

Effect of an intervention program on the reading comprehension processes and strategies in 5th and 6th grade students

Elena Gayo¹, Manuel Deaño¹, Ángeles Conde¹, Iolanda Ribeiro², Irene Cadime² and Sonia Alfonso¹

¹ Universidad de Vigo and ² Universidade do Minho

Abstract

Background: Various investigations have revealed that the promotion of cognitive and metacognitive strategies can improve reading comprehension and that when readers receive this type of instruction, they can use monitoring processes and regulation strategies adequately. The goal of this work is to analyze the effects of strategic and metacognitive instruction on reading comprehension processes and strategies, using the “Aprender a Comprender” [Learning to Understand] program. **Method:** Instruction was carried out in the classroom by two teachers during six months. Ninety-four students participated, 49 from 5th grade and 45 from 6th grade. A pretest-intervention-posttest-follow-up design was used with a comparison group by grade. **Results:** The analysis of variance shows an impact of the intervention and its differential maintenance in each grade. The 5th-grade intervention group scored higher than the comparison group in the reading comprehension test, both at posttest and at follow-up. The 6th-grade intervention group scored higher than the comparison group in the Planning scale, both at posttest and at follow-up. **Conclusions:** Textual strategy instruction favors reading comprehension and the progressive development of planning, which is necessary for supervision and regulation, and its effects are maintained over time.

Keywords: strategy instruction, reading comprehension, planning, intervention program.

Resumen

Efecto de un programa de intervención en los procesos y estrategias para la comprensión lectora en estudiantes de 5º y 6º grado.

Antecedentes: diferentes investigaciones han evidenciado que el fomento de estrategias cognitivas y metacognitivas puede mejorar la comprensión lectora y su instrucción favorece la utilización adecuada de los procesos de monitoreo y de las estrategias de regulación. El objetivo del estudio es analizar los efectos de la instrucción estratégica y metacognitiva con el programa “Aprender a Comprender” en los procesos y estrategias para la comprensión lectora. **Método:** la instrucción se llevó a cabo durante seis meses, en el aula, a cargo de dos docentes. Participaron 94 escolares, 49 de 5º grado y 45 de 6º grado. Se utilizó un diseño pretest-intervención-postest-seguimiento con un grupo de comparación por grado. **Resultados:** los análisis de varianza muestran un impacto de la intervención y su mantenimiento diferencial en cada grado. Los estudiantes del grupo de intervención de 5º grado puntuaron más alto en la prueba de comprensión lectora en postest y en el seguimiento. Los del grupo de intervención de 6º grado puntuaron más alto en la escala de planificación tanto en postest como en el seguimiento. **Conclusiones:** la instrucción estratégica textual favorece la comprensión lectora y el progresivo desarrollo de la planificación necesaria para su supervisión y regulación, manteniendo sus efectos en el tiempo.

Palabras clave: instrucción estratégica, comprensión lectora, planificación, programa de intervención.

The reading comprehension levels achieved by Spanish students have not improved since the year 2000 (Mullis, Martin, Foy, & Druker, 2012; OECD, 2013). This suggests that our educational system is not very successful in the achievement of higher reading levels that require more significant levels of meaning. In addition to the importance of reading comprehension itself, its cross-sectional nature leads to collateral effects on the rest of the academic areas and the subsequent learnings of secondary education (Alverman & Earle, 2003).

Reading comprehension is the result of the interaction between the reader's prior knowledge, the processes and strategies used to coordinate it, and the textual information employed to meet the text demands (García-Madruga, 2006; Snow & Sweet, 2003). The constant interaction between the reader and the text promotes awareness and allows the reader to establish a comprehension plan depending on his or her intentions (Echevarría, 2006). The construction of reading comprehension implies the organization of the explicit propositions of the text (micro-structure) and of the global text (macro-structure). This construction promotes a representation (Van Dijk & Kintsch, 1983) that favors the active use of literal comprehension strategies. Comprehension of the main idea of the text allows readers to combine the information of the text with their information and to build a mental situational representation (Kintsch, 1988) in which the inferences involve their active work and metacognitive control of the meaning of the text by means of specific strategies (García-Madruga, 2006).

