Word and pseudoword reading accuracy and reading speed in 7-15 year old print and braille readers

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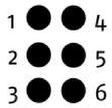


Braille is a tactile writing system, where characters are represented by the presence or absence of elevated dots arranged in a two by three matrix known as the Braille 'cell'. The Hungarian Braille alphabet consists of 44 characters (Greaney & Reason, 1999). Contrary to print reading, which is simultaneous and selective, Braille reading is sequential and exhaustive (Hughes, 2011): Braille cells are encountered one at a time. The sequential nature of Braille implies that blind readers predominantly rely on the non-lexical grapho-phonological reading mode, depending on word characteristics (Coltheart et al., 2001). It can be assumed that an effective engagement of phonological processing skills is required throughout the braille reading process (Veispak & Ghesquière, 2010 in Veispak et al., 2013).

BACKGROUND AND AIMS

The investigation presented in this study was carried out in groups of 7-15 year old blind and sighted students and examined the speed and accuracy of print vs Braille (pseudo)word reading of the groups.
The changes observed in the speed and accuracy of reading are described by age groups. Explanation for variation is offered using the latest cognitive neuroscience research.

HYPOTHESIS AND RESEARCH QUESTION

Our hypothesis was that a significant difference between Braille readers' word reading and pseudoword reading speed indicates the use of two distinct reading routines . However, if the reading speed is found to be the same, it means that blind readers use one decoding strategy, reading sequentially and relying less on semantic decoding . In this case, readers do not develop word forms.

The research question is whether examining the speed and accuracy of words and pseudowords of blind readers, divided into groups according to age, reveals unique patterns.

DATA AND METHODS

Data were collected from 180 students (n_{blind}=90, $n_{sighted}$=90). Both reading tests (Braille/print) consist of three lists of 40 one-syllable, 40 two-syllable and 40 tree/four- syllable (pseudo)words, respectively.

Participants

	Blind	Sighted	t-test
N	90	90	
Age	7;0-15;6	7;0-15;6	
Gender	49 males, 41 females	47 males, 43 females	$x^2(1) = 0,242$, $p = 0,623$
VIQ	97,145	100,44	$t(289) = 1,002$, $p = 0,201$

Age groups

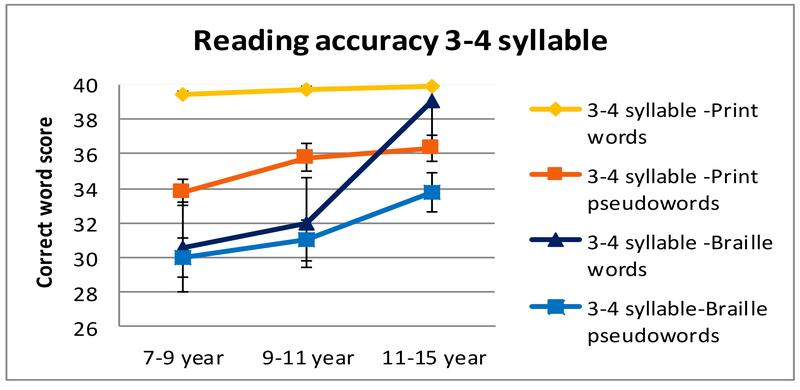
Group 1: 7;0–8;11 yr, n_{blind} = 29, $n_{sighted}$ = 31;

Group 2: 9;0–10;11 yr, n_{blind} = 21, $n_{sighted}$ = 28;

Group 3: 11;0–15;6 yr n_{blind} = 34, $n_{sighted}$ = 37.

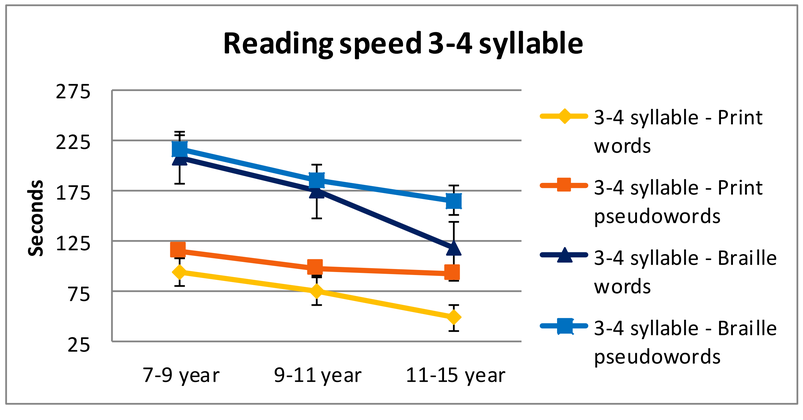
RESULTS

Reading accuracy



Significant group x word type x age ($F(3,251) = 8,25$, $p < 0,0001$) and group x word type x age x word length ($F(7,280) = 13,12$, $p < 0,0001$) interactions.

Reading speed



Significant group x word type x age ($F(2,481) = 5,32$, $p < 0,001$) and group x word type x age x word length ($F(12,07) = 16,94$, $p < 0,0001$) interactions.

DISCUSSION

Word-length effect expected to be more significant in pseudowords than in wordsin print reading, no such difference was anticipated between the reading of (pseudo)words in Braille, due to the equality of the two types of decoding strategy.

The findings, however, suggest that word length affects the reading of both words and pseudowords differently across the three age groups of blind readers.
New findings arose when the results were analysed according to age group clusters.

In the cluster of 11-15-year students (n_{blind}=34, $n_{sighted}$=37) reading strategy of word and pseudoword is different in both modalities.

Once confident reading proficiency is achieved (Group 3) blind readers begin to use direct and non-direct methods of reading, similar to their sighted peers.

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