

EFFICIENCY OF READING COMPREHENSION TRAINING IN PUPILS LIVING IN POVERTY

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Abstract

The results of Slovene and foreign studies reveal the connection between literacy levels and the level of education, employment opportunities and consequent socio-economic status of individuals and families. Reading efficiency relating to reading comprehension 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. Results of both foreign and Slovene studies indicate that the program of reading comprehension should be implemented in this group of pupils.

In the article, we want to present effectiveness of the reading comprehension improvement program in pupils living in poverty. According to the findings of our research, in which we structured and implemented the reading comprehension program for pupils living in poverty with the *Metacognitive-intersentential model of reading comprehension*, the reading comprehension of the experimental group pupils who participated in the program improved compared to the control group pupils who did not participate in the program. Experimental group pupils also significantly improved correctness of their reading, their vocabulary and skills of verbal expression. When the program ended, we tested its efficiency by applied tests. The results on the manifest variables indicated that the program was good and efficient for pupils who live in poverty and experience reading comprehension problems.

Key words: poverty, literacy, reading comprehension problems, program of reading comprehension

DOI: <http://dx.doi.org/10.12959/issn.1855-0541.IIASS-2015-no3-art03>

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Introduction

Poverty is one of the important factors that affect the level of literacy in contemporary society. The results of international PISA research, which also included Slovenia, indicate that the socioeconomic status (SES) of families has a statistically significant impact on the academic achievement and educational opportunities of 15-year-olds living in poverty. The results of PISA 2009 and 2012 reveal that, in both these years, as many as 21% of Slovene 15-year-olds did not attain the second level of literacy, which is a prerequisite for the effective and efficient functioning in everyday life. This places them in the group with poor achievement in reading. As a result, a number of difficulties arise in their use of reading literacy as an effective tool for acquiring knowledge and skills also in other areas (Ivšek, 2011; Štraus, Šterman Ivančič & Štigl, 2013). PIRLS 2011 study reveals that the reading literacy among Slovene fourth-grade pupils improved compared to the results of PIRLS 2006. Still, 21% of fourth graders are poor readers (possessing only basic reading skills) and 5% of those did not attain the minimum reading ability (Doupona Horvat, 2012).

The National Education Institute of the Republic of Slovenia in its analysis shows a strong correlation between the performance of final-grade pupils in national examinations in the Slovene language (mother tongue) and Mathematics, and gross wages by region. There is a medium correlation between pupils' achievements and education level of their parents (Plevnik, 2011). These results make raising the level of literacy one of the key challenges of the Slovene education system, 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).

Reading efficiency and the related reading comprehension are important elements of literacy. There are a number of negative impacts on reading efficiency and reading skills of children growing up in poverty, which makes it difficult to determine the specific cause of their reading problems or a direct connection between poverty and reading comprehension (Yoon, 2011). In any case, learning to read and write is critical for a learner's success in school and later in life, affecting their inclusion and active participation in social, cultural and professional life.

Language competences provide grounds for successful reading and development of literacy, particularly in the early primary-school years. Various research findings reveal that for a child to experience positive transition into schooling, their language proficiency is of utmost importance (Hay et al., 2003). Delays in language development or

language problems have a significant negative impact on a child's development of reading skills and reading comprehension, as well as on their education in general (Silver & Hagin 2002, in Hay et al., 2003). Studies conducted in the U.S. have shown that children growing up in poverty were outperformed by their peers in language skills by a year and a half when entering school (Gruendel, Oliveira & Geballe, 2003), which affects their process of literacy and development of reading comprehension. These children face considerable educational deficit already at the very beginning of their schooling, which may cause their larger or minor learning failures.

Reading comprehension is a complex, multidimensional, dynamic process that includes a number of linguistic and semantic cognitive processes (Snyder, Caccamise & Wise, 2005). Linguistic processes influencing reading comprehension, include both the linguistic skills of a lower order, such as word recognition, recognising the meaning of words and sentence-level syntactic skills, and linguistic skills of a higher order, such as the interrelation of sentences, deducing the missing information, the integration of information and sentence-level comprehension (van Kleeck, 2007). According to Pressley (2001), reading is a hierarchy of skills, ranging from processing of individual letters together with the associated sounds, to the recognition of words and text-processing competences. Skilled reading comprehension requires fluid articulation of all these processes. Reading comprehension also requires both cognitive and metacognitive processes (Block & Pressley, 2002), which include metacognitive knowledge, monitoring and control (van Kraayenoord, 2010). Metacognitive skills are among the most important factors of reading comprehension (Artelt, Schiefe & Schneider, 2001).

Since pupils living in poverty often have limited early experiences with language and literacy, and a moderate amount of parental support for activities related to reading, they need to be taught reading comprehension with the help of *diverse adjustments* (Cunningham & Allington, 2007; Phillips, Norris & Vavra, 2007) and *targeted treatment* (in Phillips et al., 2007). This way early development of the grounds for learning of reading and development of reading skills will be encouraged. Direct teaching of word recognition, text comprehension, spelling and basic literacy skills aims also at the development of metacognitive skills. Each of the skills involved in the reading process (phonological awareness, fluency, vocabulary, phonetics and comprehension) as well as the metacognitive strategies for the control of reading and comprehension need *to be taught systematically*.

These skills, however, are taught not only at school but also at home by the child's parents. This teaching requires attention, focus and motivation, which is difficult for parents who are struggling to survive, cannot take their time, and also do not possess the necessary expertise (Jensen, 2009). Even when these parents do everything they can for their children, their children are still disadvantaged due to limited resources, and they receive less cognitive stimulation than children from higher SES families. The lack of books and interaction in the preschool period (reading and telling stories, talking, playing) affect the child's poor general knowledge, their ability of attentive listening, their communication and the extent of their vocabulary.