Method

Inferences, considered as strategies (Cuetos, 2010; Ribeiro et al., 2010), recover long-term information to generate new knowledge. Catalá, Catalá, Molina, and Monclús, (2010) taxonomize inferences, distinguishing four levels of comprehension: literal, inferential, critical, and reorganization.

It is currently underlined that, in addition to the skill to read words quickly and accurately (Perfetti, Marron, & Foltz, 1996), spoken language (Catts, Fey, Zhang, & Tomblin, 1999), knowledge of vocabulary and of reading (Braze, Tabor, Shankweiler, & Mencl, 2007; Lundquist, 2004; Ransby & Swanson, 2003; Yovanoff, Duesbery, Alonzo, & Tindal, 2005), inferential and syntactic skills, and the knowledge of text structures (Biancarosa & Snow, 2004; Swanson & Trahan, 1996), we must also consider the executive functions related to reading comprehension, such as the capacity to plan, organize, and monitor information (Cutting, Materek, Cole, Levine, & Mahone, 2009).

Students who understand the texts well are more prone to use cognitive and metacognitive strategies (Palincsar & Brown, 1984; Pearson & Fielding, 1991; Tierney & Cunningham, 1984). In contrast, students who have difficulties in reading comprehension tend to perform worse than their classmates in the measures that require planning an organized response.

Sesma, Mahone, Levine, Eason, and Cutting (2009) found that planning contributes importantly to reading comprehension, but not to word reading. Cutting et al. (2009) studied a sample of students with difficulties in reading comprehension, finding that they displayed important deficits in the planning and organization of the associated skills. The study of Locascio, Mahone, Eason, and Cutting (2010) suggests that specific aspects of the executive function may be related to reading comprehension.

Planning refers to the cognitive strategies used to manage goal-oriented behaviors and for the development and implementation of an approach to perform tasks that have not been carried out habitually (Locascio et al., 2010; Mahone et al., 2002). It includes knowledge of the use of strategies to understand what one reads, reading strategies, and the executive processes used to resolve reading tasks.

The theory of the basic learning processes of Planning and Attention, Simultaneous and Successive (PASS; Das, Naglieri, & Kirby, 1994) defines planning as a higher-order mental process by which the individual determines, selects, applies, and evaluates possible solutions to problems that have no immediately apparent method or solution. Studies conducted from the PASS model have revealed the relation between reading comprehension and planning (Haddad et al., 2003; Leong, Cheng, & Das, 1985).

This study presents the results of an intervention in reading comprehension carried out with the “Aprender a Comprender” [Learning to Understand] program (Ribeiro et al., 2010). This is a program for the development of reading comprehension skills that stimulates the conscious use of strategies to resolve reading tasks. These strategies are structured to facilitate students’ planning of reading. This facilitation occurs by means of the self-questions proposed by the characters of the program to resolve the tasks after reading each informative text.

The present study has the goals of analyzing the effect of an intervention on reading comprehension and planning in 5th and 6th grade students, and to determine the maintenance of the effects of the intervention on reading comprehension and planning, comparing the pre-post and post-follow-up measurements in the intervention and comparison groups in each grade.

Participants

Ninety-four students, aged between 9 and 12 years, who studied 5th ($M = 9.59$ years, $SD = .537$) and 6th grade ($M = 10.93$ years, $SD = .447$) in a public school of the city of Ourense (Spain), participated in this study. The distribution of the participants by sex, grade, and group can be seen in Table 1. The students were from an urban area, and their families had a medium-high socioeconomic level.

The intervention and comparison groups were randomly formed, respecting the natural grouping of the classrooms. No significant differences were found in the variables grade and gender for the groups, $\chi^2(1) = .043$, $p = .836$, or in reading comprehension, either in 5th, $F(1, 47) = 1.323$, $p = .256$, or in 6th grade, $F(1, 43) = 1.527$, $p = .223$.

Instruments

To operationalize the independent variable, we used the instruction program “Aprender a Comprender” [Learning to Understand] (Ribeiro et al., 2010), made up of 30 thematic units, arranged according to difficulty level, which includes texts and their corresponding reading comprehension tasks to be solved. The text contents are those of the Primary Education curriculum. They correspond to diverse types of genre: informative, instructional, poetry, and biographical. The activities carried out with the texts use diverse response formats: multiple, short, transcription, true-false, completing, ordering, associating, summarizing, completing schemas or tables, and elaborating questions about the text.

