Comparative study about the acquisition of obstruents at two municipalities with different linguistic influences

Estudo comparativo sobre a aquisição das obstruintesem dois municípios com diferentes influências linguísticas

Estudio comparativo sobre la adquisición de las obstruintes en dos municipios con diferentes influencias lingüísticas

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Abstract

Objective: Verify the acquisition of obstruents in children speech with typical phonological development of two cities in Rio Grande do Sul, Brazil, who have different linguistic varieties. Methods: Seventy two children participated in the study, 36 of Santa Maria city, 36 of Agudo city, ages 1:0 and 4:0 (years: months). The corpus of Santa Maria was composed of 3,178 obstruents analyzed and 3,847 at Agudo. In the dependent variable correct and incorrect productions (repair strategies) were considered. The extralinguistic variables considered were age, sex, input type and the linguistic were metrical foot, number of syllables, preceding syllable and following context, word position, grammatical class, sonority and class of obstruent. Statistical analysis used the VARBRUL package, with a 5% of significance.Results: The results were similar for the two municipalities. For Santa Maria, significant intervening variables were: age, metrical foot, number of syllables, class of obstruent and the preceding syllable and following context. For Agudo were selected the same variables, replacing the number of syllables by sonority. The variable

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input type was selected in a single group, as well as age. Conclusion: There were more similarities than differences in intervening variables which influence the acquisition of obstruents. Therefore, it seems no dialectal influence in the acquisition of sonority contrast of the segments in the study, which could occur due to the desonorization characteristic in speech of adults living in the city of Agudo.

Keywords: speech; language development; phonetic; child development; child, preschool

Resumo

Objetivo: Verificar a aquisição das obstruintes na fala de crianças com desenvolvimento fonológico típico em dois municípios do Rio Grande do Sul que possuem diferentes variedades linguísticas. Métodos: Fizeram parte do estudo 72 crianças, 36 do município de Santa Maria, 36 de Agudo, com idades entre 1:0 e 4:0 (anos:meses). O corpus de Santa Maria ficou composto por 3.178 obstruintes analisadas e o de Agudo por 3.847. Como variável dependente considerou-se a produção correta e incorreta (estratégias de reparo). As variáveis extralinguísticas consideradas foramidade, sexoetipo de input,e as linguísticas foram pé métrico; número de sílabas; contexto silábico precedente e seguinte; posição na palavra; classe gramatical; sonoridade e classe da obstruinte. Utilizou-se para a análise estatística o pacote VARBRUL, com significância de 5%. Resultados: Os resultados foram semelhantes para os dois municípios. Para Santa Maria, as variáveis intervenientes significantes foram: idade, pé métrico, número de sílabas, classe da obstruinte e contexto precedente e seguinte. Para Agudo foram selecionadas as mesmas variáveis, substituindo o número de sílabas pela sonoridade. A variável tipo de inputfoi selecionada no grupo único, bem como a idade. Conclusão: Ocorreram mais semelhanças do que diferenças nas variáveis intervenientes que influenciam a aquisição das obstruintes. Dessa forma, parece não haver influência dialetal na aquisição do contraste de sonoridade dos segmentos em estudo, que poderia ocorrer em virtude da característica de dessonorização na fala de adultos residentes no município de Agudo.

Palavras-chave: desenvolvimento da linguagem; fonética; desenvolvimento infantil; pré-escolar.

Resumen

Objetivo: *Verificar la adquisición de las obstruintes en el habla de niños con desarrollo fonológico típico en dos municipios del Rio Grande do Sul que tinem diferentes variedadeslinguísticas.****Métodos:*** *Hicieron parte del estudio 72 niños, 36 del municipio de Santa Maria, 36 de Agudo, con edades entre 1:0 y 4:0 (años:meses). El corpus de Santa Maria se quedó con 3.178 obstruintes analizadas y de Agudo con 3.847. Como variable dependiente se consideró la producción correcta y incorrecta (estrategias de reparo). Las variables extralingüísticas consideradas fueron edad, sexo, tipo de inputy las lingüísticas fueron pie métrico; número de sílabas; contexto silábico anterior y siguiente; posición en la palabra; categoría gramatical; sonoridad y categoría de la obstruiente.Se utilizó para el análisis estadístico el paquete VARBRUL, con significación del 5%.* ***Resultados:*** *Los resultados fueron semejantes para los dos municipios. Para Santa Maria, las variables intervinientessignificativas fueron: edad, pie métrico, número de sílabas, categoría de la obstruinte y contexto anterior y siguiente. Para Agudo fueron seleccionadas las mismas variables, substituyendo el número de sílabas por la sonoridad. Las variables tipo de inputy edad fueron seleccionadas enel grupo único.* ***Conclusión:*** *Ocurrieron más semejanzas que diferencias en las variables intervinientes que influencian la adquisición de las obstruintes. Así, parece no existir influencia dialectal en la adquisición del contraste de sonoridad de los segmentos en estudio, que podría ocurrir por la característica de desodorización enel habla de adultos ubicadosenel municipio de Agudo..*

