



Effects of stimulating abilities on phonological awareness in the reorganization of the phonological system: case report

Efeitos da estimulação de habilidades em consciência fonológica na reorganização do sistema fonológico: relato de caso

Efectos de la estimulación de habilidades en conciencia fonológica en la reorganización del sistema fonológico: relato de caso

*Roberta Freitas Dias**

*Carolina Lisboa Mezzomo***

Abstract

Aim: This study aimed to present and analyze the effects of phonological awareness stimulation in the therapy of phonological disorders, comparing three different therapeutic approaches. **Methods:** Seven subjects, with a 6-year-old average, with diagnosis of phonological disorders, divided in three groups, participated in the study, according to the type of received therapy: purely phonological therapy, therapy based on stimulation of phonological awareness skills and phonological therapy associated with stimulation of phonological awareness skills. The subjects were evaluated before and after therapy, in relation to phonetic inventory, phonological system, phonological disorder severity and performance in phonological awareness. The obtained results were analyzed in a descriptive way. **Results:** It was observed that all subjects, except S7, reorganized their phonological systems. All subjects improved their scores in syllabic tasks, phonemic tasks and correct answers. The subjects who received therapy related

*Faculdade Nossa Senhora de Fátima, Caxias do Sul, RS, Brazil

** Universidade Federal de Santa Maria, Santa Maria, RS, Brazil

Authors' contributions:

RFD was responsible for collecting, analyzing and discussing the data from the present study, in addition to writing; CLM monitored the entire conduction of the study and assisted with the writing and revision of the manuscript.

Correspondence address: Roberta Freitas Dias robertafdias@hotmail.com

Received: 10/17/2017

Accepted: 05/26/2018



to stimulation of phonological awareness skills, associated or not to phonological therapy, obtained the best scores in phonological awareness after therapy. **Conclusion:** The presented and analyzed approaches provided phonological system reorganization of most treated subjects. The approaches which concerned stimulation of phonological awareness skills promoted further development of this ability.

Keywords: Speech Therapy; Speech Disorders; Rehabilitation of Speech and Language Disorders; Speech; Child

Resumo

Objetivo: Este estudo teve como objetivo apresentar e analisar os efeitos da estimulação da consciência fonológica na terapia dos desvios fonológicos, comparando três abordagens terapêuticas diferentes. **Métodos:** Participaram sete sujeitos, com 6 anos de idade, em média, com diagnóstico de desvio fonológico, divididos em três grupos, conforme a abordagem terapêutica recebida: terapia puramente fonológica, terapia com base na estimulação de habilidades em consciência fonológica e terapia fonológica associada à estimulação de habilidades em consciência fonológica. Eles foram avaliados, pré e pós-terapia, em relação ao inventário fonético, sistema fonológico, gravidade do desvio fonológico e desempenho em consciência fonológica. Os resultados obtidos foram analisados de maneira descritiva. **Resultados:** Constatou-se que todos os sujeitos, exceto o S7, reorganizaram seus sistemas fonológicos. Todos os sujeitos melhoraram seus escores nas tarefas silábicas, fonêmicas e no total de acertos (silábicas e fonêmicas). Os sujeitos que receberam terapia envolvendo a estimulação de habilidades em consciência fonológica, associada ou não à terapia fonológica, foram os que obtiveram maiores pontuações em consciência fonológica no pós-terapia. **Conclusão:** As abordagens terapêuticas apresentadas e analisadas neste estudo propiciaram a reorganização do sistema fonológico da maioria dos sujeitos tratados. Aquelas que envolveram a estimulação de habilidades em consciência fonológica promoveram um desenvolvimento maior desta habilidade.

Palavras-chave: Fonoterapia; Distúrbios da Fala; Reabilitação dos Transtornos da Fala e da Linguagem; Fala; Criança

Resumen

Objetivo: Este estudio tuvo como objetivo presentar y analizar los efectos de la estimulación de la conciencia fonológica en la terapia de los desvíos fonológicos, comparando tres abordajes terapéuticos diferentes. **Procedimientos:** Siete sujetos con 6 años de edad, en promedio, con diagnóstico de desvíos fonológicos se dividieron en tres grupos según el abordaje terapéutico recibido: terapia puramente fonológica, terapia basada en la estimulación de las habilidades de conciencia fonológica y terapia fonológica asociada con la estimulación de las habilidades de conciencia fonológica. Ellos fueron evaluados, pre y post terapia, en relación al inventario fonético, sistema fonológico, gravedad del desvío fonológico y desempeño en conciencia fonológica. Los resultados obtenidos fueron analizados de manera descriptiva. **Resultados:** Se constató que todos los sujetos, excepto el S7, reorganizaron sus sistemas fonológicos. Todos los sujetos mejoraron sus escores en las tareas silábicas, fonémicas y en el total de aciertos (silábicas y fonémicas). Los sujetos que recibieron terapia envolviendo la estimulación de habilidades en conciencia fonológica, asociado o no a la terapia fonológica, fueron los que obtuvieron mayores puntuaciones en conciencia fonológica en el post terapia. **Conclusión:** Los abordajes terapéuticos presentados y analizados en este estudio propiciaron la reorganización del sistema fonológico de la mayoría de los sujetos tratados. Aquellas que trabajaron la estimulación de habilidades en conciencia fonológica promovieron un desarrollo mayor de esta habilidad.

