

# THE LATENT STRUCTURE OF READING COMPREHENSION PROBLEMS IN PUPILS LIVING IN POVERTY

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**Abstract:** *The results of Slovene and international studies reveal a connection between literacy and education levels, employment opportunities and the subsequent socio-economic status of individuals and families. Home environment and living habits are also associated with literacy (reading culture) and, in particular, parental levels of education directly affect the development of child literacy. Reading efficiency relating to reading comprehension and reading to learn is an important element of reading literacy performance. The findings of several authors indicate empirical evidence of the existence of deficits and poor reading comprehension in pupils living in poverty and stress the importance of offsetting deficits and developing reading comprehension.*

*The results of the study, in which we investigated and identified the latent structure of the problems in the area of reading comprehension, show that problems in reading comprehension indicate other skills and processes such those necessary for good reading comprehension. The results of factor analysis showed differences in the latent structure of problems in reading comprehension and the latent structure of good reading comprehension. These require differing treatment of pupils who have problems with reading comprehension, with a greater emphasis on the development of phonological awareness, vocabulary development, language skills and automatization of reading as a prerequisite for achieving good reading comprehension. As parents of pupils who have problems with reading comprehension cannot be sufficiently effective in encouraging and supporting the development of cognitive factors relevant to reading, it is even more important that professional workers in schools provide appropriate treatment for pupils with deficits in this area.*

**Key words:** *poverty, literacy, reading comprehension, latent structure of reading comprehension problems*

## 1. INTRODUCTION

One of the important factors related to the level of literacy is poverty. The results of international PISA research, which also included Slovenia, point to the influence of the socio-economic background of pupils and show that the socio-economic status of families has a statistically significant impact on the academic achievement and educational opportunities of pupils living in poverty. The results of PISA 2009 show that 21.2% of Slovene 15-year-olds are below the second level which places them in the group with low achievement in reading which consequently causes numerous problems in using the potential of reading literacy as an effective tool in acquiring knowledge and skills also in other areas (Ivšek, 2011). The data gathered with the PIRLS study in 2006 were also alarming and revealing the fact that among Slovenian

fourth-grade pupils 24.4 % were weak readers (capable of only basic reading skills) and 5.6% of those did not achieve the minimum reading ability (Ivšek, 2011). The National Education Institute of the Republic of Slovenia in its analysis finds a correlation between socio-economic status and pupil performance in national examinations in the Slovene language (mother tongue) and mathematics. The analysis shows a high degree of correlation between the achievements of pupils at the end of primary school and gross wages by region and a medium correlation between achievements and parents' level of education (Plevnik, 2011).

Considering these results one of the key challenges of the Slovene education system is to raise the level of literacy, which is also consistent with the objectives of the European Union to reduce lower literacy achievements to 15 % by the year 2020 (EU Commission, 2012).

One of the important elements of reading literacy is reading efficiency including reading comprehension and reading to learn. The home environment, living habits associated with literacy (reading culture) and, in particular, the level of parental education have a direct influence on children's literacy development (Knaflič, Mirčeva & Možina, 2001). Children who grow up in poverty present a number of factors that have a negative impact on their reading skills, which makes it difficult to identify the specific cause of their reading problems or a direct connection between poverty and reading comprehension (Yoon, 2011). Empirical evidence, however, shows that socio-economic status and maternal education are highly related to reading development (Dollaghan et al., 1999, in Yoon, 2011).

Literacy development is a life-long process for every individual, however, the most important period in this development is early and middle childhood. Learning to read and write is critical for a learner's success in school and later in life. For most children their family is their first learning environment and the effectiveness of this family learning environment is the one that defines and sets conditions to skills and attitudes with which a child approaches their learning at the earliest stage (Bell, 1994, in Košak Babuder, 2004). The family is a place where a child gains experience which affects their readiness for school (Lunenburg, 2011). There are three key influences that parents have on children's readiness for school: (1) parents' expectations about the child's school success, (2) cognitive stimulus that a child experiences at home and (3) the interaction between parents and a child (Lunenburg, 2011). The children of parents who expect them to do well in school are more successful than children whose parents have low expectations. Evidence consistently indicates that the cognitive stimulation that the child experiences at home is also systematically related to children's school performance (Bloch, 2011, in Lunenburg, 2011). According to Savage (2002, in Lunenburg, 2011), families who provided more teaching, toys, games and books at home had children who were more successful than their peers in reading and writing early in their school years. Quality early learning is a protective factor against school fail-

ure and social alienation which is associated with multiple disadvantages (Ball, 1994).

