THE DETAILS IN THE THERAPEUTIC PROCESS TO THE CONSONANT CLUSTERS ACQUISITION IN THE SPEECH OF CHILDREN WITH PHONOLOGICAL DISORDER

Variáveis relevantes no processo terapêutico para a aquisição do onset complexo na fala de crianças com desvio fonológico

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ABSTRACT

Purpose: to provide relevant variable aspects in the therapeutic process of consonant clusters (CC) acquisition in children but maintains the CCV simplification. **Methods:** four children diagnosed with phonological disorders, aged 5:4 to 7:7 took part in the study, using the strategy of compensatory lengthening, having [ɾ] and [l] in the phonetic inventory and performed to simplify the CC. Children were subjected to different speech therapies, and from data obtained in those we obtained reviews of linguistic and extra-linguistic variables that are relevant for therapy. Data were analyzed using the VARBRUL statistic program. **Results:** the program selected the variable 'severity' of the disorder as being relevant for the appropriate production, CC simplification and for the distortion of the CC liquid. There was highlighted the highest possibility of correct production of CCV when the subject is under phonetic therapy. The /d/ phoneme enhances the metathesis strategy. The replacement of the liquid was due to the variable 'subject' and the kind of liquid forming the CC. **Conclusion:** the variable 'severity' is very relevant to the success of the therapy as well as to the use of strategies to repair the problem. It was also observed that children who were under different kinds of therapies had different results to each of the therapies and had better performance using the phonetic therapy.

KEYWORDS: Speech Therapy; Articulation Disorders; Speech Acoustics; Phonetics

■ INTRODUCTION

The phonological acquisition considered normal occurs when the child establishes a phonological system consistent with the adult-target, in other words, similar to the talk from the social group which he or she is inserted. This process occurs, in Brazilian Portuguese (BP), between the birth and, aproximately, the age of 5:0, in a gradual way, nonlinear and respecting the individual differences of each infant[1,2].

However, some children can't reach the development sequence expected and their phonological system organizes itself following other "ways". The result of that is a divergent system in reference to the language-target and inappropriated in relation to the language phonology of its environment. The children that present these characteristics have phonological disorder (PD)[2,3]. Such children are distinguished by expressing a constrastive phone system different from the standard ones and they can, also, present an incomplete phonetic inventory in relation to the model of their linguistic community. [2,4]

In BP, the phonological acquisition shows defined patterns for the field of segments, being vowels >> plosive, nasals >> fricatives >> liquids and of the syllabic structures, CV, V >> CVV >> CVC >> CCV (">>" indicates that the structure that precedes it was previously acquired with respect

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to the others.) It is noticed that the structure of the consonant cluster (CC) is the last one to reach the stability in the phonological system of the child[1.] By being one of the segmental sequences with higher degree of complexity in BP, the CC is the structure that usually is absent in the children's speech with PD[5-8].

The CC is characterized by the sequence of consonants, and the BP allows, to the max, two consonants in the position of CC, and the first one must be an obstruent /p, b, t, d, k, g, f, v/, and the second a liquid /l/ ou /r/[5,6,8]. Analysing the route acquisition of CC, normal or deviant, there seems to be no intermediate stages or a different acquisition order between CC with /l/ and CC with /r/[5,6].

During the phonological acquisition process, the child uses several strategy repairs to help the right production of the adult-target[9.] The studies indicate that the most used strategy in the acquisition of CC by children with normal phonological development is the process of simplification of the structure[1,5,9-12].

There are some children that, during the phonological development, before the right execution of the *coda* and of the CC, use the strategy of compensatory lengthening of the vowel in the structures CCV or (C)VC. The objective is to keep the temporal unit of the syllable, showing that the parameter of the structures is already fixed by the child[8,13-15]. With this knowledge, the doubt that presents itself is in relation to the reason that takes the children who have this strategy (showing the existence of the syllabic structure CCV in the underlay) and have the filler elements ([l, r]) in its phonetical inventory to not achieve successfully the structure target.

The difficulties in the characterization and understanding of the CC acquisition by children with PD that simplify this structure, that have the filler elements ([l] e [r]) in its phonetic inventory and use the strategy of compensatory lengthening (SCL) motivated the research, that has for objective to present relevant variables in the therapeutic process of the CC acquisition in children that perform the simplification of this structure.