Palabras clave: Fonoterapia, Trastornos del Habla; Rehabilitación de los Trastornos del Habla; Habla; Niño

Introduction

Until the mid-1970s, therapeutic approaches to traditional phonological disorders were based on articulatory training involving each of the abnormal sounds the child presented in their phonological system. From that time on, these approaches began to be conceived based on phonological and, subsequently, psycholinguistic premises, considering that changes should occur, above all, in the child's mind^(1,2).

With the paradigm shift on phonological deviations and, as a result, the treatment principles in these cases, various therapeutic approaches have been proposed, with the main objective of reorganizing the phonological system of children with phonological disorders. Among these approaches, there are two examples available in the literature, which have supported the creation of the therapeutic proposals used in the present study: the Maximal Oppositions Model³, based on contrasts of distinctive features, and Metaphon⁴, based on metaphonology. These two models of therapy have been tested in Brazil and proved to be effective^{2,5,6}. A modification was proposed for the Maximal Oppositions Model regarding the choice of target segments, phonological therapy and the structure of the therapy session².

The vast majority of approaches tested and used in Brazil are reproductions of proposed models for English speaking children. Further, contrary to the international literature^{1,4,7-9}, few Brazilian scholars from the field of phonological disorders have proposed to investigate the influence of the use of phonological awareness skills in the treatment of phonological disorders^{5,10,11}. Studies in English have shown that all therapy proposals for phonological disorders involving the stimulation of phonological awareness have resulted in improvements in the phonological system of the subjects treated, as well as in their phonological awareness skills^{1,4,7-9}.

In Brazil, studies have shown that certain phonological-based therapy models are not sufficient for children with phonological disorders to develop phonological awareness¹²⁻¹⁴, a crucial skill for the promotion of children's success in learning to read and write. As a result, therapeutic approaches that include working with this and other aspects of phonological deviations are essential in order to prevent other difficulties from hindering

the development of these children at other stages, such as the literacy process^{7,9,12,13,15}.

Based on the aforementioned studies, it is believed that the stimulation of phonological awareness can promote not only the development of this capacity in children with phonological disorders, but also the reorganization of their phonological systems.

As such, the objective of this study was to present and analyze the effects of phonological awareness stimulation in the treatment of phonological disorders, comparing three different therapeutic approaches.

Presentation of clinical cases

The subjects that participated in this study were selected by convenience sampling through the Supervised Care Internship Stage I and II, and were awaiting the service in the queue for the Speech Sector of the Speech Therapy Service at the clinical school where the data collection took place. During the study period of the project, 15 subjects with the complaint of "speech changes" were evaluated in order of arrival at the service. Eight of these were excluded because of other speech disorders (phonetic distortions, for example) or because they had previously received therapy.

Thus, seven subjects with a diagnosed phonological disorder participated in the study in question and received speech therapy. The mean age at the start of treatment was 6:0, with the sample consisting of one girl and six boys. All of them were attending school, three in preschool and four in the first year of elementary school, presenting the hypothesis of pre-syllabic or syllabic writing, with the exception of S3, with the hypothesis of alphabetic writing.

This study was conducted at the Clinical School of a Higher Education Institution (HEI), based on project 0202.0.243.000-11, which was approved by the Research Ethics Committee of the same HEI.

The following conditions were established as inclusion criteria: being between five years and six years, 11 months and 30 days; being authorized to participate in the research, through the Informed Consent Form; presenting a diagnosed phonological disorder; having normal hearing and being monolingual in Brazilian Portuguese. Children who had received speech therapy before;

those who presented speech language and hearing alterations besides phonological deviation; or those who presented evident neurological, cognitive or psychological alterations were excluded from the research.

The children performed a series of speech-language assessments, as well as complementary evaluations, in order for the diagnosis of phonological disorder to be defined. For the speech-language evaluations (anamnesis, comprehension and expressive oral language, stomatognathic system, articulatory examination, speech evaluation through the establishment of phonetic and phonological inventories and hearing evaluation) the protocols available at the clinical school where the research was conducted were used. The complementary exams consisted of otorhinolaryngological and neurological evaluations, made available at the school clinic itself.

All speech, language and hearing evaluations, both for the definition of the diagnosis of phonological disorders and for the collection of data as well as the therapeutic procedures, were performed by one of the researchers authoring this article.

The data analyzed before and after therapy were composed of the phonetic inventory and the phonological system of each child and the individual performance in a phonological awareness evaluation instrument.

For the collection and analysis of speech data, we used the AFC - Child Phonological Assessment¹⁶, composed of the phonetic inventory, phonological system and contrastive analysis, which is widely used in speech studies in Brazil. The presence of at least two productions of such in any position of the word was considered as a criterion in order for a particular phone to become part of the phonetic inventory. For a phoneme to be part of the phonological system, the criterion of at least 80% correct production was considered. Speech data was collected using a Sony - IC Recorder digital recorder, and then transcribed and reviewed by a judge with experience in phonetic transcription, before being analyzed. In cases where there was discrepancy between the transcripts of the researcher and the judge, a third transcript was taken by a second judge experienced in phonetic transcription.