Various studies increasingly show that a child's language skills are the significant factor for a positive transition to school (Beitchman et al., 1996; Bishop, 1997, in Hay et al., 2003; Hay et al., 2003). Delays in language development or language problems have a significant negative impact on a child's education (Silver & Hagin 2002, in Hay et al., 2003) and the development of reading skills and reading comprehension. Studies conducted in the U.S. have shown that children living in poverty are behind their peers in language skills by a year and a half when entering school (Grund, Oliveira & Geballe, 2003). Already at the very beginning of their schooling they start off with a considerable educational deficit which may be the cause of their larger or minor learning failures.

Like language, reading is one of the most important factors which affect the development of a child's brain (Jensen, 2009). Each of the skills involved in the process of reading (phonological awareness, fluency, vocabulary, phonetics and comprehension) must be systematically taught. Teaching requires the attention, focus and the motivation of parents, which is difficult for parents who are struggling to survive, cannot take time and do not have the necessary knowledge (Jensen, 2009). Although these parents do for their children everything they can, their children are still disadvantaged because of limited resources. Children living in poverty receive fewer cognitive stimuli than children from higher-income families. The lack of books and less interest in dealing with children in the preschool period (reading and telling stories, talking, playing) affect the child's poor general knowledge, their ability to listen attentively, their communication and the extent of their vocabulary. Teachers find a number of pupils living in poverty to have less developed abilities and skills (analysis of sounds in words, graphomotoric skills, counting and reading strategies, following instructions, phonological awareness skills) that enable effective learning of basic educational skills such as reading, writing and arithmetic.

Numerous studies have shown a correlation between reading comprehension and skills that are a prerequisite for age-appropriate reading ability

(Gough & Tunmer, 1986, in Yoon, 2011; Quellette, 2006, in van Kleeck, 2007; van Kleeck, 2007). There are two key skills for reading comprehension: decoding skills and reading comprehension skills using sufficient language comprehension skills (van Kleeck, 2007). The aim of reading for an early reader is to decode words, access them and recall their importance out of vocabulary whereas the reading aim for a skilful reader is reading comprehension. Research has shown that the links between decoding, language comprehension and reading comprehension vary with age. In their study Parrila, Kirby & McQuarrie (2004, in Yoon, 2011) have reported that decoding skills have a greater impact on reading comprehension in the lower grades of primary education, while language comprehension skills, such as vocabulary and morpho-syntactic knowledge, play an important role in reading comprehension in the upper grades of primary and secondary education.

The impact of poverty on language and cognitive development is often manifested in reading problems. Although decoding is of key importance for early literacy, reading comprehension is based on the skills of spoken language (Vellutino & Flecher, 2005). Reading comprehension requires both linguistic skills of a lower order, such as word recognition, identifying the meaning of words, knowledge of the syntactic structure on the level of sentences, as well as higher order skills such as the connection of sentences, deducing the missing information, the integration of information and comprehension on the level of sentences (Cain & Oakhill, 2006, in Yoon, 2011; van Kleeck, 2007, in Yoon, 2011).

During the schooling period pupils living in poverty must therefore develop skills that are a prerequisite for successful reading and reading comprehension (good linguistic skills, vocabulary, listening comprehension, a knowledge base with a wide range of topics, social interactions in the environments that support reading, experience with reading and access to various types of reading material), which has not been considered enough in treating these children.

Since pupils living in poverty have various early experiences with language and literacy and a different amount of parental support for activi-

ties related to reading, they need to be taught reading comprehension with the help of diverse adjustments (Cunningham & Allington, 2007, in Phillips et al., 2007; Snow, Burns & Griffin, 1998, in Phillips et al., 2007). Different instruction requires understanding of a learner's basic learning deficits and past experiences with literacy. The experts agree that children who have experienced difficulties with reading need to have targeted treatment (Lovett & Barron, 2002, in Phillips et al., 2007, p. 5) that:

- promotes the development of reading skills and letter-sound knowledge (Levy & Lysynchuk, 1997, in Phillips et al., 2007);
- directly teaches word identification, comprehension, spelling and basic literacy skills (Vellutino et al., 1996, in Phillips et al., 2007), using systematic instruction at each reading subskill level (phonemes, graphs, letters, letter patterns, word phrases, sentences and paragraphs) (Wolf & Katzir-Cohen, 2001, in Phillips et al., 2007);
- encourages early development of the foundations for learning to read.

