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THE INTRIGUING REALIZATION OF PLACE OF ARTICULATION OF FRICATIVES IN PHONOLOGICAL DISORDERS IN GREEK: A CASE STUDY

This study investigates the unfaithful realization of target LABIAL fricative /f/ and CORONAL /ð/, which are produced as [θ] and [v], respectively, by a child with functional phonological disorder, who is acquiring Greek as L1. We argue that the realization of PLACE OF ARTICULATION (PoA) of a target non-back, non-strident CORONAL, and of a LABIAL fricative is related to the value of the target's supralaryngeal feature [voice]. (Un)markedness in voicing seems to determine the realization of the (un) marked PoA, resulting in the production of segments that share (un)markedness in [voice] and PoA features. The child's incapacity to perceive the phonemic PoA contrasts /f/ vs /θ/ and /ð/ vs /v/ is due to the constraint interaction between a constraint demanding faithfulness to the [+continuant] feature and the emergent segmental markedness constraints on the distinctive feature(s) and feature *co--occurrence* in the related fricatives.

Keywords: Fricatives, feature co-occurrence, language acquisition

1. INTRODUCTION

FRICATIVES are rarer segments than STOPS in the world's languages, as they are attested in only 8.7% of languages, as indicated by Maddieson's (2013) sample. FRICATIVES differ from STOPS in terms of their sonority, as they are more sonorous than STOPS (see Selkirk 1984, among others). Additionally, they are marked for MANNER of ARTICULATION (henceforth MoA) as [+continuant] sounds. Therefore, the existence of FRICATIVES in a language also implies the presence of

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[-continuant] STOPS (Markedness Theory: e.g. Gamkrelidze 1973; Sherman 1975, a. o.).

In the phonological acquisition of languages with fricatives in their consonant inventory, STOPS are acquired earlier than FRICATIVES (e.g. for English: Ingram 1978, Gierut 1996a, 1996b; Barlow & Gierut 1999, a. o.; for Greek: Kappa 2000; for Dutch: Fikkert 1994a, 1994b; for Japanese: Ueda 1996; for Portuguese: Costa & Freitas 1998, a. o.), due to their unmarkedness for MoA, and they are realized by children instead of target fricative segments (e.g. in Mexican Spanish (Eblen 1982), in Greek: /f/ → [p], /s/ → [t] (Kappa 2002), in German: /z/→ [d] (Grijzenhout & Joppen 1998: 18)).

This case study focuses on a Greek monolingual child with functional phonological disorder. It investigates the realization of FRICATIVES produced in the front region of the oral cavity, precisely the realization of voiceless LABIAL /f/ and voiced CORONAL /ð/. Our study aims to describe the patterns of substitution, and critically discuss the influence of voicing on the realization of the above-mentioned FRICATIVES.

2. BACKGROUND

2.1. FRICATIVES in typical phonological acquisition

In typical phonological acquisition, FRICATIVES first emerge in word final position (i.e. coda), and later in word initial position (i.e. single onset) (e.g. for English: Ferguson 1978; Farwell 1976; for Greek: Kappa 2000, 2002; for Dutch: Altvater- Mackensen & Fikkert 2010). In the word final coda position, the segment [s] may act as a morphological marker and it promotes the realization of FRICATIVES in this position (e.g. in English: Song et al. 2013; in Greek: Kappa 2000, a. o.).

Among FRICATIVES, the LABIAL /f/ is acquired first (e.g. for English: Ferguson 1978; for German and Canadian English: Bernhardt & Romonath 2014), while the CORONAL fricatives /θ/ and /ð/ are the last FRICATIVES to be acquired by children (e.g. for Greek: in a corpus of 11 children, Kappa (in press), Mennen & Okalidou (2006) and citations therein; for English: Fee 1995, a. o.). It has been reported that acquired FRICATIVES are realized substituting the target ones/in the place of the target ones (1, 2).