A contrastive analysis allowed the establishment of each child's phonological system and the severity of the phonological disorder, using the

PCC-R (Percentage of Phonemes Correct-Revised), which only considers the substitutions and omissions of phonemes in its analysis¹⁷. Based on the PCC-R, the severity of the phonological disorder was classified as: severe deviation, with percentages of correct consonants lower than 50%; moderate/severe deviation, with percentages of correct consonants between 51% and 65%; mild/moderate deviation, with percentages of correct consonants between 66% and 85%; and mild deviation, with percentages of correct consonants greater than 86%. Furthermore, through the analysis of the children's phonological system it was possible to identify the altered distinctive traits in their speech, which was relevant information for the selection of the target sounds to be stimulated in one of the therapeutic approaches applied later.

The phonological awareness evaluation was performed using the CONFIAS - Phonological Awareness: Instrument of Sequential Assessment¹⁸. This instrument tests two levels of phonological awareness: syllabic and phonemic or segmental. The first part consists of nine syllabic tasks (S1 - Synthesis, S2 - Segmentation, S3 - Identification of initial syllable, S4 - Identification of rime, S5 - Production of word with given syllable, S6 - Identification of syllable medial and S7 - Rime production, S8 - Exclusion and S9 - Transposition) and the second part composed of seven phonemic tasks (F1 - Production of word that begins with the given sound, F2 - Identification of initial phoneme, F3 - Identification of final phoneme, F4 - Exclusion, F5 - Synthesis, F6 - Segmentation and F7 - Transposition).

In the CONFIAS, the correct answers are worth one point and the incorrect ones are worth zero. In the first part, syllabic tasks, the maximum score is 40 and, in the second part, phonemic tasks, the maximum is 30, totaling 70 points, which corresponds to 100% correct answers. The tasks that make up this instrument are objective, with only one correct alternative for each question. Therefore, according to the application manual and with the guidance of the authors of the tests, the results were collected and analyzed solely by the researcher who applied it, without the need for revision.

Procedures

After being evaluated, during the pre-therapy period the subjects were allocated into one of three groups by order of arrival at the Speech, Language

Pathology and Audiology Therapy Service of the clinical school, according to the therapeutic approach they would receive, with the following order:

1st TCF - Therapy based on the stimulation of phonological awareness skills

2nd TFCF - Phonological therapy associated with stimulation of phonological awareness skills

3rd TPF - Purely phonological therapy

This order was predetermined in the research project. Therefore, each subject was invariably included in one of these three groups. The structure of the above mentioned three therapeutic approaches is described below, beginning with purely phonological therapy, as enshrined in the literature of the area^{2,5,6}.

TPF - Purely phonological therapy

Subjects S1 and S2 were submitted to pure phonological therapy. In this research, this approach refers to the Modified Maximal Opposition Model², which is one of the models indicated for mild to mild/moderate phonological deviations and may also be applied in cases of moderate/severe and severe deviations¹⁹. This model is based on the contrast of maximal oppositions in minimal pairs (words that differ by only one phoneme), which must differ in two or more distinctive traits (e.g. /r/ x /ʒ/ à *Maria* x *magia*). The correct stimulation of the target sounds is based on two stages: imitation and spontaneous production. In the imitation phase the child must produce the targets, using the model provided by the therapist. After reaching a percentage of 80% productions by correct imitation, one must move onto the spontaneous production phase.

Before initiating therapy, an initial (baseline) survey should be performed for sounds that have not been fully acquired in the child's phonological system. To do so, up to six stimuli that can be represented by figures containing each of the sounds not acquired or partially acquired in the child's phonological system are selected, considering the different positions in the word (initial onset, medial onset, medial coda, final coda). The child has to name the figures, without the model from the therapist. The baseline is individual, based on the phonological system of each child, and aims to provide an initial parameter to compare the progress of treatment and generalizations occurring during this period.

The survey is repeated every five therapy sessions, and when the child gets at least 50% correct productions the same minimal pairs are then worked on at the sentence level. In a new survey, after five sentence-level sessions, new target sounds will be determined if the child reaches at least 50% correct productions for the targets being worked on. Otherwise, if the child does not reach 50% correct productions, a determined level is repeated with the same target sounds.

Each therapy session should begin and end with the auditory bombardment, which refers to a list of sixteen words that should be read to the child without them having to repeat these words. These words contain the phonemes worked on during therapy, in the same positions in which they appear in the minimal pairs.

Auditory bombardment should be performed at home with the child, so the therapist should provide the word list used in therapy for the parents and advise them to read the list at least once a day.

After 20 to 25 sessions, according to this therapeutic approach², the child's phonological system should be re-evaluated and compared with the baseline and initial evaluation to see whether there were generalizations and progress in therapy. According to the new configuration of the child's phonological system, new target sounds can be selected to continue therapy.

TCF - Therapy based on the stimulation of phonological awareness skills

Subjects S3, S4 and S5 received therapy through stimulation of phonological awareness skills. This therapeutic approach was designed by the authors of this study. The procedure includes exclusive use of tasks involving phonological awareness skills in the speech therapy of children with phonological disorders.