To teach reading comprehension with adjustments and effectively, the following guidelines should be taken into account (Phillips et al., 2007, p. 5): the use of the appropriate reading level texts; read texts which take into account the interest of the pupils; an emphasis on meaning development; integration of reading with writing considering the pupil's skills; explicit expectations for every pupil; focus on self-regulation and self-monitoring; a consistent aim to improve reading; and an effective use of instruction time.

These features have been validated and presented as effective in evaluations of different studies (in Phillips et al., 2007), which verify the effectiveness of personalised approaches to teaching reading comprehension.

## 2. RESEARCH ISSUES AND OBJECTIVES

Compared to children of their own age, several research findings show that pupils living in poverty are more likely to encounter reading comprehension difficulties (Parsons & Bynner, 1998, in Mittler, 2000; Snow, 2002, in Snyder et al., 2005;

Challen & Jacobs, 2003; Reid Lyon, 2003). Many of them lag behind their peers in language development, they lack general knowledge and common life experience already at the very beginning of their schooling. Reading comprehension requires not only the ability to memorise and decode written text but also a good reader's vocabulary, prior experiences and access to books. Many pupils living in poverty face deficits in these areas that cause problems in the area of reading comprehension.

The present research aims to contribute our perspective to good practices to reduce the negative effects of poverty on reading comprehension of pupils living in poverty and consequently on their success in school. This group of pupils, however, is not homogeneous: some of them face profound difficulties and deficits whereas the consequences of poverty have no impact on the development of reading and reading comprehension of another group of these pupils, therefore we need to be attentive to the needs and characteristics of all pupils. The survey results will help teachers, counsellors and special educators in developing approaches and assistance programmes in the area of reading comprehension for this group of pupils.

The research was used to determine cognitive characteristics of pupils (decoding ability, phonological awareness, recall from long-term memory, auditory memory and forming concepts) from families with a lower SES who have reading comprehension problems, and pupils from families with lower SES who have no reading comprehension problems. A special programme to improve reading comprehension was designed and implemented, the so-called *Metacognitive-intersentential model of reading comprehension* by Goldfus (2004). In this paper we present a part of wider research in which we have identified and studied only the structure and latent problems in the area of reading comprehension.

### 3. HYPOTHESIS

The following hypothesis has been set: The latent structure of problems in the area of reading comprehension for each group (a group of pupils with reading comprehension problems and a group of pupils without any problems in the area of reading comprehension) differs .

## 4. METHOD

### 4.1. SAMPLE

The sample included 168 fourth grade pupils (aged 8.11 to 9.11 years) from twenty-nine primary schools all over Slovenia, who attended Slovene primary school in the school year 2007/2008. All pupils originated from families with lower socio-economic status. Pupils were divided into two groups. In the first group there were 84 pupils from a lower SES who had reading comprehension problems, while there were 84 pupils from a lower SES in the second group who experienced no problems with reading comprehension. Each group of 84 pupils included 42 girls (50%) and 42 boys (50%). According to Raven's standard progressive matrices, we selected those pupils who achieved results that fall within the range of average and above-average intelligence (above  $C_{25}$ ). Both groups were equal by sex and age.

The sample was designed according to certain criteria. To define a family that offers a child a less stimulating environment due to poverty and has a lower socio-economic status, we took into account the following two criteria:

- subsidised school meals;
- parents' lower level of education (from unfinished primary school to lower vocational or vocational education).

To determine the level of reading comprehension we considered the teacher's assessment of a pupil's reading comprehension on a three-level scale (below average, average or above average level of reading comprehension). The first group consisted of 84 pupils from low SES with reading comprehension difficulties (below average level of reading comprehension) while the second group included 84 pupils from a lower SES without reading comprehension problems (average or above average level of reading comprehension).

### 4.2. INSTRUMENTS

In the research eight measuring instruments and two questionnaires were used. The following tests were included in the factor analysis:

- Rapid Automatized Naming Test - RAN (Denckla & Rudel, 1976).