Palabras clave: *habla; desarrollo del lenguaje; fonética; desarrollo Infantil; pre-escolar.*

Introduction

During the language development, there is acquisition and productive use of different linguistic units by children, gradually, in a non linear way and with individual variation. The end of this phonological process, when children are about five years old, results in the development of children's target language[1,2].

The discontinuity observed during language acquisition is known as "U-shaped" curve, characterized by moments of correct performance, followed by incorrect performance and, finally, the correct behavior appears again. It is believed that this type of phenomenon is a result of some linguistic knowledge reorganization[3,4].

In Brazilian Portuguese, the phonological acquisition presents definite patterns of segments acquisition, such as vowels >> plosives, nasals >> fricatives >> liquids and the syllable structures V, CV >> CVV >> CVC >> CCV[5]. In these segments acquisition path, it is observed that plosive consonants are the first consonantal segments class to be acquired, established before two years old. In Brazilian Portuguese (BP), the plosive consonants are the labials /p/ and /b/, the coronals /t/ and /d/ and the dorsal /k/ and /g/[6].

Next, the fricative phonemes emerge in segmental acquisition. This class of sounds presents phonemes with initial acquisition (/f/ and /v/) and phonemes with late acquisition (/s/, /z/, /S/ and /Z/). All of them are acquired before three years old. In BP, the fricative phonemes are the labial /f/ and /v/, [+ anterior] coronal /s/ and /z/, and the [- anterior] coronal /S/, /Z/[7].

Although there is a phonological acquisition pattern, it is observed that the factor "geographic location" may condition differences, because of BP dialectal variation[8,9]. Studies about linguistic variation and language acquisition verify the necessity of considering children's exposure to sociolinguistic variants of their community, not to consider linguistic variability as atypical phonological development[9,10].

Therefore, for this research, two cities were selected, with different speech influence: Santa Maria (RS) and Agudo (RS). In Santa Maria, there is not predominance of a specific dialect. On the other hand, Agudo is a city with German immigration, where part of the population is not only descendent of German, but also speaks German (Hunsrückischdialect). In Brazilian Portuguese speakers from Agudo, it is common to observe interference of German dialects, exchanges from 'strong r' to 'weak r', such as 'caroça' ([ka'□□sa]) to 'carroça' ([ka'R□sa]), from voiced consonants to voiceless consonants, such as from 'puraco' ([pu'□ako]) to 'buraco'(10)([bu'□ako]).

In this context, it was investigated the hypothesis that the monolingual children from Agudo would have different acquisition time of obstruent sound contrasts (plosives and fricatives) when compared with children from Santa Maria. It is believed that this difference occurs because of the input, by the influence of the voiceless dialect variant use by most of that population, as this mixed variety (influence of two languages in a linguistic aspect) is heard in schools, houses and community[11]. In Santa Maria, however, children, since they are born, receive as voiced input the phonemes /b, d, g, f, z, Z/. It does not cause phonemic categorization mistakes.

Another motivation for this investigation is that some studies report the influence of the German dialect in writing acquisition[10,12], but researches about the path of oral language acquisition are limited[8,9]. So, the presented data may contribute to more studies regarding dialect influences in language acquisition.

So, this study has the purpose of approaching both sound classes, previously mentioned, aiming at verifying the acquisition of voiced and voiceless obstruents and their dialect marks in speech of children with typical phonological development from two cities - Santa Maria (RS) and Agudo (RS), observing which are the intervening variables in the acquisition of these segments.

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Methods

The present research, quantitative, explanatory, experimental and cross-sectional used data from 72 children from public preschools, 36 interviews from Santa Maria – RS (G1) and 36 interviews from Agudo – RS (G2). The children presented

typical phonological development, age between 1:0 and 4:0 (years:months), all monolingual Brazilian Portuguese speakers. Each group consisted of 18 girls and 18 boys, one girl and one boy per age group, a total of 18 age groups divided in intervals of two months. The analyzed speech samples come from databases from two research projects from a university, both approved by the ethics committee, numbers 064/2004 and 05756612.6.0000.5346.