(1) English /θ/ → [f],
(2) English /ð/ → [v] (Ferguson 1978, among others)

From an articulatory point of view, it has been suggested that FRICATIVES are late-acquired by children because they require the development of particularly fine-grained motor control of the tongue to maintain the constriction size necessary for generating turbulence noise (e.g. Kent 1992). Acoustic studies

provide evidence for the late acquisition of FRICATIVES, showing that spectral cues to fricative place of articulation contrasts are not adult-like in children below the age of 5 years (Nittrouer et al. 1989).

Greek has eight (8) fricative segments, namely /f-v, θ-ð, s-z, x-ɣ/ in its phoneme inventory, which occur in the onset position, with only /s/ also occurring, as a morphological marker, in word-final coda position (e.g. Kappa 1995; Malikouti-Drachman 2002, among others). A case study demonstrates that, in the course of typical phonological development, FRICATIVES are initially realized faithfully in word-internal onset position, and then in word-initial onset position (Kappa 2002: 17). Regarding /s/, it has been observed that a fricative segment, mainly CORONAL [θ] or [ç] (the PALATAL allophone of /x/), is first attested in final coda position, and later in internal onset position (Kappa 2000, 2002).

It seems that there is no strict order of acquisition of FRICATIVES in Greek typical phonological acquisition. In the study of an 11-children corpus, it has been observed that, in the onset position, LABIAL fricatives are acquired earlier than the DORSAL ones, and their acquisition precedes that of CORONAL fricatives (Kappa in press). However, according to the survey on typical phonological acquisition, conducted by the Panhellenic Association of Logopedics (PAL 1995, cited in Mennen & Okalidou 2006), 75% of the children have acquired the DORSAL fricatives early, followed by the LABIAL, and then the strident CORONAL ones, while the non-strident CORONAL fricatives are acquired last (Mennen & Okalidou 2006:7). Variation in the order of acquisition of PLACE of ARTICULATION of fricatives has also been observed in the phonological acquisition of English (Fergusson 1978).

Regarding the age at which typically developing Greek children acquire FRICATIVES, it has been found that FRICATIVES start to be produced faithfully at around 2;06 years (Kappa 2002), while several studies indicate that FRICATIVES are fully acquired at around the age of 4;00 years (Mennen & Okalidou 2006; Magoula 2000; PAL 1995; Thomadaki & Magoula 1998).

2.2. FRICATIVES in atypical phonological acquisition

To our knowledge, research on the acquisition of FRICATIVES in *atypical acquisition* has mainly focused on English, and relevant studies have shown that the order of acquisition of segments observed in typical phonological acquisition/ development is similar to that in atypical acquisition (e.g. Dinnsen Chin Elbert & Powell 1990, a.o.). Specifically, FRICATIVES are neutralized to STOPS (3-4), or the fricative segment that has been acquired substitutes the target one (5).

(3) /f/ → [p]
(4) /θ/ → [t] (Miccio & Ingrisano 2000)
(5) /θ/ → [f] (Ingram et al. 2015, a. o.)

In the study of Kateri (2003) on the phonological system of a Greek child (age 5;09) with Specific Language Impairment (SLI), it is reported that /s/ is the first FRICATIVE to be acquired, while /θ/ is the last one. This finding suggests that /θ/ poses challenges in acquisition to children with SLI, which is consistent with Fee's (1995:199) observations regarding phonologically disordered children acquiring English.

Furthermore, Mastea and Nakes (2013) conducted a study involving 12 children, diagnosed with phonological and articulatory disorders. According to their findings, seven of these children realized the voiced CORONAL fricative /ð/ as a voiced LABIAL [v], while one out of two children realized the voiceless LABIAL /f/ as a voiceless strident CORONAL [s].

These studies provide valuable insights into the acquisition patterns, and the challenges that fricatives acquisition poses to children with Specific Language Impairment or phonological and articulatory disorders.