- Test of Repeating Sentences (Grobler, 2005)
- Test of Phonological Awareness (Magajna, 1994)
- ACADIA – Test of Developmental Activities (Atkinson, Johnston & Lindsay, 1981, in Novosel, 1989)
- Test of Reading Comprehension (Institute of Education, 1990/1991),
- Test of Reading and Writing Disorder (Šali, 1971).

The reliability of all the tests was assessed by the Cronbac'h alpha model and it was high in all tests (above 0.70).

#### 4.3. VARIABLES

The factor analysis included 21 variables. Table 1 shows the test variables included in the factor analysis.

#### 5. RESULTS AND DISCUSSION

For data processing, we used descriptive statistics and factor analysis to identify latent variables

or factors that explain the latent structure of the links between the manifest variables (latent structure of reading comprehension problems and latent structure of reading comprehension performance).

Table 2 shows the estimates of the basic parameters for a group of pupils living in poverty with reading comprehension difficulties (group 1) and a group of pupils living in poverty without reading comprehension problems (group 2).

Evaluation of the basic parameters for each group shows differences in absolute estimates of arithmetic means for all variables. All results of group 1 are worse compared to those of group 2. According to the estimates of the basic parameters we can conclude that a group of pupils with reading comprehension difficulties have problems regarding speed, accuracy of decoding and reading fluency, have less developed complex phonological skills and have weaker short-term and auditory memory compare to a group of pupils without reading comprehension problems. .

**Table 1.** Variables regarding school performance

No. of variable	Variable Labels	Description
1	Rapid naming of colours – <i>RAN test</i>	time of naming of colours
2	Rapid naming of numbers – <i>RAN test</i>	time of naming of numbers
3	Rapid naming of objects – <i>RAN test</i>	time of naming of objects
4	Rapid naming of letters– <i>RAN test</i>	time of naming of letters
5	Free simple sentence – <i>Test of Repeating Sentences</i>	subtest score
6	Cumulative, adversative in explicative coordination – <i>Test of Repeating Sentences</i>	subtest score
7	Object, time, causal and attributive subordinate clause – <i>Test of Repeating Sentences</i>	subtest score
8	Phoneme deletion from CVCV pattern in the word – <i>Test of Phonological Awareness</i>	subtest score
9	Phoneme deletion from C1C2VCV pattern at the beginning of the word – <i>Test of Phonological Awareness</i>	subtest score
10	Phoneme deletion from CVC1C2V in the middle of the word – <i>Test of Phonological Awareness</i>	subtest score
11	Phoneme deletion from VC1C2C3 pattern in the word – <i>Test of Phonological Awareness</i>	subtest score
12	Syllable deletion – <i>Test of Phonological Awareness</i>	subtest score
13	Shape drawing - <i>ACADIA subtest</i>	subtest score
14	Auditory memory – <i>ACADIA subtest</i>	subtest score
15	Concept formation skill – <i>ACADIA subtest</i>	subtest score
16	Automatized speech – <i>ACADIA subtest</i>	subtest score
17	Reading comprehension – silent reading	reading comprehension score
18	Reading the words I – time – <i>T-MBP (Test of Reading and Writing Disorder)</i>	time of reading the words I
19	Reading the words I – number of errors – <i>T-MBP (Test of Reading and Writing Disorder)</i>	number of errors
20	Reading the words II – time – <i>T-MBP (Test of Reading and Writing Disorder)</i>	time of reading the words II
21	Reading the words II – number of errors – <i>T-MBP (Test of Reading and Writing Disorder)</i>	number of errors

**Table 2.** The arithmetic mean (*M*) and standard deviation (*SD*) of variables of individual tests for each group

variable	group	N	M	SD
1	group 1	84	51,80	13,09
	group 2	84	47,83	8,38
2	group 1	84	30,67	6,00
	group 2	84	29,55	5,76
3	group 1	84	65,87	14,32
	group 2	84	59,25	11,07
4	group 1	84	26,07	4,91
	group 2	84	24,39	4,45
5	group 1	84	2,79	1,53
	group 2	84	4,15	1,86
6	group 1	84	5,79	1,54
	group 2	84	6,81	1,60
7	group 1	84	6,51	2,27
	group 2	84	8,94	2,07
8	group 1	84	4,87	1,05
	group 2	84	5,45	0,78
9	group 1	84	4,67	1,39
	group 2	84	5,27	0,95
10	group 1	84	4,48	1,23
	group 2	84	5,12	1,06
11	group 1	84	1,77	0,90
	group 2	84	2,07	1,03
12	group 1	84	5,33	1,86
	group 2	84	6,55	1,61
13	group 1	84	47,65	10,33
	group 2	84	53,18	8,49
14	group 1	84	36,05	8,54
	group 2	84	41,79	9,11
15	group 1	84	50,40	8,45
	group 2	84	56,98	7,34
16	group 1	84	52,67	5,19
	group 2	84	57,23	5,19
17	group 1	84	3,21	1,02
	group 2	84	4,83	0,95
18	group 1	84	70,40	31,98
	group 2	84	55,26	19,38
19	group 1	84	5,83	4,87
	group 2	84	3,11	2,55
20	group 1	84	105,62	47,79
	group 2	84	83,21	32,93
21	group 1	84	9,88	6,64
	group 2	84	5,17	3,04

