (.048)</td>
</tr>
<tr>
<td>8th grade (14-year-olds)</td>
<td>.454</td>
<td>45%</td>
<td>English Self-concept (.676)</td>
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</tr>
<tr>
<td>Gymnasium (17-18-year-olds)</td>
<td>.478</td>
<td>48%</td>
<td>English Self-concept (.686)</td>
<td>Anxiety (-.391)</td>
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Preliminary results – please do not quote
## Relative weights of the significant motivational predictor variables (EFL writing)

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<tr>
<td></td>
<td></td>
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<td></td>
<td>82.8%</td>
<td>17.2%</td>
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</table>

Preliminary results – please do not quote
### Stepwise multiple regression analysis, linguistic variables with EFL writing

<table>
<thead>
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<th>Adjusted R Squared</th>
<th>% variance</th>
<th>1st IV</th>
<th>2nd IV</th>
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<th>4th IV</th>
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<tbody>
<tr>
<td>4th Grade</td>
<td>.432</td>
<td>43%</td>
<td>English dictation (.615)</td>
<td>L1 Finnish segmentation (accuracy) (-.463)</td>
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</tr>
<tr>
<td>8th Grade</td>
<td>.725</td>
<td>73%</td>
<td>English dictation (.767)</td>
<td>English reading (.716)</td>
<td>L1 Finnish segmentation (time) (-.451)</td>
<td>L1 Finnish Reading (PISA) (.496)</td>
<td>English vocabulary (.664)</td>
</tr>
<tr>
<td>Gym</td>
<td>.633</td>
<td>63%</td>
<td>English dictation (.762)</td>
<td>English reading (.706)</td>
<td>Correcting L1 Finnish spelling errors (.418)</td>
<td>L1 Finnish segmentation (time) (-.246)</td>
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</tbody>
</table>
Segmentation task in L2 (4th graders’ version)

Example:
| thepigs | were | so | happy | they | sang | this | song |

Task:
| sothenextday | thethree | little | pigs | left | home | the | first | pig | death | home | from | straw | these | second | pig |
| made | a | home | from | sticks | but | the | third | pig | was | clever | hema | de | his | home | from | brick | son | day | the | big |
| bad | wolf | came | to | the | straw | house | he | knocked | on | the | door |
## Relative weights of the significant linguistic predictor variables (EFL writing)

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<tr>
<td>4th Grade</td>
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<td>English dictation 68.7%</td>
<td>L1 Finnish segmentation (accuracy) 31.3%</td>
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<td>English dictation 30.7%</td>
<td>English reading 22.8%</td>
<td>L1 Finnish segmentation (time) 12.0%</td>
<td>L1 Finnish Reading (PISA) 12.8%</td>
<td>Size of English vocab 21.7%</td>
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Preliminary results – please do not quote

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# Stepwise multiple regression analysis analysis, cognitive, motivation, and linguistic variables with EFL writing

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<td>Motivation intensity (.300)</td>
<td>Parental encouragement (-.057)</td>
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<tr>
<td>8th Grade</td>
<td>.751</td>
<td>75%</td>
<td>English dictation (.767)</td>
<td>English reading (.716)</td>
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<td>English self-concept (.676)</td>
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<td>Non-word spelling in L1 Finnish (.107)</td>
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Relative weights of the significant cognitive, motivational and linguistic predictor variables (EFL writing)

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Preliminary results - please do not quote
Conclusions – what predicts writing in L2?

- Cognitive / psycholinguistic predictors
  - 23 – 40% of variance
  - Rapid naming of colours, letters & numbers in L2 (importance increases with age)
  - Rapidly presented words in L2 (importance decreases with age)
  - Rapidly presented words in L1 (only with 4th graders)

- Motivational predictors
  - 21 – 48%
  - English self-concept
  - Intrinsic interest (only with 4th graders)
Conclusions—what predicts writing in L2?

- Linguistic predictors
  - Dictation in L2 consistently strongest predictor
  - Reading in L2 (importance increases with age?)
  - Segmentation in L1 (time and/or accuracy)

  - When the more integrative measures (dictation, reading) are left out, L2 vocabulary becomes an important predictor (as is the case when predicting L2 reading)
Conclusions—what predicts writing in L2?

- Cognitive, motivational and linguistic predictors together
  - several predictors (more than with reading in L2)
  - combination of linguistic and motivational predictors (even cognitive?)
    - reading in L2 had only linguistic predictors; L2 vocabulary particularly important
    - English self-concept and other motivation (partly different from when motivation alone was considered)
  - dictation strongest (or one of the strongest)
Benefits of relative weight analyses

- Relatively easy to compute if you have the syntax available
- Can address the issue of correlated predictors and clarify how much each predictor contributes
  - order of predictors does not always tell this
- Squaring the correlation between DV and IV gives (often) very similar information but
  - not always
  - percentages easier to understand
- To what extent these analyses help our model / theory building compared with simple regression analyses not clear yet but potentially the more precise information we have available the better

Preliminary results – please do not quote
Next steps

- Detailed design of the longitudinal Study 3 and the teaching experiments (Study 2)
  - e.g. more comprehensive measurement of structures
- More detailed analyses of Study 1 data
  - Writing (compare and possibly merge the Finnish ratings with those done by 3 Pearson raters)
  - Compare results for reading and writing
- Analyses of the Finnish / Russian data from Study 1
Thank you for your attention!

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www.jyu.fi/dialuki