Estudos da Língua(gem)
Questões de Aquisição da Linguagem

Melodies of child: Greek-English phonological interference

Melodias de criança: *interferência fonológica grego-inglês*
Melodías de niño: *interferencia fonológica griego-inglés*

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ABSTRACT
In this paper, I will operationalise *phonological interference* in terms of psycholinguistic and phonological theory by utilizing a Greek-English bilingual girl's naturalistic speech data for a month at age 2;7, in a language pair that is not researched much in bilingualism. The ultimate goal is to decipher the psycholinguistic and linguistic processes involved in the child's phonological interference at a qualitative level (the melodic tier), also backed by in-depth quantitative evidence. Phonological interaction is scrutinised in the child's developing phonologies in an under-represented linguistic context: one of the languages (English) is exogenously acquired and, thus, characterized by compromised exposure in terms of quantity and quality of input. The results sustain the manifestation of phonological interference at both the surface and underlying levels of only certain melodic units in the bilingual's languages, rather than across the board. The ensuing analyses illuminate the indisputable interaction of several developments at work.
KEY WORDS: Bilingualism; Language acquisition; Prosody.

RESUMO
Neste artigo, operacionalizarei a interferência fonológica em termos de teoria psicolinguística e fonológica, utilizando dados naturalísticos de uma menina bilíngue greco-inglesa de 2;7 anos, em um par de idiomas que não é muito

* About the author, see pages 236.

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pesquisado no bilinguismo. O objetivo final é decifrar os processos psicolinguísticos e linguísticos envolvidos na interferência fonológica da criança em um nível qualitativo (o nível melódico), também apoiado por evidências quantitativas. A interação fonológica é examinada nas fonologias em desenvolvimento da criança em um contexto linguístico sub-representado: uma das línguas (inglês) é adquirida exogenamente e, portanto, caracterizada pela exposição comprometida em termos de quantidade e qualidade de entrada. Os resultados sustentam a manifestação da interferência fonológica tanto na superfície quanto nos níveis subjacentes de certas unidades melódicas nos idiomas bilíngues, mas não em todo o quadro melódico. As análises que se seguem iluminam a interação indiscutível de vários desenvolvimentos.
PALAVRAS-CHAVE: Bilinguismo; Aquisição da Linguagem; Prosódia.

RESUMEN
En este artículo, voy a discutir la interferencia fonológica en términos de la teoría psicolingüística y fonológica. Para ello, utilizo datos naturalísticos de una niña bilingüe griego-inglés de 2;7 años. Es decir, se trata de un par de idiomas poco investigado con respecto al bilingüismo. El objetivo final es descifrar los procesos psicolingüísticos y lingüísticos involucrados en la interferencia fonológica del niño en un nivel cualitativo (o nivel melódico), también respaldado por pruebas cuantitativas. Se analiza la interacción fonológica en las fonologías en desarrollo del niño en un contexto lingüístico poco representado: uno de los idiomas (inglés) se adquiere de forma exógena y, por lo tanto, se caracteriza por una exposición comprometida en términos de cantidad y calidad de información. Los resultados sostienen la manifestación de la interferencia fonológica tanto en la superficie como en los niveles subyacentes de algunas unidades melódicas en los idiomas de los bilingües, pero no en todo el ámbito melódico. Los análisis subsiguientes iluminan la interacción indiscutible de múltiples desarrollos.
PALABRAS-CLAVE: Bilingüismo; Adquisición del Lenguaje; Prosodia.

1 Introduction

Basic constructs discussed in this paper cluster around the themes of phonological interference/transfer, melodies (segments and features) in bilingual development as they emerge in consonant substitution patterns, and markedness effects. The paper is dealt out as follows: relevant literature review in the remaining *introduction*; next, presentation of the *methodology* of the study (child participant, linguistic context); following that, data mining and analysis method; then the *results*; and a *discussion* on inferences invoked by the study at the end.

1.1 When languages are in contact

The idea that languages interact on and across all grammatical levels, such as phonology, morphology, semantics and syntax, is found to be true in speakers of all ages under the presupposition that more than one grammar is

being represented/acquired – 'grammar' referring to a language, a language variety or a dialect. As the two languages are in contact within the same person, interference across intermingling entities is inevitable and, thus, it is a normal feature (GROSJEAN, 2008).

Early mentions of such constructs as 'transfer' and 'interference' appear in Weinreich (1953). Brière (1968:11-12) argues that, with regard to interference "the hierarchy of difficulties predicted by the linguist may be completely different from the hierarchy of difficulties predicted by the psycholinguist". The linguist views interference in terms of articulatory or classificatory features, while the psycholinguist sees interference as either 'retroactive' or 'proactive' with regard to the degree of similarity between the languages, between convergent/divergent structures and between the learning contexts. Both approaches are being extensively used in understanding interference in bilingualism.

