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Original articles

Contributions of phonological awareness and rapid serial naming for initial learning of writing

Contribuições da consciência fonológica e nomeação seriada rápida para a aprendizagem inicial da escrita

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ABSTRACT

Purpose: to investigate the contribution of phonological awareness and rapid serial naming for the initial learning of writing.

Methods: the study involved 100 children of both sexe, aged from two to six years and eleven months, enrolled in early childhood education from a nursery and a school hall in the in the city of Recife. Was used as assessment tools Test of Phonological Awareness, a task of Rapid Serial Naming and script writing evaluation. Data were transcribed and analyzed according to descriptive and inferential statistic.

Results: it was observed that increasing age is directly related to the development of phonological awareness levels and reduction of errors and the time for performance of the tasks of rapid serial naming. Among the phonological awareness, syllable awareness scores obtained better rates, can be observed in great difficulty participating in the tasks of phonemic awareness. It was possible to identify significant correlations between phonological awareness, rapid serial naming and writing.

Conclusion: the rapid serial naming contribute to early learning of reading and writing, with the encouragement of these important skills before literacy cycle, favoring this process and signaling potential learning problems early. The poor performance on tasks can be suggestive of the influence of socioeducational factors, one should consider the context of the child's life and the lived educational experiences in the family and school.

Keywords: Learning; Child Rearing; Risk Factors; Reading; Learning Disorders

RESUMO

Objetivo: investigar a contribuição da consciência fonológica e nomeação seriada rápida para a aprendizagem inicial da escrita.

Métodos: participaram do estudo 100 crianças, na faixa etária de três a seis anos e onze meses, matriculadas na educação infantil de uma creche e uma escola municipal da cidade do Recife. Utilizou-se como instrumentos de avaliação o Teste de Consciência Fonológica, a tarefa de Nomeação Seriada Rápida e um roteiro de avaliação da escrita. Os dados foram transcritos e analisados conforme a estatística descritiva e inferencial.

Resultados: observou-se que o aumento da faixa etária está diretamente relacionado ao desenvolvimento dos níveis de consciência fonológica, assim como com a diminuição dos erros e do tempo para execução das tarefas de NSR. Verificou-se que as crianças com mais de quatro anos, tiveram um desempenho em consciência fonológica aquém do esperado para sua idade. Dentre as habilidades de consciência fonológica, a consciência silábica obteve melhores índices de pontuações, podendo-se observar grande dificuldade dos participantes nas tarefas de consciência fonêmica. Com relação a escrita, a maioria das crianças estavam na fase pré-silábica. Foi possível verificar correlações significantes entre as habilidades de consciência fonológica com a nomeação seriada rápida e escrita.

Conclusão: a consciência fonológica e nomeação seriada rápida contribuem para a aprendizagem inicial da escrita, sendo importante o estímulo destas habilidades antes do ciclo de alfabetização, o que pode favorecer este processo e sinalizar, precocemente, eventuais problemas de aprendizagem. O baixo desempenho nas tarefas pode ser sugestivo da influência de fatores socioeducacionais, devendo-se considerar o contexto de vida da criança e as experiências educativas vivenciadas na família e escola.

Descritores: Aprendizagem; Educação Infantil; Fatores de Risco; Leitura; Transtornos de Aprendizagem

INTRODUCTION

Phonological awareness is the meta-linguistic ability to recognize formal phonological features or those concerning the sound structure of language. It refers to the knowledge of intentionally manipulate the sound structure of words, from the replacement of a particular sound until its segmentation into smaller units[1,2]. Studies show the importance of phonological awareness to the learning of the written language, since for children to learn to read and write in the alphabetic writing system is necessary the perception of the grapheme-phoneme relationship. For this, the skills in identification, analysis, synthesis and manipulation of phonological components in syllabic and phonemic levels, which make up the phonological awareness, play a key role[2,3].

Although reading and writing are interrelated processes, other variables have been described as precursors of reading. One would be the ability of "phonological processing". In the available literature, this processing has been assessed by means of rapid serial naming activities, which is defined as an ability to recognize graphic symbols fastly and accurately (decoding). It is believed that the greater this processing capacity, the greater will be the cognitive resources available for the task of reading comprehension, although the understanding requires skills that go beyond the phonological processing, such as prior knowledge; ability to make inferences; among others[4,5].