The therapy plan involved the training of auditory discrimination for speech sounds and the stimulation of syllabic and segmental levels of phonological awareness over a period of 25 therapy sessions.

The first ten sessions were reserved to stimulate syllabic awareness and the subsequent 15 sessions to stimulate segmental awareness. For both levels of phonological awareness, an increasing order of complexity was followed, beginning with simpler tasks (such as syllabic segmentation and segmental identification, for example), followed by more

complex tasks (such as syllabic transposition and phonemic synthesis, for example). The emphasis given at the segmental level, with 15 therapy sessions, was proposed considering that this is the level of greatest difficulty for children with phonological disorders^{11,13}. However, if the child did not demonstrate the ability to solve tasks involving the segmental level, syllabic level stimulation was maintained until they were able to perform simple tasks involving the word segments.

In addition to these two levels of phonological awareness, auditory discrimination for speech sounds was included in this plan, with the application of one task every five therapy sessions (e.g. discrimination of deaf and sonorous segments), according to a phonological awareness development program proposed for European Portuguese²⁰ published by the Ministry of Education of Portugal.

The criterion for increasing the complexity of the phonological awareness tasks within each syllabic and segmental level, as well as for the passage from syllabic to segmental level stimulation, was the child's understanding and success in the tasks applied. As such, in each therapy session two to three tasks were worked on. For example, in the first session of the syllabic level word production tasks with the same initial syllable and identification of words with the same initial syllable were applied. If the child succeeded in these two tasks, in the next session the tasks applied would be more complex, until they were ready to introduce tasks at the segmental level in subsequent sessions. Percentages of correct answers in the phonological awareness tasks applied to the child in therapy were not used, but a qualitative analysis of their performance was carried out by the therapist, who observed their comprehension and ability to perform the tasks.

The tasks worked on with the children were inserted into play activities (board games, bowling, memory, "lince", among others) and, when this was not possible, the children knew that in some moments of the session, between one game and another, they had to perform tasks to "think about the sounds of our speech".

In this therapeutic approach, no target sounds were selected, and all sound classes (plosives, nasal → fricatives →) in the different syllabic structures

that may occur in Brazilian Portuguese (CV, V → CVC → CCV), following the typical acquisition order of speech. The aim of the survey was to verify the child's performance in the speech therapy as a whole and not the percentage of correct answers in specific sounds, such as the Modified Maximal Oppositions Model². In addition, no activities were given to be performed at home, but parents were only advised to always give the correct model of speech to their children.

TFCF - Phonological therapy associated with stimulation of phonological awareness skills

The therapy of subjects S6 and S7 was based on the phonological therapeutic approach associated with the stimulation of phonological awareness skills, which integrates the Modified Maximal Oppositions Model² and the stimulation of phonological awareness skills designed for this study, as described above. As such, the final 15 minutes of each session were reserved for phonological awareness activities, involving the syllable and the segment.

For purely phonological therapy and for phonological therapy associated with the stimulation of phonological awareness skills, auditory bombardment was performed and parents were instructed to perform activities with the child at home, according to the procedures described in the Modified Maximal Oppositions Model².

Regardless of the therapeutic approach, all subjects received therapy twice a week, each session lasting 45 minutes, for a maximum total of 25 therapy sessions (for the analysis of results), except for the sessions reserved for surveys.

The results obtained for each of the subjects and between the groups underwent a descriptive analysis, considering the phonetic inventory, the phonological system and the severity of the phonological deviation, before and after therapy.

Table 1 presents information about the subjects in relation to the phonological system and the severity of the phonological deviation, before and after therapy. In addition, the type of therapeutic approach received, the target sounds worked on with the subjects who received phonological therapy,

Chart 1. Characterization of the subjects, according to the therapeutic approach received, the phonological system and the severity of the phonological deviation, pre- and post-therapy, the selected target sounds and the number of sessions