The program is made up of two books, one for the teacher, with the program orientations, and the other for the student, which includes the texts, activities, and all the work materials.

To operationalize the dependent variable, reading comprehension, we used the “Prueba de Evaluación de la Comprensión Lectora” ([Reading Comprehension Assessment Test] ACL; Catalá et al., 2010), which contains different types of texts, grouped by level from 1st to 6th grade. Each level contains texts with 3 and 4 items that represent four comprehension levels: literal, inferential, critical, and reorganization. *Literal comprehension* is reflected in the skill to recognize information explicitly expressed in the text. It assesses strategies of “recognizing referents” and “finding the specific information in the text or selective inquiry.” *Reorganization* requires the skill to integrate and reuse information from the text to classify, summarize, etc. It assesses the strategies of “rewriting fragments and paraphrasing fragments from a text”. *Inferential or interpretative comprehension* requires readers to think beyond the written text and use their personal experience to deduce details, predict, elaborate hypothesis, or interpret the

Table 1
Distribution of participants by grade, gender and group

Grade	Intervention group		Comparison group		Total
	Boys	Girls	Boys	Girls	
5 ^o	11	14	10	14	49
6 ^o	12	10	12	11	45
Total	23	24	22	25	94

figurative language. It assesses strategies such as: “inferring the meaning of a word from its context in the text” and “inferring from the text elements that are not explicit and foreseeing possible changes in the text beginning with a new situation”. Lastly, *critical comprehension* or *judgment* requires the capacity to make judgments about what one reads, to elaborate opinions about the text by comparing ideas presented in the text with an external criterion. At this level, we assessed the strategy of “emitting judgments and opinions of a text.”

The reliabilities of the test for each one of the levels established from 1st to 6th grade, by means of the KR-20, were, respectively, .80, .83, .80, .83, .82, and .76.

Planning was operationalized with the Planning Scale of the *Das-Naglieri Cognitive Assessment System*, (D.N.: CAS; Naglieri & Das, 1997). The tasks require participants to create an action plan, verify it according to the original goal and, if necessary, to modify it. *Matching Numbers* requires locating and underlining the two numbers that are the same in the different rows presented. The *Planned Codes* subtest presents a legend that shows the specific correspondence between letters and codes. The task consists of filling the empty boxes under each letter with the corresponding codes and discovering their internal organization in order to solve the task. The last subtest, *Planned Connections*, requires an efficacious approach to sequentially connect a series of randomly distributed numbers, and to connect numbers and letters alternately and sequentially.

The sum of the three subtests provides a standard score for the scale with a mean of 100 and standard deviation of 15. The reliability of this scale for the Spanish sample was .90, calculated by the test-retest procedure (Deaño, 2005).

Administration procedure

Instruction program. The “Aprender a Comprender” [Learning to Understand] program was applied through 30 thematic units, in 60-90-minute sessions, one day per week, for six months of the school term, integrated within the curriculum, in the subject of Language and Spanish Literature. The procedure followed is that indicated in the program: First: read the text; Second: answer the questions formulated by the members of the comprehension family; Third: act according to the response to those questions, writing them down in the corresponding space.

In each session, the teachers explained what to do and how to get organized to carry out the task. They asked the students to read the text individually, sometimes in silence and sometimes out loud, or they would read it to them. Then, the students worked individually or in pairs, in small groups or the entire class, answering the questions proposed. The last ten minutes were dedicated to discussing and assessing the task performed, for which purpose they received scoring templates.

The teachers were trained in the administration of the program, one for each intervention group, until their interpretation of the guidelines established in the program was equivalent. The teachers had to adapt to the orientations specified in the teacher’s book, which includes all guidelines to carry out the program. In successive meetings, doubts were resolved, and the teachers’ performance with the intervention groups was analyzed and monitored.

The comparison groups were instructed by another two teachers who were in charge of teaching the subject in these

groups. They followed the habitual methodology, consisting of a spoken explanation of the tasks to be carried out with the texts of the book, reading the corresponding materials, and performing the proposed exercises individually. These groups received the same number of study hours as the intervention groups. They used reading texts of books from a publishing house, which were similar in typology, structure, and complexity to those used in the book of the “Aprender a comprender” [Learning to Understand] program used by the intervention groups.