Studies indicate that impairments in phonological awareness and rapid serial naming hamper the letter-sound conversions and represent the main risk factors for learning disorders[4]. Strategies to develop these skills, in early literacy, allow greater success in learning the written language and prevention of learning disorders.

Learning disorders can be characterized by the presence of neurological or hereditary disorder, which is responsible for changing the cognitive and language processing. It can be manifested through difficulties in the process of decodification or identification of words, such as reading, reading comprehension, mathematical reasoning, spelling activities, writing of words and texts[6,7].

It is observed that for learning disorders, in most cases, there is no prescription of medications, but rather educational adaptations coupled with specialized care[8]. Despite the recognition of the existence of this kind of problem among students and the need for the school to prepare for the proper care of them, the Ministry of Education has not yet set, formally, policies that can ensure the appropriate and necessary assistance to this population.

With the purpose of starting increasingly earlier the identification of learning disorders, national[8,9] and international[10-12] studies point to the need to carry out the identification and early intervention in students in early literacy so that the predictive factors for the good performance in reading, such as phonological awareness and rapid serial naming, can be worked in students that have poor performance in relation to their group-class.

To this end, programs have been developed for the early identification of students at risk for learning disorders, such as the Response to Intervention – RTI model. The RTI was adopted as public policy in the United States and has ensured that students at risk receive preventive interventions, organized into multiple levels, which progressively increase the instruction according to the response of the children[13,14].

In Brazil, notwithstanding, there is no policy for early identification of learning disorders, the educational resources are scarce, with a set of unfavorable factors for the implementation of these programs in schools. On the other hand, studies show the importance of the theme for the Brazilian educational reality, since the sooner it is recognized the child at risk, the smaller the teaching-learning process that both the school and the child will have to compensate. When learning disorders are identified and treated early, the child can overcome his difficulties and continue in the literacy process[15,16].

Given the above, this study aimed to investigate the contributions of phonological awareness and rapid serial naming for the initial learning of writing in children from the kindergarten and the 1st grade of elementary school I. The specific objectives were to describe the development of phonological awareness and rapid serial naming; to analyze the development stage of writing and correlate it with the skills of phonological awareness and rapid serial naming; and to analyze the influence of socio-educational factors in the process of learning to write.

METHODS

This study was approved by the Ethics Committee for Research involving Human Beings, of the Health Sciences Centre (CCS) – Federal University of Pernambuco, under the opinion 261.858/2013 CAAE No. 12927813.1.0000.5208 of the National Health Council.

The methodological path suitable for the present research prioritized a quantitative analysis, the study

being characterized as descriptive, correlational and cross-sectional.

The research was conducted in a day care center and a municipal school in the city of Recife, state of Pernambuco. The age range of children in the day care center was zero to three years, and in the school, of four to six years. The study included 80 children of both sexes, with ages ranging from three years to six years and eleven months, subdivided into four age groups: G1 (3:0-3:11); G2 (4:0-4:11); G3 (5:0-5:11); G4 (6:0-6:11).

The sample exclusion criteria were: children who, according to the analysis of the teachers, had problems in communicating, learning, or with special educational needs; children who at the time of evaluation were identified with a phonological disorder condition or other language problems; and children with a history of hearing or neurological problems or, still, other obvious aspect that might interfere with language development.

Data were collected from May to July 2013. Initially, individual data were obtained on the student identification form at school. Subsequently, socio-educational information were obtained through a questionnaire administered to parents or caregiver, whose objectives were to characterize the sample and to know the context in which the children were placed.

Parents or legal guardian have received an information letter containing the objectives of the study and ensuring confidentiality. Those who agreed to participate signed the Free and Informed Term of Consent – FITC.