Therapeutic Approach	Subject (sex/age)	PRE-THERAPY		POST-THERAPY		Target sounds	Number of sessions
		SF – I (n)	Severity	SF – II (n)	Severity		
TPF	S1 (M/5a3m)	p, b, t, d, f, v, s, z, ʒ, ʃ, m, n, ɲ, l, λ, R (16)	DL (86,6%)	p, b, t, d, g, f, v, s, z, ʒ, ʃ, m, n, ɲ, l, r, λ, R (18)	DL (96,3%)	/g/ x /r/ OM	25
	S2 (M/5a6m)	p, b, t, d, k, g, f, v, s, z, m, n, ɲ, l, r, λ, R (17)	DL (93,5%)	p, b, t, d, k, g, f, v, s, z, ʒ, ʃ, m, n, ɲ, l, r, λ, R (19)	DL (94,3%)	/ʒ/ x /r/ OM	10
TCF	S3 (M/6a6m)	p, b, t, d, k, g, f, v, s, z, m, n, ɲ, l, λ, R (16)	DLM (83,3%)	p, b, t, d, k, g, f, v, s, z, ʒ, ʃ, m, n, ɲ, l, r, λ, R (19)	DL (97,2%)	---	20
	S4 (M/6a1m)	p, t, k, f, s, ʃ, m, n, ɲ, l, λ, R (12)	DLM (80,6%)	p, t, k, f, s, ʃ, m, n, ɲ, l, r, λ, R (13)	DL (88,2%)	---	25
	S5 (F/6a8m)	p, t, k, f, s, m, n, ɲ, l, λ, R (11)	DLM (67,3%)	p, t, k, f, s, ʃ, m, n, ɲ, l, r, λ, R (13)	DLM (78%)	---	25
TFCF	S6 (M/5a5m)	p, b, t, d, f, v, s, z, ʃ, m, n, ɲ, l, λ, R (15)	DLM (73%)	p, b, t, d, k, f, v, s, z, ʒ, ʃ, m, n, ɲ, l, λ, R (17)	DLM (85%)	/g/ x /r/ OM /ʒ/ x /r/ OM	25
	S7 (M/6a5m)	p, b, t, d, f, v, s, z, m, n, ɲ, R (12)	DMG (65%)	p, b, t, d, f, v, s, z, m, n, ɲ, R (12)	DMG (59,2%)	/ʒ/ x /l/ OM /g/ x /r/ OM	25

Legend: TPF: Purely phonological therapy; TCF: Therapy based on the stimulation of phonological awareness skills; TFCF: Phonological therapy associated with phonological awareness; SF – I: Initial Phonological System; SF – II: Final Phonological System; n: number of sounds; F: female; M: male; DL: mild deviation; DLM: mild/moderate deviation; DMG: moderate/severe deviation; OM: medial onset; ---: No target sounds were selected.

and the number of therapy sessions received by each of them is also shown in the table.

In Table 1, it can be noted that subjects S6 and S7 had their target sounds redirected based on the surveys performed. In the case of S6, according to the Modified Maximal Oppositions Model, when a target sound has more than 50% correct answers at the sentence level, new target sounds must be selected to continue treatment². In the case of the subject S7, new sounds were selected due to the difficulty in production by imitation of the initially selected target sounds. It should be emphasized that

the therapeutic approach based on the stimulation of phonological awareness does not include the stimulation of target sounds but of all the phonemes that make up the phonological system of Brazilian Portuguese. Therefore, there are no specified target sounds in table 1 for the subjects who received this type of therapeutic approach.

The therapeutic evolution of each subject can be seen in table 1, which shows the number of phones in the phonetic inventory, the number of phonemes in the phonological system and the

Table 1. Number of segments acquired in the phonetic inventory and in the phonological system, and the percentage of correct consonants, pre- and post-therapy

Therapeutic Approach	Subject	Phonetic Inventory		Phonological System		PCC (%)	
		AI	AF	AI	AF	AI	AF
TPF	S1	19	19	16	18	86.6	96.3
	S2	17	19	17	19	93.5	94.3
	S3	17	19	16	18	83.3	97.2
TCF	S4	19	19	12	13	80.6	88.2
	S5	15	16	11	13	67.3	78
TFCF	S6	16	18	15	17	73	85
	S7	13	14	12	12	65	59.2

Legend: TPF: Purely phonological therapy; TCF: Therapy based on the stimulation of phonological awareness skills; TFCF: Phonological therapy associated with stimulation of phonological awareness skills; AI: initial evaluation; AF: final evaluation; PCC: percentage of correct consonants.

percentage of correct consonants, before and after therapy.

Regarding the phonetic inventory, it was observed that all subjects increased the number of phones except for subjects S1 and S4, who already

had complete inventories in the pre-therapy period. As for the phonological system, with the exception of the subject S7, all other subjects increased the number of phonemes in the phonological system and the percentage of correct consonants.

Table 2. Results obtained by the subjects in the CONFIAS, in the syllabic tasks and phonemic tasks, pre and post-therapy

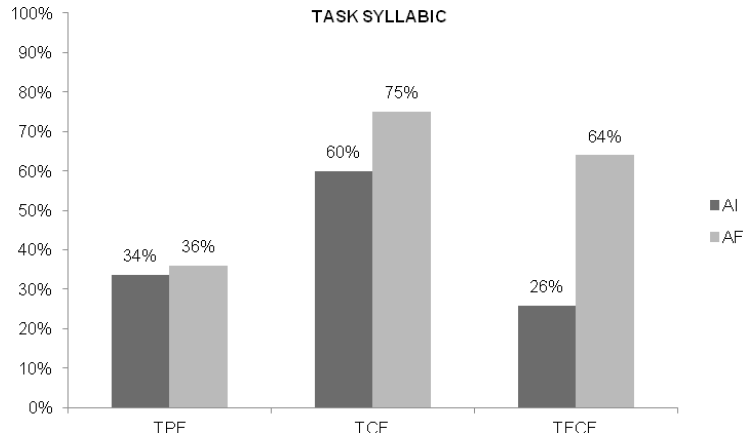
Therapeutic Approach	Subject	CF tasks	Initial Evaluation A/T (F)	Final Evaluation A/T (F)
TPF	S1	Syl	15/40 (37.5%)	15/40 (37.5%)
		Phon	05/30 (16.7%)	04/30 (13.3%)
	S2	Syl	12/40 (30%)	14/40 (35%)
		Phon	03/30 (10%)	04/30 (13.3%)
TCF	S3	Syl	26/40 (65%)	34/40 (85%)
		Phon	14/30 (46.7%)	27/30 (90%)
	S4	Syl	28/40 (70%)	34/40 (85%)
		Phon	07/30 (23.3%)	16/30 (53.3%)
	S5	Syl	18/40 (45%)	22/40 (55%)
		Phon	06/30 (20%)	11/30 (36.7%)
TFCF	S6	Syl	19/40 (47.5%)	32/40 (80%)
		Phon	05/30 (16.7%)	09/30 (30%)
	S7	Syl	12/40 (30%)	19/40 (47.5%)
		Phon	04/30 (13.3%)	05/30 (16.7%)

