

EDUCATIONAL ORIENTATION REGARDING VOCABULARY AND LITERACY ACCESS.
EVALUATING THE IMPACT OF AN INTERVENTION PROGRAM DESIGNED
TO PROMOTE EARLY LEARNING AT HOME.

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Abstract

The study evaluates the impact of a linguistic and cognitive development program for 5-year-old children. The program was implemented undergoing two conditions. In the first condition, the children participated in activities in their preschool classroom (extensive condition), while the second condition also involved family literacy activities in the children's homes (intensive condition). The program's impact was evaluated by using a pre-test – post-test design. The tests for receptive vocabulary (RV), category production (CP) and writing were administered to a sample of 214 children who participated in the intensive condition, 69 who participated in the extensive condition, and a control group of 49 children from Buenos Aires who did not participate in the program. The results showed that participation in the intensive condition led to a greater increase in RV, CP and writing abilities than the extensive condition and that both experimental conditions showed a greater increase in skill level when compared with the control group. The mother's education level and previous preschool attendance

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seemed to have no effect. The results showed significant correlations between all of the variables analyzed and that the RV scores at the beginning of the year predicted both the RV and writing scores at the end of the year.

Key Words: literacy, vocabulary, intervention programs.

Since the 1960s, studies have been carried out in homes in which children learn to read and write at an early age (Durkin, 1966; Snow, 1983; Taylor, 1983; among others). The aforementioned studies have shown that starting at an early age, the children in these homes have the opportunity to participate in shared reading and writing situations together with adults and older children. In these situations the children develop a series of skills and abilities that can be considered precursors to literacy.

Studies that address reading and writing learning difficulties in relation to the issue of school failure (Beals, 2001; Borzone & Rosemberg, 2000; Weizman & Snow, 2001) indicate that success or “failure” in terms of reading and writing are associated with the skills and abilities that the child develops at a very young age as part of their interactions with the literate adults in their immediate environment.

These skills and abilities, which are considered critical to literacy, include specific information about the names of the letters, the establishment of correlations between the written symbol and the sound, as well as a series of conceptual and linguistic skills and abilities that interact in early development (Dickinson, McCabe & Essex 2006). In effect, language functions as a catalyst for cognitive change in the first years of one’s life (Nelson, 1996; 2007). Language does not only play a role in human communication; linguistic abilities also allow one to represent and heuristically approach the world. Moreover, Dickinson, McCabe and Essex claim that the reach of language development (the phonological, lexical, semantic, syntactic and pragmatic

aspects) in early experiences is very important because the diverse aspects that comprise the communicative and representational function of oral language will later become an integral support for literacy.

Among these skills and abilities, vocabulary, an aspect that was underestimated until just a few years ago (Biemiller, 2006), has proven to have a role relevant to learning to read and write, according to recent studies. The diversity and extent of a child's vocabulary are associated with their reading and writing performance in the first few years of primary school. In fact, some studies have found a strong correlation between vocabulary and word recognition (Snow, Tabors, Nicholson & Kurland, 1995). Other studies show that the relationship between these variables is indirect: the extent of one's vocabulary is associated with the quality of the phonological representation of words, which affects the development of phonological awareness. At the same time, vocabulary is an important learning objective in students' first year at primary school, as it is an essential part of learning to read and write words (Goswami, 2003).

Moreover, the extent of one's vocabulary has long-term and direct effects in the third and fourth grades at school. A child's vocabulary knowledge in preschool is a significant predictor of their reading comprehension level in the middle years of primary school (Sénéchal, Oulette & Rodney, 2006). Reading comprehension depends in large part on the child's lexical abilities to decode and fluently read the words (Protopapas, Sideridis, Mouzaki & Simos, 2007). In addition, an extensive vocabulary implies a knowledge base consisting of flexible, precise, interrelated, and easily retrievable representations of meaning (Biemiller, 2006; Joshi, 2005; Perfetti, 2007).

Differences between children in terms of breadth of vocabulary develop during the preschool years. At this stage, the children's vocabulary can differ by several thousands of words (Biemiller, 2006). Even though there may be individual

differences, these differences seem to be more due to the opportunities of context than to individual abilities (Biemiller, 2003). Along this line, studies by Hart and Risley (1995), and Weizman and Snow (2001), have shown that at 4 years old, the size of a child's vocabulary is determined, in great part, by the number of different words that their parents use and by the total number of words that they use, as well as by the parent's use of sophisticated, abstract, or complex vocabulary (Weizman & Snow, 2001). In addition, adult interventions that clarify, explain, and expand upon the meaning of complex and abstract words used in conversations are also associated with the subsequent range of children's vocabulary (Weizman & Snow, 2001).