Measurement of reading comprehension and planning. The pretest and posttest measures corresponding to *reading comprehension* (ACL) were taken collectively. The Planning Scale (D.N.: CAS) was applied individually. The tests were administered one week before and one week after the intervention. The follow-up tests were carried out 24 weeks after the posttest, in each case, following the same protocol as for the previous measures. Both tests followed the administration rules established by their authors.

Design and data analysis

We used a pre/intervention/post/ follow-up design, comparing the intervention and comparison groups in each grade. We conducted a 2x3 (2 Groups: intervention and comparison, x 3 Measurement Moments: M1, M2, and M3) repeated measures analysis of variance with the general linear model procedure for reading comprehension (ACL) and planning (D.N.: CAS). We used the SPSS statistical package version 18.0.

Results

In 5th grade, analysis of the effect of the intervention on the variable reading comprehension revealed a main effect for measurement moment, $F(1, 47) = 171.225, p < .001, \eta_p^2 = .785$, and a significant Group x Moment interaction (Table 2). The change in the 5th grade students’ mean scores was statistically significant, varying from M1 ($M = 4.67$) to M2 ($M = 6.25$), with a large effect size.

The significant Group x Moment interaction, of a large size, indicated that, at M1, both groups had a similar performance in reading comprehension, $F(1, 47) = 1.323, p > .05, \eta_p^2 = .027$, but at M2, the intervention group performed significantly better than the comparison group, $F(1, 47) = 8.496, p < .01, \eta_p^2 = .153$. In the evolution of each group from M1 to M2, the increase of the intervention group’s scores was statistically significant, $F(1, 47) = 157.178, p < .000, \eta_p^2 = .770$. The comparison group also increased their scores, $F(1, 47) = 36.429, p < .001, \eta_p^2 = .437$, but with a smaller associated effect size than the intervention group.

For the variable planning, a main effect for measurement moment was found, $F(1, 47) = 111.426, p < .000, \eta_p^2 = .703$, but the Group x Moment interaction was nonsignificant (Table 2). The 5th grade participants significantly improved their mean scores in planning from M1 ($M = 99.16$) to M2 ($M = 105.61$), with a large associated effect size.

The absence of a significant Group x Moment interaction shows that, at M1, the intervention group achieved a significantly higher performance in planning than the comparison group, $F(1, 47) = 4.545, p < .05, \eta_p^2 = .088$. At M2, this initial difference was dissipated, with a very marginal level of significance, $F(1, 47) = 3.867, p = .055, \eta_p^2 = .076$. The evolution of the intervention group

from one measurement moment to the next showed a significant increase of their mean scores in planning, $F(1, 47) = 55.284$, $p < .001$, $\eta^2_p = .540$. This was also found for the comparison group, $F(1, 47) = 56.147$, $p < .001$, $\eta^2_p = .544$, with a similar effect size for both groups.

The effect of the intervention program on the 5th graders' reading comprehension was maintained at the follow-up measure (Table 3). All the children improved their mean scores in reading comprehension from M2 ($M = 6.25$) to M3 ($M = 6.78$), $F(1, 47) = 44.069$, $p < .001$, $\eta^2_p = .484$, but the gains of the students from the intervention group were statistically significant compared with the other group, $F(1, 47) = 4.775$, $p < .05$, $\eta^2_p = .092$. In the evolution from M2 to M3, both the intervention group, $F(1, 47) = 6.142$, $p < .05$, $\eta^2_p = .116$, and the comparison group, $F(1, 47) = 47.136$, $p < .001$, $\eta^2_p = .501$, gained in reading comprehension.

For planning, when analyzing M2-M3 and controlling for M1, the 5th graders performed similarly at both measurement moments, $F(1, 46) = 1.726$, $p > .05$, $\eta^2_p = .036$. No statistically significant differences between the intervention group and the comparison group were found at M3, $F(1, 46) = .443$, $p > .05$, $\eta^2_p = .010$, as had been observed at M2. The evolution from M2 to M3 shown for each group indicates that both the intervention group, $F(1, 46) = 61.794$, $p < .001$, $\eta^2_p = .573$, and the comparison group, $F(1, 46) = 80.824$, $p < .001$, $\eta^2_p = .637$, significantly improved their mean scores in planning.