In order to include the children in the researches, the parents and/or guardians were briefly interviewed, to get information about pregnancy, birth, linguistic and motor development, clinical history, current behavior and general aspects about family history and dynamics. In Agudo, it was also applied a questionnaire to parents and/or guardians and teachers to verify the type of input received by the children, in order to ensure that they are monolingual Brazilian Portuguese speakers.

The sample subjects' participation was authorized through the informed consent by part of the children's guardians and also the oral consent. Thus, it was performed speech and hearing screening with the following evaluations: hearing screening, evaluation of the stomatognathic system, voice and language.

To be part of the samples (G1 and G2), the children should be in their language acquisition period, with typical development (expected development for their age group), not be receiving or have not received speech and hearing therapy.They should present normal hearing and they should not present evident neurological, emotional or cognitive impairments, which are relevant to speech production.

The sample collection procedure was performed through the instrument Children Phonological Assessment (CPA)[13] which consists of five thematic pictures (toilet, kitchen, living room, vehicles and zoo), using also selected objects and toys, based on this evaluation instrument. This evaluation tool enables the spontaneous naming of all contrastive phones of Brazilian Portuguese in all positions that they may occur, considering syllable and word. The speech data were recorded and phonetically transcribed, using restrict phonetic transcription. The collections were reviewed and analyzed by the researcher and by an experienced speech language pathologist and audiologist.

All words with obstruents (plosives and fricatives) in initial and medial onset were part of the corpus and, when the word presented more than one obstruent, it was codified more than once, according to its production (Ex.: boneca). So, the group from Santa Maria consisted of 3,178 analyzed obstruents and the group from Agudo consisted of 3,847 analyzed obstruents.

In both groups the same variables were considered. For the dependent variable the considered variants were the following: correct production (Ex.: bolo (cake) - ['bolu]), syllable or segment omission (Ex.: bicho (animal) – ['bi0]), devoicing (Ex.: dedo (finger) – ['detu], posteriorization (Ex.: urso (bear) – ['uSu]), anteriorization (Ex.: janela (window) – [za'n la]), fricative plosivization(Ex.: saia (skirt) – ['taya]) and others (metathesis, for instance – Ex.: televisão (television) – [tevili'zãw]). In this study, however, because of its purposes, only data regarding correct production will be analyzed.

The considered variants and variables to categorize the independent variables were:

a) Independent extralinguistic variables:

- sex: female and male;
- age: between 1:0 and 4:0 divided in 18 age groups;
- type of input: Santa Maria and Agudo.

b) Linguistic independent variables:

- metrical foot: head (Ex.: gos(toso) (tasty)), weak part of the foot (Ex.: gos(toso)), out of the foot (Ex.: gos(toso)), extra-metrical (Ex.: (lâmpa)<da> (lamp));
- number of syllables: monosyllable, disyllable, trisyllable and polysyllable (Ex.: pé; ga-to; tu-ba-rão; tar-ta-ru-ga, respectively);
- precedingphonologicalcontext: empty (Ex. 0Bola (ball)), coronal vowel (Ex.: peixe (fish)), dorsal vowel (Ex.: pato (duck)), labial vowel (Ex.: copo (cup)), consonant (coda)(Ex.: tartaruga (turtle));
- following phonological context: coronal vowel (Ex.: peixe (fish)), dorsal vowel (Ex.: pato), labial vowel (Ex.: bola);
- word position: initial onset (Ex.: bola) and medial onset (Ex.: peixe);
- speech part: content word (Ex.: boi (ox)) and functional word (Ex.: esse (this));
- sonority: voiceless (Ex.: pato) and voiced (Ex. bola);
- obstruent class: plosive (p,b,t,d,k,g) and fricative (f,v,s,z,S,Z).

The data were codified in a form of the program Microsoft Access, one for each city, which

was used to perform the analysis in the statistical program VARBWIN, through which it was verified the results significance.

The statistical program VARBRUL[14] in Windows environment, known as VARBWIN[15] has been used with language acquisition data, because it provides frequencies and probabilities about the studied phenomena, and it selects relevant variables in the phonological acquisition process.

The program VARBRUL consists of six basic programs: CHECKTOK, READTOK, MAKECELL and IVARB or TVARB or MVARB. The CHECKTOK corrects the entrance data, in case they present some typing/codification mistake, providing correct data. The READTOK transforms the data corrected by the CHECKTOK, and it generates new data with changes. The data generated by the READTOK are received by a third program, the MAKECELL, which prepares the data to be performed by the VARB2000.