3. PRESENT STUDY

3.1. Participant and methodology

The dataset used in this study is derived from the transcribed data presented in Fotoglou's thesis (2015), which were elicited through a picture naming task. The participant is a monolingual child, 4;06 years old, acquiring Greek as first language (L1). The child has been diagnosed with functional phonological disorder. However, the severity of the disorder is not specified by Fotoglou (ibid.), who mentions that the child cannot perceive the phonemic contrasts resulting in "mistaken" realizations of CORONAL and LABIAL fricatives. The child has not been diagnosed with Specific Language Impairment. The data collection was cross-sectional, and the researcher interacted with the child at a Speech-Language Therapy center.

The child has mastered all stop consonants and vowels of Greek and accurately produces them in syllable onset, word-initially/internally. However, not all FRICATIVES have been fully acquired (see §3.2). Word-internal codas are not faithfully realized, although the child has acquired final codas that function as a morphological marker. The faithful realization of complex onsets and appendices seems to emerge gradually, mainly in stressed internal syllables. Complex onsets and appendices in word-initial stressed/unstressed syllables and in word-internal unstressed syllables have not been realized yet. The child seems to still be in the intermediate phase of phonological development.

3.2. Findings

At the segmental level, the target DORSAL fricatives [x, ɣ] and the target CORONAL strident[3] voiceless fricative [s] have been acquired and they are faithfully realized (6-7). Similarly, the target CORONAL voiceless non-strident (distributed) fricative [θ] and the target LABIAL voiced fricative [v] are also faithfully realized (8-9).

	Target word	→	**Child's output**	**Gloss**
(6)	*DORSAL fricatives*		*DORSAL fricatives*	
	[ma.ˈ**ç**e.ri]		[ma.ˈ**ç**e.li]	'knife'$_{\text{NEU.NOM.SG}}$
	[**x**o.ˈdri]		[**x**o.ˈdi]	'fat'$_{\text{FEM.NOM.SG}}$
	[ˈ**ɣ**ra.ma]		[ˈ**ɣ**a.ma]	'letter'$_{\text{NEU.NOM.SG}}$
	Target word	→	**Child's output**	**Gloss**
(7)	*CORONAL strident fricative*		*CORONAL strident fricative*	
	[ˈvri.**s**i]		[ˈvi.**s**i]	'faucet'$_{\text{FEM.NOM.SG}}$
	[ˈ**s**i.ne.fo]		[ˈ**s**i.ne.θo]	'cloud'$_{\text{NEU.NOM.SG}}$
(8)	*CORONAL voiceless[-strident] fricative*		*CORONAL voiceless [-strident] fricative*	
	[**θ**er.ˈmo.me.tro]		[**θ**e.ˈmo.me.to]	'thermometer'$_{\text{NEU.NOM.SG}}$
	[a.ri.ˈ**θ**mos]		[a.li.ˈ**θ**mos]	'number'$_{\text{NEU.NOM.SG}}$
(9)	*LABIAL voiced fricative*		*LABIAL voiced fricative*	
	[kre.ˈ**v**a.ti]		[ce.ˈ**v**a.ti]	'bed'$_{\text{NEU.NOM.SG}}$
	[**v**e.ˈlo.na]		[**v**e.ˈlo.na]	'needle'$_{\text{FEM.NOM.SG}}$

It seems that the child cannot faithfully realize the PoA of specific target FRICATIVES, produced in the front region of the oral cavity, i.e. the voiced non-strident (distributed) CORONAL /ð/ and the voiceless LABIAL /f/ in all onset positions (i.e. prominent initial/ stressed syllables, and non-prominent internal/unstressed syllables). The target voiceless LABIAL /f/ is realized as voiceless CORONAL [θ], while the voiced CORONAL /ð/ is produced as the voiced LABIAL [v], at a ratio of 100%, as shown in (10) and (11) respectively:

[3] In the dataset, there is only one token with the voiced strident /z/, which is produced faithfully.