The differences between children attributable to the language that they hear in their environment (linguistic input): the quantity and diversity of words, as well as the scaffolding coming from adult interventions are not randomly distributed: differences between those from different socioeconomic levels are particularly striking. If the differences that are observed at the beginning of the child's schooling are not attended to they will only become more pronounced: students with a reduced vocabulary tend to read less and learn a smaller quantity of new words, while students with an extensive vocabulary tend to read more, therefore improving their comprehension (Joshi, 2005).

Early literacy programs that have been implemented in the United States and other countries since the 1960s have aimed to reduce the risks of literacy failure associated with experiential differences between children (such as poverty or minority group status), taking the importance of promoting vocabulary learning into account. The different strategies employed by these programs vary based on the age of their target population, the services that they offer, the program implementation site, and the people involved (Britto, Fuligni & Brooks-Gunn, 2006; Snow, 2006).

Intervention models that include home visits also incorporate actions directed at the parents, who are taught by professionals or paraprofessionals about the different ways that they can contribute to their children's literacy. For example, the *Early Access to Success in Education* program (Snow, Dickinson & Tabors, 1989-present) carries out workshops with parents, literacy activities in the home, and promotes parental involvement in school activities. The *Home Instruction for Parents of Preschool Youngsters* program (Lombard, 1969-present) and *Parents as Teachers* and *Nurse Home Visiting* programs also conduct activities with the children's families.

On the other hand, several programs focus their activities only on preschool centers. The *Abecedarian* (Campbell & Ramey, 1994) program stands out among those that follow this condition. This program is directed toward children up to three years of age and focuses on their linguistic and cognitive development. A third intervention model combines the two previous strategies: activities in educational centers and periodic home visits. Examples of this model are the *Head Start*, *Early Head Start*, *Parent-Child Development Centers* programs.

Programs differ in terms of the theories that they are based upon, and consequently in terms of the emphasis that their strategies place on different components such as phonetic awareness and letter knowledge, which have a more limited impact on literacy, in comparison to the amount of attention that is paid to vocabulary and other conceptual and discursive components that have a more significant impact on literacy. As Snow (2006) asserts, the key is to overcome controversies and to promote the learning of all of these aspects in an integrated manner. This can be done through reading and writing activities, conversations, and language games that are meaningful to the child and in which the child's participation is properly guided or scaffolded by the adult.

In response to the aforementioned programs' evaluations, the "Oscarcito: Linguistic and Cognitive Promotion and Development for Low-Income Children"¹ program was created in Argentina. The program was designed to transfer research findings on various aspects of child cognitive and language development². The program aims to optimize habitual activities taking place in preschools and use the work with the families to maximize the impact that interactions have on the children's linguistic and cognitive development. These specially designed activities retrieve the children's knowledge and language abilities and seek to increase their vocabulary, their knowledge of the world, their discourse strategies, their learning of the standard linguistic variation, and to facilitate their entrance into the literacy process.

The program takes the results of the previously mentioned studies into account and therefore places special emphasis on actions intended to promote vocabulary and the teaching of early writing concepts and skills. Consequently, the present study aims to report the evaluation results of the program's impact on children's ability to learn these skills and abilities. The sample group is comprised of 5-year-old children from the Entre Ríos province of Argentina, where the program is currently being implemented³.

Methodology

Subjects

Three groups of children participated in the evaluation: Group A was comprised of 214 children who participated in the intensive condition of the program, Group B contained 69 children who participated in the extensive program condition, and Group C was a control group composed of 46 children who attended two separate preschool classes in

¹ C. R. Rosemberg and A. M. Borzone (2004- present) with support and funding from the Care Foundation of Germany and Arcor Foundation of Argentina.

² "Linguistic and Cognitive Development in Early Childhood: A Psycholinguistic and Sociocultural Study in the Martinalized Urban Neighborhoods of Buesos Aires" Program. (CONICET; SECyT - Director: A. M. Borzone, Co-director: C. R. Rosemberg).

³ Promotion of Linguistic and Cognitive Development in the Preschools of Entre Ríos Province Program. (Carried out under an agreement between the Arcor Foundation and the General Education Council of Entre Ríos Province, Director: C. Rosemberg, Co-director A. M. Borzone - CONICET).

Buenos Aires province where the linguistic and cognitive development program was not implemented.