■ METHODS

The participants in the study were selected at two public schools, at a philantropic school in Santa Maria and at the screening visits performed in the Speech Unit of the Phonology Service (UPS) at the original institution.

The inclusion criteria adopted in the research were: Informed Consent Form (ICF) signature by parents or responsibles; no performance of previous speech therapy; presence of CC simplification ($C^1C^2V \rightarrow C^1V$) in the phonological system;

presence of [r] e [l] in the phonetic inventory; monolingual speaking of BP; presence of SCL; age above 5:0; nonexistence of evident alterations in the neurological, psycological\emotional and cognitive aspects; hearing within the normality standards.

The children excluded were the ones those presented changes in the speech screening in some aspect of the language, except the phonological. They demonstrated changes in the stomatognathic system and failed in the hearing screening. No signature of the ICF, as the presence of changes in the neurological, psycological and ENT aspects were also considered exclusion criteria.

For the sample selection, it was made a speech screening, evaluation of the presence of SCL and complementary exams when there was suspect of neurological, cognitive, ENT or psycological changes.

It was performed, in the speech screening, the following evaluations: child phonological assessment – CPA[2]; language evaluation by a logical sequence; assessment of stomatognathic system (using the UPS protocol); articulatory exam (using UPS protocol) and hearing screening. When necessary, the children were forwarded to complementary exams (ENT, neurological and psycological evaluation).

In total, 154 children have been screened, both genders, ages between 5:0 and 7:0. From them, 38 presented speech alterations, however, 22 children were framed in exclusive factors of the research (execution of previous speech therapy, changes in oral motricity, emotional\cognitive changes). When the speech screening finished, considering the inclusion and exclusion criteria, 16 children were selected to usage analysis of SCL.

The SCL was verified from a recording, in silent environment, where the children should name in a spontaneous way or by delayed imitation pairs of pictures that contrast in the structure CCV x CV[16]. These speech records were analysed acoustically by the audio-processing software PRAAT (available at www.praat.org). In the analysis of the lengthening, it was confronted the vowel emission time in syllable with simplified CC and the emission time from the same vowel in a syllable with simple onset (ex.: *prato* – ['pa̱tu] x *pato* – ['pa̱tu]). Besides, the emission time of the fricative in the simplified CC was compared to the emission time from the same fricative in simple *onset* (ex.: *frio* – ['fi̱w] x fio – ['fi̱w]). The emission times were confronted to analyse the presence or the absence of the strategy studied. It was considered, in the identification of SCL occurrence, a value of 0,04s of difference among the obtained values to the pairs of analysed words. This value was stipulated based on BP writings

that investigated the length of vowels in different contexts[13,14,17,18].

For the study, only children that performed the SCL in 40% or more productions were accepted. Such percentage was stipulated according to the numbers considered for the acquisition of the phonemes in the phonological system, whereby, if the occurence is from 40 to 79%, the phoneme lies partially acquired[19]. So, the execution of a percentage equal or superior to 40% of SCL is a good indicative that the children start making the productive use of the strategy studied.

After the investigation of the productive use of SCL by the 16 children, it was verified that only 5 subjects attended to all the inclusion criteria in the research. As 1 subject has given up, the sample was constituted of the speech data from 4 children, 3 boys and 1 girl, ages between 5:4 e 7:7. The subjects were submitted to two weekly visits of speech therapy, with about 45 minutes each, until the achievement of 80% of right production[2,19], considered the parameter of CC acquisition. All the children were attended by the same therapist.

Two children received phonological based therapy, according to the model of Minimum Pairs minimum opositions related to the syllabic structure[20] and two received phonetic\articulatory therapy[21]. The choice of the therapeutical model for each children was carried out by a raffle. After the raffle, S1 and S2 were designated to receive phonological therapy and the S3 and S4, phonetic therapy. The phonological approach aims for a reorganization of the sound abstract system, while the approach to phonetic does an articulation work from the multisensory training, that searches the acess to phone\syllable target.

Every four sessions was performed polls to verification of the child progresses. And according to the obtained speech data on these polls, a data analysis was made for the resarch. The speech gathering was held in a silent environment and were transcribed by a restricted phonetic transcription. The transcriptions were revised by two other evaluators, speech therapy senior students, with experience in the area.