For better differentiation of latent structures in group 1 (pupils with reading comprehension difficulties) and in group 2 (pupils without reading comprehension problems) we decided upon a separate factoring of system variables of both groups. After extracting factors we performed perpendicular

varimax rotation of the structural matrix in which each factor explained their share of the variance of the system independently of other factors.

### 5.1. Factor analysis of variables for group 1 – group of pupils with reading comprehension difficulties

According to the Kaiser criterion, we extracted five factors in the factor analysis (Kaiser-Meyer-Olkin = 0.708, Bartlett's test of sphericity:  $\chi^2 = 713.682$ ,  $df = 210$ ,  $p = 0.000$ ), which explained 58.6% of the total variance of variables.

**Table 3.** Eigenvalue ( $\lambda$ ), the percentage of explained variance of each factor (%) and cumulative percentage (F%)

Component	Rotation Sums of Squared Loadings		
	$\lambda$	% of variance	F %
1	4,574	21,783	21,783
2	2,370	11,285	33,068
3	1,970	9,381	42,449
4	1,836	8,744	51,193
5	1,561	7,431	58,624

**Table 4.** Structure of factor matrices by perpendicular varimax rotation

	Component				
	1	2	3	4	5
18	0,851	-0,025	-0,124	0,073	0,000
20	0,817	-0,076	-0,149	0,087	0,098
4	0,751	-0,001	-0,055	-0,008	-0,072
1	0,735	0,014	0,029	<b>-0,305</b>	-0,270
2	0,719	0,010	-0,058	-0,093	0,137
3	0,693	-0,033	0,253	-0,289	-0,194
19	0,687	-0,092	<b>-0,361</b>	-0,065	0,086
21	0,592	-0,178	<b>-0,438</b>	-0,128	0,150
7	0,058	0,723	-0,074	0,229	0,053
17	-0,187	0,656	0,181	-0,079	-0,255
14	-0,046	0,650	-0,072	0,078	<b>0,449</b>
6	-0,056	0,633	-0,072	<b>0,406</b>	-0,176
15	-0,024	0,586	0,075	-0,154	0,256
12	0,060	-0,016	0,693	<b>0,301</b>	0,074
9	-0,221	0,150	0,655	-0,042	0,007
8	-0,127	-0,104	0,640	0,002	0,169
5	0,150	0,164	-0,055	0,800	0,035
10	-0,293	-0,064	0,248	0,572	0,058
11	-0,195	0,083	0,122	0,526	-0,045
13	0,010	-0,002	0,117	-0,068	0,870
16	0,002	0,361	0,270	0,152	0,473

The first factor explained 21.8% of the variance. It is most saturated with variables 18 (Reading the

words I – time), 20 (Reading the words II – time), 4 (Rapid naming of letters), 1 (Rapid naming of colours), 2 (Rapid naming of numbers), 3 (Rapid naming of objects), 19 (Reading the words I – number of errors) and 21 (Reading the words II – number of errors), so this is a factor of the *speed of decoding sequential visual information*. Pupils with reading comprehension difficulties still face problems regarding speed, accuracy of decoding and reading fluency, and cannot follow what they read appropriately. They read slowly and still make a lot of mistakes. Our findings are consistent with the findings of Vellutino et al. (2004, in Verhoeven et al., 2011) that those pupils who are weak readers are also less accurate at discriminating phonemes and have difficulties with tasks that require phonemic awareness and parsing. And according to Wolf and O'Brien (2001, in Verhoeven et al., 2011), they are also slower in rapid sequential naming of objects, numbers and letters. Since reading comprehension depends on the integration of information in working memory, pupils who are slower at sequential naming cannot understand a more demanding written text although they are able to identify individual words (Li et al., 2011).