Initially, it was performed an assessment of the phonological awareness, through the sequential Phonological Awareness Test (CONFIAS)[17]. This test is divided into two parts, the first corresponds to the syllabic level consisting of nine items: synthesis; segmentation; initial syllable identification; rhyme identification; word production with a given syllable; medial syllable identification; rhyme production; exclusion; and transposition. The second part involves the phonemic level, arranged in seven items: production of word that starts with the given sound; initial phoneme identification; final phoneme identification; exclusion; synthesis; segmentation; and transposition.

Each task is accompanied by an explanatory framework, in which appear the orders and examples of how to apply it. To make sure that the children understand the task, it were always proposed two initial examples and they never counted for the score. The correct answers were worth 1 point and the incorrect were worth 0. In the syllabic level the maximum score was equivalent to 40 hits, and in the phonemic level, 30 hits, totaling 70 points, which corresponds to 100%. Importantly, the test is indicated by the authors to be used with children from four years old, but in this study, with the intention to check a greater or lesser phonological "sensitivity" in younger children, it was applied with children from three years of age and, in this case, when the child missed all sub-items of a level, the test was stopped.

Subsequently, it was performed an assessment of the Rapid Serial Naming[18] skill, being divided into four stages: letters; numbers; objects; and colors. The steps were presented in two boards, composed of five different stimuli, which are repeated randomly, distributed in 5 rows and 10 columns, in board A and B, being necessarily applied in sequence, without interruption. The letters task consisted in presenting the letters "a", "m", "o", "r" and "s". The numbers task comprised five numbers, of a single digit, all disyllables, "4" ("quatro"), "5" ("cinco"), "7" ("sete"), "8" ("oito") and "9" ("nove"). The objects step used figures that were among the five most typical items in their respective categories, among them, ball, car, moon, door, and cat. Finally, the colors stage was composed of the colors: blue; yellow; green; red; and black.

Participants were instructed to appoint as soon as possible the visual stimuli, following the path from top to bottom and from left to right. Each task had a training sheet, containing five different stimuli present in the experimental boards, being certified that the children know the colors, objects, numbers and letters. Errors were considered when the child made omissions and incorrect appointments. Nonetheless, the wrong answers spontaneously corrected were not considered errors. For each task two scores were computed: the average time and the average number of errors, being registered in the protocol of application and analysis of rapid serial naming tasks.

In the writing assessment, each task has been applied following the order of the script. The tasks feature sequential character where, initially, it was asked each participant to write his age and his own name. It was conducted orally the evaluation of the nominal realism, through two questions: "Tell me two big words and two little words", "What's the biggest word: ox or ant?" ("boi" or "formiga"), in order to verify if the child adopts quantifiable properties of the referents as a criterion for deciding on spelling differences between words.

Then, it was applied the word dictation, using monosyllabic words and words with two syllables, three syllables or polysyllabic ones, equally distributed, being two of each. At this stage, two words were left open, presenting as main characteristics the regularity and the same initial syllable of the name of the surveyed child. Participants who were able to write all the words made the dictation of two sentences, eg "The cat drank milk" ("O gato bebeu leite") and "I like to play" ("Eu gosto de brincar"). All steps were filmed and the results were analyzed according to the developmental stages of the child's writing, described in four levels proposed by authors[19].

Upon completion of data collection, the results were coded in numeric variables to enable the construction of a database, using SPSS 13.0 software, which carried out the descriptive and analytical statistical analysis. To compare means between groups, it was held the analytical statistics using the Spearman correlation test to analyze the relationship between phonological awareness, rapid serial naming and writing.

RESULTS

In order to characterize the study population will be presented, initially, the socio-educational results for the questionnaire. When analyzing the responses of parents/carers, it was observed that 55% had income of up to 1 minimum wage, 40% of fathers had high school as the level of education and 42% of mothers had elementary school II. With regard to nationality, 75% of fathers and 73% of mothers were from the Metropolitan Region of Recife (MRR). Of the children surveyed, 53% watched television until three hours a day, 29% had no children's story books and 22% had up to three books. Regarding the frequency of reading, 37% of the parents never read to children, 43% rarely read, and 18.75% often read.

In Table 1, the data are distributed according to the mean and standard deviation for the performance in phonological awareness skills (CONFIAS test) and its relationship to age group (cluster). It is observed that increasing age is directly related to the development of phonological awareness levels, especially at the syllabic awareness, as it was found great difficulty of participants in the phonemic awareness tasks.