Many children from families of lower SES enter school with significant deficits in a broad range of prereading skills (Torgesen, 2004), and are at risk for reading difficulties before their schooling even began. Not only are their phonological skills and print-related knowledge weak, they have weaker vocabularies, less experience with complicated syntax, and less general background knowledge – all of which are vital for strong reading comprehension. Teachers in Slovenia also find a number of pupils living in poverty to have less developed abilities and skills (phonological awareness skills, graphomotoric skills, counting and reading strategies, following instructions) that enable effective learning of basic educational skills such as reading, writing and arithmetic (Košak Babuder, 2004).

Research Issues and Objectives

Numerous research findings show that pupils living in poverty are more likely to encounter reading comprehension problems than their same-age peers (Parson & Bynner, 1998, in Mittler, 2000; Chall & Jacobs, 2003; Lyon, 2003; Snyder, Caccamise & Wise, 2005). Many of them lag behind their peers in language development, general knowledge and common life experience already at the very beginning of their schooling. Reading comprehension requires not only the ability to decode and memorise written text, but also a good reader's vocabulary, prior experiences, access to books and good use of metacognitive strategies. Many pupils living in poverty face deficits in these areas, which causes problems in their reading comprehension.

Different authors emphasise the importance of compensating the deficits in the area of language, general knowledge and common life experience, as well as the development of reading comprehension in order to live successfully as adults (Mittler, 2000; Snyder et al., 2005; Chall & Jacobs, 2003; Lyon, 2003). This is the reason why pupils living in poverty need specific programs of reading comprehension that help

them offset the deficits resulting from their lack of experience and lack of stimulating domestic literacy environment, and help them develop reading comprehension. These trainings should improve reading comprehension, academic achievement and literacy of pupils, which influences their later educational and employment opportunities.

In the present research, we focused on the fourth-grade pupils since it is the age when readers move from “learning to read” to “reading to learn” according to Chall’s Developmental Model of Reading (1983, in Chall & Jacobs, 2003). At this age, pupils living in poverty often start to experience reading comprehension problems. This is the result of increasingly abstract language characteristic of the education in grade 4 and beyond (Chall & Jacobs, 2003) as well as the increased demand for reading comprehension because of learning from textbooks.

The present research aims to contribute our perspective to good practices of reducing the negative effects of poverty on reading comprehension of pupils and consequently on their academic achievement and literacy. The research results will help teachers, counsellors and special educators in developing more effective reading comprehension approaches and assistance programs for this group of pupils.

In the present research, which is a part of wider research on reading comprehension and reading to learn with poverty inflicted pupils, we designed and tested a program for improving reading comprehension with the *Metacognitive-intersentential model of reading comprehension* by Goldfus (2004). We checked the efficiency of the program by identifying cognitive characteristics and linguistic factors of reading (decoding ability, phonological awareness, recall from long-term memory, auditory memory, forming concepts, syntactic and semantic skills) in pupils from families with a lower SES who have reading comprehension problems, and pupils from families with a lower SES who have no reading comprehension problems.

We examined whether the reading comprehension of pupils from the experimental group (EG), who experience reading comprehension problems and who participated in the program, has improved after the program was completed. We also wanted to ascertain whether the reading comprehension of EG pupils improved compared to the control group (CG) of pupils who did not participate in the program.

Both linguistic and cognitive skills were developed in pupils through this program, as well as metacognitive strategies, which were measured by

cognitive and linguistic variables and a questionnaire for identifying metacognitive skills. In this paper, we present only the results related to linguistic and cognitive characteristics.

Hypothesis

The following hypothesis has been set:

Pupils from the experimental group, who live in poverty and experience reading comprehension problems, will demonstrate significantly better reading comprehension after the program with Metacognitive-intersentential model of reading comprehension has been implemented. Their comprehension will also be significantly better compared to pupils from the control group, who also live in poverty and experience reading comprehension problems.

Method

Sample

The basic sample included 168 fourth-grade pupils from twenty-nine primary schools all over Slovenia, divided into two groups. In the first group, there were 84 pupils with reading comprehension problems (reading comprehension level below average), and in the second group there were 84 pupils who experienced no reading comprehension problems (reading comprehension level average or above average). All pupils originated in families with lower SES. During testing, pupils were aged from 8.11 to 9.11 years. We selected those pupils who attained results that fall within the range of average and above-average intelligence (above C25) according to Raven's standard progressive matrices. Both groups were equal by sex and age.

To define a family as living in poverty and having a lower SES, two criteria were considered: subsidized school meals and 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 (reading comprehension level below average, average or above average).

The first group of pupils – pupils with reading comprehension problems (84) – was further divided into two subgroups following the method of random sample: the experimental group (EG) and the control group (CG), each including 22 pupils equal by sex and age. There were 12

boys and 10 girls in each group. EG participated in the 15-hour program of improving reading comprehension and metacognitive strategies. The program was implemented in seven groups, with 3-4 pupils in each. Pupils in the CG did not participate in the reading comprehension program.

The Structure of Reading Comprehension Improvement Program

Metacognitive-intersentential model of reading comprehension by Goldfus (2004; 2007) is a program intended for improving reading comprehension of pupils with learning problems.

Reading comprehension in the model refers to the structure of the text and how it effects processing of higher- and lower-cognitive processes with their components and sub-components. An integral component of the model is applied metacognition and is defined as the ability to understand, monitor and self-regulate cognition. The concept of metacognition and metacognitive development has been broken down into component parts where every aspect of text processing has its metacognitive component. The model is an orchestration of metacognition, together with intra- and intersentential processing of a text held together by memory (Goldfus, 2004). By recognising intra- and intersentential relations and deducting the meaning of the text as a whole (by creating keywords), pupils actively create the meaning (of individual words, whole sentences or text as a whole). Creating or constructing the meaning of the read text is the most important component of learning with comprehension, which includes metacognition (Goldfus, 2004).

Reading material used in this program, has been adapted to pupils' competences, because the reading comprehension in this program requires them to be able to decode words, understand the syntax, retain the sequence of words in their working memory, use appropriate vocabulary, and use keywords (Goldfus, 2007). All of these skills and knowledge were trained by pre-reading and post-reading activities that upgraded the central part of the reading comprehension program.