The second factor explained 11.3% of the variance and is most saturated with variables 7 (Object, time, causal and attributive subordinate clause), 17 (Reading comprehension – silent reading), 14 (Auditory memory), 6 (Cumulative, adversative in explicative coordination) and 15 (Concept formation skill). The factor was named *verbal memory and comprehension of meaningful material*. Pupils of group 1 have limited working memory capacity and weak short-term memory as well as auditory memory. They also have problems with understanding words and concepts as well as basic and essential relations between them. All of the above-mentioned deficits result in poor reading comprehension. Research has shown that both young readers and readers who fail in reading have more problems with processes such as parsing sentences into their constituent components or identifying deeper structures of language (e.g. the gist of the text) during listening comprehension compared to readers who are older or are more successful when it comes to reading (Verhoeven et al., 2011).

The third factor explained 9.4% of the variance. It is most saturated with variables 12 (Syllable deletion), 9 (Phoneme deletion from  $C_1C_2VCV$  pattern at the

beginning of the word) and 8 (Phoneme deletion from CVCV pattern in the word), so this is the factor of a *more demanding level of phonological awareness*, which is reflected in the still underdeveloped complex phonological skills of pupils with reading difficulties. With all three variables, phonological awareness is very important since it is one of the key cognitive processes associated with reading. Unlike the basic phonological skills, such as word awareness, awareness of and finding rhymes and alliteration, blending sounds - synthesis, the skills of manipulating sounds and syllables are among the more demanding phonological skills (Moats & Tolman, 2009).

The fourth factor explained 8.7% of the variance and is most saturated with variables 5 (Free simple sentence), 10 (Phoneme deletion from  $CVC_1C_2V$  in the middle of the word) and 11 (Phoneme deletion from  $VC_1C_2C_3$  pattern in the word). It is the factor of *memorising and manipulating the demanding phonological structures* and shows the links between reading comprehension problems, memorising difficult words that include more difficult sound consonant structures, and understanding their meaning. Our findings are consistent with the findings and conclusions of many studies (Parsons & Bynner, 1998, in Mittler, 2000, Snyder et al., 2005; Chall & Jacobs, 2003; Reid Lyon, 2003) which show that pupils living in poverty face reading comprehension problems as a result of a less-known vocabulary and more complex literary and abstract language compared to the language they use in everyday verbal interaction.

The fifth factor explained 7.4% of the variance. It is most saturated with variables 13 (Shape drawing) and 16 (Automatized speech), so this is the factor of *visual motor coordination*. Comparative studies among readers who read well and those who have difficulties with reading, have shown that the latter have slightly lower visual perceptual skills than readers who read well (Pečjak, 1999), which is consistent with the results of our study. Reading comprehension depends on the ability of visual perception of letters and words, visual tracking of the printed text and the exact transition from line to line. Pupils with less developed reading skills which affect poor reading comprehension often have problems with appropriate reading and text orientation (they skip the line or re-read it).

## 5.2. Factor analysis of variables for group 2 – group of pupils without reading comprehension problems

As with pupils from lower SES who have reading comprehension problems, factor analysis was conducted for pupils who have no reading comprehension problems. According to the Kaiser criterion, five factors were extracted in the factor analysis (Kaiser-Meyer-Olkin = 0.675, Bartlett's test of sphericity:  $\chi^2 = 652.453$ ,  $df = 210$ ,  $p = 0.000$ ), which explained 56.8% of the total variance of the variables.

**Table 5.** Eigenvalue ( $\lambda$ ), the percentage of explained variance of each component (%) and cumulative percentage (F %)

Component	Rotation Sums o Squared Loadings		
	$\lambda$	% of variance	F %
1	3,127	14,890	14,890
2	2,360	11,238	26,129
3	2,247	10,698	36,826
4	2,119	10,090	46,917
5	2,083	9,917	56,834