	Target word	→	Child's output	Gloss
(10)	*[-voice] LABIAL fricative*		*[-voice] CORONAL [-strident] fricative*	
	[**f**e.ˈga.ɾi]		[**θ**e.ˈga.li]	'moon'$_{\text{NEU.NOM.SG}}$
	[ka.ˈ**f**es]		[ka.ˈ**θ**es]	'coffee'$_{\text{NEU.NOM.SG}}$
	[**f**o.ˈtça]		[**θ**o.ˈtça]	'fire'$_{\text{FEM.NOM.SG}}$
	[kaɾ.ˈ**f**i]		[kaɾ.ˈ**θ**i]	'nail'$_{\text{NEU.NOM.SG}}$
	[ˈsi.ne.**f**o]		[ˈsi.ne.**θ**o]	'cloud'$_{\text{NEU.NOM.SG}}$
(11)	*[+voice] CORONAL [-strident] fricative*		*[+voice] LABIAL fricative*	
	[**ð**el.ˈfi.ni]		[**v**e.ˈθi.ni]	'dolphin'$_{\text{NEU.NOM.SG}}$
	[ˈ**ð**a.xti.lo]		[ˈ**v**a.ti.lo]	'finger'$_{\text{NEU.NOM.SG}}$
	[lu.ˈlu.**ð**i]		[lu.ˈlu.**v**i]	'flower'$_{\text{NEU.NOM.SG}}$
	[aɾ.ˈku.**ð**a]		[a.ˈku.**v**a]	**'**bear'$_{\text{NEU.NOM.SG}}$
	[ˈro.**ð**a]		[ˈlo.**v**a]	'wheel'$_{\text{FEM.NOM.SG}}$
	[kli.ˈ**ð**i]		[ci.ˈ**v**i]	'key'$_{\text{NEU.NOM.SG}}$
	[psa.ˈli.**ð**i]		[sa.ˈli.**v**i]	'scissors'$_{\text{NEU.NOM.SG}}$
	[a.ʝe.ˈla.**ð**a]		[a.ʝe.ˈla.**v**a]	'cow'$_{\text{FEM.NOM.SG}}$

4. DISCUSSION

In the literature, it has been claimed that the acquisition of segments can be influenced by the vowel context and by phoneme frequency (Nicolaidis et al. 2003 and citations therein). However, the findings from this dataset suggest that, in this child's system, the substitution of FRICATIVES is independent of the vowel context, i.e. the presence or absence of specific vowels following the FRICATIVES does not seem to affect the substitution pattern. In addition to that, according to PHOIBLE, a repository of cross-linguistic phonological inventory data (Moran & McCloy 2019), /θ/ and /ð/ are the least frequent consonants in Greek, while /f/ and /v/ are the most frequent ones (/θ/ 4% vs /f/ 44% and /ð/ 5% vs /v/ 27%). Thus, the LABIAL fricatives are expected to be acquired earlier than the non-strident CORONAL ones. Contrary to the this expectation, both the LABIAL /v/ and the CORONAL /θ/ are faithfully realized regardless of their frequency, and substitute the FRICATIVES that are contrastive in terms of PoA. This suggests that factors other than phoneme frequency, such as the phonological constraints and the child's phonological development, play a more significant role in determining the substitution patterns observed.

Specifically, it seems that, in the case of FRICATIVES produced in the front region of the oral cavity, namely the non-strident (distributed) CORONAL and the LABIAL fricatives, the child has acquired the feature values for [voice] and for MoA ([+continuant]). As a result, a stop does not substitute the above target fricatives

in this dataset. Instead, the realization of PoA of these target fricatives is affected by *voice*. We argue that the realization of PoA of a target non-back, non-strident fricative CORONAL or LABIAL is related to the value of the supralaryngeal feature [voice] of the target fricative. (Un)markedness in voice seems to determine the realization of the (un)marked PoA, thus resulting in fricative segments which share (un)markedness in [voice] and PoA features, as follows in (i) and (ii).

i) When an unmarked for voice (voiceless) target LABIAL fricative /f/ is to be produced, it is neutralized to the unmarked PoA, namely to the CORONAL one, and it is realized as the non-strident [θ].

ii) When a *marked* for voicing (voiced) target non-strident CORONAL fricative /ð/ is to be produced, it is realized with a *marked* PoA, namely as the LABIAL [v].