In 6th grade, the analysis of the effect of intervention on reading comprehension revealed a main effect for measurement moment, $F(1, 43) = 162.037$, $p < .001$, $\eta^2_p = .790$, with a large effect size. Reading comprehension at M2 ($M = 6.83$) was significantly better than at M1 ($M = 5.12$) for all the 6th grade students. A significant Group \times Moment interaction was also produced (Table 4). At M1,

Table 2

Descriptive statistics and results of analysis of variance for the intervention and comparison groups of 5th grade at pre (M1) and post (M2) for reading comprehension (ACL) and planning (D.N.: CAS)

	Intervention group n = 25		Comparison group n = 24		Group \times Moment N = 49		
	M1	M2	M1	M2	F (df)	p	η^2_{pi}
	M (SD)	M (SD)	M (SD)	M (SD)			
Reading comprehension	5.00 (2.18)	7.12 (2.26)	4.33 (1.86)	5.37 (1.91)	19.918 (1, 47)	.000***	.298
Planning	102.52 (9.64)	108.88 (10.26)	95.79 (12.34)	102.33 (12.94)	.022 (1, 47)	.882	.000

¹ Effect size: Small .0196, Medium .1304, Large .2592 (Cohen, 1992)
*** $p < .001$

Table 3

Descriptive statistics and results of analysis of variance for the intervention and comparison groups of 5th grade at post (M2) and follow-up (M3) for reading comprehension (ACL) and planning (D.N.: CAS)

	Intervention group n = 25		Comparison group n = 24		Group \times Moment N = 49		
	M2	M3	M2	M3	F (df)	p	η^2_{pi}
	M (SD)	M (SD)	M (SD)	M (SD)			
Reading comprehension	7.12 (2.26)	7.40 (2.04)	5.37 (1.91)	6.17 (1.90)	10.046 (1, 47)	.003**	.176
Planning	108.88 (10.26)	115.16 (9.90)	102.33 (12.94)	109.67 (14.16)	.819 (1, 46)	.370	.017

¹ Effect size: Small .0196, Medium .1304, Large .2592 (Cohen, 1992)
** $p < .01$

Table 4

Descriptive statistics and results of analysis of variance for the intervention and comparison groups of 6th grade at pre (M1) and post (M2) for reading comprehension (ACL) and planning (D.N.: CAS)

	Intervention group n = 22		Comparison group n = 23		Group \times Moment N = 45		
	M1	M2	M1	M2	F (df)	p	η^2_{pi}
	M (SD)	M (SD)	M (SD)	M (SD)			
Reading comprehension	4.77 (2.11)	7.09 (2.22)	5.48 (1.70)	6.57 (2.02)	21.185 (1, 43)	.000***	.330
Planning	98.41 (11.20)	109.36 (10.80)	93.22 (13.10)	98.17 (12.64)	12.551 (1, 43)	.001**	.226

¹ Effect size: Small .0196, Medium .1304, Large .2592 (Cohen, 1992)
** $p < .01$; *** $p < .001$

$F(1, 43) = 1.527, p > .05, \eta^2_p = .034$, and at M2, $F(1, 43) = .691, p > .05, \eta^2_p = .016$, there were no statistically significant group differences, although the intervention group obtained significant gains, with a large effect size, in their scores at M2 with regard to M1, $F_{intervention}(1, 43) = 146.935, p < .001, \eta^2_p = .774$; $F_{comparison}(1, 43) = 33.772, p < .001, \eta^2_p = .440$.

In the analysis of the effect of the intervention on planning, a main effect for measurement moment was found, $F(1, 43) = 88.322, p < .001, \eta^2_p = .673$, as well as a significant Group \times Moment interaction (Table 4). The mean scores from M1 ($M = 95.81$) to M2 ($M = 103.77$) of all the 6th grade students increased significantly, with a large effect size. The significant Group \times Moment interaction showed that, at M1, the children from the intervention and comparison groups had the same level of performance in planning, $F(1, 43) = 2.032, p > .05, \eta^2_p = .045$. At M2, the intervention group obtained significantly higher mean scores than the comparison group, $F(1, 43) = 10.150, p < .01, \eta^2_p = .191$. In the evolution of each group from M1 to M2, it can be observed that the students from the intervention group, $F(1, 43) = 81.911, p < .001, \eta^2_p = .656$, as well as those from the comparison group, $F(1, 43) = 17.531, p < .001, \eta^2_p = .290$, obtained statistically significant gains, with a greater associated effect size in the intervention group.