The children in all three groups evaluated were students in the 5-year-old classrooms at preschools whose populations were comprised of socio-economically disadvantaged children. The children's descriptions take their mother's education level and the child's previous preschool attendance into account. With respect to the mother's level of education, 50% of the children's mothers in the control group had completed primary school. 76.6% of the children's mothers in the extensive group and 67.7% of the children's mothers in the intensive group were able to reach this level. 50% of the mothers in the control group, 21.2% of the mothers in the extensive group, and 31.8% of the mothers in the intensive group had graduated from or attended high school. Only 2% of the mothers included in the extensive condition and 0.5% of the mothers in the intensive condition had completed university. 78% of children in the control group had previously attended preschool, while 44.9% of the children in the extensive condition, and 59.7% of those in the intensive condition had previously attended.

Procedure

Extensive implementation included carrying out program activities in every 5-year-old preschool classroom in the province (impacting 23,800 children and 1,270 teachers). Management teams of school principals and supervisors trained the teachers in their charge on actions specifically designed to strengthen preschool activities that promote children's linguistic and cognitive development.

In order to be able to properly conduct teacher training, management teams had previously received special training on linguistic and cognitive development in children⁴. Management teams also used:

1. A series of modules that explain the theoretical concepts underpinning program actions designed to promote child linguistic and cognitive development. Modules discuss the processes of verbal interaction, vocabulary development, narrative and expositive discourse learning, and learning to write and the relationship between language development and play⁵.

2. Teams also used guides with pedagogical proposals for the preschool classrooms. The guides' organization takes into account various situations that seek to recreate the organization of daily activities through proposing specific strategies that teachers can use to promote oral communication, the development of literacy precursors, and children's discursive and conceptual development. Each classroom's guides are organized by various themes and contexts (for example, animals, pirates, space, and pollution, among others). The guides are accompanied by activity proposals designed to promote the development of skills and abilities related to writing acquisition.

Intensive implementation is carried out with a group of 628 at-risk children who attend preschools in the Concordia, Federación and Chajarí regions of Entre Ríos province. In addition to actions carried out in their preschools (described in the previous section), this program implementation condition also includes activities with the children's families, which are carried out in coordination with the activities taking place at their early learning institution. Activities involving the families are comprised of completing 12 workshops that address the promotion of child linguistic and cognitive

⁴ The management teams' theoretical and methodological training and preparation was carried out in Paraná, Entre Ríos during the year 2009. Training was conducted through a cycle of 6 seminars and two workshops, and with the support of the Arcor Foundation.

⁵ Modules are available online at: https://www.fundacionarcor.org/esp_biblioteca.asp

development in the context of story reading situations. During the workshops, families are given samples of the “At Oscarcito’s House” children’s book series (Rosemberg, Borzone & collaborators, 2005, 2008)⁶, and are presented with strategies for reading stories to children, as well as rhyming, verse, and poetry games used to promote the development of phonetic awareness, which is necessary for writing. They also discuss the importance of learning new and varied words and how to help the children learn them. Additionally, workshops cover strategies to promote children’s discursive development as well as learn to write their own names and familiar words.

Procedure for Obtaining and Analyzing Information

The 3 groups of children were evaluated at the beginning and at the end of the year by specially trained staff, in individual interviews during the school day, using the following tests:

Standardized Receptive Vocabulary Test: Picture Vocabulary Test in Spanish (Adapted from the Peabody Picture Vocabulary Test. Dunn & Dunn, 1981).

Production of Conceptual Categories Test: in this test (adapted from Lucariello, Kyratzys & Nelson, 1992), the child has to provide basic conceptual items pertaining to several familiar high-order conceptual categories such as animals, foods, furniture, tools, and parts of the body. The quantity of basic-level items that the child can produce for each high-order category is analyzed. Cases in which the child can produce the word that represents the concept, for example, *saw*, are considered. Cases in which the child refers to the concept without recovering the corresponding linguistic term, for example, *to cut wood*, instead of producing the basic-level category name are also considered, although in a different way (receiving a lower score).

⁶ These books are edited and given to the children’s families with the support and financing of the Arcor Foundation.

Writing Test: children are asked to write their name and 5 other simple words that they are familiar with (ex: mom, dad, duck, bear, table). Scores are assigned based on if the child wrote the whole word, if any letters were omitted, if they wrote the word using random letters, if they only wrote the first letter, or if they didn't write any letters.

Data Analysis

The children's pre-test and post-test scores were comparatively analyzed and the statistical significance of these differences was evaluated using the ANOVA test. Additionally, we evaluated if the mother's education level and the child's previous preschool attendance were observed to have any effects on the child's development (test used: ANOVA).

