

Morphology, word reading, and spelling among Swedish students with poor reading in grade two and four

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Introduction

Phonemic awareness (PA) and rapid automatized naming (RAN) contribute to individual variations in word reading and spelling (Melby-Lervåg et al. 2012; Moll et al. 2014). Also, morphological awareness (MA) has been shown to contribute (Kirby & Bowers 2018; Levesque et al. 2021; Hasenäcker et al. 2023), as morphological information gives clues to the orthographical representation of complex words (Kuo & Andersson 2006; Rastle 2022). Yet, it is still not clear how important morphology is for the different phases of reading development (Kirby & Bowers 2018; Rastle 2022; see Ehri 2005 and Levesque et al. 2021 for two different models).

According to Seymour et al. (2003), Swedish has complex syllable structure (e.g., CVC syllables, complex consonant clusters) and situates in between shallow (one letter–one phoneme) and deep orthographies (e.g., multi-letter graphemes, irregularities, morphological influences). Swedish orthography is sometimes predictable from the morphological structure of words (cf. Venezky 1999 for English), and to spell and read complex words, morpheme boundaries must often be respected.

Aim of the study: To investigate the role of MA (inflection, compounding, derivation) for word reading and spelling skills among Swedish students with poor word reading.

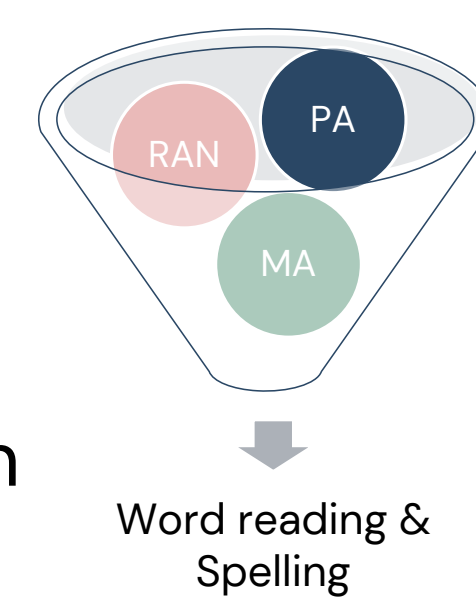
- RQ1: To what extent does MA predict variation in word reading when controlling for PA and RAN in grade 2 and 4?
- RQ2: To what extent does MA predict variation in spelling when controlling for PA and RAN in grade 2 and 4?

Method

Participants: 57 students in grade 2, and 82 in grade 4, with word reading skills at $z < -0.7$, May 2023. Recruited from 18 schools in Sweden.

Procedure: Individual and group testing, autumn 2023.

Data analysis: Hierarchical regressions were performed with word reading and spelling in grade 2 and 4 as dependent variables. PA and RAN were included in the first step and MA in the second step to explore if MA could explain any additional variance in the dependent variables.



Results

Table 1. Descriptive statistics of the study measures

Measures	Grade 2	Grade 4	Total	Total
	n = 57	n = 82	n = 139	n = 139
	M (SD)	M (SD)	M (SD)	Min - Max
PA (points)	13.9 (5.3)	20.8 (5.9)	18 (6.6)	2–32
RAN (seconds)	140.1 (40.2)	93.4 (18.2)	112.5 (37.2)	60–234
MA (points)	26.9 (9.2)	40.3 (8.2)	34.8 (10.8)	1–59
Word reading (points)	37.4 (26.0)	86.2 (22.9)	66.2 (34.1)	1–145
• z-score	-1.34 (.84)	-1.14 (.85)		
Spelling (points)	8.9 (4.6)	12.6 (7.3)	11.1 (6.4)	0–31
• z-score	-2.79 (1.69)	-1.60 (.90)		

Figure 1. The contribution of MA to word reading when controlling for PA and RAN (RQ1)