**Table 6.** Structure of factor matrices by perpendicular varimax rotation

	Components				
	1	2	3	4	5
20	0,903	0,045	-0,014	0,177	-0,013
18	0,875	0,053	-0,012	0,213	0,007
19	0,699	0,003	-0,376	0,024	-0,339
21	0,583	-0,122	-0,328	0,041	-0,423
7	0,100	0,750	0,077	-0,143	0,141
6	0,152	0,633	0,336	0,016	0,140
14	-0,268	0,573	-0,044	-0,077	0,146
5	0,054	0,570	0,298	0,129	0,045
16	-0,079	0,474	0,067	0,052	0,437
17	-0,436	0,442	-0,273	-0,129	-0,133
11	-0,004	0,000	0,804	-0,188	-0,057
10	-0,053	0,180	0,701	-0,079	0,094
12	-0,115	0,183	0,446	0,032	0,437
9	-0,15	0,206	0,445	0,181	-0,017
1	0,099	0,089	0,041	0,817	-0,191
2	0,287	0,116	0,081	0,669	0,368
3	0,054	-0,248	-0,174	0,628	-0,068
4	0,521	-0,080	-0,067	0,625	0,144
13	-0,024	0,188	0,120	0,004	0,742
15	-0,028	0,187	-0,243	-0,039	0,689
8	-0,073	-0,190	0,240	-0,016	0,300

The first factor explained 14.9% of the total variance, which is the highest percentage. It is most saturated with variables 20 (Reading the words II – time), 18 (Reading the words I – time), 19 (Reading the words I – number of errors) and 21 (Reading the words II – number of errors), so this is the factor of *ability of decoding words*. Every time a pupil successfully decodes a complex and difficult word, they reinforce the orthographic image of it (Ehri & Saltmarsh, 1995, in Vaessen, 2010). By increasing the reading experience, when a pupil reads the word correctly, there is an increasing number of familiar words and their reading vocabulary expands (Vaessen, 2010). The reading ability of pupils without any problems in the area of reading comprehension is associated with an increased amount of exercise, which contributes to the automation of reading techniques; and the acquired reading technique is very important in improving reading comprehension. We could say that the more a reader reads, the better and faster they read while maintaining more information in the short-term work memory which consequently results in better reading comprehension.

The second factor explained 11.2% of the variance and is most saturated with variables 7 (Object, time, causal and attributive subordinate clause), 6 (Cumulative, adversative in explicative coordination), 14 (Auditory memory), 5 (Free simple sentence), 16 (Automatized speech) and 17 (Reading comprehension – silent reading). This factor was named *comprehension and semantic memorisation of meaningful material*. The importance of linguistic components of reading comprehension are demonstrated in the study by Verhoeven and Van Leeuwen (2008, in Verhoeven et al., 2011). The results showed that a rich vocabulary with a high degree of listening comprehension ability helps pupils to become competent in the integration of words and a text (word-to-text integration). It can be concluded that good reading comprehension of pupils from a group without reading comprehension problems is associated with their strong language skills that enable them to successfully follow the meaning of the already-read material.

The third factor explained 10.7% of the variance. It is most saturated with variables 11 (Phoneme deletion from VC<sub>1</sub>C<sub>2</sub>C<sub>3</sub> pattern in the

word), 10 (Phoneme deletion from CVC<sub>1</sub>C<sub>2</sub>V in the middle of the word), 12 (Syllable deletion) and 9 (Phoneme deletion from C<sub>1</sub>C<sub>2</sub>VCV pattern at the beginning of the word). This factor was named the *complex phonological awareness* because it essentially represents complex phonological skills, such as the manipulation of sounds and syllables supported only by one's internal visual image. Pupils from the group without reading comprehension problems have acquired the orthographic image of the words very well, i.e. their *phonological awareness* is high which is closely linked to the effectiveness of their reading and reading comprehension (Pikulski & Chard, 2005).

*The fourth* factor explained 10.1% of the variance and is most saturated with variables 1 (Rapid naming of colours), 2 (Rapid naming of numbers), 3 (Rapid naming of objects) and 4 (Rapid naming of letters). This is the factor of *rapid serial recall*. Rapid automated naming which indicates how quickly pupils can name well-known visual stimuli is, according to various experts (de Jong & van der Leij, 1999, in Li et al., 2011; Georgiou, Parr & Papadopoulos, 2008, in Li et al., 2011), a very strong predictor of reading comprehension. It is one of the cognitive processes which are the basis for trained word recognition which is the key aspect of reading comprehension (Li et al., 2011). Kirby, Parr and Pfeiffer (2003, in Li et al., 2011) attribute the link between reading comprehension and rapid automated naming to reading fluency. Since rapid automatic naming is a precursor to reading fluency, and fluency is essential for reading comprehension, a certain level of speed reading for a proper understanding is required (Li et al., 2011). We can conclude that the pupils in group 2 who have no reading comprehension problems, have good automated recall and reading fluency, which contributes to their good reading comprehension.