This way, a corpus of 457 observed words has been formed, in different moments, since the beginning to the end of the therapeutical process. The words containing CC have been analysed and codified according to the linguistic and extralinguistic variables and in accordance with the production, being considered as a dependent variable the right production or the used strategy.

Thereby, it was considered as dependent variables : the right production C^1C^2V, the simplification to C^1V, the liquid distortion, the liquid

substituition, the metathesis, the liquid semivocalization, the simplification to C^2V and the simplification to V.

To the analysis of the independent variables relevants during the therapeutical process of CC acquisition, were analysed the roles of the following factors :

- Extralinguistic variables: subject, phonological disorder degree, therapeutical model.
- Linguistic Variables: type of CC liquid, type of CC obstruent, tonicity, number of syllables, previous environment, successive environment, position in the word.

The subject variable was composed by the four children participants in the research (S1, S2, S3, S4). The disorder gravity degree, obtained from the initial evaluation, was classified according to the Percentage Consonants Correct (PCC)[22]. This percentage is obtained with the division of the right consonants number by the total number of consonants produced correct or incorrectly, multiplied by one hundred. From the PCC result, the PD is classified in severe (PCC < 50%), moderately-severe (50% < PCC < 65%), mildly-moderate (65% < PCC < 85%), and mild (85% < PCC < 100%). The analysed sample doesn't have subjects with severe PD degree. The *therapeutical model* was analysed as to the phonological therapy and to the phonetic therapy.

In the kind of CC liquid, the compounds were analysed by lateral liquid and by non-lateral liquid, the only possible at BP. The *types of obstruents* that form the CC in this study are /p, b, t, d, k, g, f, v/. The tonicity was analysed considering five variants – tonic, post-tonic, post-post-tonic, pre-tonic and pre-pre-tonic –, because the kind of structure analysed allows these occurrences. At the study data wasn´t observed CCs in words post-post-tonic, although they exist in BP (ex.: quilômetro, féretro, álgebra). The variable *number of syllables* was divided in: monosyllables, dissyllables; trisyllables and polysyllables. As to the previous environment, the classification was in an empty environment (when it was initial onset, ex. prato), consonants (having a *coda* as precedent, ex: estrela) and vowels. The vowels, both the previous environment as the *successive environment*, were categorized according to the classification of the V Point of Clements and Hume[23], labial/dorsal vowel (/o, ɔ, u/), coronal vowel (/e, ɛ, i/) and dorsal vowel (/a/). The onset position was also analysed in the word at initial position and at medial position.

This research was approved by the Ethics and Research Committee from a higher education institute under the protocol number of

107496/2002-0. The parents and/or responsible for the children involved in the project were properly informed about the objectives and procedures, allowing their participation by an ICF.

The data was classified and categorized according to the production of the children. The categorization was typed in a form at Microsoft Office Access Program 2003. The codification was used as data entrance in the statistic program used in the research, the computational package VARBRUL, analysed by the program VARBWIN. This group of programs is widely used in analysis in variationist linguistic, and besides being a specific program to the linguistic variation area, it was used with sucess in the data analysis of the language acquisition[4,6,7,15,14,24].

A probabilistic analysis in the binary form was made. It means that the program, by statistical calculations, atributed values related to the variants of the independent variables, in relation to two variables of the linguistic phenomenon in question, represented by the dependent variable. The margin of error worked was 5%, this way, any factor with significance below this value was not statistically expressive.

The relative values or probabilities of the occurrence of the phenomenon studied (right production of CC) were taken from the statistic interaction that contained, together, all the variables selected as significants by the program. The probabilistic values from .50 to 59 were considered neutral, which means, they were not favoring, not disfavoring of the phenomenon studied. The values above or equal .60 were considered favoring. The values below .50, were disfavoring of the phenomenon studied.

■ RESULTS

The following charts present the results obtained after the statistic program round. On these charts (Chart 1, Chart 2 and Chart 3) are presented all the variables analysed by the program, independent of presenting or not the statistic relevance.

In chart 1 are only the variable selected as statistically significants to the occurrence of the phenomenon studied. On the other charts (Chart 2 and Chart 3) are presented the extralinguistic and linguistic variables that weren't selected as statistically significants to the occurrence of the phenomenon, but that can be linguistic relevants, since this analysis depends on the researcher look.

For the composition of the charts, the occurrence probabilities of the phenomenon studied were listed (CC production), taken from the statistic interaction with statistic significance. The probabilistic values of the variables not selected as statistically significant,

were taken from the interactions with better significance, or, values closer to zero. These values are in bold on the charts.

