

Phonological and writing skills at the end of the second grade in Croatian speaking children with and without dyslexia

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Introduction

- **Croatian:** orthographically transparent language with alphabetic writing system; some specific features, such as letters containing diacritics (č, ć, đ, š, ž) (Barić et al., 2005)
- **Phonological skills** contribute more to reading in languages that have more deviations from one-to-one grapheme-phoneme correspondence (Míguez-Álvarez et al., 2022), but the contribution of phonological skills has been less studied with respect to writing
- **Writing:** a complex skill; written composition needs to be seen as multidimensional
- This contributes to the understanding of different roles of well-known factors such as **accuracy**, **complexity**, and **quality** that are important for early written expression (García et al., 2017)

Previous studies

- Children with **reading and/or language disorder (R/LD)** exhibit:
- 1) poor handwriting skills, poor spelling skills or a combination of both (Berninger, 2006)
 - 2) problems with speed and fluency in writing (García et al., 2017)
 - 3) poorer quality of the written product (Williams et al., 2013)
- Contribution of the phonological skills to writing skills:
- depends on orthographic transparency and writing system (Georgiou et al., 2012)
 - + is highly transferable across languages (Furnes & Samuelsson, 2011)

Aims of the current study

- to examine the **relationship between phonological and writing skills**
- to specifically determine the contribution of **phonological skills** to **adherence to writing conventions** and **productivity** in written product

Study outline and design

Participants

- 2nd grade children with typical language development (TD) and with reading and/or language disorder (R/LD) (Table 1)

Table 1. Participant characteristics.

| | N | Age M (SD) | Sex (F/M %) | Preschool (%) |
|----------------------------|----|-------------|-------------|---------------|
| 2 nd grade TD | 97 | 103 (3.404) | 49.5/50.5 | 86.5 |
| 2 nd grade R/LD | 87 | 106 (5.487) | 52.9/47.1 | 85.9 |

Materials and procedure

- **Phonological skills measures (PSM):** phonological awareness (PA), rapid automatized naming (RAN) and phonological working memory (PWM) task
- **Writing skills measures (WSM):** sentence construction task with two components: adherence to writing conventions (AWC) and productivity (P) (P = total number of words (TNW), total number of correct words (TNCW) and total number of errors (TNE))
- Individual paper-pencil testing by trained SLPs

Analysis

- Descriptive statistics, correlations and linear regression of phonological variables as predictors of writing measures using IBM SPSS 27

Results

- TD perform better on all **PSM and WSM** (Table 2)

Table 2. Descriptive data.

| Var | 2 nd grade TD (N=97) | | | 2 nd grade R/LD (N=87) | | |
|------|---------------------------------|-------|------------|-----------------------------------|-------|-------------|
| | M | SD | Min-Max | M | SD | Min-Max |
| PWM | 13.99 | 1.765 | 10-16 | 11.07 | 3.049 | 0-16 |
| PA | 36.27 | 1.901 | 30-38 | 31.70 | 6.125 | 7-38 |
| RAN | 16.37 | 3.513 | 9.70-28.00 | 20.51 | 5.329 | 11.49-44.00 |
| AWC | 13.90 | 1.279 | 8-15 | 11.82 | 3.598 | 1-15 |
| TNW | 23.83 | 3.282 | 18-34 | 23.02 | 3.631 | 18-44 |
| TNCW | 21.98 | 3.400 | 15-32 | 18.93 | 3.803 | 9-36 |
| TNE | 1.95 | 1.944 | 0-10 | 4.17 | 3.051 | 0-16 |

- There is a **different trend in correlations** between PSM and WSM for the groups (Table 3)

Table 3. Correlation analyses.

| | PWM | PA | RAN | AWC | TNW | TNCW |
|------|-------|-------|-------|-------|-------|-------|
| PWM | - | | | | | |
| PA | .24* | .50** | | | | |
| RAN | | | - | | | |
| AWC | .21* | | | - | | |
| TNW | .28** | | | | - | |
| TNCW | .35** | .27** | .32** | -.25* | .28** | .22* |
| TNE | -.25* | | -.21* | -.23* | .34** | .38** |

Regression results statistically significant for **AWC** ($R^2=0.101$, $F(3, 180)=6.704$, $p<.001$), **TNCW** ($R^2=0.207$, $F(3, 180)=15.654$, $p<.001$) and **TNE** ($R^2=0.101$, $F(3, 180)=13.792$, $p<.001$). Phonological skills seem to contribute to these writing skills →RAN: significant predictor of AWC ($b=-.099$, $t(3,180)=-2.310$, $p<.05$); PA and RAN: significant for TNCW ($b=.221$, $t(3,180)=3.399$, $p<.001$; $b=-.146$, $t(3,180)=-2.629$, $p<0.01$); PWM and RAN: significant for TNE ($b=-.192$, $t(3,180)=-2.414$, $p<0.05$; $b=.120$, $t(3,180)=3.005$, $p<0.01$)

Discussion and concluding remarks

- Writing skills: not excessively studied in the context of Croatian language and writing system. **Current findings:** children with R / LD perform poorer on writing skills, such as adherence to writing conventions, as well as certain measures of productivity connected with spelling and writing construction
- Children with R/LD write the same N of words as TD children (productivity relatively low in younger children): it is not the amount of writing that distinguishes them, but the way they write: amount of mistakes, use of punctuation marks, etc. → writing quality as a discriminative criterion
- Both phonological knowledge and speed are important for accuracy, while speed is important for implementing writing rules
- Future studies: 1) should test more complex models with other variables known to contribute and mediate the relationship between cognitive skills and writing; 2) writing skills should include other components; e.g. handwriting quality and fluency + other measures of composition quality

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