In order to study the connections between the tests, a correlations analysis was performed, using *Pearson's r* test as a statistic. An analysis of predictors for the tests evaluated at the beginning and end of the year was performed through multiple regression analysis.

Results

The Impact of the Intervention Program on the Child's Performance in Vocabulary, Production of Conceptual Categories, and Writing.

The 3 groups' performance on the receptive vocabulary, production of conceptual categories, and writing tests taken both at the beginning and end of the year was analyzed. Results show that the two groups who participated in the program, either in the intensive condition (Group A) or in the extensive condition (Group B), had similar starting points on the pre-test. The control group (Group C) did not perform as well on the three initial tests evaluated. At the end of the year differences could also be observed between the two groups of children who participated in the program. The children who participated in the intensive condition (Group A) performed better on the

three tests than the children who participated in the extensive condition (Group B). Both Groups A and B performed better than the control group. These results are presented in Charts 1, 2, and 3.

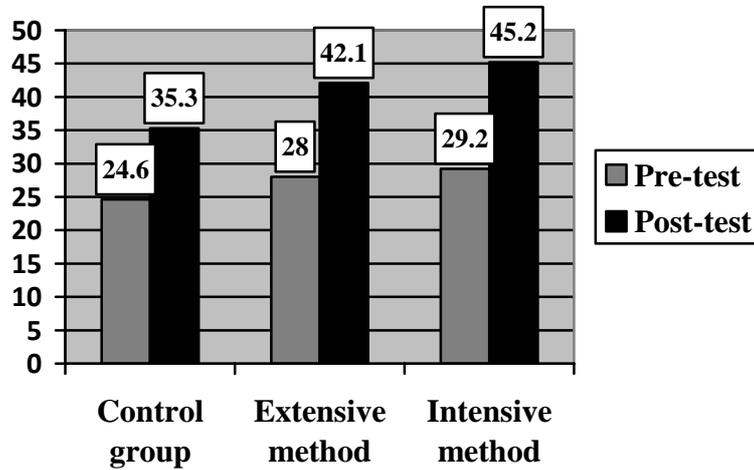


Figure 1: Scores obtained in receptive vocabulary (pre-test and post-test) by children who participated in the intensive condition, in the extensive condition and the control group.

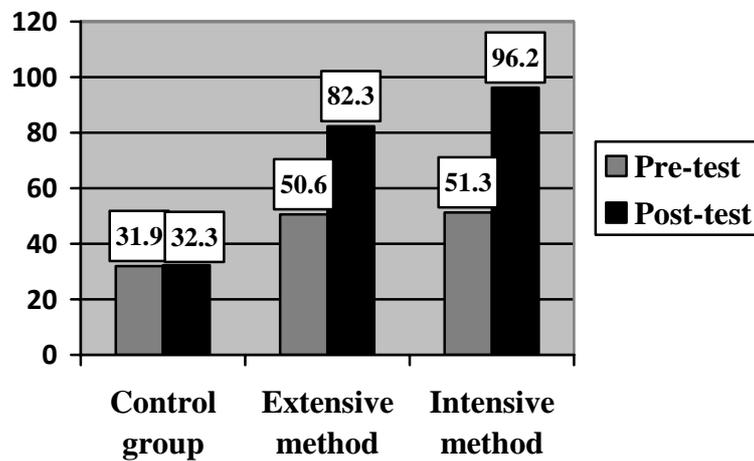


Figure 2: Scores obtained in production of conceptual categories (pre-test and post-test) by children who participated in the intensive condition, in the extensive condition and the control group.

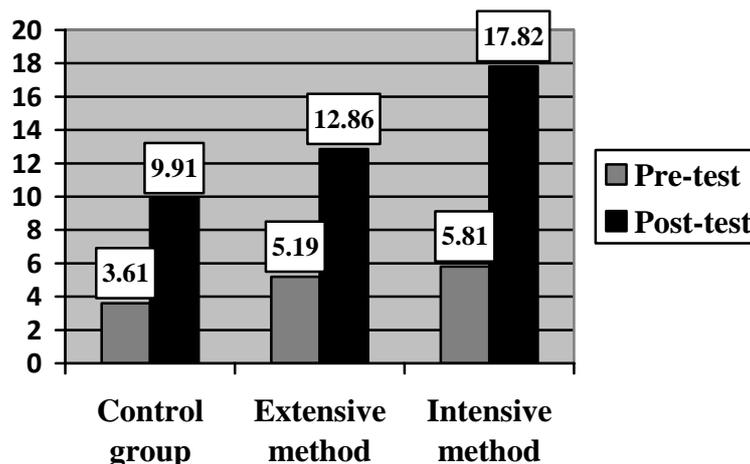


Figure 3: Scores obtained in writing (pre-test and post-test) by children who participated in the intensive condition, in the extensive condition and the control group.