The semivocalization variables, simplification to C^2V and simplification to V, cited in previous essays[6-8] about the CC acquisition, were not observed in the *corpus* analysed, because of that they don't appear on the charts.

■ DISCUSSION

The studying results indicate that, the milder the disorder severity, the bigger the chances of the right production of the CC structure occur. On the other hand, the bigger the severity degree of PD, the bigger the chances are of occuring the simplification of the structure (Chart 1). The result that goes to the study idea[25,] which refers that the number of phonological processes gets bigger as the disorder gravity gets too.

As to the kind of therapeutical approach, the phonetic – applied to S3 and S4 – showed bigger probability in the fulfillment of the right CCV, helping the articulation of the adjacent segment to the obstruent by the distortion and in the occurrence of metathesis (Chart 1). On the other hand, the phonological model (applied in S1 and S2) seemed to contribute to the CC simplification and liquid substituition (Chart 1 and Chart 2). It can be inferred that these results come from the possible adjacent phonological knowledge, verified by the acoustic analysis, since the difficulty of the children seems to be at the phonetic level and not in the language phonology[14,15]. With these children, the therapies that use a facilitator phonetic context to the right production obtain more sucess and speed, seeing that the difficulty seems to be in the translation of the phonological knowledge in an appropriated motor action [18,26,27].

The liquids /l/ e /r/ that form the CC showed relevance only to the liquid substitution strategy, being the lateral liquid favoring of the process (/l/ → [r]), while to the other variables (right production, metathesis, among others) weren't verified relevance. (Chart 3). It agrees on a study[6,7], that refers not having a domain order in the CC acquisition formed by a lateral or non-lateral liquid. The relevance of this variable to the substituition of the liquid can have sociolinguistic influence. Studies[28,29] that evaluated the occurrence of phonological processes in low-income pre-school children, observed that the substituitions among the older children restricted basically to the substituition of the liquid /l/ by the liquid /r/ in consonant clusters. Such result can be explained by the linguistic variant that the children were exposed.

Table 1 – Variables selected as statistically significant to the right production, to the CC simplification, to the distortion of the liquid of CC, to the occurrence of metathesis and to the substitution of the liquid of the CC.

Variable	CCV		CV		Distortion		Metathesis		Substitution	
	F	P	F	P	F	P	F	P	F	P
Subject										
S1									**3/60=5%**	**.65**
S2									0/205=0%	–*
S3									1/70=1%	.39
S4									0/122=0%	–*
Input										*.01*
Significance										*.001*
PD Severity										
Mild	**73/183=40%**	**.78**	80/183=44%	.25	**21/183=11%**	**.63**				
Mildly-moderate	**56/70=80%**	**.96**	10/70=14%	.07	0/70=0%	–*				
Moderately-severe	4/204=2%	.10	**192/204=94%**	**.87**	8/204=4%	.39				
Input		*.16*		*.71*		*.07*				
Significance		*.000*		*.000*		*.009*				
Therapeutical Model										
Phonological Therapy					13/263=5%	.47	1/263=0%	.25		
Phonetic Therapy					**16/194=8%**	**.54**	**8/194=4%**	**.81**		
Input						*.07*		*.01*		
Significance						*.009*		*.000*		
Type of liquid CC										
With /l/									**3/37=8%**	**.97**
With /r/									1/420=0%	.42
Input										*.01*
Significance										*.001*
CC obstruent										
/p/							1/100=1%	.34		
/b/							0/74=0%	–*		
/k/							1/35=3%	.59		
/g/							0/39=0%	–*		
/t/							1/91=1%	.40		
/d/							**6/39=15%**	**.92**		
/f/							0/71=0%	–*		
/v/							0/8=0%	–*		
Input								*.01*		
Significance								*.000*		

Statistical Test: VARBRUL   Value of p ≥ 0,05
Legend: CCV: right production; CV: CC simplification; F: frequency; P: probability or relative value; T: therapy; S: subject; PD: phonological disorder; CC: *consonant cluster*; *: categorical values do not generate relative values.