The analysis of M2 to M3 for reading comprehension in the 6th graders (Table 5) revealed a main effect for measurement moment, $F(1, 43) = 40.364, p < .001, \eta^2_p = .484$, with a large effect size. All the participants achieved significant gains in reading comprehension six months after having carried out the intervention ($M_{M2} = 6.89$; $M_{M3} = 7.39$). There was no significant Group \times Moment interaction because, at M2 and M3, there were no statistically significant differences between the two groups (M2: $F(1, 43) = .691, p > .05, \eta^2_p = .016$; M3: $F(1, 43) = .244, p > .05, \eta^2_p = .006$). The analysis of the evolution from M2 to M3 showed that the intervention group increased their scores significantly, $F(1, 43) = 13.322, p < .01, \eta^2_p = .237$, as did the comparison group, $F(1, 43) = 28.671, p < .001, \eta^2_p = .400$.

Lastly, the analysis of M2 and M3 for planning revealed a main effect, with a large size, for measurement moment, $F(1, 43) = 197.195, p < .001, \eta^2_p = .821$, indicating that six months after the intervention ($M_{M3} = 112.53$), all the 6th graders achieved a better performance in planning than at the posttest measurement ($M_{M2} = 103.77$).

No significant Group \times Moment interaction was obtained, but upon comparing the groups in M2, $F(1, 43) = 10.150, p < .01, \eta^2_p = .191$, and M3, $F(1, 43) = 5.863, p < .05, \eta^2_p = .120$, we observed statistically significant differences in favor of the intervention

group, although both groups showed significant gains in their planning scores, $F_{intervention}(1, 43) = 79.534, p < .001, \eta^2_p = .649$; $F_{comparison}(1, 43) = 120.231, p < .001, \eta^2_p = .737$.

Discussion and conclusions

Regarding the first goal of this study, it can be stated that the “Aprender a Comprender” [Learning to Understand] program is efficacious for 5th grade students. The post-intervention results revealed important differences in the scores of the comprehension test of the intervention group, which was initially equivalent to the comparison group. This shows that the strategy instruction of the program produces improvements, with a large effect size, in the reading comprehension of 5th graders.

In planning, both the 6th grade groups increased their scores significantly at posttest, but the students who took part in the intervention program increased their scores differentially from the comparison group. The intervention group gained more, with a large effect size.

The second proposed goal, the maintenance of the effects of the intervention six months after completing the program, was confirmed in the reading comprehension level in the 5th grade intervention group, with regard to the comparison group.

The improvement in planning achieved by the 6th grade intervention group was maintained at follow-up compared to the posttest measurement, with important differences regarding the comparison group. This shows the lasting effect of the improvement in planning processes, which contribute to reading comprehension.

These results coincide with studies showing improvement in trained reading comprehension strategies (Echevarría, 2006; Spörer, Brunstein, & Kieschke, 2009). Students who followed the “Aprender a Comprender” [Learning to Understand] program showed that they know the principles of the trained comprehension strategies, they apply them to new situations, and they maintain the learnings, as manifested in normalized reading comprehension tests (Spörer et al., 2009). They acquired these principles by means of the aid and facilitation of questions that were first provided by the characters of the *Comprehension Family* and that they gradually asked themselves. They became aware, not only of the principles of the trained strategies, but also of their combination and use for their reading goals. This seems to be reflected in their planning scores regarding reading comprehension (Das et al., 1994) and current studies that show that planning is an important component of reading comprehension (Cutting et al., 2009; Sesma et al., 2009).