To assess the impact on learning of the two types of intervention (the intensive condition and the extensive) one must consider the performance increase seen in each one of the two experimental groups and the control group between the pre-test and post-test. Table 1 compares the increase that the different groups of children show on each one of the variables considered: receptive vocabulary, production of conceptual categories, and writing.

Table 1: Comparison of the increase in scores obtained in receptive vocabulary, production of conceptual categories and writing in the intensive condition, the extensive condition and the control group.

	Intensive condition Group A	Extensive condition Group B	Control group Group C
Receptive vocabulary	16.05	14.15	10.56
Production of conceptual categories	44.88	31.76	0.36
Writing	12.01	7.67	6.3

For the children in Group A, participation in the intensive condition led to a greater increase in their receptive vocabulary, production of conceptual categories, and writing

skills than participation in the extensive condition did for the children in Group B. Both groups experienced a greater improvement than the children in Group C.

Increase in receptive vocabulary skills. The difference between the increase in receptive vocabulary skills shown by Group A (intensive condition) and by the control group is statistically significant ($F_{(1, 236)} = 5.616, p < .019$ test: One-factor ANOVA). On the other hand, the differences in the increase in receptive vocabulary between the group that participated in the extensive condition (Group B) and the control group (Group C), and between the group that participated in the extensive condition (Group B) and the group that participated in the intensive condition (Group A) are not statistically significant ($F_{(1, 90)} = 1.256, p < .265$; $F_{(1, 251)} = 1.463, p < .228$, respectively. Test: One-factor ANOVA).

Increase in the ability to produce conceptual categories. At the end of the year, the difference between the children who participated in the intensive condition of the program and those that participated in the extensive condition in terms of the increase in their ability to produce conceptual categories is significant ($F_{(1, 249)} = 1.880, p < .003$, Test: One-factor ANOVA). There are also significant differences between the increases experienced by the two experimental groups and by the control group ($F_{(1, 234)} = 72.952, p < .001$; $F_{(1, 90)} = 33.816, p < .001$, respectively. Test: One-factor ANOVA). It is important to note that the children who did not participate in the intervention program demonstrated almost no increase in their abilities to produce conceptual categories. This can be clearly seen in the table.

Writing. With regards to the writing variable, the recorded increase between Group A and Group B's pre-test and the post-test scores have a statistically significant difference. The difference is even greater when comparing Group A's scores with Group C's scores ($F_{(1, 252)} = 21.426, p < .001$ Test: One-factor ANOVA; $F_{(1, 238)} =$

29.773 $p < .001$, respectively. Test: One-factor ANOVA). Differences between the increases demonstrated by the extensive condition group (Group B) and the control group (Group C) are not statistically significant ($F_{(1, 91)} = 1.462$, $p < .2336$, Test: One-factor ANOVA).

Chart 4 (shown below) presents a more detailed analysis of the gains observed at the end of the year in terms of the three groups of children's word writing performance.

