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Phonemic awareness in students before and after language workshops

Consciência fonêmica em escolares antes e após oficinas de linguagem

ABSTRACT

Purpose: To verify the phonemic awareness performance of students before and after language workshops. **Methods:** Phonemic awareness abilities of 49 students in the fourth year of Elementary School were assessed using the second part of the test “Phonological Awareness – Sequential Assessment Instrument” (CONFIAS). The exclusion criteria in the study were: presence of complaints or indicators of hearing and/or vision deficits; presence of neurological, behavioral and/or cognitive impairments. Subjects included in the study participated in both initial and final assessments and in at least 75% of the workshop meetings. According to their performance on the test, children were divided into three groups: initial, intermediate and advanced. Each group attended separate weekly workshops for stimulation of phonological and phonemic abilities. After five language workshops the students were reassessed. **Results:** The phonemic awareness performance of students in all groups significantly improved after the workshops. The intermediate group presented the greater improvement in the mean number of correct answers. **Conclusion:** The phonemic awareness performance of students improves after language workshops.

RESUMO

Objetivo: Verificar o desempenho de escolares em consciência fonêmica antes e após a realização de oficinas de linguagem. **Métodos:** Foi realizada a avaliação da consciência fonêmica em 49 escolares do quarto ano do Ensino Fundamental, utilizando a parte dois do teste “Consciência Fonológica – Instrumento de Avaliação Sequencial” (CONFIAS). Os critérios de exclusão no estudo foram: presença de queixas relacionadas ou de indicadores de alterações da audição e/ou visão; presença de distúrbios neurológicos, comportamentais e/ou cognitivos. Foram incluídas no estudo as crianças que participaram das avaliações inicial e final e de, no mínimo 75% dos encontros das oficinas. Conforme desempenho no teste, os escolares foram divididos em três grupos: inicial, intermediário e avançado. Foram realizadas oficinas semanais para estimulação das habilidades fonológicas e fonêmicas, de acordo com o grupo a que pertenciam. Após as cinco oficinas, os escolares passaram por avaliação final idêntica à inicial. **Resultados:** O desempenho em consciência fonêmica dos escolares de todos os grupos evoluiu de forma significativa após a realização das oficinas. O grupo intermediário foi o que apresentou maior evolução na média de acertos. **Conclusão:** O desempenho de escolares em consciência fonêmica evoluiu consideravelmente após a realização de oficinas de linguagem.

Study conducted at the Investigation Laboratory in Reading and Writing, Department of Physical Therapy, Speech-Language Pathology and Audiology, and Occupational Therapy, School of Medicine, Universidade de São Paulo – USP – São Paulo (SP), Brazil.

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INTRODUCTION

Phonological awareness (PA) is the ability to reflect about the sound structure of speech and manipulate it, that is, to think and operate over language as an object⁽¹⁾. This ability improves with age and it is fully developed with formal education, in a mutual causality relationship between reading and spelling acquisition and the development of PA^(1,2).

Syllabic awareness and phonemic awareness are sub-abilities of PA, and the latest regards the manipulation of phonemes^(3,4). Some studies^(5,6) have reported that syllabic abilities are more easily developed than phonemic abilities.

Phonemic awareness involves synthesis, segmentation, manipulation, and transposition tasks, and results from the contact with the writing code^(6,7). Hence, this ability develops along with the learning of reading and writing, and is also helpful in literacy, forming a reciprocity bond. Studies have shown that phonemic awareness tasks are more related to the literacy process than syllabic and intra-syllabic awareness tasks^(6,7).

For the development of phonemic awareness, initially children develop the syllabic awareness, which is an early stage of recognition and manipulation of the sound structure of the language^(8,9). Different authors have pointed out that phonemic awareness allows the child to improve more easily and productively in reading and writing^(10,11). Therefore, children without this ability can present difficulties to learn how to read and write^(3,5,11).

However, the relationship between written language acquisition and the development of linguistic-cognitive abilities does not seem unidirectional, but mutual, especially regarding the development of phonemic awareness. Thus, a certain level of phonological analysis would be expected before literacy, influencing the learning of written language⁽¹²⁾.

Alphabetical knowledge requires a series of specialized phonological abilities. Initially, PA allows children to represent sound segments in written language. Learning how to read, however, requires more advanced types of PA. As children become aware of different types of phonemic units, reading improves concomitantly^(11,12).

A few studies^(13,14) have proposed intervention procedures using direct training of phonological awareness abilities and the explicit teaching of grapheme-phoneme correspondence rules to students from different grade levels of Elementary School. Their results have shown great improvements in writing and reading abilities.