In this study, the formal analysis is conducted within the Optimality Theory framework (Prince & Smolensky 1993/2004), and Correspondence Theory (McCarthy & Prince 1995) using Feature-Cooccurrence Constraints (FCCs) (Smolensky 1993; for phonological acquisition see Levelt & van Oostendorp 2007; Veer 2007).

We claim that the child's unfaithful realization of target [f] and [ð] is due to constraint interaction, namely between a constraint that demands faithfulness to the MoA [+continuant] feature of FRICATIVES and the emergent segmental markedness constraints (a) on distinctive features and (b) on feature combinations in a segment, i.e. *Feature-Cooccurrence Constraints* (FCCs) (e.g. Levelt & van Oostendorp 2007; Veer 2007). FCCs play a central role in determining segment inventories in phonological acquisition, as they impose co-occurrence restrictions on feature combinations.

In our data, two FCCs are activated in the child's grammar, prohibiting the realization of the distributed (non-strident) voiced CORONAL fricative, *[ð] (12a), and of the voiceless LABIAL, *[f] (12b).

(12) FEATURE-COOCCURRENCE CONSTRAINTS

a) [*[-voice] & *[LABIAL, +cont]]: No voiceless LABIAL fricative [f], i.e.*[f].

b) *[+voice] &*[CORONAL, +cont., +distributed]]: No voiced [+distributed] CORONAL fricative [ð], i.e. *[ð].

By adopting the above FCCS, it becomes clear why the target voiceless [+distributed] CORONAL [θ] and the target voiced LABIAL [v] substitute their contrastive for PoA fricatives, namely [f] and [ð], respectively.

Crucial FAITHFULNESS constraints in the child's grammar are also involved in the realization of fricatives, as shown in (13a-d).

(13)
a) IDENT-IO [voice]: Correspondent segments in input and output have identical values for voicing.
b) IDENT-IO [+cont]: Correspondent segments in input and output have identical values for the MoA feature [+continuant].
c) IDENT-IO[+strident]: Correspondent segments in input and output have identical values for stridency.
d) IDENT-IO[DORSAL]: Correspondent segments in input and output have identical DORSAL POA.

The FAITHFULNESS constraints in (13a-d) are highly-ranked and equally ranked with each other, as the features of voicing, MoA, and stridency have been acquired. The latter constraints conflict with the FCCs in (12a, 12b) and the MARKEDNESS Constraints in (14a, b).

(14)
a) *[+strident]: The strident fricatives [s, z] are prohibited.
b) *[+distributed]: The distributed fricatives [θ, ð] are prohibited.

Finally, the MARKEDNESS constraints in (14a, b) conflict with the lower-ranked FAITHFULNESS constraint in (15).

(15) IDENT-IO [PLACE]: Correspondent segments in input and output have identical PoA.

The constraint hierarchy ranking is shown in (16).

(16) IDENT-IO [voice], IDENT-IO[+cont], IDENT-IO[+strident], IDENT-IO[DORSAL] >> [*[-voice]&*[LABIAL,+cont]], [*[+voice]&*[CORONAL,+cont,+distributed]] >> *[+strident] >> *[+distributed] >> IDENT-IO [PLACE]

Due to space limitations in the tables (1-5), the FCC constraint [*[-voice]&*[LABIAL,+cont]] is written as *[f], and the constraint [*[+voice] &*[CORONAL,+cont, +distributed] as *[ð].

The evaluation of output candidates by the grammar is illustrated in Tables 1-5 below:

Table 1. Evaluation of output candidates for target DORSAL FRICATIVE

TARGET [ɣ]	IDENT-IO [voice]	IDENT-IO [+cont]	IDENT-IO [+strident]	IDENT-IO [DORSAL]	*[f]	*[ð]	*[+strident]	*[+distributed]	IDENT-IO [PLACE]
a. [x]	*!								
b. [θ]	*!			*				*	*
c. [f]	*!			*	*				*
d. [g]		*!							
e. [v]				*!					*
f. [ð]				*!		*		*	*
☞ g. [ɣ]									

In Table 1, the output candidates for the target DORSAL fricative [ɣ] are evaluated. The candidates (a-f) fatally violate the highest-ranked constraints. Specifically, candidates (a-c) fatally violate the constraint IDENT-IO[voice], candidate (d) fatally violates the constraint IDENT-IO[+cont] and candidates (e-f) fatally violate the constraint IDENT-IO[DORSAL]. Therefore, candidates (a-f) are not selected as optimal outputs. Candidate (g) is selected as the optimal output and it is realized, as it does not violate any of the grammar's crucial constraints.