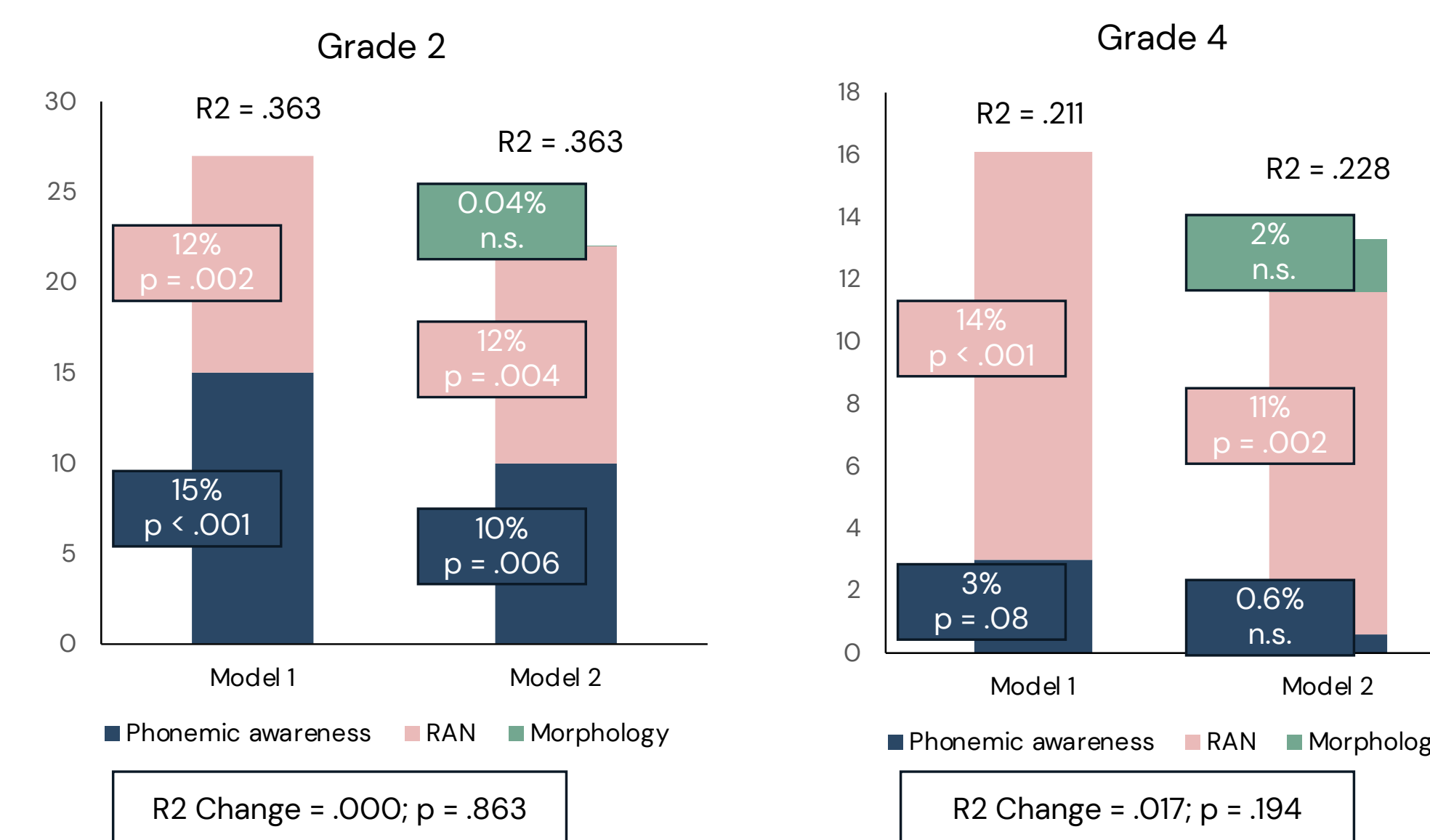
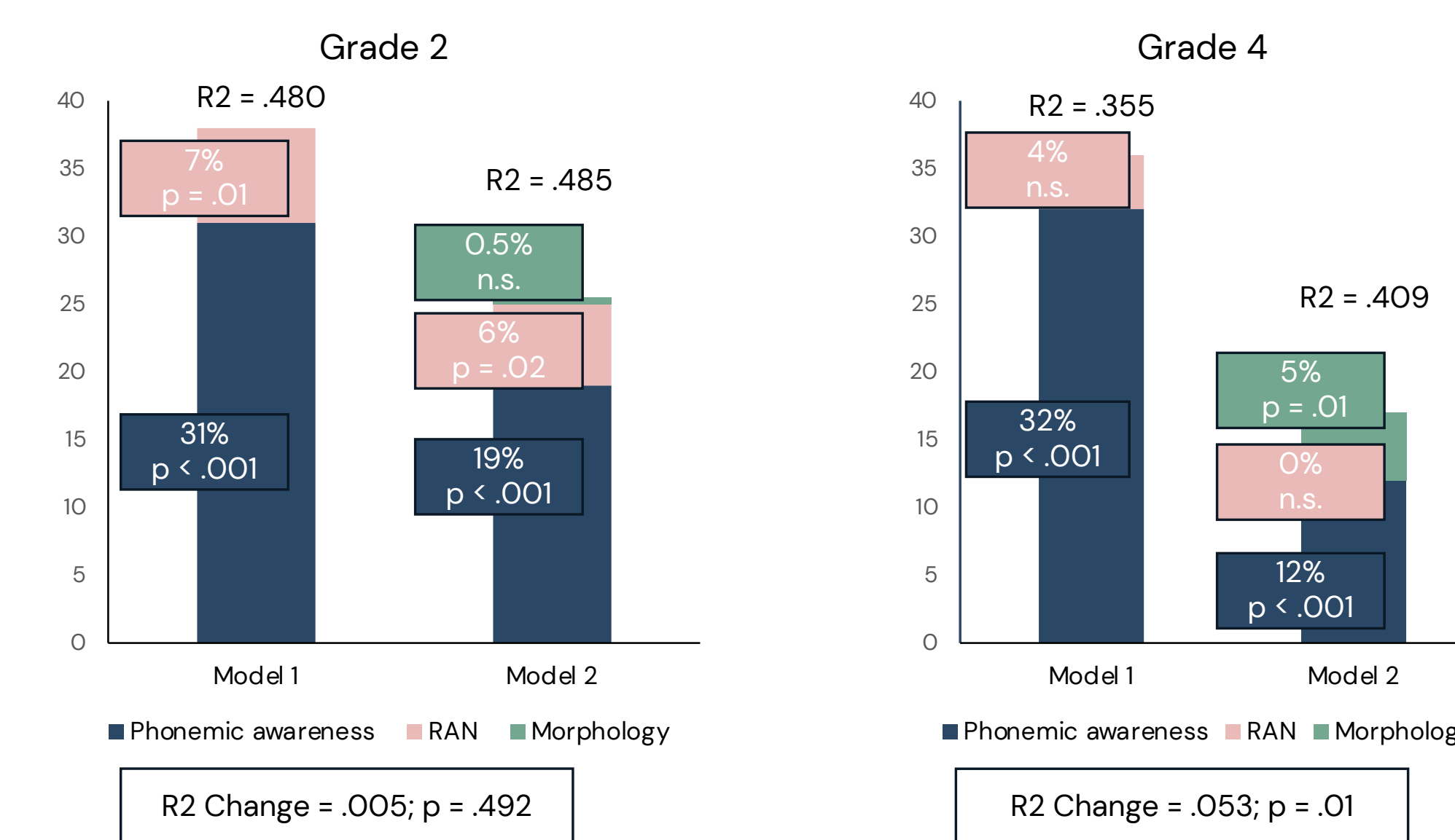