Considering the reciprocity between the development of phonemic awareness and reading and writing proficiency, it is necessary to develop and apply different means and strategies that may improve and/or perfect the knowledge and the manipulation of phonemes. The learning of the mechanism of grapho-phonemic conversion, which is one of the most important aspects of the alphabetical principle in Portuguese, must also be considered.

Hence, this study had the aim to verify the performance of students regarding phonemic awareness, before and after language workshops.

METHODS

This research was developed at the Department of Physical Therapy, Speech-Language Pathology and Audiology, and Occupational Therapy of the School of Medicine of the Universidade de São Paulo (USP). It was approved by the Ethics Committee for the Analysis of Research Projects (CAPPesq) of the institution, under protocol number 154/10. Data were collected at a public school in the West zone of the city of São Paulo (SP), Brazil.

Participants

Two fourth grade Elementary School classes (A and B) were selected for participation in the program. Participants were 49 students, 27 male and 22 female, with ages between 9 and 11 years (mean age 9.8 years). Speech-language pathologists' intervention within the classrooms occurred accordingly to the previous selection conducted by the direction of the school, which indicated the classes with worse overall performances in reading and writing activities.

For the students to take part in the research, their parents/legal guardians previously signed the free and informed consent term. The following exclusion criteria were considered: presence of related complaints or indicators of hearing and/or vision deficits; presence of neurological, behavioral and/or cognitive impairments. The study included children that participated in both initial and final assessments and who participated in at least 75% of the workshop meetings.

Procedures

Initially, it was conducted a phonemic awareness assessment using the second part of the test "Phonological Awareness – Sequential Assessment Instrument" (CONFIAS)⁽¹⁵⁾. The CONFIAS test is an instrument designed to assess phonological awareness in a broad and sequential manner. The use of this instrument allows the investigation of phonological abilities. The test assesses the syllabic and phonemic levels, but only the tasks at the phoneme level were carried out, since formal literacy is taught syllabically.

The items assessed were: Production of words initiated by a given sound; Identification of initial phoneme; Exclusion; Phonemic synthesis; Phonemic segmentation; Phonemic transposition. The score in this section of the CONFIAS test varies from zero to 30; the correct execution of each task is worth one point, and the incorrect response is not scored.

Initial assessment was carried out individually by the researchers in the first meeting, respecting each child's rhythm, and lasted, in total, approximately four hours.

After initial assessment, students were divided into groups, according to the performance obtained on the CONFIAS test, that is, the higher the child's score, the better his/her performance. Students who scored from 0 to 10 points were placed in the initial group; those who scored between 11 and 20 points were in the intermediate group; and those with a score between 21 and 30 were in the advanced group. Hence,

the final composition of the groups was as it follows: 12 students in the initial group, 21 in the intermediate group, and 16 in the advanced group, regardless of the classroom they were in (A or B).

Language workshops were conducted weekly, totalizing five 50-minute meetings for each group.

Initial group

Workshop I – Identification of letters and alliteration

Material: Cards with the vowels written in big colorful block letters (to facilitate identification).

Procedure: First, the cards were presented for the children to identify the vowels. After that, they seated together in a circle, and it was proposed that each child raffled a letter and gave it to the researcher, who would name it aloud. Then children (one at a time) should say words initiated by the sound raffled. When a child had difficulties in the task, the researchers provided contextual and/or semantic hints.

Workshop II – Trail

Material: Board with the image of a trail, a common dice, a dice with faces in different colors, six pawns in different colors, envelopes in the same colors of the dice's faces containing cards with different types of activities (which involved alliteration with vowels and fricative consonants, recognition of alliteration among different words, syllable segmentation of words with CV syllable structure, separation of the child's own name into syllables and letters, counting and identifying the letters in the child's name).

Procedure: Each child should choose a pawn and advance in the trail according to the numbers obtained in the common dice. Then, the color dice was rolled, and the activity selected would correspond to that contained in the envelope of the same color. In this activity, the main objective focused the sounds. Hence, the written correspondent of the sound (written in the cards) was not presented by the researchers, who were responsible for manipulating the envelopes.

Workshop III – Playing with the sounds

Material: Board with spaces in three different colors, a dice, six pawns in different colors, cards with vowels and the consonants S, V and F, a sheet of paper with figures that contained the same initial sound of the children's names, and an envelope containing cards with simple words (frequent in the language and without consonant clusters) that rhymed.