Legend: TPF: Purely phonological therapy; TCF: Therapy based on phonological awareness skills; TFCF: Phonological therapy associated with stimulation of phonological awareness skills; CF: phonological awareness; syl: syllabic; phon: phonemic; A: correct answers; T: total; F: frequency.

Table 2 shows the results obtained through the application of CONFIAS, in the syllabic tasks and the phonemic tasks, for each one of the subjects before and after therapy.

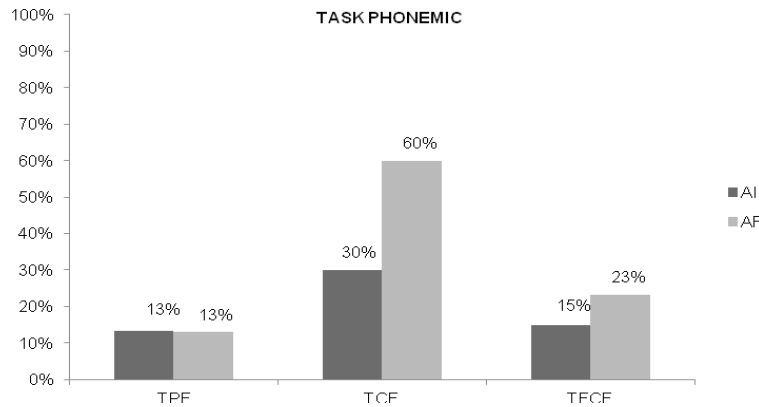
For the syllabic tasks, it was noted that all subjects increased their correct scores after therapy,

with the exception of S1. In the phonemic tasks the subjects also increased their scores, with subject S3 presenting largest increase, of 13 correct answers, between the pre- and post-therapy evaluations.



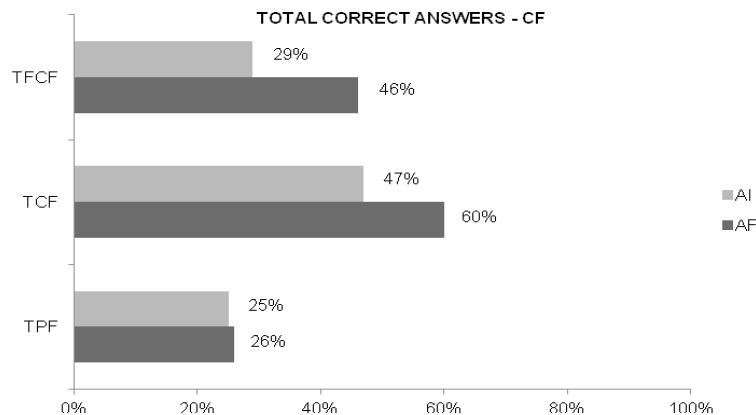
Legend: TPF: Purely phonological therapy; TCF: Therapy based on the stimulation of phonological awareness skills; TFCF: Phonological therapy associated with phonological awareness; AI: initial evaluation; AF: final evaluation.

Figure 1. Percentages of correct answers obtained by the groups in the syllabic task, pre- and post-therapy



Legend: TPF: Purely phonological therapy; TCF: Therapy based on the stimulation of phonological awareness skills; TFCF: Phonological therapy associated with phonological awareness; AI: initial evaluation; AF: final evaluation.

Figure 2. Percentages of correct answers by groups in the phonemic task, pre- and post-therapy



Legend: TPF: Purely phonological therapy; TCF: Therapy based on the stimulation of phonological awareness skills; TFCF: Phonological therapy associated with phonological awareness; AI: initial evaluation; AF: final evaluation.

Figure 3. Percentages of total correct answers in phonological awareness by the groups, pre- and post-therapy

Figures 1, 2 and 3 show the mean correct answers between the groups in relation to the syllabic task, the phonemic task and the total number of correct answers in the CONFIAS, respectively, in the moments before and after therapy.

For the syllabic tasks, it was observed that the group that received TFCF obtained the greatest increase in correct answers after therapy, 38%. The TPF group obtained an increase of only 2%. In the phonemic tasks, the TCF group had the highest increase, with a 30% increase in correct answers, while the TPF group maintained 13% accuracy, post-therapy, with 0% increase. In the total correct answers, including the syllabic and phonemic tasks, the TFCF group was the one that obtained the highest increase, with 23% correct answers after therapy. The TPF group only obtained 1% increase in the total score.