The VARB2000 makes probabilistic analysis in binary way. It means that this program, through statistical calculation, attributes relative weights to the variants of the independent variables, in relation to two variants of the approached linguistic phenomenon, represented by the dependent variable. It works with a margin of error of 5%. It indicates that any factor with significance below this value is not considered as statistically expressive.

The probabilistic values are taken from interaction among variables which contain, jointly, all the variables which were selected as significant by the program. These factors are statistically significant and they play an essential role in the studied phenomenon. So, the relative weights under .50 are considered as not favorable; from .50 to .59, neutral; and equal or over .60, favorable.

The procedure to perform statistical analysis happened through isolated program use trials (G1 or G2) and after, they were analyzed in a unique group (G1 + G2), in order to evaluate the role of the variable input type.

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Results

Figures 1 and 2 present the obtained results considering the percentages of correct production of obstruents in both cities, according to the age groups. Based on this data, it is observed that in both profiles the obstruent acquisition presents regression. Besides, it is verified high frequencies of correct production since the initial period of phonological acquisition (1:0).

The correct productions reach more than 90%, stabilizing after the age group 2:6 in Santa Maria (G1) and in Agudo (G2). In Agudo (G2) there is more instability. It is verified even after this period low decrease of correct production in ages 3:0-3:1;29 and 3:4-3:7;29.

These findings expressed a similar developmental curve.

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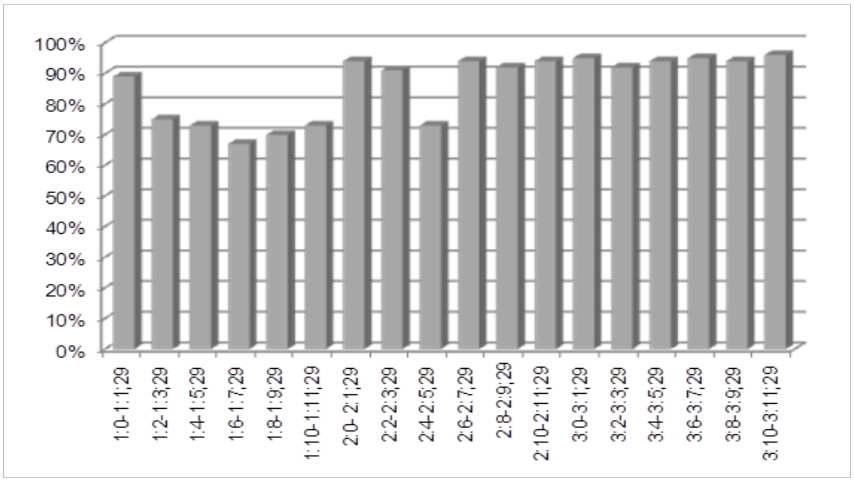
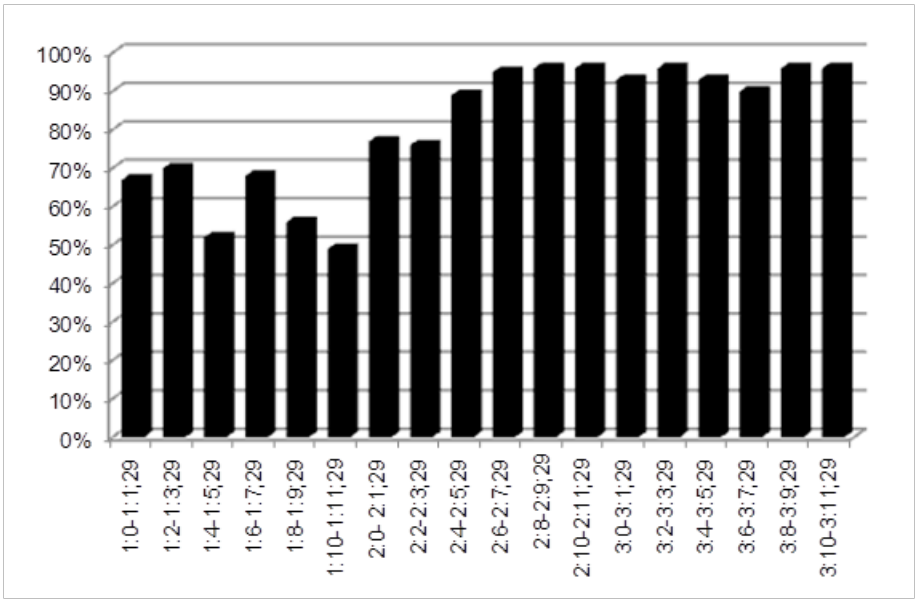


FIGURE 1. PERCENTAGE OF CORRECT PRODUCTION PER AGE GROUP IN SANTA MARIA



In relation to the sound contrast, the results expressed higher percentage of correct production of voiceless plosives in both groups, while the voiced fricatives were the segments less correctly produced (Figure 3). The results were very similar in both cities, as both groups developed similar phonological development general lines, such as the "U-shaped curve", what may indicate absence of dialectal influence in the acquisition of the studied segments.