The tonicity was not statistically relevant to none of the strategies analysed (Chart 3). However, there is a high probability of right production in pre-pre-tonic syllables, disagreeing on a study[6] that suggests the post-tonic position favoring in the acquisition of CC formed by /r/. On the other strategies, only in the metathesis the tonicity seemed to have any influence, being again the pre-pre-tonic syllables favoring the strategy, which agrees partially with the study where the tonicity exerts a strong influence in the execution of the metathesis. It diverges from other research[24], whereby the occurrence of metathesis is not conditioned by the accent. However, both studies[1,24] are unanimous in declare that the occurrence of the metathesis happens mostly in direction to the tonic syllable, mainly in dissyllable words.

The polysyllabic words seemed to favor the right production of CCV and the execution of the metathesis. It disagrees on a study[30] that states being higher the chances of cancellation of the liquid as bigger is the word. Yet the monosyllabic words seem to favor the substitution of the liquid (Chart 3).

The kind of favoring *obstruent* of the right production of CC, in this study (/g/), is not taken

Table 2 – Extralinguistic variables not selected as statistically significants to the right production, to the CC simplification, to the distortion of the underlying liquid to CC, to the occurrence of metathesis and to the substitution of the forming liquid of the CC.

Variable	CCV		CV		Distortion		Metathesis		Substitution	
	F	P	F	P	F	P	F	P	F	P
Subject										
S1	**19/60=32%**	**.70**	31/60=52%	.32	**6/60=10%**	**.61**	1/60=2%	.33		
S2	5/205=2%	.11	**192/205=94%**	**.86**	8/205=4%	.37	0/205=0%	–*		
S3	**56/70=80%**	**.95**	10/70=14%	.07	0/70=0%	–*	3/70=4%	.56		
S4	**53/122=43%**	**.79**	49/122=40%	.23	15/122=12%	.67	5/122=4%	.55		
Input		.17		.70		.07		.04		
Significance		.000		.000		.010		.167		
PD severity										
Mild							6/183=3%	.48	3/183=2%	.51
Mildly-moderate							3/70=4%	.55	1/70=1%	.47
Moderately-severe							0/204=0%	–*	0/204=0%	–*
Input								.04		.02
Significance								.095		.280
Therapy Model										
Phonological Therapy	23/263=9%	.25	**223/263=85%**	**.75**					3/263=1%	.58
Phonetic Therapy	**110/194=57%**	**.82**	59/194=30%	.19					1/194=1%	.39
Input		.23		.66						.01
Significance		.000		.000						.474

Statistical Test: VARBRUL   Value of p ≥ 0,05
Legend: CCV: right production; CV: CC simplification; F: frequency; P: probability or relative value; T: therapy; S: subject; PD: phonological disorder; CC: *consonant cluster*; *: categorical values do not generate relative values.

as the favoring of the CCV acquisition (Chart 3), that suggests[6] the deaf plosive labial as favoring in the acquisition of the group formed by /l/ and the labial and sound obstruents in the acquisition of the CC compound by /r/. In the repair strategies of simplification and substitution of the liquid, the kind of obstruent that more favored was /v/ and /f/ respectively (Chart 3). Such finding agrees partially with the study[30] that indicates that when the first consonant that forms the CCV syllable is labiodental e not voiced obstruent, there is fostering of the cancelation of the coronal rhotic of the CC.

When the sounds are grouped to form words, they interect, influencing one another, this interection rises for many reasons, one of them is related to the basic mechanism or phisiological restrictions of the speech display, this interaction is nomitaded phonological environment[31.] In relation to the phonological environment, it can be highlighted that the previous context formed by consonants favor the simplification of the structure analysed (Chart 3). It can be due to the word structure presents a *coda* and, later, the CC, the two structures with higher degree of complexity in the production and later acquisition in BP[1,6,7,13,14]. In the successive environment, the dorsal vowel was relevant to the metathesis process, while the labial\dorsal vowels promoted a higher probability of the substitution of the liquid (Chart 3).

The onset position in the word seems to influence only the metathesis appearance. The result suggests that the position of the medial onset favors the appearance of metathesis (Chart 3), which is appointed by a study[32] that indicates the tendency of the metathesis to happen at the beginning of the word, in its first syllable. This neutral result in the production of CCV, observed on the position of the CC in the word, agrees on the study[6] where is not observed domain order to initial onset and medial onset in the normal and deviant acquisition.