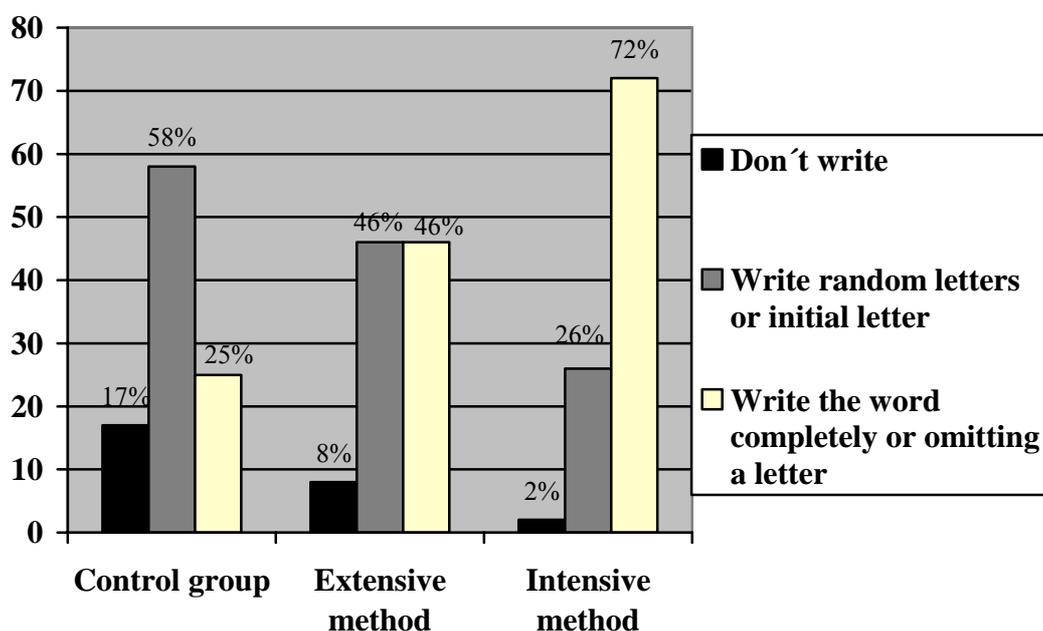


Figure 4: Writing abilities at the end of the year (Post-test) in the children that participated in the intensive condition, the extensive condition and the control group. As can be seen in the chart, there are statistically significant differences regarding the percentage of words written either completely or omitting a letter between the groups that participated in the intensive ($p < .000$) and extensive condition ($p < 0.002$) with respect to the control group.

The children's writing performance can be interpreted more fully by taking into account the results presented in Table 2, which specify and differentiate the children's performance on the task of writing their own name and their performance on attempts to write other simple words (such as bear, duck, table, mom, dad).

Table 2: Percentage of children that write words in a conventional way, either completely or omitting a letter.

Variables	Intensive condition Group A N=214			Extensive condition Group B N=69			Control group Group C N=46		
	Pre.	Post.	Incre.	Pre.	Post.	Incre.	Pre.	Post.	Incre.
Own name	33.8%	91.3%	57.5%	27.5%	76.8%	49.3%	54.3%	86.3%	32%
Other words	7.7%	69.46%	61.76%	6.32%	39.78%	33.38%	1.74%	12.72%	10.98%

As seen in Table 2, a large percentage of the children in each group could write their own name at the end of the year. Nevertheless, when looking at the percentage of children who could write other words (such as bear, duck, table, mom, dad), one can see that the majority of the children in the intensive condition group (Group A) could do so, and less than the half of the children in the extensive condition group (Group B) could do so, while only a little percentage of the children in the control group (Group C) were able to write words other than their own name. The differences regarding the increase in the percentage of children that are able to write their own name are statistically significant when considering groups A-C ($z= 3,21, p < 0,05$), B-C ($z= 1.89, p < 0.05$). With respect to the writing of other words, those differences are observed between groups A-B ($z= 4.31, p < .000$), A-C ($z= 8.94, p < .000$) and B-C ($z = 3.06, p < .002$).

The impact of the mother's level of education and the child's previous preschool attendance on the child's performance

Mother's level of education. It is important to verify that the changes in the children's performance, evaluated over the course of the year, were mainly due to the effects of the linguistic and cognitive development program's implementation and that they did not reflect differences attributable to the impact of other variables such as the mother's level of education and the child's previous preschool attendance. In order to

do so, the impact that these two variables had on children's receptive vocabulary, production of conceptual categories, and writing test scores was statistically evaluated.

A variance analysis was performed, using the mother's education level and the child's scores obtained on each of the tests as variables. Statistical analysis of the results revealed significant differences between the scores at the beginning and the end of the year (Receptive Vocabulary: $F_{(1, 239)} = 390.23, p < .001$; Category Production: $F_{(1, 237)} = 247.79, p < .001$; Writing: $F_{(1, 240)} = 500.52, p < .001$). The results did not show any effects based on the mother's level of education (Receptive Vocabulary: $F_{(1, 239)} = 2.55, p = .11$; Category Production: $F_{(1, 237)} = 0.33, p = .57$; Writing: $F_{(1, 240)} = 0.49, p = .49$), or based on interaction (Receptive Vocabulary: $F_{(1, 239)} = 0.12, p = .73$; Category Production: $F_{(1, 237)} = 3.64, p = .06$; Writing: $F_{(1, 240)} = 0.00, p = .97$).

Previous preschool attendance. In order to study the effect of previous preschool attendance on the child's test scores, another variance analysis was performed, this time jointly considering preschool attendance and the child's performance at the beginning and end of the year. The results showed that there were significant differences between the scores on each of the tests at the beginning and end of the year (Receptive Vocabulary: $F_{(1, 278)} = 538.00, p < .001$; Category Production: $F_{(1, 277)} = 332.41, p < .001$; Writing: $F_{(1, 280)} = 575.43, p < .001$). Whether or not the child had previously attended preschool made no difference in their test scores (Receptive Vocabulary: $F_{(1, 239)} = 0.21, p = .65$; Category Production: $F_{(1, 277)} = 0.04, p = .83$; Writing: $F_{(1, 280)} = 0.05, p = .82$), and no interaction effects were detected (Receptive Vocabulary: $F_{(1, 239)} = 0.51, p = .48$; Category Production: $F_{(1, 277)} = 1.08, p = .30$; Writing: $F_{(1, 280)} = 0.41, p = .52$).