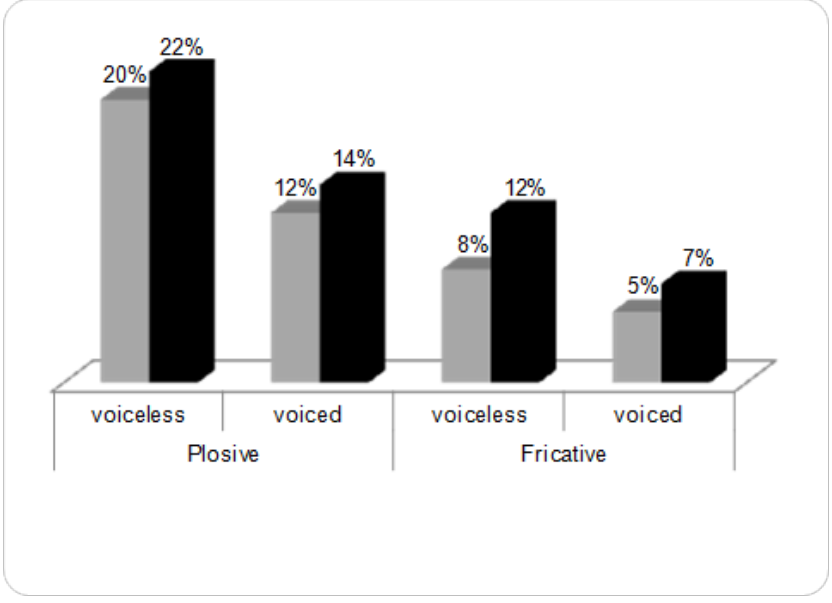


FIGURE 3. PERCENTAGE OF OBSTRUENTS CORRECT PRODUCTION IN RELATION TO THE VARIABLES SONORITY AND OBSTRUENTS CLASS IN G1 AND G2
Legend: Santa Maria Group; Agudo Group

About the general results of the intervening variables, the ones selected as statistically relevant for obstruents correct production in both cities were age, metrical foot, number of syllables, preceding phonological context, following phonological context, sonority and obstruent class. In Santa Maria (G1), specifically, the significant variables were age, metrical foot, number of syllables, preceding and following phonological context, and obstruent class. In Agudo (G2) the selected variables were: age, metrical foot, preceding and following phonological context, sonority and obstruent class.

Regarding the linguistic variables (Table 1), the results by children from Santa Maria (G1) expressed that, about the obstruent class, the fricatives (/f,v,s,z,S,Z/) presented favorable relative weight for correct production, as well as two syllable words (disyllable). About the preceding and following phonological contexts, it is perceived that the obstruent preceded by labial vowel (Ex.: poço (well)), dorsal vowel (Ex.: café (coffee)) and by coronal vowel (Ex.: peixe (fish)), and followed by dorsal vowel (Ex.: faca (knife)) and labial vowel (Ex.: foca (seal) presented higher probability to benefit correct production of those consonants. The results for the variable sonority detected that the voiceless obstruents (/p, t, k, f, s, S/) are more favorable, but it was not a significant variable.

In Agudo (G2) the results were the following: higher frequency of correct production for monosyllable words; neutral relative weights for plosives (/p, b, t, d, k, g/) and for voiced phonemes (/b, d, g, v, z, Z/); favorable relative weights (over .60) for preceding and following phonological contexts with labial vowel (Ex.: sofá (couch) and bola (ball), respectively).

In both samples (G1 and G2) the probability of obstruent correct production was higher when in the head of metrical foot position (Ex.: gos(toso) (tasty)), in tonic syllable (Table 1).