Table 5
Descriptive statistics and results of analysis of variance for the intervention and comparison groups of 6th grade at post (M2) and follow-up (M3) for reading comprehension (ACL) and planning (D.N.: CAS)

	Intervention group n = 22		Comparison group n = 23		Group \times Moment N = 45		
	M2	M3	M2	M3	F (df)	p	η^2_p
	M (SD)	M (SD)	M (SD)	M (SD)			
Reading comprehension	7.09 (2.22)	7.55 (2.26)	6.57 (2.02)	7.22 (2.19)	1.287 (1, 43)	.263	.029
Planning	109.36 (10.80)	117.32 (11.18)	98.17 (12.64)	107.74 (14.99)	1.667 (1, 43)	.204	.037

¹ Effect size: Small .0196, Medium .1304, Large .2592 (Cohen, 1992)

This proposal lends some meaning to other results of this study, where the comparison groups, both of 5th and 6th grade, following the habitual school program for primary education, obtained similar scores in reading comprehension and planning at some of the measurement moments.

These results extend our existing knowledge of the efficacy of instruction programs in reading comprehension, by including support through questions formulated in the learning context in order to make the students aware of the most efficient cognitive strategies for the development of reading competence. Textual instruction is efficacious to regulate the cognitive resources of readers, who are also aided by actively dealing with the combination of multiple strategies for reading comprehension,

progressively improving it while they develop planning, which is also necessary to supervise and regulate reading skills.

This study presents some practical and empirical limitations regarding the difficulties encountered by the teachers to apply a new approach in classrooms that had been formed for years, and with learning experiences that were different from the one presented herein. It is necessary to extend the number and sociodemographic characteristics of the participants, controlling for the effect of variables such as the teacher, the contents of the texts, the students' interest and motivation, and the randomness of participant assignment to the groups.

Future research should determine which strategies, of those developed by the program, are the most effective to improve reading comprehension and promote its planning.