It is observed in Table 2 the mean and standard deviation for rapid serial naming tasks and its relation for each age group (cluster). It is noted better performance for the tasks of objects, followed by colors. It can be seen that with increasing age there was a decrease of errors and of the time to perform the RSN tasks.

Table 3 shows the distribution of the stages of writing and nominal realism and its relation to age group (cluster). It appears that from the 80 children surveyed, 93.75% are in the pre-syllabic writing phase, 3.75% are in the syllabic and 2.5% in the syllabic-alphabetical, no child presented alphabetic writing. With regard to the overcoming of the nominal realism, it was found that 77.5% of participants demonstrated not to have risen above it, 21.25% showed overcoming and only one individual had inconsistent response, because he properly responded to the oral questions of the task, but in the writing part, he proved not to think of the graphophonic match of the word, but rather in its meaning.

Table 4 shows the Spearman correlation analysis between phonological awareness, rapid serial naming and writing. Significant correlations were found between the skills of phonological awareness and rapid serial naming, both in the number of errors, in the exercise time, and between the phonological awareness and the writing level of the children.

	GROUPS				
	1	2	3	4	Total
Income					
Up to 1 minimum wage	9	12	12	13	46
1-2 minimum wages	6	8	8	6	28
2-4 minimum wages	4	0	0	0	4
More than 6 minimum wages	0	0	0	0	0
Does not know	1	0	0	1	2
Caregiver					
Mother	13	11	15	14	53
Father	2	3	0	2	7
Relative	5	5	4	4	18
Other	0	1	1	0	2
Father's schooling					
Did not attend school	1	1	0	0	2
Elementary school I	3	2	1	4	10
Elementary school II	2	6	6	5	19
High school	11	6	7	7	31
Higher education	0	1	0	0	1
Does not know	3	4	6	4	17
Mother's schooling					
Did not attend school	0	0	0	0	0
Elementary school I	3	4	2	1	10
Elementary school II	6	7	10	9	32
High school	8	8	7	9	32
Higher education	2	0	0	0	2
Does not know	1	1	1	1	4
Father's place of birth					
MRR	16	16	13	15	60
Interior of Pernambuco	4	1	1	1	7
Another city	0	1	2	2	5
Does not know	0	2	4	2	8
Mother's place of birth					
MRR	15	16	13	16	60
Interior of Pernambuco	3	3	4	2	12
Another city	2	1	3	1	7
Does not know	0	0	0	1	1
Hours in which the child watches TV					
Does not watch TV	6	10	1	1	18
Up to 3 hours	10	9	12	11	42
3-6 hours	3	1	6	7	17
More than 6 hours	1	0	1	1	3
Amount of storybooks					
Does not have	3	6	9	4	22
Has up to 3 books	5	7	3	1	16
Has 3 to 6 books	7	3	3	8	21
Has more than 6 books	5	4	5	7	21
Parents reading habit					
Never	9	8	5	7	29
Rarely	4	10	12	8	34
Offen	4	2	1	4	11
Daily	3	0	2	1	6
Child asks to read					
Never	5	9	8	3	25
Rarely	5	4	6	7	22
Often	6	2	3	4	15
Daily	4	5	3	6	18

Figure 1. Characterization of the results for the percentage of the socio-educational questionnaire on children from kindergarten and 1st grade of elementary school I (n=80).

Table 1. Distribution of the results for the phonological awareness test (mean and standard deviation) by age group, on children from kindergarten and 1st grade of elementary school I, Recife, 2015. (N=80)

GROUP	Syllabic Awareness	Phonemic Awareness	Total Phonological Awareness
1	1.75 (1.74)	.15 (.49)	1.90 (1.97)
2	2.70 (2.25)	.00 (.00)	2.70 (2.25)
3	7.10 (5.88)	.10 (.45)	7.20 (5.89)
4	9.55 (6.72)	1.15 (1.35)	10.70 (6.91)

Note: Standard deviation in parentheses

Table 2. Distribution of the results for the rapid serial naming tasks (mean and standard deviation) by age group, on children from kindergarten and 1st grade of elementary school I, Recife, 2015. (N=80)