Table 2. Evaluation of output candidates for target LABIAL FRICATIVE

TARGET [ve.ˈlo.na]	IDENT-IO [voice]	IDENT-IO [+cont]	IDENT-IO [+strident]	IDENT-IO [DORSAL]	*[f]	*[ð]	*[+strident]	*[+distributed]	IDENT-IO [PLACE]
a. [**p**e.ˈlo.na]	*!	*							
b. [**f**e.ˈlo.na]	*!				*				
c. [**t**e.ˈlo.na]	*!	*							*
d. [**θ**e.ˈlo.na]	*!							*	*
e. [**ð**e.ˈlo.na]						*!		*	*
☞f. [**v**e.ˈlo.na]									

In Table 2, the output candidates for the target word [ve.ˈlo.na], which includes the voiced LABIAL fricative [v], are evaluated. Candidates (a-d) fatally violate the highest ranked constraint IDENT-IO [voice], therefore candidates (a-d) are not selected as optimal outputs. Candidate (e) fatally violates the FCC constraint *[ð], as it includes the non-strident voiced coronal [ð]. Candidate (f) is selected as the optimal output, and it is realized as it does not violate any of the grammar's crucial constraints.

Table 3. Evaluation of output candidates for target CORONAL FRICATIVE

TARGET [ka.ˈla.**θ**i]	IDENT-IO [voice]	IDENT-IO [+cont]	IDENT-IO [+strident]	IDENT-IO [DORSAL]	*[f]	*[ð]	*[+strident]	*[+distributed]	IDENT-IO [PLACE]
a. [ka.ˈla.**t**i]		*!							
b. [ka.ˈla.**p**i]		*!							*
c. [ka.ˈla. **ð**i]	*!					*		*	
d. [ka.ˈla.**v**i]	*!								*
e. [ka.ˈla.**f**i]					*!				*
☞ f. [ka.'la.**θ**i]								*	

In Table 3, the output candidates for the target word [ka.ˈla.θi], which includes the voiceless CORONAL fricative [θ], are evaluated. Candidates (a-b) and (c-d) fatally violate the highest-ranked constraints IDENT-IO[voice] and IDENT-IO[+cont] respectively, therefore candidates (a-d) are not selected as optimal outputs. Candidate (e) fatally violates the FCC constraint *[f], as it includes the LABIAL [f]. Candidate (f) is selected as the optimal output and it is realized, as it violates the constraint *[+distributed], which is lower-ranked than the IDENT-IO[voice], IDENT-IO[+cont], *[f] constraints.

Table 4. Evaluation of output candidates for target LABIAL FRICATIVE

TARGET [ka.ˈ**fe**]	IDENT-IO [voice]	IDENT-IO [+cont]	IDENT-IO [+strident]	IDENT-IO [DORSAL]	*[f]	*[ð]	*[+strident]	*[+ distributed]	IDENT-IO [PLACE]
a. [ka.ˈ**fe**]					*!				
b. [ka.ˈ**pe**]		*!							
c. [ka.ˈ**ve**]	*!								
d. [ka.ˈ**ðe**]	*!					*		*	*
e. [ka.ˈ**se**]							*!		*
☞f. [ka.ˈ**θe**]								*	*

In Table 4, the output candidates for the target word [ka.ˈfe], which includes the voiceless LABIAL fricative [f], are evaluated. Candidate (a) fatally violates the FCC constraint *[f], and, therefore is not selected as the optimal output. Candidates (b-d) fatally violate the highest-ranked constraints, specifically (b) violates IDENT-IO[+cont], (c-d) violate IDENT-IO[voice]. Candidate (e) fatally violates the Markedness constraint *[+strident]. The candidate (f) satisfies the higher-ranked constraints, and violates the lowest-ranked constraints *[+distributed] and IDENT-IO[PLACE]. Candidate (f) is selected as the optimal output, and it is realized by the child, since the violation or satisfaction of the lowest-ranked constraints *[+distributed] and IDENT-IO[PLACE] plays no role in the selection of the optimal output.