Figure 2. The contribution of MA to spelling when controlling for PA and RAN (RQ2)



Discussion

We found no significant contribution of MA to variation in **word reading** in grade 2 and 4, when controlling for PA and RAN. Leaning on Kirby and Bowers (2018), we did expect some influence of MA at least in grade 4. Nevertheless, our results confirm that PA and RAN serve a key role in cracking the alphabetical code in grade 2 (cf. Melby-Lervåg et al. 2012). In grade 4, however, the impact of PA decreased along with an increase of RAN, which might reflect that students at this stage have greater challenges in reading fluency than reading accuracy.

The lack of significance of MA could be due to several reasons. Phonological processing skills may play a stronger role than morphology for poor readers also after cracking the code. The word reading test format can be another factor since it starts with morphologically simple words, and due to the time limit, poor readers do not always get to the complex words, which would put more strain on MA (cf. Levesque et al. 2021; Rastle 2022; Hasenäcker et al. 2023).

PA was the main significant contributor to **spelling** in grade 2 and 4. In grade 4, also MA turned out to be significant (N. B. there were few complex words in the spelling test for grade 2). Hence, this study indicates that PA continues to be important for phoneme-grapheme encoding also after the first years of schooling.

In conclusion, although only weak impact of MA was found, this study does not conflict with a view of morphological patterns being learnt gradually and individually through increased reading experience (Rastle 2022).

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Future work: To explore if intensive training in phonics and/or morphology is beneficial for poor readers in grade 2 and 4 (6 weeks, 4x30 min/day, with repeated reading as control). The measures presented here are part of the pre-testing.