GROUP	Object		Color		Letters		Numbers	
	Errors	Time	Errors	Time	Errors	Time	Errors	Time
1	75.33 (23.24)	74.67 (24.11)	72.75 (28.60)	147.50 (28.60)	81.00 (26.85)	167.67 (11.68)	50.00 (.00)	60.00 (.00)
2	31.67 (25.70)	177.08 (71.16)	44.25 (31.72)	184.13 (75.87)	88.25 (14.89)	92.25 (29.28)	93.67 (7.09)	66.00 (32.19)
3	12.89 (13.67)	198.06 (58.92)	20.00 (24.30)	182.71 (57.83)	68.38 (16.78)	130.50 (43.42)	28.56 (21.89)	190.00 (69.10)
4	4.12 (5.11)	173.35 (49.12)	8.06 (18.70)	173.18 (40.99)	27.56 (32.31)	155.94 (68.11)	13.53 (21.65)	151.60 (45.62)

Note: Standard deviation in parentheses

Table 3. Distribution of results concerning the absolute frequency of the writing and nominal realism stages by age group, on children from kindergarten and 1st grade of elementary school I, Recife, 2015. (N=80)

GROUP	Pre-syllabic	Syllabic	Syllabic-alphabetical	Overcame nominal realism	Did not overcome realism	Dubious response to realism
1	20	0	0	4	16	0
2	19	1	0	5	15	0
3	19	1	0	5	14	1
4	17	1	2	3	17	0

Table 4. Spearman correlation between phonological awareness, rapid serial naming and writing, on children from kindergarten and 1st grade of elementary school I, Recife, 2015. (N = 80)

	1	2	3	4	5	6	7	8	9	10	11	12
1-SA	–											
2-PA	**.409**** **(.000)**	–										
3-TPA	**.979*** **(.000)**	.511** (.000)	–									
4-RSNOE	**-.471**** **(.000)**	**-.321*** **(.011)**	**-469**** **(.000)**	–								
5-RSNOT	**.277*** **(.039)**	-.058 (.657)	**.267*** **(.036)**	**-.456**** **(.000)**	–							
6-RSNCE	-.429** (.003)	-183 (.223)	**.422*** **(.003)**	**.536**** **(.000)**	-.139 (.387)	–						
7-RSNCT	.048 (.746)	.091 (.542)	-.091 (.545)	-.100 (.529)	**.599**** **(.000)**	.029 (.847)	–					
8-RSNLE	-.342 (.60)	-.251 (.174)	-.374* **(.038)**	.253 (.202)	-.0,27 (.893)	**.678**** **(.000)**	.100 (.598)	–				
9-RSNLT	.255 (.167)	.163 (.381)	.325 (.075)	.286 (.148)	.087 (.665)	.026 (.892)	**.377*** **(.040)**	**.417*** **(.020)**	–			
10-RSNNE	-.214 (.275)	-.314 (.104)	-.261 (.180)	.092 (.668)	**-.532**** **(.008)**	**.543**** **(.004)**	-.017 (.932)	**.747**** **(.000)**	-.212 (.242)	–		
11-RSNNT	184 (348)	-.015 (.941)	.188 (.339)	-.250 (.050)	**.775**** **(.000)**	-.308 (.126)	**.311*** **(.114)**	.231 (.257)	**.495*** **(.010)**	-.340 (.076)	–	
12-Wri	.159 (.113)	.333** (.001)	.240* **(.016)**	-.090 (.486)	.119 (.359)	.001 (.993)	.154 (.300)	-.095 (.611)	.111 (.552)	-.101 (.609)	-.014 (.945)	–

** Significant correlation with p > 0.01
* Significant correlation with p > 0.05
Legend: SA- Syllabic awareness; **PA-** Phonemic awareness; **TPA**- Total phonological awareness; **RSNOE**- Rapid serial naming of objects error; **RSNOT**- Rapid serial naming of objects time; **RSNCE**- Rapid serial naming of colors error; **RSNCT**- Rapid serial naming of colors time; **RSNLE**- Rapid serial naming of letters error; **RSNLT**- Rapid serial naming of letters time; **RSNNE**- Rapid serial naming of numbers error; **RSNNT**- Rapid serial naming of numbers time; **Wri**- Writing.