Discussion

Subjects who received purely phonological therapy, S1 and S2, had a mild deviation at the beginning of therapy. This means that their phonological systems were almost fully complete. Despite the severity of the mild phonological deviation of these two subjects, both acquired new phonemes in their phonological systems and completed their phonetic inventories after therapy, increasing their percentage of correct consonants (96.3% for subject S1 and 94.3% for subject S2), receiving a discharge from speech therapy. These results illustrate the efficiency of the Modified Maximal Opposition Model², referred to in this study as purely phonological therapy, for the reorganization of the phonological system, as observed in previous studies^{2,6}.

Subjects S3, S4 and S5 received therapy solely on the basis of stimulation of phonological awareness skills and presented a mild/moderate deviation at the time of pre-therapy. In the post-therapy evaluation, these subjects increased their phonetic inventories and acquired new phonemes, reducing the severity of their phonological deviations. With the exception of subject S5, the severity of the deviations went from mild/moderate to mild. The results obtained for subjects S3, S4 and S5 suggest that the stimulation of phonological awareness skills can lead to changes in the phonetic inventory and the phonological system, with the acquisition of new sounds. This finding corroborates the find-

ings of other studies, in which the authors found that the stimulation of phonological awareness can promote changes in the phonological systems of children with phonological disorders⁷⁻¹¹.

The subjects in the TFCF group, S6 and S7, presented divergent results from each other. For subject S6, there was an increase in the number of phones in their phonetic inventory and an increase in the number of phonemes in their phonological system, resulting in an increase in the percentage of correct consonants, despite the fact that the severity remained the same, with mild/moderate deviation. Meanwhile, the subject S7 maintained their phonological system with 12 phonemes and decreased the percentage of correct consonants, from 65% to 59.2%, maintaining a moderate/severe deviation. This decrease in the percentage of correct consonants is common during the therapeutic process in phonological deviations, as there may be regression in the establishment of phonemes, characterizing a non-linear phonological acquisition process²¹. This discontinuity in acquisition mainly involves liquid consonants²¹, precisely the phonemes that were also stimulated in the therapy of subject S7, phonemes /l/ and /r/.

Regarding the results related to the evaluation of phonological awareness, subjects S1 and S2 discreetly improved their scores for syllabic and phonemic tasks. With this result, it can be inferred that although promoting the reorganization of the subjects' phonological systems, purely phonological therapy was not enough to improve this skill, as has already been verified in other studies¹²⁻¹⁴.

Subjects S3, S4 and S5 presented a significant improvement in syllabic tasks and phonemic tasks. This result confirms one of the hypotheses of this study that the stimulation of phonological awareness skills not only contributes to the development of phonological awareness but also promotes the reorganization of the phonological system.

Although subject S7 evolved less in relation to phonological awareness, both he and subject S6 presented improvement in the scores for this ability, especially for the syllabic task.

When analyzing the results obtained by the groups, regarding the syllabic and phonemic tasks and the total score, it was noticed that there was an improvement in the scores for the three therapeutic approaches. The TCF group was the one that obtained the highest percentage of correct answers in metalinguistic skills after therapy, followed by the

TFCF group. This demonstrates that the application of phonological awareness skill stimulation programs promotes the development of this ability, as revealed in other studies^{9,10}.

It is important to note that the TCF and TFCF groups presented the highest percentage of correct answers in phonological awareness when compared to the TPF group before therapy. However, performance in this skill before therapy is not a basis for a good evolution in the therapeutic process²². The importance of the stimulation of phonological awareness in the therapy of phonological disorders has been emphasized in previous studies, which demonstrated that phonological therapy alone does not promote the development of phonological awareness, which is usually lagging in such cases¹²⁻¹⁴.

It should be noted that the greatest increase in the percentage of correct answers for phonemic tasks was attained by the TCF group, which is the most difficult level for children with phonological disorders in certain tasks^{11,13}, fundamental for the acquisition of reading and writing. The result obtained by this group for phonemic tasks leads to the belief that the exclusive stimulation of phonological awareness skills in phonological disorders can promote the development of these abilities in an effective way, contributing to the non-emergence of difficulties during literacy.

Therapeutic approaches involving the stimulation of phonological awareness skills encouraged the development of this ability in the children in the TCF and TFCF groups, which is an important metalinguistic ability for phonological acquisition and for the literacy process. It is believed that by being encouraged to manipulate the sounds of words and consequently reflect on their own speech, this promoted self-correction and the production of phonemes that were previously avoided or replaced¹¹. New studies should be conducted to improve therapy based on the stimulation of phonological awareness skills and to verify the effects of this approach in larger groups of children with phonological disorders.

Conclusion

the therapeutic approaches presented and analyzed in this study led to the reorganization of the phonological system of the subjects treated and contributed to the development of phonological

awareness. With the exception of subject S7, they all acquired new phonemes in their phonological systems and increased their percentages of correct consonants. Subjects who received therapy involving stimulation of phonological awareness skills evidently had higher percentages of correct scores in this ability compared to those receiving purely phonological therapy.