Procedure: Each child should choose a pawn, and advanced in the trail according to the number obtained by rolling the dice. Each color in the spaces of the trail represented an activity: in the green space, the child should raffle a letter card and say a word initiated by that sound; in the yellow space, the child should select among the figures in the sheet of paper one that initiated with the same sound as her name; in the red space, the child should raffle a card from the envelope and say a word that rhymed with the one represented in the card. In this activity, depending on the task, the letters were used or not for support.

Workshop IV – Discovering rhymes

Material: Individual sheets containing several figures, an envelope with written words that rhymed with the figures in the paper sheets, and colored EVA pieces.

Procedure: An "alphabet bingo" was carried out. The researchers raffled a word from the envelope and read it aloud. Whoever had in his/her paper sheet a figure that rhymed with the word raffled should place a colored piece over it, until all figures were marked. The student that did that first would be the winner.

Workshop V – Game of semantic fields

Material: Board, pawns, and five envelopes with figures from different semantic fields.

Procedure: Inside each envelope there were several figures within the same semantic field, such as bathroom and kitchen, room, school, and body parts. The child should raffle a figure and say a word that corresponded to an alliteration, rhyme or syllabic segmentation. If the child could complete the task, he/she advanced a space in the trail. The child that reached the final space in the trail board first would be the winner.

Intermediate group

Workshop I – Memory with rhymes game

Material: Sheets of paper with daily images, displaying the name of the figure under it (example: *galinha* – chicken and *farinha* – flour/*caminhão* – truck and *avião* – plane).

Procedure: First, the sounds of the phonemes were presented, and the concept of rhyme was explained. The researchers also provided examples of rhymes between words. The memory game was conducted so that the students should find the pairs of figures that rhymed between them. Students should read aloud the pair obtained and verbalize why the words rhymed.

Workshop II – Panel of phonemic manipulation

Material: Sheets of paper with the letters of the alphabet, colored cards containing some letters, a panel of card paper to assemble and disassemble words.

Procedure: Each child raffled a colored card. Each color corresponded to a group of random letters (Example: Blue = A, D, J, L, B, M). After that, the child should choose a letter from the group and suggested words initiated by this letter. One of the researchers selected a word to be phonemically manipulated through addition, subtraction or exchange of phonemes. One at a time, the children raffled a colored card, and all the manipulation possibilities were discussed in the group.

Workshop III – Odd or even game

Material: Board numbered in ascending order, a common dice, paper flags, an envelope representing odd numbers and another one representing even numbers, both containing two-syllable words without consonant clusters.

Procedure: Children were divided into two groups. Each round, a group rolled the dice and, depending on the number (odd or even), researchers raffled a word from the corresponding envelope and segmented it into phonemes, so the group

could synthesize it. The winner was the student who reached the number 10 in the board first.

Workshop IV – Animals game

Material: Board, pawns of different colors, numbered cards with figures representing animals from different classes (domestic, farm, or extinct). According to the class of animals, different difficulty levels were established for the words: domestic animals (one- and two-syllable words); farm animals (two- and three-syllable words without consonant clusters); and extinct animals (three-syllable and polysyllabic words with consonant clusters).

Procedure: Children were divided into two groups. Each group should choose a card numbered between 1 and 30, which had in its back figures corresponding to animals from distinct classes. For each class, researchers segmented the word and the child should synthesize it. If he/she completed the task successfully, another card was selected and so on, until the child missed the answer, passing the turn to the other group. For each correct answer, the group advanced a space in the board trail. The winner was the group with higher number of correct answers that first got to the end of the trail.

Workshop V – Year game

Material: Board containing the main holidays on the year (beginning with “New Years” and ending with “Christmas”), pawns, common dice, list of words corresponding to each holiday in the board, and cards marked with each ability (rhyme, alliteration, manipulation, synthesis, and segmentation).

Procedure: The pawns started in the “New Years” space after the dice was rolled, and children raffled one of the cards offered by the researchers. The child should carry out the task raffled, because the words were distributed according to the semantic field corresponding to each holiday (Example: New Years – *brinde/toast*, *branco/white*, *paz/peace*). For each correct answer, the group advance towards another holiday, until the end of the year. The group that first got to the “Christmas” holiday won the game.

Advanced group

Workshop I – Presentation of sounds

Material: A4 bond paper, number 2 pencil, cards with the alphabet letters.

Procedure: Initially, children were oriented about the sound of each letter represented in the cards. They were asked to reproduce the sound presented. After that, researchers segmented several words so that the students wrote them down.