DISCUSSION

According to Table 1, with increasing age of the child, there is improvement in phonological awareness skills. These results show, as expected, that the progression of age, and especially of the school years, influences the development and improvement of phonological awareness skills that depend, in part, on the contact with written and formal learning. These data corroborate the findings of a study conducted in the metropolitan area of Recife[2]. One can also observe this comparison in other regions of the country in various sociolinguistic contexts[1].

Similarly, research conducted in the south[1] region aimed to compare the performance in expressive vocabulary and phonological awareness among children with speech disorders and typical language acquisition and to analyze the influence of age in this performance. The data show that children of a younger age obtained less hits in phonological awareness tasks. This result can be explained by the prior knowledge acquired by the child at a later age and the influence of the written language. Since the older children started to have more contact with the concepts of grapheme and phoneme, they have consequently gained a higher level of phonological awareness.

In the present study, it was observed that the participants had a lot of difficulty in performing the tasks of phonological awareness. In a way, this difficulty was expected to children under four years, as the test employed (CONFIAS) is recommended for children from this age group due to the difficulty in assessing phonological awareness in children of three years. Still, the test has been selected and applied in order to verify if it could indicate some phonological "sensitivity" by

the younger children, being possible to verify some level of sensitivity for the syllabic awareness skill.

Even if there is sensitivity to the syllabic awareness skill, the average of the results found in all age groups is far below from what the author of the test[17] advocates.

According to the test, the minimum of hits in syllabic awareness, in children of four years who are in the development phase of the pre-syllabic writing should be 18 points and the maximum should be 29 points. In this study, children aged 4 averaged 2.70 (two point seven) points and children with 6:11 years achieved an average of 9.55 (nine point fifty-five) points, which can be considered very low according with the test parameters. The performance below the recommended in the test parameters was also observed in children between 5 and 6 years, which points to the possibility of the influence of socio-educational factors for developing this skill.

The result of the socio-educational questionnaire can justify such a performance, as seen in Figure 1, which shows that from the 80 children studied, 42 watch television up to three hours per day. These results draw attention considering that 10 were aged three years and attending day care at full time, and in the time they spend at home, they apparently receive little encouragement to reading and writing activities. Another noteworthy datum is the low investment in reading, it is observed that 36.25% of parents never read to children and 42.5% rarely read, ie 78.75% of the parents (two-thirds) do not have the reading habit.

It is also noted too little investment by households in the acquisition of children's books, whereas 27.5% do not have books and 20% have up to three books. That is, it is observed that 47.5% of children have little or no access to books at home. As parents attended school, there should be more contact of children with the written material in order to enhance literacy activities. Among other words, it is necessary to make use of reading and writing in everyday life, appropriating its social role[20]. With these practices, consequently, the child will perform better on skills related to reading and writing, such as phonological awareness.

The poor performance in phonological awareness could also be observed in another study conducted in the metropolitan region of Recife[2], which aimed to investigate the relationship between phonological awareness and the development of the phonological system in children from public and private schools. The authors also found increased sensitivity to the syllabic awareness skill, and the surveyed children aged four years achieved an average of 2.54 (two point fifty-four) points, while those aged six years and eleven months obtained an average of 21 points. These scores were also lower than what the test proposes.

Differently, another study conducted in the south region with children from private schools[21], in order to verify the relationship between early literacy, phonological awareness and working memory, observed that the children from kindergarten, aged five and six years, had higher scores in the CONFIAS test, compared with the children in this study. In syllabic awareness, they achieved scores that ranged between 32-39 points and phonemic awareness of 15-22 points. It is noteworthy that the children surveyed were at the stages of syllabic-alphabetic and alphabetic writing, unlike this study, in which 95% of the children met the pre-syllabic stage. These data are indicative that there is a relationship between phonological awareness and writing, indicating that children in later writing phases have greater ease in phonological awareness skills.