Each of our meetings according to the program with the *Metacognitive-intersentential model of reading comprehension* consisted of three parts. *Part 1*: pre-reading activities (identifying the type and difficulty of the text, recognizing of familiar information, etc.); *Part 2*: Metacognitive-intersentential model of reading comprehension (construct the meaning

of the read text); *Part 3*: post-reading activities (checking the reading comprehension and metacognitive strategies).

The program was implemented by 7 special educators at 7 primary schools who were trained simultaneously. They received reading material and detailed instruction how to implement different parts of the program. The program comprised of 15 meetings of pupils in small groups, which took 45 minutes each, and lasted for 3 months. First, the meetings were more frequent (2-3 times a week), later they were organized once a week.

Measuring Instruments

Efficiency of the program with the *Metacognitive-intersentential model of reading comprehension* was tested with repeated measures analysis, which included the *Test of Reading Comprehension* (Institute of Education, 1990/1991), *ACADIA – Test of Developmental Activities* (Atkinson, Johnston & Lindsay, 1981, in Novosel, 1989), *Test of Repeating Sentences* (Grobler, 2005), *Test of Phonological Awareness* (Magajna, 1994), *Test of Phonological Awareness* (Magajna, 1994), *Test of Reading and Writing Disorder – T-MBP* (Šali, 1971) and *Rapid Automatized Naming Test – RAN* (Denckla & Rudel, 1976). The reliability of all the tests was assessed by the Cronbach's alpha model and it was high in all tests (above 0.70).

Variables

Repeated measures analysis included 16 variables: 1-RC – Reading comprehension – silent reading (test score); 2-CFS – Concept formation skill (*ACADIA* – subtest score); 3-AS – Automatized speech (*ACADIA* – subtest score); 4-FSSR – Free simple sentence repetition (*Test of Repeating Sentences* – subtest score); 5-CCR – Coordinate clause repetition (*Test of Repeating Sentences* – subtest score); 6-SCR – Subordinate clause repetition (*Test of Repeating Sentences* – subtest score); 7-PD – Phoneme deletion (*Test of Phonological Awareness* – subtest score); 8-SD – Syllable deletion (*Test of Phonological Awareness* – subtest score); 9-T-RSW – Time in reading short words (*T-MBP* – time); 10-E-RSW – Errors in reading short words (*T-MBP* – number of errors); 11-T-RLW – Time in reading longer words (*T-MBP* – time); 12-E-RLW – Errors in reading longer words (*T-MBP* – number of errors); 13-RAN-C – Rapid naming of colours (*RAN test* – time); 14-RAN-N – Rapid naming of numbers (*RAN test* – time); 15-RAN-L – Rapid naming of letters (*RAN test* – time); 16-RAN-O – Rapid naming of objects (*RAN test* – time).

Data Processing

For data processing we used descriptive statistics and a one-way ANOVA with repeated measures to ascertain whether the differences in manifest variables within the group are smaller than the differences between both groups, considering the results of two measures. We examined interaction between the variables and the effects of individual variables. Improved progress of reading comprehension by EG pupils, who participated in the reading comprehension improvement program, was tested with repeated measures analysis, according to their reading comprehension results and other applied tests compared to the CG pupils.

Results and Discussion

Table 1: The arithmetic mean (M) and standard deviation (SD) of variables of individual tests according to the group (EG and CG) and the time of measure

Variable	Group	Pre-test			Post-test		
		N	M	SD	N	M	SD
1-RC	EG	22	3,2273	1,02036	22	5,1818	0,73266
	CG	22	3,5909	1,29685	22	4,3636	1,17698
2-CFS	EG	22	50,7273	9,01418	22	56,5455	7,32723
	CG	22	50,2273	9,01286	22	51,2273	9,22694
3-AS	EG	22	52,5455	5,19823	22	56,6818	3,73384
	CG	22	53,3182	5,97125	22	53,3182	6,25175
4-FSSR	EG	22	3,0455	1,73143	22	5,3182	1,24924
	CG	22	2,6818	1,55491	22	3,6818	1,52398
5-CCR	EG	22	5,4545	1,53459	22	7,0000	1,19523
	CG	22	6,0909	1,3060	22	6,5455	1,26217
6-SCR	EG	22	6,1818	2,10750	22	9,3182	1,88696
	CG	22	7,2727	2,33364	22	8,5909	2,06234
7-PD	EG	22	16,2273	2,97500	22	18,4091	2,38366
	CG	22	15,7273	3,10425	22	17,2727	2,56685
8-SD	EG	22	5,3636	1,98915	22	6,6364	1,78740
	CG	22	5,0455	2,03487	22	6,5000	1,62569
9-T-RSW	EG	22	73,0909	34,94882	22	58,0455	23,70951
	CG	22	63,3182	21,60112	22	55,0909	20,56328
10-E-RSW	EG	22	5,6818	5,19511	22	3,1364	3,79593
	CG	22	5,7273	4,38810	22	4,3636	5,42960
11-T-RLW	EG	22	106,0909	45,71955	22	90,3636	41,60191
	CG	22	96,2273	36,14248	22	85,6364	38,83978
12-E-RLW	EG	22	9,3636	6,12991	22	4,9545	4,34771
	CG	22	9,9091	6,98235	22	7,4091	5,46556
13-RAN-C	EG	22	52,2273	13,85274	22	47,0455	8,79111
	CG	22	51,6364	15,76478	22	51,5909	15,33642
14-RAN-N	EG	22	31,0000	6,90755	22	28,7273	6,25019
	CG	22	30,2273	6,41376	22	29,2727	5,00649
15-RAN-L	EG	22	27,1364	5,72626	22	24,4545	5,28905
	CG	22	25,2727	4,37723	22	26,5455	8,03994
16-RAN-O	EG	22	64,2273	20,21593	22	59,9091	17,64709
	CG	22	68,7273	12,73515	22	67,3182	13,57303

Table 1 shows the estimates of the basic parameters of descriptive statistics for both the first (test) and the second measure (retest), one for each group: the EG pupils who participated in the reading comprehension improvement program with the *Metacognitive-intersentential model of reading comprehension*, and the CG pupils who

did not participate in the program. Results in Table 2 show that EG pupils, who achieved lower average values at the first measure, improved in seven variables at the second measure compared to CG pupils. These are 3-AS (Automatized speech), 5-CCR (Coordinate clause repetition), 6-SCR (Subordinate clause repetition), 1-RC (Reading comprehension), 13-RAN-C (Rapid naming of colours), 14-RAN-N (Rapid naming of numbers) and 15-RAN-L (Rapid naming of letters).