References

- Alvermann, D., & Earle, J. (2003). Comprehension instruction. In A.P. Sweet & C. Snow (Eds.), *Rethinking reading comprehension* (pp. 12-30). New York: Guilford Press.
- Biancarosa, G., & Snow, C.E. (2004). *Reading next—a vision for action and research in middle and high school literacy: A report from Carnegie Corporation of New York*. Washington, DC: Alliance for Excellent Education.
- Braze, D., Tabor, W., Shankweiler, D.P., & Mencl, W.E. (2007). Speaking up for vocabulary: Reading skill differences in young adults. *Journal of Learning Disabilities, 40*, 226-243.
- Catalá, G., Catalá, M., Molina, E., & Monclús, R. (2010). *Avaluació de la comprensió lectora. Proves ACL. Vol. I, Cicle inicial de Primària* [Assessment of Reading Comprehension. ACL test. Vol. I, Primary Initial Cycle]. Barcelona: Grao.
- Catts, H.W., Fey, M.E., Zhang, X., & Tomblin, J.B. (1999). Language basis of reading and reading disabilities: Evidence from a longitudinal investigation. *Scientific Studies of Reading, 3*, 331-361.
- Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155-159.
- Cuetos, F. (2010). *Psicología de la lectura* [Psychology of reading]. Madrid: Wolters Kluwer.
- Cutting, L.E., Materek, A., Cole, C.A., Levine, T.M., & Mahone, E.M. (2009). Effects of fluency, oral language, and executive function on reading comprehension performance. *Annals of Dyslexia, 59*, 34-54.
- Das, J.P., Naglieri, J.A., & Kirby, J.R. (1994). *Assessment of cognitive processes*. Needham Heights, MA: Allyn & Bacon.
- Deaño, M. (2005). *Batería Das-Naglieri: sistema de evaluación cognitiva (D.N: CAS) adaptación española* [Das-Naglieri Battery: Assessment of cognitive processes]. Ourense, Spain: Gersam.
- Echevarría, M.A. (2006). ¿Enseñar a leer en la Universidad? Una intervención para mejorar la comprensión de textos complejos al comienzo de la Educación Superior [Teaching how to read at university? An intervention to improve the comprehension of complex texts when starting higher education]. *Revista de Psicodidáctica, 11*(2), 169-188.
- García-Madruga, J.A. (2006). *Lectura y conocimiento* [Reading and knowledge]. Barcelona: Paidós.
- Haddad, F.A., García, Y.E., Naglieri, J.A., Grimditch, M., McAndrews, A., & Eubanks, J. (2003). Planning facilitation and reading comprehension: Instructional relevance of the Pass Theory. *Journal of Psychoeducational Assessment, 21*, 282-289.
- Kintsch, W. (1988). The role of knowledge in discourse comprehension: A construction-integration model. *Psychological Review, 95*, 163-182.
- Leong, C.K., Cheng, S.C., & Das, J.P. (1985). Simultaneous-successive syntheses and planning in Chinese readers. *International Journal of Psychology, 20*, 19-31.
- Locascio, G., Mahone, E.M., Eason, S.H., & Cutting, L.E. (2010). Executive dysfunction among children with reading comprehension deficits. *Journal of Learning Disabilities, 43*, 441-454.
- Lundquist, E. (2004). *Reading skills of young adults who decode poorly: The nonword deficit revisited*. Storrs, CT: University of Connecticut.
- Mahone, E.M., Hagelthorn, K.M., Cutting, L.E., Schuerholz, L.J., Pelletier, S.F., Rawlins, C., ..., & Denckla, M.B. (2002). Effects of IQ on executive function measures in children with ADHD. *Child Neuropsychology, 8*, 52-65.
- Mullis, I.V.S., Martin, M.O., Foy, P., & Drucker, K.T. (2012). *PIRLS 2011 International Results in Reading*. Chestnut Hill, MA: TIMSS & PIRLS International Study Center, Lynch School of Education, Boston College.
- Naglieri, J.A., & Das, J.P. (1997). *Cognitive Assessment System*. Itasca, IL: Riverside.
- OECD (2013). *PISA 2009 results: Learning Trends: Changes in student performance since 2000*.
- Palincsar, A.S., & Brown, A.L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. *Cognition and Instruction, 1*, 117-175.
- Pearson, P.D., & Fielding, L. (1991). Comprehension instruction. In R. Barr, M.L. Kamil, P. Mosenthal, & P.D. Pearson (Eds.), *Handbook of reading research* (Vol. 2, pp. 815-860). White Plains, NY: Longman.
- Perfetti, C.A., Marron, M.A., & Foltz, P.W. (1996). Sources of comprehension failure: Theoretical perspectives and case studies. In C. Cornoldi & J.V. Oakhill (Eds.), *Reading comprehension difficulties: Processes and remediation* (pp. 137-165). Mahwah, NJ: Erlbaum.
- Ransby, M.J., & Swanson, H.L. (2003). Reading comprehension skills of young adults with childhood diagnosis of Dyslexia. *Journal of Learning Disabilities, 36*, 538-555.
- Ribeiro, I., Viana, F.L., Cadime, I., Ferreira, A., Leirao, C., & Pereira, L. (2010). *Compreensao da leitura. Dos modelos teóricos ao ensino explícito: Un programa de intervenção para o 2º ciclo do Ensino Básico* [Reading comprehension. From theoretical models to explicit teaching: Program for the 2nd cycle of basic education]. Coimbra, Portugal: Alameda.
- Sesma, H.W., Mahone, E.M., Levine, T., Eason, S.H., & Cutting, L.E. (2009). The contribution of executive skills to reading comprehension. *Child Neuropsychology, 15*, 232-246.
- Snow, C.E., & Sweet, A.P. (2003). Reading for comprehension. In A.P. Sweet & C.E. Snow (Eds.), *Rethinking reading comprehension* (pp. 1-11). New York: Guilford Press.
- Spörer, N., Brunstein, J.C., & Kieschke, U. (2009). Improving students' reading comprehension skills: Effects of strategy instruction and reciprocal teaching. *Learning & Instruction, 19*, 272-286.
- Swanson, H.L., & Trahan, M. (1996). Learning disabled and average readers' working memory and comprehension: Does metacognition play a role? *British Journal of Educational Psychology, 66*, 333-355.
- Tierney, R.J., & Cunningham, J.W. (1984). Research on teaching comprehension. In P.D. Pearson (Ed.), *Handbook of reading research* (Vol. 1, pp. 609-655). White Plains, NY: Longman.

Van Dijk, T., & Kintsch, W. (1983). *Strategies of discourse comprehension*. New York: Academic Press.

Yovanoff, P., Duesbery, L., Alonzo, J., & Tindal, G. (2005). Grade-

level invariance of a theoretical causal structure predicting reading comprehension with vocabulary and oral reading fluency. *Educational Measurement: Issues and Practice*, 24, 4-12.