

# The impact of phonological and orthographic processing in Russian children reading development

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## Introduction

Reading implies visual information and linguistic processing. According to the **dual-route approach to orthographic processing** (Grainger et al. 2012, Ziegler et al. 2014), at early stages of learning to read children rely more on the phonological information rather than on the orthographic information.

The **aim** of this study is to define the extent to which phonological and orthographic processing influences reading skills in Russian monolingual children (continuing the research started by Ivanov et al., 2010 and Korneev et al., 2017).

## Method

**Participants:** 36 Russian monolingual children, aged 7-11 years.

They performed **three behavioral tests:**

1. The **Standardized Assessment of Reading Skills** (Kornev, 1997) measured reading speed (number of words read in one minute).
2. The task **Changing a sound in a pseudoword** (Dorofeeva et al., 2019) assessed the level of phonological processing. The task was, for example, to change the sound /v/ to the sound /v'/ in the word *mimiva*. The number of correct responses to 24 probes was counted.
3. The **Rapid Automatized Naming** task (RAN; Denckla Rudel 1974) assessed orthographic processing measuring time spent on naming all the unique digits (2, 4, 6, 7, 9) in a 60-digits matrix.

## Results

Linear regression analysis was performed in the IBM SPSS Statistics (Version 22). Reading speed correlated significantly with 1) the age of a child, 2) the phonological awareness, and 3) the time spent on the RAN completion (see graphs for details).

The  $\beta$  coefficient demonstrated that those factors explained 13.5%, 19% and 8.3% of the variance in reading speed correspondingly. All three factors are noncollinear (VIF=1.27; 1.14 и 1.42 respectively), i.e. they make a contribution in reading speed independently from each other.



Reading development in Russian monolingual children is based on the development of both phonological and orthographic processing.

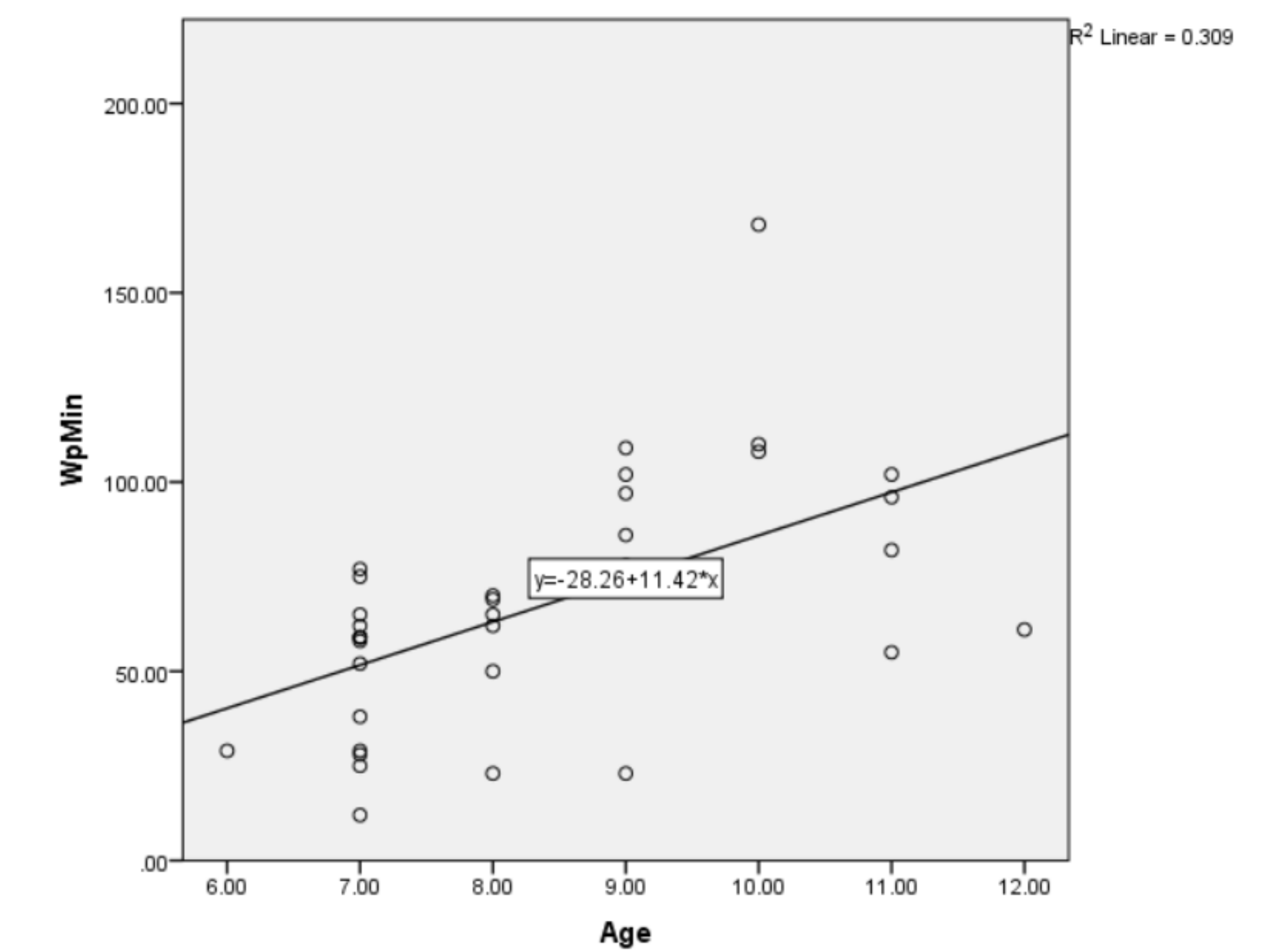
Importantly, the correlation between age and reading speed was not as strong, as the correlation between reading speed and phonological awareness.