Considering these results it is reasonable to attribute the increase observed in the groups to their participation in the program implemented.

Relationships between vocabulary development, production of conceptual categories, and learning to write

A correlation analysis was performed in order to study the relationships between performance on the receptive vocabulary, production of conceptual categories, and writing tests at the beginning of the year. The results of this analysis are presented in Table 3.

Table 3
Correlation between the tests in the beginning of the year

	Peabody	Production of conceptual categories	Writing
Peabody	1		
P. of conceptual categories	.49***	1	
Writing	.36***	.33***	1

*** $p < .001$

<i>Differences of the increase between the three groups</i>			
Variables	Group A-B	Group A-C	Group B-C
Own name	$z = 1.19$ $p < 0.23$	$z = 3.32$ $p < 0.05$	$z = 1.89$ $p < 0.05$
Other words	$z = 4.31$ $p < 0.000$	$z = 8.94$ $p < 0.000$	$z = 3.06$ $p < 0.002$

As can be seen in Table 3, at the beginning of the year the receptive vocabulary test correlated positively and significantly (at medium intensity) with the category production test score. The receptive vocabulary test had a positive, significant, medium-low intensity correlation with writing test scores. Similarly, the production of conceptual categories test was also revealed to have a medium-low intensity, positive and significant correlation with the writing test.

As can be seen below in Table 4, the correlations between these variables are stronger at the end of the year.

Table 4

Correlation between the tests in the end of the year

	Peabody	Production of conceptual categories	Writing
Peabody	1		
P. of conceptual categories	.51***	1	
Writing	.46***	.50***	1

*** $p < .001$

The results of the correlation analysis led us to perform a multiple regression analysis to test the hypothesis predicting the children's performance on the vocabulary, production of conceptual categories, and writing tests taken at the end of the year based on the measurements of those same variables taken at the beginning of the year.

The results of the multiple regression analysis are presented below in Table 5. They show that both the children's receptive vocabulary and production of conceptual category scores at the beginning of the year predict their receptive vocabulary abilities at the end of the year.

Table 5

Standardized Betas of the regression analysis on receptive vocabulary scores obtained at the end of the year

Predictors	Peabody at the end of the year
	β
Peabody at the beginning of the year	.67***
Categories at the beginning of the year	.15***
Writing at the beginning of the year	.04

$$R^2 = .59, (p < .001)$$

$$*** p < .001$$

Moreover, the regression analysis on the production of conceptual categories test scores from the end of the year showed that the children’s production of conceptual categories abilities at the beginning of the year, and the writing test scores from the beginning of the year predicted their abilities to produce conceptual categories at the end of the year.

Table 6

Standardized Betas of the regression analysis on production of conceptual categories scores obtained at the end of the year

Predictors	Prod. of conceptual categories at the end of the year
	β
Peabody at the beginning of the year	.07
Prod. of conceptual categories at the beginning of the year	.49***
Writing at the beginning of the year	.11*

$$R^2 = .32, (p < .001)$$

$$*** p < .001, * p < .05$$

Finally, we studied the variables that predict performance on the end-of -year writing test by performing a multiple regression analysis on the end-of-year test scores. Receptive vocabulary scores, and scores on the production of conceptual categories and writing tests taken at the beginning of the year were used in the model as predicting variables. The β values for each test and the model’s R^2 can be seen below, in Table 7.

Table 7

Standardized Betas of the regression analysis on writing scores obtained at the end of the year

Predictors	Writing at the end of the year
	β
Peabody at the beginning of the year	.22***
Prod. of conceptual categories at the beginning of the year	.12*
Writing at the beginning of the year	.35***

$R^2 = .28, (p < .001)$
*** $p < .001$, * $p < .05$

As can be observed in Table 7, the regression analysis on the end-of-year writing test scores shows that the three variables evaluated in the analysis that predict performance are: receptive vocabulary scores at the beginning of the year, category production scores at the beginning of the year, and writing scores at the end of the year.

General discussion

The results of the analysis showed that the child linguistic and cognitive development program led to a greater increase in receptive vocabulary, production of conceptual categories, and writing skills for participating children than for children in the control group. This was true for both children who participated in the program's intensive condition (in preschools and at their homes), and children who participated in the extensive condition (only in their preschools). However, participation in the intensive condition did lead to a greater increase on each of the variables analyzed.