Besides the *corpus* analysed to count with a considered number of data (457 produced words), these are decorrent of the therapy with a small number of subjects (4 children), not allowing the generalization of the findings. Still, the study has the intention of helping the speech clinic in choosing the stimulus word, that can control tonicity, number of syllables, favoring phonemes that favor the right production during the therapeutical process.

Besides, it comes from the idea that the children who use the repair strategies have a more sophisticated phonological knowledge, seeing the way they deal with the different targets of the language. This knowledge can be used as a prognosis.of the therapy.

Table 3 – Linguistic variables not selected as statistically significants to the right production, to the CC simplification, to the distortion of the underlying liquid to CC, to the occurrence of metathesis and to the substitution of the forming liquid of the CC.

Variable	CCV		CV		Distortion		Metathesis		Substitution	
	F	P	F	P	F	P	F	P	F	P
Type of CC										
With /l/	11/37=30%	.51	22/37=59%	.48	1/37=3%	.30	0/37=0%	–*		
With /r/	122/420=29%	.50	260/420=62%	.50	28/420=7%	.52	9/420=2%	§		
Input		.30		.62		.07		§		
Significance		.935		.775		.293		§		
Tonicity										
Tonic	89/313=28%	.49	195/313=62%	.51	20/313=6%	.49	5/313=2%	.44	4/313=1%	§
Post-tonic	19/66=29%	.50	39/66=59%	.47	5/66=8%	.54	**3/66=5%**	**.70**	0/66=0%	–*
Pre-tonic	19/64=30%	.51	41/64=64%	.52	4/64=6%	.49	0/64=0%	–*	0/64=0%	–*
Pre-pre-tonic	**6/14=43%**	**.65**	7/14=50%	.38	0/14=0%	–*	**1/14=7%**	**.79**	0/14=0%	–*
Input		.30		.62		.07		.03		§
Significance		.735		.759		.923		.218		§
Number of syllable										
Monossylable	11/48=23%	.42	33/48=69%	.58	3/48=6%	.48	0/48=0%	–*	**1/48=2%**	**.65**
Dissyllable	91/300=30%	.52	178/300=59%	.47	22/300=7%	.52	6/300=2%	.50	3/300=1%	.47
Trissyllable	20/80=25%	.45	55/80=69%	.58	4/80=5%	.42	1/80=1%	.38	0/80=0%	–*
Polissyllable	11/29=38%	**.60**	16/29=55%	.43	0/29=0%	–*	**2/29=7%**	**.78**	0/29=0%	–*
Input		.29		.62		.07		.02		.02
Significance		.423		.267		.694		.292		.442
Type of CC obstruent										
/p/	25/100=25%	.45	67/100=67%	.56	7/100=7%	.53			0/100=0%	–*
/b/	22/74=30%	.51	46/74=62%	.50	5/74=7%	.53			1/74=1%	.36
/k/	13/35=37%	.59	18/35=51%	.39	3/35=9%	.59			0/35=0%	–*
/g/	**15/39=38%**	**.61**	21/39=54%	.42	3/39=8%	.56			0/39=0%	–*
/t/	24/91=26%	.47	62/91=68%	.57	4/91=4%	.41			0/91=0%	–*
/d/	11/28=11%	.49	21/39=54%	.42	1/39=3%	.29			0/39=0%	–*
/f/	21/71=30%	.51	41/71=58%	.46	6/71=8%	.58			**3/71=4%**	**.65**
/v/	2/8=25%	.45	**6/8=75%**	**.65**	0/8=0%	–*			0/8=0%	–*
Input		.29		.62		.07				.03
Significance		.719		.390		.832				.029
Environment previous										
Empty	100/339=29%	.51	209/339=62%	.49	23/339=7%	.51	3/339=1%	.40	*4/339=1%*	§
Consonant	1/14=7%	.16	**13/14=93%**	**.89**	0/14=0%	–*	0/14=0%	–*	*0/14=0%*	–*
Labial/dorsal vowel	5/17=29%	.51	11/17=65%	.53	1/17=6%	.47	0/17=0%	–*	*0/17=0%*	–*
Coronal vowel	19/58=33%	.55	32/58=55%	.43	4/58=7%	.52	**3/58=5%**	**.80**	*0/58=0%*	–*
Dorsal vowel	8/29=28%	.49	17/29=59%	.46	1/29=3%	.34	**3/29=10%**	**.89**	*0/29=0%*	–*
Input		.29		.63		.07		.02		§
Significance		.332		.080		.889		.008		§
Suc. Environment										
Labial/dorsal vowel	29/102=28%	.49	61/102=60%	.48	9/102=9%	.59	1/102=1%	.35	**2/100=2%**	**.73**
Coronal vowel	51/179=28%	.49	113/179=63%	.51	11/179=6%	.50	3/179=2%	.48	1/179=1%	.43
Dorsal vowel	53/176=30%	.51	108/176=61%	.50	9/176=5%	.45	**5/176=3%**	**.61**	1/176=1%	.43
Input		.30		.62		.07		.02		.01
Significance		.932		.855		.490		.518		.482
Position in the word										
Initial Onset	100/339=29%	.50	209/339=62%	.50	23/339=7%	.52	3/339=1%	.39	*4/339=1%*	§
Medial Onset	33/118=28%	.49	73/118=62%	.50	6/118=5%	.44	**6/118=5%**	**.79**	*0/118=0%*	–*
Input		.30		.62		.07		.02		§
Significance		.757		.971		.490		.010		§