Table 5. Evaluation of output candidates for target CORONAL FRICATIVE

TARGET [lu.ˈlu.**ði**]	IDENT-IO [voice]	IDENT-IO [+cont]	IDENT-IO [+strident]	IDENT-IO [DORSAL]	*[f]	*[ð]	*[+strident]	*[+distributed]	IDENT-IO [PLACE]
a. [lu.ˈlu.**ði**]						*!		*	
b. [lu.ˈlu.**θi**]	*!							*	
c. [lu.ˈlu.**fi**]	*!				*				*
d. [lu.ˈlu.**di**]		*!							
e. [lu.ˈlu.**zi**]							*!		
☞f. [lu.ˈlu.**vi**]									*

In Table 5, the output candidates for the target word [lu.ˈlu.ði], which includes the voiced CORONAL fricative [ð] are evaluated. Candidate (a) fatally violates the FCC constraint *[ð] therefore (a) is not selected as the optimal output. Candidates (b-d) fatally violate the highest-ranked constraints, specifically (b) and (c) violate IDENT-IO[voice], and (d) violates IDENT-IO[+cont]. Candidate (e)

fatally violates the constraint *[+strident], as it includes the voiced strident [z]. Candidate (f) violates the lowest-ranked constraint IDENT-IO[PLACE]. Thus, the latter candidate is selected as the optimal output and realized. As in table 4, the violation or satisfaction of lowest-ranked constraint IDENT-IO[PLACE] plays no role in selecting the optimal output.

5. CONCLUSION

To summarize the findings, this study investigates the unfaithful realization of the target fricatives LABIAL /f/ and CORONAL /ð/, which are produced as [θ] and [v], respectively, by a monolingual Greek-speaking child (age 4;06) with functional phonological disorder. The realization of [θ] and [v] is found to be dependent on voicing. We argue that if the target FRICATIVE is marked for voice (voiced), it is realized as a fricative with the marked LABIAL PoA, i.e. [v]. Conversely, if the target FRICATIVE is unmarked for voice (voiceless), it is realized as a FRICATIVE with the unmarked CORONAL PoA, i.e. [θ]. The order of acquisition of fricatives in the child's system is given in (17).

(17) DORSAL, strident CORONAL, /v/, /θ/ > /f/, /ð/

The Feature Cooccurrence Constraints against the realization of targets [ð] and [f] are still highly-ranked in the child's grammar, indicating a delay in the child's system and a protracted language development, compared to the faithful realizations of [ð] and [f] attested in the speech of typically developing children of the same age (see PAL 1995).

The dataset in this paper provides insights into the specific substitution patterns of this particular child with functional phonological disorder. However, a limitation of this study is the need for more available data for the child at a more advanced age, which would provide insights into the progression of this process. Additionally, the realization of the non-strident CORONAL fricative /ð/ and the LABIAL fricative /f/, may be motivated by articulatory or perceptibility factors The distinction between /v/ and /ð/ is the most difficult for listeners to hear, and differentiation often relies on verbal context and on visual observation of the talker's lips rather than acoustic differences (Miller & Nicely 1955: 347). Thus, further research is needed to explore the potential impact of these additional factors.