TABLE 1. RELEVANT LINGUISTIC VARIABLES IN THE CORRECT PRODUCTION OF OBSTRUENTS IN G1 AND G2

G1		VARIABLES / VARIANTS	G2	
F	RW		RW	F
		Metrical foot		
1384/1423=97	**.78**	Head of the metrical foot	**.66**	**1431/1522=94**
738/887=83	.11	Weak partof the metrical foot	.38	979/1120=87
816/868=94	.51	Out of the metrical foot	.41	1076/1205=89
		Number of syllables		
249/262=95	.43	Monosyllables	-	166/175=95
1555/1671=93	.60	Disyllables	-	1624/1782=91
883/963=92	.42	Trisyllables	-	1251/1379=91
251/282=89	.29	Polysyllables	-	445/511=87
		Preceding phonological context		
1474/1539=96	.44	zero / no	.52	1617/1762=92
317/341=93	**.72**	Coronal vowel	.54	531/591=90
405/437=93	**.61**	Dorsal vowel	.54	648/700=93
265/288=92	**.61**	Labial vowel	**.69**	**311/326=95**
477/573=83	.38	consonant (coda)	.22	379/468=81

		Following phonological context		
824/989=83	.12	Coronal vowel	.32	1075/1260=85
1005/1045=96	.65	Dorsal vowel	.57	1373/1469=93
1109/1144=97	**.75**	Labial vowel	**.62**	**1037/1117=93**
		Sonority		
1847/1984=93	-	Voiceless	.47	2130/2381=89
1091/1194=91	-	Voiced	.55	1356/1466=92
		Obstruent class		
2063/2254=92	.45	Plosive	.54	2308/2526=91
875/924=95	**.63**	Fricative	.43	1178/1321=89
.000		**SIGNIFICANCE**	**.024**	

Legend:statistically significant values, with significance level of 5% ($p<0.05$); (G1) = Santa Maria group; (G2) = Agudo group; (RW) = relative weight; (F) = frequency; (-) = variables not selected as statistically significant

In table 2, there are results from the extralinguistic variables in G1, G2 and in the unique group (G1+G2). The final and intermediate ages were favorable to the obstruents correct performance, as individually as in a unique group. So, it is concluded that the obstruents correct production would be more favorable as the subjects get older, when their phonological system is closer to the adult target.

The variable type of input was statistically significant to correct production. Children from Santa Maria (G1) presented higher probability of plosives and fricatives correct production. Santa Maria (G1) was considered by the program VARBRUL as neutral and Agudo (G2) was considered as not favorable. About frequency, it is observed that the children from both groups produced the obstruents correctly most of the times. Although the results pointed to equivalent frequencies, it must be highlighted that the relative weight from Santa Maria (G1) was higher than the relative weight from Agudo (G2).

The statistical analysis did not select the variable sex as important extralinguistic variable.

TABLE 2. RELEVANT EXTRALINGUISTIC VARIABLES IN THE CORRECT PRODUCTION OF OBSTRUENTS IN G1, G2 AND UNIQUE GROUP

VARIABLES	VARIANTS	G1		G2		UNIQUE GROUP	
		RW	F	RW	F	RW	F
Age	1:0– 1:1;29	.22	8/9=89	.17	2/3=67	.26	10/12=83
	1:2– 1:3;29	.01	3/4=75	.12	7/10=70	.17	10/14=71
	1:4– 1:5;29	.13	8/11=73	.05	15/29=52	.10	23/40=57
	1:6– 1:7;29	.08	2/3=67	.10	13/19=68	.16	15/22=68
	1:8– 1:9;29	.04	23/33=70	.06	24/43=56	.11	47/76=62
	1:10 – 1:11;29	.10	82/112=73	.05	40/81=49	.11	122/193=63
	2:0– 2:1;29	.47	303/324=94	.18	128/166=77	.35	431/490=88
	2:2– 2:3;29	.49	211/232=91	.15	122/160=76	.30	333/392=85
	2:4– 2:5;29	.07	35/48=73	.37	264/296=89	.36	299/344=87
	2:6– 2:7;29	.45	145/154=94	**.60**	**299/316=95**	.58	444/470=94
	2:8– 2:9;29	.41	282/306=92	**.66**	**292/304=96**	.55	574/610=94
	2:10 – 2:11;29	.56	254/271=94	**.65**	**342/358=96**	.59	596/629=95
	3:0– 3:1;29	.59	248/261=95	.51	328/354=93	.54	576/615=94
	3:2– 3:3;29	.50	201/218=92	.66	340/355=96	.58	541/573=94
	3:4– 3:5;29	.59	199/211=94	.53	321/346=93	.53	520/557=93
	3:6– 3:7;29	**.63**	**395/414=95**	.43	281/311=90	.51	676/725=93
	3:8– 3:9;29	.59	279/296=94	.65	301/314=96	.60	580/610=95
	3:10 – 3:11;29	**.65**	**260/271=96**	.67	367/382=96	.66	627/653=96
*Input type	Santa Maria					.55	2938/3178=92
	Agudo					.46	3486/3847=91
SIGNIFICANCE		.000		.024		.000	