Workshop II – Sounds game

Material: Board, cards containing words, dice, and plastic pawns.

Procedure: Children were divided into two groups. Each group threw the dice and advanced the pawns in the trail board. Each space in the board represented a phonemic awareness activity (segmentation, synthesis, or transposition). Then children raffled a word and handed it to the researchers to receive the

instructions for the task to be fulfilled, according to the item represented in the board.

Workshop III – Sounds line

Material: Cardboard, letter cards, board, and pawns.

Procedure: Children were divided into two groups and oriented to form words in a small clothesline. This task was completed as a game, and students should carry out phonemic manipulations (addition, subtraction, transposition) in the words represented, in order to obtain new words. If they succeeded, the group advanced a space in the board. Children carried out the phonemic manipulations solicited. Researchers manipulated the respective graphic correspondents in the letters line, and only at the end of the task showed the result to the children.

Workshop IV – Pass or re-pass

Material: Hourglass, question cards, letter cards.

Procedure: Children were divided into pairs, and raffled the question cards. They handed the cards to the researchers when it was their turn to receive the instructions. These cards contained words and pseudowords to be unveiled through phonemic synthesis and transposition. If the first pair could not find out the target-word within the time frame of the hourglass, it was the other pair’s turn; if this team also could not complete the task within the time frame, the chance of response went back to the first pair. This occurred successively, until the target-word was unveiled. In case the students could not find the correct answer, the question went back to the first pair, who should answer it or carry out an extra task, such as segmenting a word or pseudoword.

Workshop V – Envelope game

Material: Board, dice, pawns, list of three-syllable words, colored envelopes.

Procedure: Children received individual pawns. Each child rolled the dice and advanced in the board trail. Some spaces contained figures corresponding to an envelope, according to the difficulty level of the words (three-syllable, polysyllable, or pseudowords). Words were spoken by the researchers with phonemic inversion, and the children should organize the phonemes to reach the target-word.

All students were reassessed using the second part of the CONFIAS test. As in the initial assessment, the last meeting had the duration of, approximately, four hours.

For the statistical analysis of the comparison between the scores obtained in initial and final assessments, as well as between the performances of the groups in the workshops, the non-parametric Wilcoxon test was used, because data distribution was not normal (Kolmogorov-Smirnov <0.05). The significance level adopted was 5%.

RESULTS

Regarding the initial and final performances of the total group of students, the mean correct answers was higher after

Table 1. Performance of students before and after intervention

	n	Minimum	Maximum	Mean	SD	Z	p-value
Pre	49	1	30	15.47	6.580	-5.977	<0.001*
Post	49	3	30	22.73	6.525		

* Significant values ($p \leq 0.05$) – Wilcoxon test

Note: SD = standard deviation

Table 2. Performance and comparison between initial, intermediate, and advanced groups before and after intervention

Group		n	Mean	SD	Z	p-value
Initial	Before	12	8.33	5.105	-2.937	0.003*
	After	12	15.75	6.210		
Intermediate	Before	21	13.86	2.516	-4.023	<0.001*
	After	21	22.29	4.818		
Advanced	Before	16	22.94	2.670	-9.098	0.001*
	After	16	28.56	1.209		

* Significant values ($p \leq 0.05$) – Wilcoxon test

Note: SD = standard deviation

the language workshops (Table 1), which was confirmed by the Wilcoxon test ($Z = -5.977$; $p < 0.001$), suggesting improvement in the phonemic abilities of all students.

In the comparison of each group separately (initial, intermediate, and advanced), data indicate that the total mean correct answers considerably increased in all groups after the workshops, demonstrating improvement in the phonemic awareness performance of all three groups. It is emphasized that the intermediate group presented greater improvement in the mean correct answers when compared to the other groups. The Wilcoxon test confirmed this difference, with significant data for all three groups (Table 2)

DISCUSSION

The awareness that language is composed by small sounds and that these sounds correspond to letters is essential for the acquisition and development of reading in an alphabetic opaque writing system (such as Brazilian Portuguese), because the proficiency in decoding words into smaller segments is related to a better future performance in reading⁽¹⁶⁾. Hence, this study had the aim to verify the phonemic awareness performance of fourth grade Elementary School students before and after language workshops.

Regarding the performance of the initial group, some students showed little knowledge about phonemic manipulation. In some cases, there was only one correct answer in the initial assessment. Therefore, the activities proposed for this group were organized as to present to the students the phonemes and its associations to the respective letters. We opted to begin the workshops with the vowels, given its greater ease of use as hint for the alliteration task. Moreover, the organization of activities associating rhyme and alliteration to letters and words provided to the students the possibility to relate more easily sound segments and graphemes, making the reading and writing acquisition process easier.