*The fifth* factor explained 9.9% of the variance. It is most saturated with variables 13 (Shape drawing), 15 (Concept formation skill) and 8 (Phoneme deletion from CVCV pattern in the word), so this is the factor of *mental analysis and synthesis*. For variable spatial and visual-motor coordination, which represents copying the complex shapes, a good preliminary analysis of a sketch followed by a synthesis is required. Variables 'creating notion

skill' and 'sound removal' relate to analysis and synthesis which, in this case, takes place on a mental level. For reading comprehension, it is important to analyse information and synthesise that information into a meaningful unit.

## 5. CONCLUSION

Our results confirm the hypothesis that the latent structure of the problems in the area of reading comprehension for each group – a group of pupils with reading comprehension difficulties and a group of pupils without reading comprehension problems, differ.

There are significant differences between the two groups; pupils with reading comprehension difficulties are confronted with other problems which are even higher because of poverty. In our study, we focused on the fourth grade pupils since it is the age when pupils move from 'learning to read' to 'reading to learn' according to the Chall's model of reading skills development (1983, in Chall & Jacobs, 2003). This is also the period when pupils living in poverty start having problems in the area of reading comprehension, which is the result of more and more abstract language used in the process of education (Chall & Jacobs, 2003) and the increased demand for reading comprehension because of learning from textbooks.

From the analysis and comparison of latent structures, it is evident that the latent structure of groups of pupils with difficulties in reading comprehension and groups of pupils without such problems differ. Latent structures do not have exactly the same factors which implies that the problems in the area of reading comprehension indicate other skills and processes such as skills and processes necessary for good reading comprehension. In both latent structures the same elements are present in certain factors, primarily those that indicate *decoding, memory and verbal understanding and advanced skills of phonological awareness*. Based on the structure of latent factors, we can assume that the quality of reading comprehension depends on a great number of linguistic and cognitive processes of reading involved in the latent structure and connecting them to each other. In order to clarify a significant percentage of the variance,

we would require more complex and multivariate-based study to include other factors (eg. the influence of executive functions in the process of reading and reading comprehension, the impact of factors related to pupils' attitudes toward reading, reading culture in a family literate environment and the promotion of literacy in the preschool environment), which were not included in the factor analysis.

The structure of factors which defines the group of children with difficulties in reading comprehension shows poor reading comprehension. Reading comprehension is strongly dependent on the development of basic cognitive and language processes of reading which are developed in the preschool period. In order to develop these skills the assistance and support of parents, especially mothers, is of key importance in the child's progress in developing language skills (language of management concepts, language acquisition of grammatical rules, new concepts and words, understanding words, developing vocabulary), vocabulary and communication between parents as well as parents and children. The mothers of pupils who have problems in reading comprehension have significantly lower level of education than the mothers from the group of pupils without any problems in reading comprehension so we can conclude that they contribute to the development of these skills to a certain extent. These pupils stay behind their peers already at the very beginning of school considering language development, general knowledge and life experiences. During the schooling these pupils

must therefore develop skills that are a prerequisite for successful reading and reading comprehension (good language skills, vocabulary, listening comprehension, a knowledge base with a wide range of topics, social interactions in the environment that support reading, have experience with reading and availability of different types of reading materials), which does not adequately reflect the instruction practice of these pupils. Their reading (comprehension) problems are the result of general or specific learning difficulties.

With the help of appropriate support, teachers and other school professionals can help to break the vicious circle of poverty. This can be done only with the implementation of support programs, in which pupils living in poverty are included, and to systematically run these programs from the very beginning of schooling. In doing so, the intensity and extent of support programs should be adjusted to the severity of a pupil's special educational needs, and quality training and further education of teachers should be provided at the same time. For many pupils living in poverty whose learning difficulties are less pronounced, the already-existing forms of support in the Slovene school system (supplementary classes and with individual and group forms of support) would suffice. These support programs enable teachers and professionals to take action early and intensively enough to improve knowledge, skills and abilities of pupils with regard to their special educational needs and to carry on with a good instruction practice in the classroom.

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