Statistical Test: VARBRUL   Value of p ≥ 0,05

Legend: CCV: right production; CV: CC simplification; F: frequency; P: probability or relative value; T: therapy; S: subject; PD: phonological disorder; CC: *consonant cluster*; *: categorical values do not generate relative values.

■ CONCLUSION

Based on this study it was possible to achieve the goals proposed. It was found that the variable model of therapy is favorable to the best performance of the children that use the SCL, because they obtain a better performance in the CC acquisition when submitted to the therapy with phonetic/articulatory base.

As to the relevant variables during the therapeutical process of CC acquisition by children with PD that simplify this structure, they have the filler elements ([l] e [r]) in their phonetic inventory and use the SCL, it was noted that the extralinguistic variable, PD severity, is important to the success of the therapy (right production of CCV) as well as to the use of the repair strategies. Besides, it was observed that the children with indications of underlying phonological knowledge, who receive different kinds of therapy, answer with a different way to each of them, with better performance in the phonetic therapy.

Related to the linguistic variables, it was observed that the type of liquid component of the CC seems not to be important to the therapeutical process for the right production, but to the CC structure. Other linguistic variables, as previous and successive environments and the position in the word, also do not show so relevant to the therapeutical process. However, the linguistic and extralinguistic variables and variants can indicate what disadvantage the right production of CCV helping, this way, the selection of targets for the phonological therapy.

With that, the aim is to help the speech therapist in the selection of stimulus words for the therapy, reflecting on the therapeutical model to use in children that have already presented an underlying phonological knowledge, especially to the individual variations of each subject.

RESUMO

Objetivo: apresentar variáveis relevantes no processo terapêutico de aquisição do *onset* complexo (OC) em crianças que realizam a simplificação dessa estrutura. **Métodos:** participaram do estudo quatro crianças com diagnóstico de desvio fonológico (DF), com idades entre 5:4 a 7:7, que utilizavam a estratégia de alongamento compensatório (EAC), possuíam [ɾ] e [l] no seu inventário fonético e realizavam a simplificação do OC. As crianças foram submetidas a diferentes modelos terapêuticos e, a partir dos dados obtidos nas sondagens, realizaram-se análises das variáveis linguísticas e extralinguísticas relevantes durante o processo terapêutico. A análise dos dados de fala foram realizadas por meio do programa estatístico VARBRUL. **Resultados:** a variável gravidade do desvio foi a que o programa selecionou como relevante para a produção correta do OC, para sua simplificação e para a distorção da líquida da estrutura. Ele apontou que quando o sujeito é submetido à terapia articulatória (TA), há maior probabilidade de ocorrência de produção correta de CCV, realização de distorção e metátese. O fonema /d/ se mostrou favorecedor da estratégia de metátese. A substituição da líquida foi influenciada pela variável sujeito e pelo tipo de líquida formadora do OC. **Conclusão:** quanto às variáveis, a gravidade do DF mostra-se importante tanto para o sucesso da terapia (produção correta de CCV), como para o uso de estratégias de reparo. Observou-se que aplicar tipos de terapia distintos faz com que as crianças respondam de forma diferenciada a cada um deles, com melhor desempenho na TA.

DESCRITORES: Fonoterapia; Transtornos da Articulação; Acústica da Fala; Fonética

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