As for the variables 9-T-RSW (Time in reading short words) and 11-T-RLW (Time in reading longer words), the average time of reading the words by EG pupils was longer in both measures, which made for a worse average result compared to the CG pupils. However, it improved at the second measure.

In other variables, 10-E-RSW (Errors in reading short words), 12-E-RLW (Errors in reading longer words), 2-CFS (Concept formation skill), 4-FSSR (Free simple sentence repetition), 7-PD (Phoneme deletion) and 8-SD (Syllable deletion), EG pupils achieved better average results than the CG already at the first measure, and even further improved it at the second measure.

Evaluation of basic parameters for each group shows minor differences in absolute estimates of arithmetic means for all variables, and in both measures. At the first measure, the average results of EG pupils in most variables were lower, but at the second measure, they improved. EG also improved their results in most variables when compared to CG. In six variables, EG pupils achieved better average results than the CG at the first measure, and then further improved it at the second measure.

Results and Interpretation of the Analysis of the Variables Variance in Applied Tests before the Program

One-way analysis of variance helped us determine how the EG pupils, who participated in the reading comprehension improvement program, on average differ from CG pupils, who did not participate in it, following different variables that are used to describe the sample.

First, Levene’s test for equality of variances was used to check whether the variance in both groups is equal.

Table 2: Testing equality of variances and analysis of the variables variance in applied tests

variable	Levene's Test for Equality of Variances		One-way Analysis of Variance	
	F	P	F	P
1-RC	1,333	0,255	1,068	0,307
2-CFS	0,009	0,926	0,034	0,855
3-AS	0,232	0,633	0,210	0,649
4-FSSR	0,459	0,502	0,537	0,468
5-CCR	1,058	0,310	2,194	0,146
6-SCR	0,696	0,409	2,648	0,111
7-PD	0,016	0,899	0,298	0,588
8-SD	0,054	0,818	0,275	0,603
9-T-RSW	3,110	0,085	1,245	0,271
10-E-RSW	1,045	0,313	0,001	0,975
11-T-RLW	1,411	0,242	0,630	0,432
12-E-RLW	0,128	0,723	0,076	0,784
13-RAN-C	0,216	0,644	0,017	0,896
14-RAN-N	0,287	0,595	0,148	0,703
15-RAN-L	0,923	0,342	1,471	0,232
16-RAN-O	4,543	0,039		

Analysis of the equality of variances (Table 2) pointed out that there was only one variable (16-RAN-O – Rapid naming of objects) in which both groups differ structurally, meaning they do not belong to the same basic population. According to the analysis of results in other variables, the groups can be treated as equal. The variable 16-RAN-O was thus removed from further analysis.

The difference between the two groups in other 15 manifest variables is statistically insignificant, meaning that the two groups belong to the same basic population. Further analysis of variance is thus justified.

Results and Interpretation of the Analysis of Repeated Measures

Improvement of the progress of reading comprehension by EG pupils participating in the program was tested by repeated measures before and after the program, according to their reading comprehension results and other applied tests compared to the CG pupils not participating in the program. Repeated measures enable the analysis of variance when a number of measures are performed in the same group at certain intervals. This method helped us to test whether the differences within the group are smaller than the differences between both groups. Interactions between variables were examined, and so were the effects of individual variables.

Table 3: Multivariate analysis of the interaction of the main experiment effects and the group using Wilks' Lambda

variable	Effect	Wilks' Lambda	F	Sig.
1-RC	Time	0,310	93,333	0,000
	Time * group	0,706	17,526	0,000
2-CFS	Time	0,870	6,248	0,016
	Time * group	0,931	3,120	0,085
3-AS	Time	0,862	6,707	0,013
	Time * group	0,862	6,707	0,013
4-FSSR	Time	0,533	36,828	0,000
	Time * group	0,883	5,570	0,023
5-CCR	Time	0,624	25,347	0,000
	Time * group	0,848	7,541	0,009
6-SCR	Time	0,416	59,006	0,000
	Time * group	0,810	9,830	0,003
7-PD	Time	0,675	20,265	0,000
	Time * group	0,986	0,591	0,446
8-SD	Time	0,680	19,770	0,000
	Time * group	0,998	0,088	0,768
9-T-RSW	Time	0,625	25,223	0,000
	Time * group	0,951	2,165	0,149
10-E-RSW	Time	0,815	9,508	0,004
	Time * group	0,980	0,869	0,357
11-T-RLW	Time	0,693	18,571	0,000
	Time * group	0,983	0,707	0,405
12-E-RLW	Time	0,581	30,260	0,000
	Time * group	0,948	2,310	0,136
13-RAN-C	Time	0,954	2,014	0,163
	Time * group	0,956	1,945	0,171
14-RAN-N	Time	0,894	4,974	0,031
	Time * group	0,981	0,830	0,368
15-RAN-L	Time	0,980	0,868	0,357
	Time * group	0,860	6,834	0,012

Multivariate differences between EG and CG were tested with the help of Wilks' Lambda (Table 3). The lower value of Wilks' Lambda is, the greater the significance. Since Wilks' Lambda distribution is very complex, it is transformed to the F-value.