Legend:statistically significant values, with significance level of 5% ($p<0.05$); (G1) = Santa Maria group; (G2) = Agudo group; (RW) = relative weight; (F) = frequency; (*) = variable considered only for the unique group statistical program operation

Discussion

The presented data expressed that, in the process of obstruents acquisition in Santa Maria (G1) and Agudo (G2) there was use regression. This regressions during phonological acquisition are called "U-shaped" curves, which are characterized by three phases: first, there is correct performance; then, there is incorrect performance; and, finally, the correct performance starts again until the acquisition[3,4]. This non linearity in acquisition was observed in both G1 and G2. In these cases, only after the age of 2:6 the correct production of the studied phonemes was stabilized. Researches verify the same phenomenon regarding plosive and fricative phonemes, showing that there is usually a production decrease in, at least, one age group[6,16,17].

There were also some particularities in this process: high frequency of correct production in the age group of 1:0 in Santa Maria (G1) and periods of low decreases in the obstruent production after 2:6 in Agudo (G2). The presented characteristics are, probably, related to individual variation of speakers from some age groups. This fact should be considered in researches about the process of phonological development(1). However, when these productions are observed in percentage figures (Figures 1 and 2), the curves of both groups are similar, indicating that the children from both cities acquire the obstruents in equivalent period. It could mean no interference of another language in the acquisition of these segments. This result disagrees with information from other studies with different population, which identified different periods of

stabilization of a specific segment, according to each population, with interference of dialectal variation in language acquisition[8,9].

In relation to the sonority contrast, again, the evidences revealed that, about frequency of production, there is not visible dialectal influence in the acquisition of obstruents in both groups, as there were similar percentages between the production of voiced and voiceless phonemes. There is not apparent difficulty to produce this contrast. Even so, it is highlighted that, as in other results (Table 1), the variable sonority was selected only in Agudo (G2), with the voiced variant with higher relative weight than in Santa Maria (G1), even being neutral (neither favorable nor non favorable to the studied phoneme). A possible explanation is that children from Agudo are more attempt to the contrast [+voz], because most of the adult population from this city devoices the voiced obstruents. This fact could produce a phonemic sensitivity in the acquisition process, with the purpose of performing the correct semantics, as the adult targets are variable (ex: for the target /vaka/ (cow) sometimes the input is [ˊvaka] (cow) or sometimes it is [ˊfaka] (knife), what could create semantic confusion).

For G1 and G2, the voiceless plosives are the segments with the highest correct production index, while the voiced fricatives present reduced percentage of correct production. In the acquisition order of the obstruent class, usually the voiceless consonants are acquired before the voiced and plosives, before the fricatives[1,18]. It may justify the high index of voiceless plosives correct production in both cities. This tendency was also perceived in longitudinal description of speech data by a child in process of normal language acquisition, with initial and final age of 1:6 and 2:6, respectively. In this case, the voiceless plosive phonemes (/k/ and /p/) were correctly used since the first collections[2]. Studies also verify that, while the voiceless plosives are firstly acquired, in fricatives the voiced phoneme is acquired before its voiceless pair[6,7].

It is important to observe that in the process of obstruents acquisition, children have to establish oppositions based on several features, one of them is the [sound] feature. The sonority feature corresponds to important differentiation between pairs (voiceless and voiced) of these phonemes: /p/ x /b/; /t/ x /d/; /k/ x /g¬/; /f/ x /v/; /s/ x /z/ e /S/ x /Z¬/. It causes the differentiation between the lexical items, such as "faca" (knife) versus "vaca" (cow)[13,18].

In relation to the sonority contrast, the findings from Santa Maria (G1) and Agudo (G2) agree with the findings from Jardim – Azambuja[19], who performed a study in order to describe and analyze the emergency order of the sonority contrasts and articulation point of Brazilian Portuguese monolingual speakers. In this study, there were two girls and two boys during the period from 1:0 to 1:6. The author perceived that the contrast emergency occurred first in plosives and that the sonority differentiation was the first one to occur for all children.

In this study, it was also considered the influence of linguistic and extralinguistic factors in the obstruents acquisition of the studied corpora. Several researches investigated the interference of these elements in the acquisition of different sound classes and syllable structures. This idea is important to the preparation of more effective therapy[16,17,20,21].

Considering the selected linguistic factors (Table 1), there seems to be higher number of selected variants in Santa Maria (G1). However, it is perceived, again, some similarities between both populations (number of syllables, phonological contexts and metrical foot).