The differences in score increases between the group of children who participated in the intensive condition and the children in the control group are statistically significant for all tests evaluated (receptive vocabulary, production of conceptual categories, and writing). The differences in score increase between Group A (intensive condition) and Group B (extensive condition) are statistically significant for the production of conceptual categories test and the writing test, but not for the

receptive vocabulary test. For their part, the differences in increases between Group B (extensive condition) and Group C (control group) are only statistically significant for the production of conceptual categories variable.

With regards to the children's performance on the writing test, the analysis showed that the children who participated in the program had much greater abilities to write simple and familiar words (besides their own name) than did the children in the control group. The difference observed in the control group between the high percentage of children who could write their own name and the low percentage of children who can write other words seems to reveal an educational bias that exists at the school these children attend in Buenos Aires. Being able to write one's own name is a learning goal for the 5-year-old classroom and teachers appear to promote global learning strategies (writing the complete word from memory) in order to achieve it. This is in contrast to analytic work, or work that would allow them to develop their phonological awareness and knowledge of correspondences to be able to write other words (Borzzone & Signorini, 2002; Burgess, 2006; Snow, 2006).

Although important differences were observed between the groups, a much higher percentage of children who participated in either intervention condition (around 70% in Group A and around 40% in Group B), could use analytical strategies, showing greater mastery of the writing system than the children in the control group. Therefore, our study corroborated the results of previous quasi-experimental research that demonstrated that exercises, games designed to develop phonological awareness, and scaffolding provided by adults that led the child to pay attention to the sound structure of language in shared writing situations all promote the development of phonological awareness (Burgess, 2006; Ehri & Rosberts, 2006).

The results of this study are consistent with research performed in other languages, especially in English, in showing that there is a direct relationship between vocabulary skills, the ability to produce conceptual categories, and early writing development. In addition, they demonstrate that vocabulary skills at a specific moment in child development (at the beginning of the school year in which they turn 5), predict both the extent of their vocabulary at the end of the school year and their writing abilities (Goswami, 2003; Snow, Porche, Tabors & Harris, 2007).

The increase seen in participating children's vocabulary and ability to produce conceptual categories should be assessed considering the fact that vocabulary knowledge contributes to the increased quantity and to the stability of the relationships between orthographic, phonological, and semantic representations. These connections facilitate lexical access while processing written texts (Perfetti, 2007), contribute to the establishment of conceptual relationships between lexical items, and thus improve text comprehension (Bast & Reitsma, 1998; Sénéchal, Oulette & Rodney, 2006). The lexicon can therefore create a link between the two types of skill levels associated with reading: decoding and comprehension (Protopapas, Sideridis, Mouzaki & Simos, 2007).

The performance differences observed between children who only participated in the program in their preschool classrooms (extensive condition) and those who also participated in systematic family literacy situations as part of the intensive condition confirm Britto, Fuligni and Brooks-Gunn (2006) and Snow's (2006) claim that it is very important to collaborate with the child's family to generate story reading situations and literacy activities that promote learning. These results also provide new empirical evidence on the importance of story reading at home to develop vocabulary, expand the children's conceptual base and make it more complex, and promote their early entry

into literacy process (Borzzone, 2005; Ninio & Bruner, 1978; Whitehurst & Valdez-Menchaca, 1992).

The fact that the mother's education level was not observed to have a significant impact on the child's test scores, as had been seen in previous studies conducted in the United States (Weizman & Snow, 2001), should be interpreted taking the conformity of the groups evaluated into account. The majority of the children assessed came from families in which the adults had a low or basic level of education (less than 17% of all the children's mothers had reached or exceeded high school). On the other hand, in studies that did see a performance effect as a result of the mother's level of education, these mothers had at least 12 years of schooling (Weizman & Snow, 2001), or were mothers that had university or even post-grad educations (Hoff, 2006). On the other hand, the fact that preschool attendance at age 4 was not observed to have an impact on performance at age 5 can only be interpreted as evidence of the fact that in the period before they attended preschool the children were not involved in frequent and systematic activities designed to teach them vocabulary, increase their knowledge base, and promote early writing skills.

The absence of an impact based on these two variables, on one hand, and the comparison between the performance of the children who participated in the intervention program and those in the control group, on the other, highlight the importance of planned and systematic intervention to achieve observable gains in the children's performance. These results stress the importance of strengthening learning opportunities provided by teaching contexts in the preschools by working in coordination with the children's families.