Table 4: Results of the univariate analysis of variance for dependent variables according to the experiment and the group

Variable	Tests of Within-Subjects Contrasts				Tests of Between-Subjects Effects			
	Source	Mean Square	F	Sig.	Source	Mean Square	F	Sig.
1-RC	Time	40,909	93,333	0,000	Group	1,136	0,603	0,442
	Time * group	7,682	17,526	0,000				
2-CFS	Time	255,682	6,248	0,016	Group	186,182	1,697	0,200
	Time * group	127,682	3,120	0,085				
3-AS	Time	94,102	6,707	0,013	Group	36,920	0,843	0,364
	Time * group	94,102	6,707	0,013				
4-FSSR	Time	58,909	36,828	0,000	Group	22,000	7,214	0,010
	Time * group	8,909	5,570	0,023				
5-CCR	Time	22,000	25,347	0,000	Group	0,182	0,068	0,796
	Time * group	6,545	7,541	0,009				
6-SCR	Time	109,136	59,006	0,000	Group	0,727	0,104	0,749
	Time * group	18,182	9,830	0,003				
7-PD	Time	76,409	20,265	0,000	Group	14,727	1,269	0,266
	Time * group	2,227	0,591	0,446				
8-SD	Time	40,909	19,770	0,000	Group	1,136	0,232	0,633
	Time * group	0,182	0,088	0,768				
9-T-RSW	Time	2978,909	25,223	0,000	Group	890,909	0,731	0,397
	Time * group	255,682	2,165	0,149				
10-E-RSW	Time	84,045	9,508	0,004	Group	8,909	0,246	0,623
	Time * group	7,682	0,869	0,357				
11-T-RLW	Time	3809,557	18,571	0,000	Group	1170,920	0,376	0,543
	Time * group	145,102	0,707	0,405				
12-E-RLW	Time	262,545	30,260	0,000	Group	49,500	0,841	0,364
	Time * group	20,045	2,310	0,136				
13-RAN-C	Time	150,284	2,014	0,163	Group	86,011	0,285	0,596
	Time * group	145,102	1,945	0,171				
14-RAN-N	Time	57,284	4,974	0,031	Group	0,284	0,004	0,948
	Time * group	9,557	0,830	0,368				
15-RAN-L	Time	10,920	0,868	0,357	Group	0,284	0,005	0,945
	Time * group	86,011	6,834	0,012				

In Table 4, there are the results of univariate analysis of variance that helped us determine the differences by individual dependent variables, during both experimental and control conditions (participating or not participating in the reading comprehension program):

- determining the statistical significance of differences between both groups at the 1st measure (group)
- determining the statistical significance of differences between the 1st measure and the 2nd measure within the group (time)
- determining the statistical significance of differences between the 1st measure and the 2nd measure and between both groups (time*group)

According to the results of the univariate analysis of variance in Table 4, at the first measure there was no statistically significant difference between both groups in four variables: 1-RC (Reading comprehension: $F=0.603$, $P=0.442$), 3-AS (Automatized speech: $F=0.843$, $P=0,364$), 5-CCR (Coordinate clause repetition: $F=0.068$, $P=0.796$) and 6-SCR (Subordinate clause repetition: $F=0,104$, $P=0,749$).

Compared to the first measure both groups improved their results in these four variables at the second measure. However, progress of EG was statistically more significant than that of CG: 1-RC ($F=93.333$, $P=0.000$), 3-AS ($F=6.707$, $P=0.013$), 5-CCR ($F=25.347$, $P=0.000$) and 6-SCR ($F=59.006$, $P=0.000$).

At the second measure, progress of EG in the same variables was statistically more significant than that of CG: 1-RC ($F=17.526$, $P=0,000$), 3-AS ($F=6,707$, $P=0,013$), 5-CCR ($F=7,541$, $P=0,009$) and 6-SCR ($F=9,830$, $P=0,003$). Progress of EG in these variables can be credited to the effect of the program.

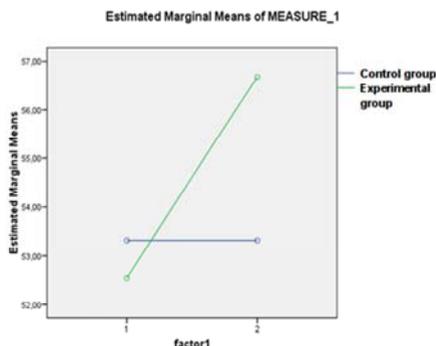
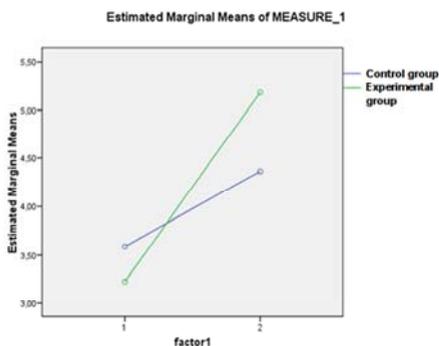
The results prove that the reading comprehension improvement program contributed to EG pupils actually improving their reading comprehension and language competence.

The results are displayed more explicitly in graphics in Figure 1.