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Η ΙΔΙΑΙΤΕΡΗ ΠΡΑΓΜΑΤΩΣΗ ΤΟΥ ΤΟΠΟΥ ΑΡΘΡΩΣΗΣ ΤΩΝ ΤΡΙΒΟΜΕΝΩΝ ΣΤΙΣ ΦΩΝΟΛΟΓΙΚΕΣ ΔΙΑΤΑΡΑΧΕΣ ΣΤΗΝ ΕΛΛΗΝΙΚΗ: ΜΙΑ ΜΕΛΕΤΗ ΠΕΡΙΠΤΩΣΗΣ

Περίληψη

Η μελέτη περίπτωσης εστιάζει στην πραγμάτωση των τριβόμενων χειλικών συμφώνων /v, f/ και κορωνιδικών συμφώνων /ð, θ/ στο λόγο ενός παιδιού (ηλικία 4;06) με λειτουργική φωνολογική διαταραχή, το οποίο κατακτά την ελληνική ως πρώτη γλώσσα (Γ1). Τα δεδομένα αντλήθηκαν από την Φώτογλου (2015) και δείχνουν ότι από τα τριβόμενα σύμφωνα, τα ραχιαία, τα συριστικά, το [-συριστικό] κορωνιδικό άηχο /θ/, και το ηχηρό χειλικό /v/ πραγματώνονται πιστά στην αρχική/εσωτερική έμβαση συλλαβής. Ωστόσο, το επιμεριστικό ηχηρό κορωνιδικό τριβόμενο /ð/ και το άηχο χειλικό τριβόμενο /f/ πραγματώνονται ως [v] και [θ] αντίστοιχα σε ποσοστό 100%, π.χ. η λέξη-στόχος *λουλούδι* [lu.ˈlu.**ð**i] πραγματώνεται από το παιδί ως [lu.ˈlu.**v**i], και η λέξη *καφές* [ka.ˈ**f**es] ως [ka.ˈ**θ**es]. Υποστηρίζουμε ότι (α) η συχνότητα εμφάνισης των τριβομένων [f, v] και [θ, ð] στην Ελληνική και το φωνηεντικό περιβάλλον δεν παίζουν ρόλο στην (μη)πραγμάτωση των υπόψη συμφώνων, (β) η πραγμάτωση του τόπου άρθρωσης του επιμεριστικού

κορωνιδικού και του χειλικού τριβόμενου-στόχου σχετίζεται με την τιμή τους ως προς το Δ.Χ. [±ηχηρό]. Συγκεκριμένα, όταν το χειλικό τριβόμενο-στόχος είναι προσδιορισμένο με την αμαρκάριστη τιμή [-ηχηρό], τότε πραγματώνεται από το παιδί το άηχο τριβόμενο [θ] με τον αμαρκάριστο κορωνιδικό τόπο άρθρωσης, ενώ όταν το επιμεριστικό τριβόμενο-στόχος είναι [+ηχηρό] τότε πραγματώνεται το ηχηρό τριβόμενο [ν] με τον μαρκαρισμένο χειλικό τόπο άρθρωσης. Η αδυναμία του παιδιού να αντιληφθεί τις φωνολογικές αντιθέσεις [f] vs [θ] και [ð] vs [ν] οφείλεται στην αλληλεπίδραση των φωνολογικών περιορισμών που είναι ακόμα ψηλά ιεραρχημένοι στο σύστημά του με αποτέλεσμα την καθυστέρηση της ανάπτυξης του φωνολογικού του συστήματος σε σχέση με τα παιδιά τυπικής ανάπτυξης της ίδιας ηλικίας. Συγκεκριμένα, πρόκειται για την αλληλεπίδραση μεταξύ του περιορισμού πιστότητας στο Δ.Χ. [+διαρκές] των τριβομένων και των ενεργών περιορισμών μαρκαρισμένης δομής σε σχέση (α) με τα Δ.Χ. ενός τεμαχίου, (β) με τη συνεμφάνιση των Δ.Χ. στο τεμάχιο, οι οποίοι δεν επιτρέπουν την πραγμάτωση του άηχου χειλικού [f] και του ηχηρού, επιμεριστικού (μη-συριστικού) κορωνιδικού [ð].

Λέξεις-κλειδιά: Τριβόμενα, γλωσσική ανάπτυξη, περιορισμοί συνεμφάνισης