In Santa Maria (G1), the favorable variants for correct obstruent production were: fricatives, disyllables, voiceless, in tonic syllable (head of the metrical foot), with following context filled in by dorsal and labial vowel and all vowels were selected to fill in the preceding context (dorsal, labial and coronal). In Agudo, the variants were: plosives, monosyllables, voiced, in tonic syllable (head of the metrical foot), with following and precedent phonological contexts filled in by labial vowel.

The results for the variable number of syllables (disyllables for G1 and monosyllable for G2) agree with another study, as words with longer syllabic structure are more rare in children's lexicon[22]. On the other hand, a research found that, in relation to fricatives, the favorable environment to correctly produce these segments would be polysyllable words[17].

About tonicity (metrical foot), a study performed in Brazilian North East region verified that this variable was not an influent factor in the correct production of most coronal fricatives[22], while, in Brazilian South, the tonicity influenced the fricatives acquisition when in pre and post-tonic syllable[16,17] and the acquisition of plosive consonants in tonic syllable (head of the metrical

foot)[5]. This last data agrees with the findings of the present investigation in the tonicity aspect, in both studied cities.

The interference of the variable preceding and following phonological context, during acquisition, occurred for both groups. In G1, more vowels were selected in both contexts. In a study about the fricative segments /s/ and /z/, the vowel with the highest influence in following context was the coronal /e/ and ,for preceding context, it was the coronal vowel / /[16]. In another study, also about fricatives, the precedent phonological context was favored by the labial vowel /o/ for the segment /v/ and by the coronal vowel /e/ for /f/. In the following context, the labial vowels were favorable for the segments /f/, /v/ and /S/ [19]. In Santa Maria (G1), the coronal vowel was also favorable to the precedent phonological context and the labial vowels were favorable for the following context in fricatives.

In the acquisition of plosives, the coronal and labial vowels favor the correct production in following context[5], as it happened in Agudo (G2) for the precedent and following phonological context filled in by labial vowels.

The analysis of the influence of extralinguistic context (Table 1) concerned three variables: age, sex and type of input. From them, only the variable sex was not selected as favorable, what also may be observed in researches about typical development, which showed that the extralinguistic variable sex does not influence the BP phonological acquisition in all situations[23,24].

In relation to age, as in individual statistical program operation, as in operations with a unique group, the intermediate and final age groups favored the obstruents correct performance. It was expected, because there is higher benefit for correct production as age increases[25]. This tendency of stabilization in advanced ages is possible to be observed in results through the percentage figures (Figure 1 and 2). Studies about obstruents acquisition showed the acquisition order of the phonemes which belong to this sounds class, indicating the expected stabilization age. Thus, in general, the plosives are acquired up to two years old and the fricatives are acquired up to three years old[6,7]. These ages confirm, in a certain way, the results of the present study.

Regarding the variable type of input, it is perceived that the relative weight value is higher in Santa Maria (G1), even as neutral, indicating favoring in the obstruents production in G1. Probably, this result was obtained because of the invariable production of these segments by the speakers from this region (voiced and voiceless targets always the same), characterized as facilitating agent to correct production, while in Agudo (G2) the voiced obstruents can by devoiced or not, according to the variable input (dialect) received by these children. This data is relevant, because it tends to partially prove the raised hypothesis, even if it is not related to the variable sonority.

However, the frequencies of correct production are equivalent. It means that, widely speaking, the children from both groups produce the obstruents correctly most of the time. This fact disagrees with two mentioned recent studies, in which the authors identified the influence of the dialectal variant in the phonological acquisition in different communities[8,9]. Other authors also report this influence, as the acquisition of coronal fricatives by children from 2:0 to 6:11from Recife, PE, Brazil occurred in older age group, usually six months older than most of literature observes. So, aspects such as linguistic and sociocultural diversity should be considered[22].

Conclusion

The main results of this research reveal that, in the process of obstruents phonemes acquisition in Santa Maria (G1) and Agudo (G2), there is no interference of dialectal variation.

It was verified that the variables metrical foot, preceding phonological context, following phonological context, number of syllables, sonority, obstruent class and the extralinguistic variables age and type of input interfere in the acquisition of the plosive and fricative segments. The findings were similar, however, it is highlighted some particularities in some acquisition aspects in both populations. Thus, these differences between the groups should be deeply studied in other researches about such aspects.

It is observed that the data of this study collaborate with studies that aim at pointing regional characteristics with data about phonological acquisition, contributing to speech and language evaluation and treatment of patients with different dialectal marks, making the current parameters more flexible.

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