Figure 1: Average results of variables 1, 3, 5 and 6 at the 1st and the 2nd measure of both the control and the experimental group

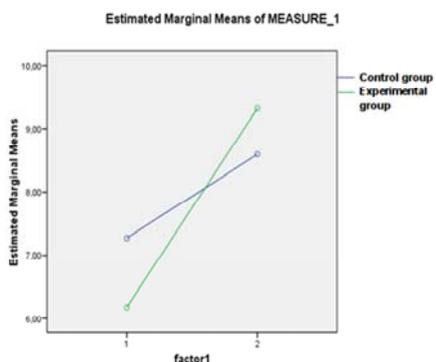
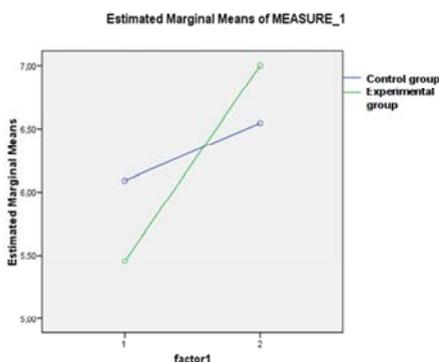
Variable 1 (*Reading comprehension*)

Variable 3 (*Automatized speech*)



Variable 5 (*Coordinate clause repetition*)

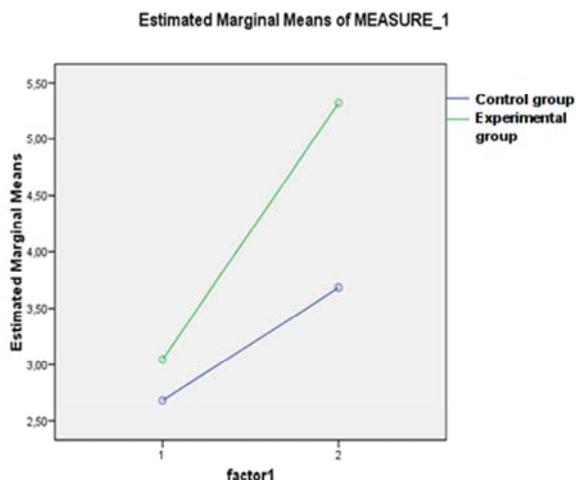
Variable 6 (*Subordinate clause repetition*)



According to Table 4, the statistically significant difference between the two groups at the first measure was present only in one variable: 4-FSSR (Free simple sentence repetition: $F=7.214$, $P=0.010$). At the second measure, the progress of EG was statistically more significant than that of CG (4-FSSR: $F=5.570$, $P=0.023$). Compared to the first measure, both groups improved their results ($F=36.828$, $P=0.000$). However, only improvement of EG results was statistically significant.

Figure 2 displays progress of each group at both the first and the second measure.

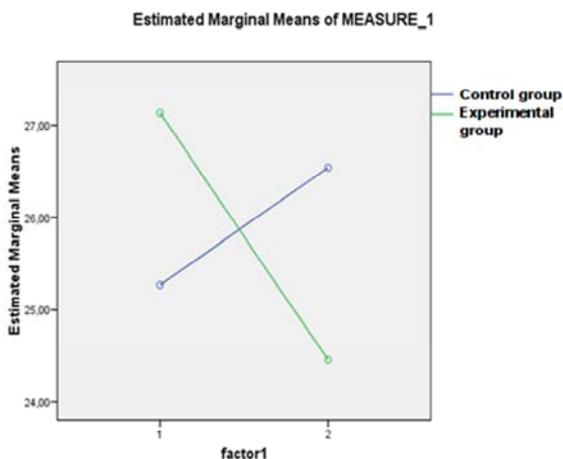
Figure 2: Average results of the variable 4 (Free simple sentence) at the first and the second measure of CG and EG



According to Table 4 results, there were no statistically significant differences between EG and CG at the first measure in the following variables: 2-CFS (Concept formation skill), 7-PD (Phoneme deletion), 8-SD (Syllable deletion), 10-E-RSW (Errors in reading short words) and 12-E-RLW (Errors in reading longer words). Before the program started, EG was slightly better than CG in all the above variables, but the difference was not statistically significant. At the second measure, progress was identified in both groups, but again with no significant differences between them, which indicates that the effect of the association with the group is negligible (association with the group has no effect on the result change at the second measure). Effect of the program in these variables cannot be confirmed.

In the 15-RAN-L variable (Rapid naming of letters), the testing showed there was no statistically significant difference between the two groups at the first measure ($F=0.005$, $P=0.945$), while the progress of EG at the second measure was statistically more significant than that of CG ($F=6.834$, $P=0.012$). Interactive effect of the program can be credited for this. EG improved its result, while CG even regressed. Figure 3 displays average results of each group at both the first and the second measure.

Figure 3: Average results of the variable 15 (Rapid naming of letters) at the first and the second measure of CG and EG



Before the program started, CG was slightly better than EG in variables 9-T-RSW (Time in reading short) and 11-T-RLW (Time in reading longer words) at the first measure, but the difference was not statistically significant (9-T-RSW: $F=0.731$, $P=0.397$; 11-T-RLW: $F=0.376$, $P=0.543$) (Table 4). At the second measure, both groups improved (9-T-RSW: $F=25.223$, $P=0.000$; 11-T-RLW: $F=18.571$, $P=0.000$), but again with no significant differences between the two of them, which indicates that the effect of the association with the group is negligible (9-T-RSW: $F=2.165$, $P=0.149$; 11-T-RLW: $F=0.707$, $P=0.405$) (association with the group has no effect on the change of the result at the second measure). Effect of the program in these variables cannot be confirmed.

In the variable 13-RAN-C (Rapid naming of colours), testing showed that there were no statistically significant differences between the two groups at the first measure (CG was better than EG). At the second measure, both groups improved their results, but the improvement was not statistically significant. There was not enough difference between the two groups to confirm that any kind of change occurred between the groups between both measures, neither did any interaction or the effect of the group take place. The progress of EG was slightly better than that of CG, but it was not statistically significant. Effect of the program on the result in the variable 13-RAN-C (Rapid naming of colours) thus cannot be confirmed.

Conclusions

In the end, our hypothesis that EG pupils, who live in poverty and have reading comprehension problems, would demonstrate statistically significant improvement in their reading comprehension after the reading comprehension program is completed, compared to their reading

comprehension before the program and compared to the CG pupils, who also live in poverty and have reading comprehension problems, can be completely confirmed and accepted. Results of the repeated measures analysis showed that EG pupils with reading comprehension problems attained statistically better results in the reading comprehension variable at the second measure after the program had completed, compared to the first measure and compared to CG pupils.