With regard to the phonemic awareness skills, in this study, the children had difficulties in performing the test. These data indicate that difficulties in these skills could be due to educational issues, namely the way in which the appropriation of the alphabetic writing system is approached in the school and the relativization of the use of the test in populations with different socio-educational backgrounds.

Similarly to what was seen in the phonological awareness test, the participants had difficulties in performing the tasks of rapid serial naming, as shown in Table 2. It can be seen that they performed better for naming objects, followed by the designation of colors. These findings contrast to what was observed in another study[22], in which the tasks of naming letters and numbers were made by participants with less time and number of errors. Furthermore, it was expected that the subjects had greater time in the tasks of naming colors and objects, in virtue of the extension of the words, in the stimuli of each task. However, the results found in this study can be justified due to the still limited knowledge regarding letters and digits that children from kindergarten have, being easier to carry out the tasks of colors and objects, in which it is possible to resort to the meaning of the figures.

It is observed that the research investigate this ability in children from the literacy period, notwithstanding the findings of this study demonstrate that children as young as three years already have sensitivity to rapid serial naming, accomplishing all stages of the task

(colors, objects, letters and numbers), being possible to evaluate early this skill in kindergarten children. These data demonstrate the importance of monitoring the development of this skill during the school years, since the literature indicates that children at risk for learning disabilities, such as dyslexia, have difficulties in carrying out the activity[23].

Research show the importance of investigating skills that make up the phonological processing, among them the rapid serial naming, for early identification of learning disabilities. Authors[16] conducted a longitudinal study in the southeast region, which aimed to evaluate the accuracy of two instruments of collective screening – Alternative Tool for Educators and Cognitive-Linguistic Protocol, in identifying children at risk for learning disorders, especially dyslexia. The latter instrument involves the rapid serial naming subtest. 45 children from private schools attended, aged 6-8 years. The study took place in separate time intervals, at the beginning of the academic calendar of the second and third grade, and at the end of the fifth grade. It were also carried out assessments of the academic performance based on the school curriculum. The results revealed that the phonological abilities of the Alternative Tool for Educators correlated with the abilities of the Cognitive-Linguistic Protocol. Moreover, it was possible to identify 13 participants with poor school performance, 11 being classified as at risk for learning disorders. For the authors, the findings provide empirical support for carrying out further research on the early identification of children at risk for learning disabilities.

The rapid serial naming is also used to compare children with and without learning disorders complaints, as in a survey conducted in the southeast[22] region, which sought to investigate the rapid serial naming in children from a public and a private school, with and without complaints of school problems. The study enrolled children aged between seven and eleven years, from the 2nd and the 5th grade of elementary school. The results showed that the performance of private school students, compared to public school students, is superior, and that there is a statistically significant difference between subjects with and without learning disorder complaints.

Another study conducted in the southeast[15] region investigated private school children, in the 2nd grade of elementary school I, with an average age of seven years and four months. It was aimed to develop and implement collective educational activities, which could assess the phonological awareness in pre-readers and beginning readers and serve as potential screening tools to help identify students at risk for developing difficulties in reading and writing. The protocol has proven its effectiveness, confirming that the phonological awareness, the verbal working memory and the rapid serial naming relate to the main risk factors for dyslexia, regardless of sociocultural factors, and whose losses consist the main feature or symptomatology of students at risk for dyslexia.

In general, studies show poor performance in rapid serial naming skills as characteristic of groups of individuals who have difficulty in reading. Nonetheless, it is important to draw attention to other aspects that can justify the difficulties in these skills, such as demographic factors; socio-educational opportunities; family background; and other variables of socioeconomic and cultural level.

The importance of considering these variables is portrayed in other studies[24,25] with low-socioeconomic-status children. The findings refer to the underperforming reflection on reading and writing skills, caused by factors which directly and indirectly exert influence, such as the above. Therefore, it is important to awaken in researchers, teachers and parents the understanding of the complexity of issues involved in the reading and writing learning and, with this, watch for possible obstacles in child development.

Nonetheless there is a great shortage of research related to the rapid serial naming that bring demographic data, socioeconomic and cultural variables, which offer the possibility to compare socio-educational data in the other regions. Overall, the studies only characterize individuals as of public and/or private schools, without portraying the context in which they live.