According to the literature, syllabic awareness abilities precede the capacity to perceive phonemes as linguistic units^(3,6,13). In this sense, the use of syllabic segmentation activities with the initial group had the aim to draw students' attention to the fact that words are composed by smaller sound segments, and that their manipulation might not only change the position of the words, but also create new words.

The activities proposed for the initial group were adequate along all workshops, especially regarding the abilities profile of the group, that is, more basic phonological awareness were proposed, since most children in this group were in the initial stage of the literacy process. Children showed great interest in understanding the proposed activity, and did their best in executing it.

Regarding the intermediate group, we sought to direct the focus of the activities so that the students would pay attention to the phonemic components of words, as well as to their manipulation. The first workshop was an exception, because it proposed a rhyming activity that was relatively easy for the knowledge level of the students, but also allowed the researchers to better direct the work in order to maximize the abilities of this group.

Some authors have stated that, along the process of formal education, it is expected that the knowledge about the sounds of language increases towards the recognition and manipulation of phonemes^(6,7,10). The activities proposed for the intermediate group, which had demonstrated better abilities with phonemes in the initial assessment (when compared to the initial group), emphasized the phonemic manipulation, synthesis and segmentation abilities, with constant correction of the difficulty level to the profile of the group.

It is worth to emphasize that the easiness the intermediate group demonstrated in understanding the proposed activities allowed the execution of tasks with increasing level of difficulty and, thus, greater improvement in the phonemic awareness abilities. This fact draws attention to the reality of Brazilian school, that needs to contemplate in the same group/class

children with different ability profiles, something that has not been happening, which can recrudescence the deficiencies presented by Brazilian public education⁽¹⁷⁾.

The advanced group was the one to present lower mean improvement. Two explanation might clarify this fact: in the initial assessment, these students already had higher mean scores than the other two groups and, therefore, the maximum increase interval was smaller in the advanced group. On the other hand, students in this group already presented well-developed phonemic abilities in the initial assessment, which generated a planning of more complex activities, since many studies have associated schooling and phonemic knowledge^(6-8,18).

The tasks proposed for the advanced group presented higher level of difficulty, and involved mainly phonemic transposition, which demands sophisticate phonemic awareness abilities. Moreover, during the initial assessment, it was possible to observe that these students did not have difficulties to understand and execute phonemic manipulation and segmentation tasks. For this reason, along the workshops, it was necessary to propose activities that offered more challenges to the group, besides allowing the maximization of the abilities focused. Hence, we decided to incorporate phonemic tasks that also involved polysyllabic words and pseudowords.

Several forms of phonemic awareness stimulation have already been developed, from phonemic manipulation of real words with different lengths to activities involving pseudowords. It was concluded that tasks with pseudowords present better results because they depend fully on phonological support^(6,19).

As observed, the phonemic awareness performance of all students presented good improvement. However, although they presented evolution in the phonemic abilities, the performance of the students in this study is below the described in international literature, according to which preschool students already have good phonemic awareness performance^(6-8,18).

It is worth emphasizing that even though all groups improved, this evolution occurred according to the expected for the ability profile of each group. Considering that the study might have included subjects with learning impairments, differences were expected both in the evolution and in the final performance of the students, due to the fact that, while the initial group comprised children with lower academic performance, the advanced group was composed by students with better academic achievement. Hence, the workshops contemplated different groups according to the profile of abilities presented by each of them, respecting the heterogeneity found among students.

As a possible limitation of this research, we point out the reduced number of workshops (due to school reunions, class councils, field trips), that prevented the improvement of the complexity level of the tasks proposed. In the intermediate group, for instance, it was not possible to contemplate the phonemic synthesis ability. Moreover, it was not possible to associate phonemic awareness and reading and/or writing, which could have demonstrated the real influence of phonemic awareness on these abilities.

Thus, we suggest further studies to relate the performance and the improvement of phonemic abilities with the

development and the proficiency in reading and writing. Furthermore, a greater number of workshops is recommended for consolidation and generalization of the results.

CONCLUSION

The phonemic awareness performance of students considerably improved after the language workshops. Although the initial performance of these students was low, speech-language pathology work is effective for this population. Moreover, the phonemic awareness work associated to strategies of grapho-phonemic conversion is also effective and suggests new paths for clinical and educational Speech-Language Pathology.

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