Results of measures were analysed before and after the program, and compared to the control group. They proved that the program with the *Metacognitive-intersentential model of reading comprehension*, which involved 22 EG pupils living in poverty, is efficient. Analysis of repeated measures confirms the effects of the reading comprehension improvement program on the reading comprehension and on some other variables for measuring linguistic and cognitive characteristics of pupils as well. Compared to CG pupils who did not participate in the program, EG pupils reached statistically important improvement of their results not only in the variable Reading comprehension (1-RC), but also in variables Automatized speech (3-AS), Free simple sentence repetition (4-FSSR), Coordinate clause repetition (5-CCR), Subordinate clause repetition (6-SCR) and Rapid naming of letters (15-RAN-L).

In variables Concept formation skill (2-CFS), Phoneme deletion (7-PD), Syllable deletion (8-SD), Errors in reading short words (10-E-RSW) and Errors in reading longer words (12-E-RLW), EG was slightly better than CG at both the first and the second measure, while at the second measure, there was progress evident in both groups. Since the differences between the two groups were not statistically significant, we cannot confirm that the measured variables were affected by the program. Progress in both groups also cannot be assigned to the effects of the program, but rather to other factors of the learning process (reading and writing drill) and the development of literacy, which should be further examined.

The program affected the measured variables because it involved activities that require memorising, comprehension and use of logical material. To understand and analyse sentences in the model, the pupils needed a number of skills. The relation between the components required for reading, such as the working memory, reading technique and appropriate vocabulary (Young, 2000), responds to mastering of the skills which were developed in the reading comprehension program, and which are important also for resolving all of the above tasks. Besides successful decoding of words, pupils have to understand the syntax, retain the word order, use context clues, and possess appropriate

vocabulary, which all needs to coincide for the reader to understand the meaning of a sentence. At the same time, readers have to keep sentences in their working memory and connect them with each other. After they read a paragraph or a chapter, they have to keep both the details and the main idea in their working memory. According to Yuill and Oakhill research (1991, in Verhoeven et al., 2011), younger readers and readers with reading problems find these processes more difficult. EG pupils also improved their verbal skills of memorising. Verhoeven et al. (2011) discover that verbal skills of memorising play an important role in the research of the relation between the language and literacy problems, since the linguistic knowledge and memorising capability are interdependent.

Special educators who implemented the program as well as teachers in classrooms reported how efficient the program was. Special educators observed that pupils had improved their reading comprehension and strategies of summarising the content with keywords, and developed strategies of summarising the text with mind maps or comics. Classroom teachers, on the other hand, noted that many pupils improved their reading technique, reading comprehension and verbal expression, which they attributed to the program and its effects.

According to different international researches (PISA, PIRLS, TIMSS, HBSC) (Doupona Horvat, 2012; Gorenc, 2007; Štraus et al., 2013), which also included Slovenia, the SES of families still has a statistically significant impact on the academic achievement, educational opportunities and literacy of pupils and students living in poverty. This is why pupils need early specific assistance programs to offset the deficits, which result from the lack of experience and stimulation in their domestic literacy environment. The program presented in this research helps the pupils improve their reading comprehension, academic achievement and, finally, also their reading literacy, which affects their education and employment opportunities later on. The scope and intensity of the program can be adapted to the distinctness of the pupil's special educational needs. A part of the program should be implemented in the classroom with all pupils, while the pupils who live in poverty and face larger deficits should participate in the whole program implemented by the trained special educators.

By implementing various compensation programs, additional exercises and trainings (for graphomotoric skills, expanding the vocabulary, development of pre-reading abilities, communicating, reading, attention-span etc.) we can prevent poverty consequences from spreading and manifesting as school failure and social exclusion.

References

- Artelt, Cordula, Schiefele, Ulrich, & Schneider, Wolfgang (2001): Predictors of reading literacy. *European Journal of Psychology of Education*. Vol.: 16, No.: 3, pp.: 363–383. doi: 10.1007/BF03173188.
- Block, Cathy Collins, & Pressley, Michael (2002): *Comprehension instruction: Research-based best practices*. New York: Guilford Press.
- Chall, Jeanne S., & Jacobs, Vicki A. (2003): Poor Children's Fourth-Grade Slump. *American Educator*. Vol.: 27, No.: 1, pp.: 14–15.
- Cunningham, Patricia M., & Allington, Richard L. (2007): *Classrooms that work: They can all read and write* (4th ed.). Boston: Allyn & Bacon.
- Denckla, Martha B., & Rudel, G. Rita (1976): Rapid 'automatized' naming (R.A.N.): Dyslexia differentiated from other learning disabilities. *Neuropsychologia*. Vol.: 14, pp.: 471–479. doi: [http://dx.doi.org/10.1016/0028-3932\(76\)90075-0](http://dx.doi.org/10.1016/0028-3932(76)90075-0).
- Doupona Horvat, Marjeta (2012): Bralna pismenost četrtošolcev v Sloveniji in po svetu: izsledki Mednarodne raziskave bralne pismenosti PIRLS 2011, (Zbirka PIRLS 2011). Ljubljana: Pedagoški inštitut.
- European Commission (2011): *Tackling early school leaving: A key contribution to the Europe 2020 Agenda*. Communication from the commission to the european parliament, the council, the European economic and social committee and the Committee of the regions. Brussels, 31.1.2011, COM(2011) 18 final.
- Goldfus, Carol (2004): A cognitive processing model of FL comprehension for the LD adolescent FL student. Abstract. Sixth BDA International Conference. *Dyslexia: The Dividends from Research to Policy and Practice*. 27–30 March, University of Warwick, UK.
- Goldfus, Carol (2007): English language learning strategies for students with dyslexia. Internal material of seminar. Ljubljana: Društvo Bravo.
- Gorenc, Mateja (2007): Odnosi z vrstniki. In Helena Jeriček, Darja Lavtar, & Tatjana Pokrajac (Eds.): *Z zdravjem povezano vedenje v šolskem obdobju: HBSC Slovenija 2006*. Ljubljana: Inštitut za varovanje zdravja Republike Slovenije., pp.: 107–120.
- Grobler, Marinka (2005): *Posebne jezične teškoče u slovenske djece osnovnoškolske dobi*. Doktorska disertacija. Zagreb: Edukacijsko rehabilitacijski fakultet.
- Gruendel, Janice M., Oliveira, Margaret, & in Geballe, Shelley (2003): *All children ready for school: The case for early care and education. A guide for policy makers*. New York: National Center for Children in Poverty.
- Hay, Ian, Elias, Gordon, Homel, Ross, Freiberg, Kate, Ernst, Ruth, & Jensen, Heather (2003): *Nature and Extent of Preschoolers'*