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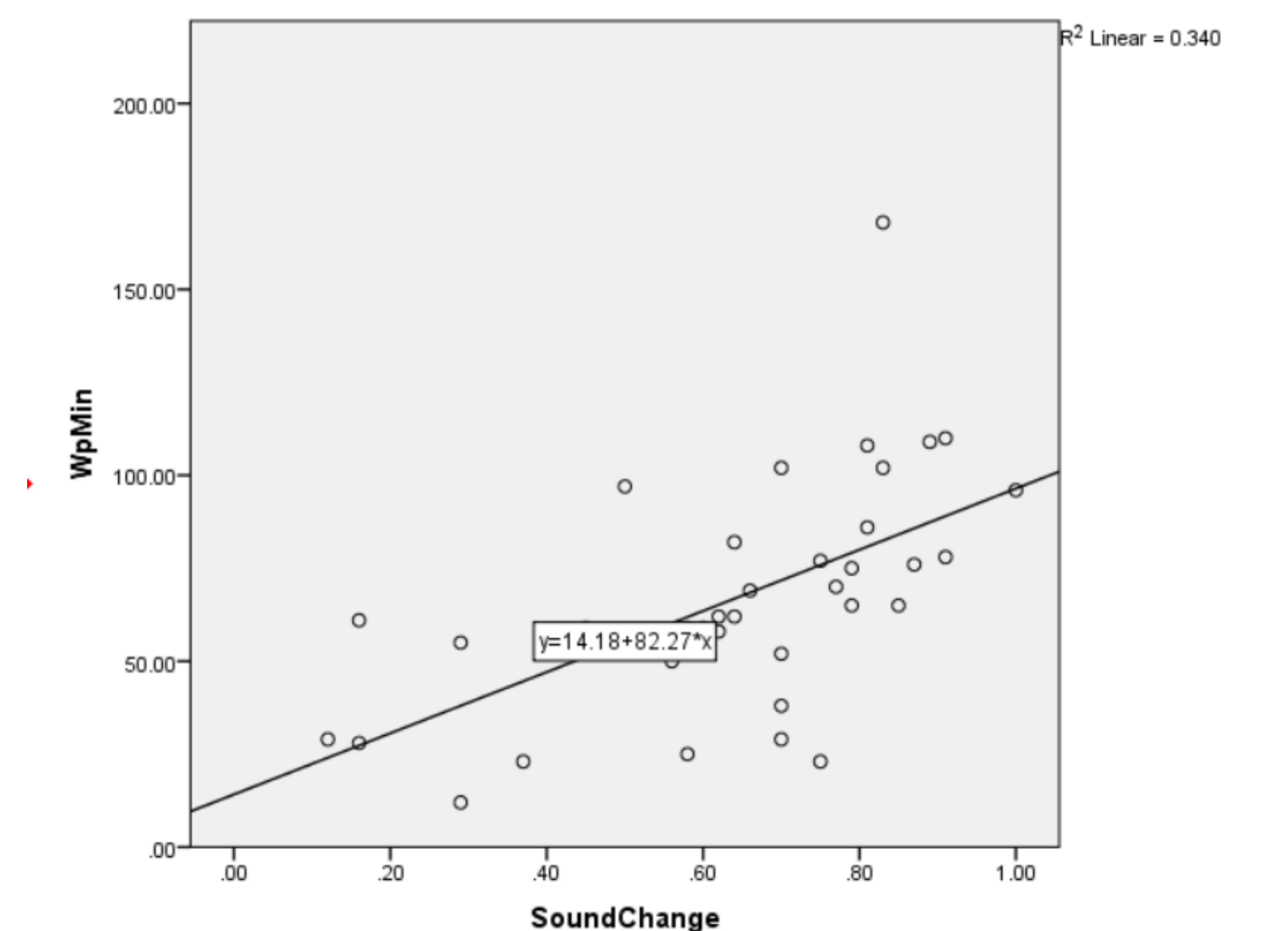
Correlation between reading speed and the age of a child ( $t=3.06$ ,  $p=0.004$ )

GGraph



Correlation between reading speed and phonological awareness ( $t=3.83$ ,  $p=0.001$ )

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Correlation between reading speed and the time spent on the RAN completion ( $t=-2.27$ ,  $p=0.03$ )

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