Table 3 shows that 93.75% of the participants are in the pre-syllabic writing phase. Thus, with no claim to establish a causal connection, it is not surprising that as most of the subjects are in the first phase of writing, pre-syllabic, they presented difficulties in the tasks of rapid serial naming and phonological awareness.

It is expected that children in the older age group are also in the subsequent writing phase and exhibit overcoming of the nominal realism, for example. Children of five and six years of age should submit written productions featured, respectively, in the syllabic-alphabetical and alphabetical stage. However, these data were not observed in this study, and they were also not evidenced in other research[26] that sought to assess the writing phase of children aged five-six

years, which found that most of the participants were at the pre-syllabic writing phase.

Another significant datum of the study was the relationship found between the writing and the nominal realism. This relationship is evidenced when comparing the number of subjects who did not overcome the nominal realism with the writing stage they were in. The results show that those children who relied heavily on the meaning of words were found, mostly, in the pre-syllabic stage. And from the age of 3 they have begun to overcome the nominal realism, corroborating authors, who claim that the nominal realism emerges in the early grades[27].

Table 4 shows the correlation matrix, indicating that the phonological awareness, at the level of syllable – syllabic awareness, negatively correlated with the designation of objects and colors. This negative correlation shows that the better the performance at syllabic level, the lower is the number of error occurrences in rapid serial naming tasks. In addition, the syllabic awareness was not correlated with the designation of letters and numbers, finding that may be justified depending on the age group of the children surveyed.

The correlation between phonemic awareness and total phonological awareness proved to be significant ($p<0.01$), showing that subjects who had low performance in phonemic tasks activities also showed poor performance in the total phonological awareness test. The phonemic awareness also correlated with rapid serial naming of objects and writing, showing that the children who were able to perform the phonemic awareness tasks obtained fewer errors in identifying objects. This result indicates the relationship of this skill early in the learning of writing, in which the child can actually accomplish grapheme-phoneme conversion, realizing the elements of writing.

In this study, the correlation of phonological awareness with writing evidences the presence of these skills before the literacy period. The relationship between these variables is well documented in the literature in children with older age, at literacy phase or after this period[28,29]. Therefore, the results point to the importance of the development of phonological awareness skills in young children so they can develop reading and writing, prompting greater sensitivity to these skills, which arise in early childhood education still in a less refined form.

Phonological awareness was also significantly correlated to rapid serial naming. This finding corroborates a study[30] that sought to investigate the contribution of phonological awareness and rapid serial naming for the reading and writing ability in adult subjects enrolled in a literacy program. It was observed that the phonological awareness skills correlate with the speed of lexical access and the reading and writing, suggesting that phonological awareness is a correlate of the reading and writing ability as or more important than the rapid serial naming.

The existence of significant correlations between the skills assessed at this early stage of learning of reading and writing reveals the importance of stimulating the development of the same before the actual literacy cycle, favoring the process of literacy and signaling, early, any learning problems, always considering the contexts and socio-educational opportunities, as mentioned earlier.

CONCLUSION

The results of this study show that although it is difficult to assess the phonological awareness and the rapid serial naming in children of early childhood education, one can see an evolution in these skills due to advancing age, which indicates that they are developing in the early grades.

The syllabic awareness achieved better rates, being possible to verify great difficulty of participants in phonemic awareness tasks. It is possible that the syllabic awareness is a valuable tool for promoting the development of writing in the early grades, as well as for early identification of learning problems.

On the other hand, when comparing the performance of children of this study in the skills of phonological awareness, rapid serial naming and writing with the results of other investigations, it appears that, in general, they obtained a performance below expectations for their age and education level. This fact may suggest the influence of environmental factors such as, for example, the socio-educational opportunities for the development of such skills. Hence, one must consider the child's life context and the educational experiences in the family and at school to understand the results.

Notwithstanding, the results revealed significant correlations of the phonological awareness skills with rapid serial naming and writing. Thus, these skills should be part of the set of aspects to be observed for purposes of monitoring the early learning of writing in early childhood education, including for possible problems to be identified early.

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