- Language Delays in a Disadvantaged Community. *Reimagining Practice: Researching Change*, 2., pp.: 41–47.
- Ivšek, Milena (2011): Položaj Slovenije v študiji Eurydice. In Fani Nolimal (Ed.): *Bralna pismenost v Sloveniji in Evropi*. Zbornik konference. Brdo, 25.–26.10.2011. Zavod RS za šolstvo: Ljubljana.
- Jensen, Eric (2009): *Teaching with Poverty in Mind: What being poor does to kids' brains and what schools can do about it*. Alexandria: ASCD.
- Košak Babuder, Milena (2004): *Povezanost revščine z učno uspešnostjo in socialno vključenostjo otrok*. Magistrska naloga. Ljubljana: Univerza v Ljubljani, Pedagoška fakulteta.
- Lyon, Reid G. (2003): *Reading Disabilities: Why Do Some Children Have Difficulty Learning To read? What Can Be Done About It?* *The International Dyslexia Association's Quarterly Periodical, Perspectives*, Spring. Vol.: 29, No.: 2. Available at: <http://www.wrightslaw.com/info/read.disability.lyon.pdf> (15.8.2014).
- Magajna, Lidija (1994): *Razvoj bralnih strategij – vloga kognitivnega in fonološkega razvoja ter fonološke strukture jezika*. Doktorska disertacija. Ljubljana: Univerza v Ljubljani, Filozofska fakulteta.
- Mittler, Peter (2000): *Working towards Inclusive Education, social contexts*. Great Britain: David Fulton Publishers, Great Britain.
- Novosel, Marija (1989): *ACADIA test razvoja sposobnosti*. Priročnik. Zagreb: Fakultet za defektologiju.
- Phillips, Linda M., Norris, Stephen P., & Vavra, Karen L. (2007): *Reading comprehension instruction*. *Encyclopedia of Language and Literacy Development* London, ON: Canadian Language and Literacy Research Network., pp.: 1–10.
- Plevnik, Tatjana (2011): *O učiteljih za opismenjevanje in razvijanje bralne pismenosti*. In Fani Nolimal (Ed.): *Bralna pismenost v Sloveniji in Evropi*. Zbornik konference. Brdo, 25.-26.10.2011. Zavod RS za šolstvo: Ljubljana.
- Pressley, Michael (2001): *Comprehension instruction: What makes sense now, what might make sense soon*. *Reading Online*. Vol.: 5, No.: 2. Available at: http://www.readingonline.org/articles/art_index.asp?HREF=/articles/handbook/pressley/index.html (12.12.2014)
- Snyder, Lynn, Caccamise, Donna, & Wise, Barbara (2005): *The Assessment of Reading Comprehension. Considerations and Cautions*. *Top Lang Disorders*. Vol.: 25, No.: 1, pp.: 33–50. doi: 10.1097/00011363-200501000-00005.
- Šali, Borut (1971): *Test motenosti v branju in pisanju (T-MBP)*. Ljubljana: Zavod SR Slovenije za rehabilitacijo invalidov.
- Štraus, Mojca, Šterman Ivančič, Kludija, & Štigl, Simona (Eds.) (2013): *OECD PISA 2012: matematični, bralni in naravoslovni dosežki*

slovenskih učencev: program mednarodne primerjave dosežkov učencev 2012: nacionalno poročilo. Ljubljana: Pedagoški inštitut. Available at: http://www.pei.si/UserFilesUpload/file/raziskovalna_dejavnost/PISA/PI SA2012/PISA_2012_Povzetek_rezultatov_za_Slovenijo.pdf (12.2.2015)

- Torgesen, Joseph K. (2004): Preventing early reading failure – and its devastating downward spiral: The evidence for early intervention. *American Educator*. Vol: 28, No.: 6–19, pp.: 45–47.
- van Kleeck, Anne (2007): SLPs' foundational role in reading comprehension: A response to Alan Kamhi. *The ASHA Leader*. Vol: 12, No.: 10, pp.: 32–33. doi:10.1044/leader.FMP2.12102007.32.
- van Kraayenoord, Christina E. (2010): The role of metacognition in reading comprehension. In Hans-Peter Trollenier, Wolfgang Lenhard and Peter Marx (Eds.): *Brennpunkte der gedachtnisforschung: Entwicklungs - und padagogisch - psycho logische perspektiven* (pp. 277–302) Gottingen, Germany: Hogrefe.
- Verhoeven, Ludo, Reitsma, Pieter, & Siegel, S. Linda (2011): Cognitive and linguistic factors in reading acquisition. *Reading and writing*. Vol.: 24, No.: 4, pp.: 387–394. doi: 10.1007/s11145-010-9232-4Open Access.
- Yoon, Hyo Jin (2011): The association between reading comprehension and prerequisite skills for children in poverty. Doctoral dissertation. Martin: The University of Tennessee: Available at: <http://etd.uthsc.edu/WORLD-ACCESS/Yoon/2011-043-Yoon.pdf> (7.5.2015)
- Young, L. Maxine. (2000): Working memory, language and reading. Available at: http://hstrial-jzadina.homestead.com/Working_Memory.pdf (5.5.2015)