The analysis of the two approaches proposed by the authors involving phonological awareness and a model established in the literature showed that these approaches seem to be effective for cases of phonological deviations.

The stimulation of phonological awareness as the main therapeutic strategy in the treatment of phonological disorders is scarce in the literature. Therefore, the present study addressed this issue, which is of fundamental importance for these cases, and proposes that further investigations be carried out in order to fill this gap and equip the speech therapist with other possible therapeutic approaches. The inclusion of phonological awareness in the therapy of phonological disorders may contribute to the non-repercussion of speech errors in writing, which is common in this population, as well as promoting literacy, and may have effects on the reorganization of deviant phonological systems.

References

1. Stackhouse J, Wells B, Pascoe M, Rees R. From phonological therapy to phonological awareness. *Seminars Speech Language*. 2002; 23(1): 27-42.
2. Bagetti T, Mota HB, Keske-Soares M. Modelo de Oposições Máximas Modificado: uma proposta de tratamento para o desvio fonológico. *Rev Soc Bras Fonoaudiol*. 2005; 10(1): 36-41.
3. Gierut JA. The conditions and course of clinically induced phonological change. *J Speech Hear Res*. 1992; 35: 1049-1063.
4. Dean EC, Howell J, Reid J. Metaphon: a metalinguistic approach to the treatment of phonological disorders in children. *Clin Linguist Phon*. 1995; 9(1): 1-58.
5. Ardenghi LG, Mota HB, Keske-Soares M. A terapia Metaphon em casos de desvios fonológicos. *Rev Soc Bras Fonoaudiol*. 2006; 11(20): 106-15.
6. Gubiani MB, Keske-Soares M. Evolução fonológica de crianças com desvio fonológico submetidas a diferentes abordagens terapêuticas. *Rev CEFAC*. 2014; 16(2): 663-671.
7. Gillon GT. The efficacy of phonological awareness intervention for children with spoken language impairment. *Lang Speech Hear Serv Schools*. 2000; 31: 126-141.
8. Hesketh A, Adams C, Nightingale C, Hall R. Phonological awareness therapy and articulatory training approaches for children with phonological disorders: a comparative outcome study. *Int J Lang Comm Dis*. 2000; 35(3): 337-354.



9. Denne M, Langdown N, Pring T, Roy P. Treating children with expressive phonological disorders: does phonological awareness therapy work in the clinic? *Int J Lang Commun Dis.* 2005; 40(4): 493-504.
10. Spíndola RA, Payão LMC, Bandini HHM. Abordagem fonoaudiológica em desvios fonológicos fundamentada na hierarquia dos traços distintivos e na consciência fonológica. *Rev CEFAC.* 2007; 9(2): 180-89.
11. Staudt LB, Fronza KA. Estímulo à consciência fonológica para a superação de desvios fonológicos identificados em crianças do ensino fundamental: Fonodado. RBLA, 2015; 15(4): 941-969.
12. Melo Filha MGC, Mota HB. Habilidades em consciência fonológica de sujeitos após realização de terapia fonológica. *Pró-Fono.* 2009; 21(2): 119-124.
13. Marchetti PT, Mezzomo CL, Cielo CA. Habilidades em consciência silábica e fonêmica de crianças com fala desviante com e sem intervenção fonoaudiológica. *Rev Soc Bras Fonoaudiol.* 2010; 15(1): 80-7.
14. Stefanini MR, Oliveira BV, Marcelino FC, Maximino LP. Desempenho em consciência fonológica por crianças com transtorno fonológico: comparação de dois instrumentos. *Rev CEFAC.* 2013; 15(5): 1227-35.
15. Wiethan FM, Mota H. Propostas terapêuticas para os desvios fonológicos: diferentes soluções para o mesmo problema. *Rev CEFAC.* 2011; 13(3): 541-551.
16. Yavas M, Hernandorena CLM, Lamprecht RR. Avaliação fonológica da criança. Porto Alegre: Artes Médicas, 2001.
17. Shriberg LD, Austin D, Lewis BA, McSweeney JL, Wilson DL. The percentage of consonants correct (PCC) metric: extensions and reliability data. *J Speech Lang Hear Res.* 1997; 40(4): 708-22.
18. Moojen S. (Coord.). Consciência fonológica: Instrumento de avaliação sequencial (CONFIAS). São Paulo: Casa do Psicólogo, 2003.
19. Pagliarin KC, Keske-Soares M. Abordagem contrastiva na terapia dos desvios fonológicos: considerações teóricas. *Rev CEFAC.* 2007; 9(3): 330-38.
20. Freitas MJ, Alves D, Costa T. O conhecimento da Língua: desenvolver a consciência fonológica. 2. ed. Lisboa: Ministério da Educação, 2008.
21. Keske-Soares M, Pagliarin KC, Ghisleni MRL, Lamprecht RR. Aquisição não-linear durante o processo terapêutico. *Letras de Hoje.* 2008; 43(3): 22-26.
22. Mezzomo CL, Mota HB, Keske-Soares M, Ceron MI, Dias RF. A influência das habilidades em consciência fonológica na terapia dos desvios fonológicos. *Rev CEFAC.* 2014; 16(1): 328-335.