VISUAL WORD RECOGNITION IN NORMAL READING CHILDREN AND CHILDREN WITH READING DIFFICULTIES
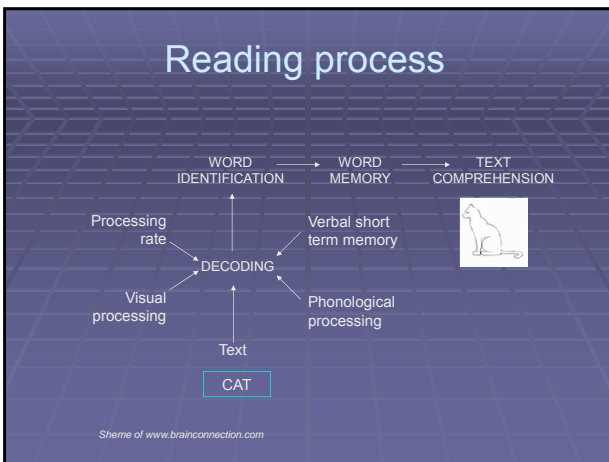
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In Latvia about 15-20% of school aged children have reading difficulties (S.Tūbele, A Kapeloviča, 2006)

What kind of reading disorders exist ?
- Phonological deficit (~70%)
- Processing speed/ orthographic deficit (15%)
- Language comprehension deficit (15%)

Reading process

WORD IDENTIFICATION → WORD MEMORY → TEXT COMPREHENSION

Processing rate

Verbal short term memory

DECODING

Visual processing

Phonological processing

Text

CAT

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- Reading is difficult process because visual symbols must be rapidly identified and translated into the sound.

- Visual processing- unsteady eye control, unstable eye fixation, unstable ocular dominance. During brief fixation on word (~300 msec) can their visual forms be taken in. Magnocellular system stabilize these brief fixation and direct the eye movements. Magnocellular sensitivity helps to determine orthographic ability because the precision with which visual attention and eye fixation can be directed on letters in order to identify their correct order.

The lexical decision-making models

- Dual Route Cascaded model

Distinguish the nonlexical and the lexical route, which are activated at the same time. In the nonlexical route the graphemes of word are decoded into phonemes one-by-one, in a serial way. In the lexical route, all letters of a word are activated in parallel, and these letters activate a word's entry in the orthographic lexicon. The number of words readers can access directly in their orthographic lexicon depends on their reading skill.

- ACV98

The global procedure use knowledge about whole word. Global procedure spans all letters or syllables in a word at a time. This process is parallel.
The analytic procedure is based on the activation of word syllabic segments or smaller segments.

The aim

- To determine differences in visual word recognition and lexical decision for different lengths of words showed in short interval of time (500msec) between normal reading children and children with reading difficulties.

Tasks of the research

- To estimate a reading fluency and select the target groups - normal reading children and children with reading difficulties
- To evaluate the accuracy of word recognition, set up two different groups and ages
- To compare the lexical decision-making model between target groups

Methods

- Fifty-two children took part in the study. Thirteen children in Grade 4 (9-10 years old) and fourteen children in Grade 3 (8-9 years old) had a reading speed less than average in class. These groups will be called children with reading difficulties or poor readers, others - normal reading children or good readers.
- Reading ability was assessed by modified *One-minute test*.
- The developed computerized test shall evaluate the manner in which a children's forms the lexical decision. The stimulus set consisted of 150 words. Each word was shown on a computer for 500 msec. The length of the words varied from four to ten letters. The children's answers were expected verbally and correctly and incorrectly named words were recorded. Each word length was shown 15 times.
- Letter size corresponded to 6 cycles / degree.

Reading fluency
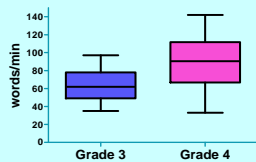
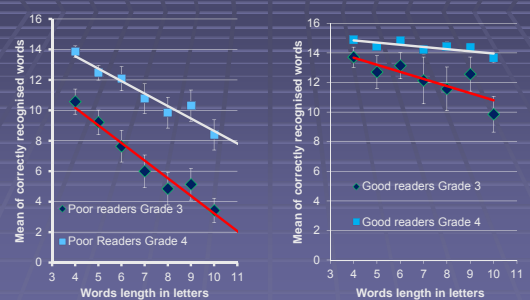|	Grade 4	Grade 3
Total number of values	28	27
Number of excluded values	0	0
Number of binned values	28	27
Minimum	33.0	35.0
25% Percentile	66.75	49.0
Median	90.5	62.0
75% Percentile	111.75	78.0
Maximum	142.0	97.0
Mean	88.6429	63.2222
Std. Deviation	29.1639	17.7294
Std. Error	5.51146	3.41203
Lower 95% CI of mean	77.3342	56.2087
Upper 95% CI of mean	99.9516	70.2357

Data with correctly recognized words of two age groups.

words length	Poor readers Grade 3 (n=14)			Good readers Grade 3 (n=7)			Poor readers Grade 4 (n=13)			Good readers Grade 4 (n=17)		
	mean	±δ	%	mean	±δ	%	mean	±δ	%	mean	±δ	%
4	10,6	2,8	70	13,7	0,7	91	13,8	0,4	91	14,9	0,1	99
5	9,2	2,5	61	12,7	1,1	85	12,5	0,5	85	14,4	0,2	96
6	7,6	2,0	51	13,1	0,9	88	12,1	0,8	88	14,8	0,1	99
7	6,0	1,6	40	12,1	1,6	81	10,8	1,0	81	14,2	0,3	95
8	4,9	1,3	32	11,6	1,5	77	9,8	1,0	77	14,4	0,3	96
9	5,1	1,4	34	12,6	1,2	84	10,3	1,0	84	14,4	0,2	96
10	3,4	0,9	23	9,9	1,2	66	8,4	1,0	66	13,7	0,3	91

Results
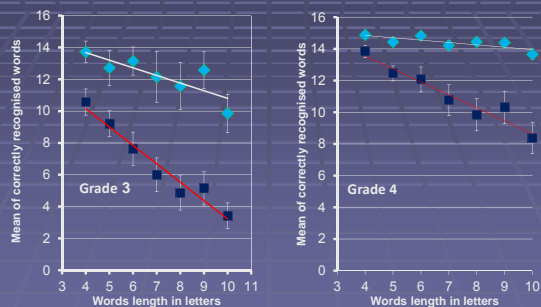
Results

Results

- Reading fluency

Grade 4   90.5±5.51 (wpm),

Grade 3   62±3.41 (wpm).

- Linear regression slope

Grade 4 Good   -0.14±0.08, R^2=0.62

Grade 4 Poor   -0.86±0.10, R^2=0.94
        p=0.00025

Grade 3 Good   -0.46±0.16, R^2=0.68

Grade 3 Poor   -1.25±0.11, R^2= 0.95
        p=0.0025

Conclusion

- Reading fluency significantly increases with the child's age and reading experience.
- The second task results show s that poor readers at the constant time are able to decode words shorter than the good readers, because phoneme is decoded to grapheme in the analytical process or by nonlexical rout.

Conclusion

- Length effects are often believed to indicate the use of a serial sub – lexical decoding strategy instead of a more parallel available to poor readers because of lack of orthographic knowledge.
- In Grade 4 normal reading children did not affected by length when performing lexical decisions on words. To Grade 3 this effect is also detected, but there is lower processing speed.
- Poor readers in Grade 3 and 4 showed a substantial effect of length. Increasing the word length the accuracy of the lexical decisions decreases. Difference in age groups explained processing speed or attention.

Thank you

Acknowledgments