Once a certain stage in any general learning process has been achieved, this gained knowledge or skill may become a foundation or an inhibitor to further learning, what is known as *transfer*. Transfer (e.g. BABATSOULI; KAPPA, 2011, FLEGE; DAVIDIAN, 1984, GASS; SELINKER, 1983, MAJOR, 2008), in other words, is this twofold effect of a 'previously learned' language 'on subsequently learned ones' (Edwards & Zampini, 2008:2). As in the case of transfer, segment mispronunciations in interference are classified as phonemic, phonetic, allophonic and distributional (e.g. MOULTON, 1962). Basic errors in bilingual phonology involve: 'underdifferentiation of phonemes' when weaker language sounds are not distinguished in the dominant language and, thus, are confused; 'overdifferentiation of phonemes' when dominant language phonemic distinctions are imposed on the weaker language; 'reinterpretation of distinctions' when the bilingual distinguishes weaker language phonemes by redundant features that are, however, relevant in the dominant language; 'actual phone substitution' when phones are pronounced differently but have the same phonemic constitution in the two languages, and 'hypercorrectness' when the bilingual shows excessive caution against underdifferentiation (BRIÈRE, 1968 and references therein). The more different the grammar systems of the two languages are, the more difficult will the learning process be and higher the possibility of interference (WEINREICH, 1953).

It is also known that the appearance and extent of interference relates to whether the bilingual converses with a monolingual or a bilingual interlocutor, limiting interference in the first case but freely succumbing in the second (WEINREICH, 1966). Grosjean (2012:13) provides a review of subsequent definitions on interference and, recognizing them to be too broad, suggests a differentiation between 'transfers', or 'static elements' that reflect the permanent traces of one language on the other and 'interferences' or 'dynamic elements' that show ephemerally in the other language. In other words, interferences are linked to processing and have to be accounted for by encoding mechanisms. That existing definitions of transfer and interference should not be considered full-proof is also claimed by Odlin (2008), among others.

1.2 Phonological interaction in bilingual children

The acquisition of phonology in children involves the development of an array of skills such as phonological representations, articulatory and acoustic-perceptual aptitudes, as well as speech-motor control (e.g. INGRAM, 1989). In children raised bilingually these skills need to be built at the same time in two languages. The complexity of this task and the complexity of understanding the forces behind this task turns having a model of bilingual acquisition of phonology into an on-going necessity in the field (HAMBLY, WREN; MCLEOD; ROULSTONE, 2013, KEHOE, 2018).

Early literature on bilingual phonologies suggests that children develop two separate systems from the start on the grounds that the languages interact and can ultimately be separate from each other (PARADIS; GENESSEE, 1996). Volterra and Taeschner's (1978) earlier claim that language in bilinguals is of a mixed type has been revoked (e.g. MEISEL, 1989), though other claims subsequently have also spoken in favour of a lack of absolute degree of underlying system separation (e.g. BUNTA, DAVIDOVICH; INGRAM, 2006; PARADIS, 2000). Based on a definition by Paradis and Genesee (1996:3), cross-language interaction is "the systemic influence of the grammar of one language on the grammar of the other language … causing differences in a bilingual's patterns and rates of development in comparison with a monolingual's". Further, three types of interaction are claimed by the authors to manifest themselves: *transfer* (where a language-specific property is carried over to the other language), *acceleration* (a grammatical construct appears in the speech of the bilingual earlier than in it would in a respective monolingual), and *delay* (a construct develops later than the monolingual norm). Despite the terminological difference, this categorisation is a sub-group of the one mentioned earlier in Brière (1968), and references therein. It is also known that the acquisition level of a grammatical construct in one language can have a positive effect on the acquisition of this or similar constructs in the other language (BABATSOULI; NICOLADIS, 2019, and refs. therein). Towards developing a model of bilingual interaction, Lleó and Cortés (2013) have attempted to control language internal factors, such as markedness, frequency, and complexity, as well as language external factors, such as age, language context, etc. in bilingual Spanish-speaking children.

There are several shortcomings involved in the understanding of crosslinguistic interaction in bilingualism, one of which is the shortage of large cross-sectional studies involving a specific language pair, single and large cross-sectional studies involving involving different language pairs, the lack of normative data as a yardstick for comparing bilingual productions with that of monolinguals, and methodological discrepancies across different studies that weaken an ultimate demarcation of universals (KEHOE, 2018). According to Hambly et al. (2013), the majority of research involves case-studies or studies of Spanish-English bilinguals. Despite the limitations of single-case study research, however, a quantitative and qualitative zoom-in on a child's phonologies developing alongside each other is telling, if not in terms of wide-scoped inferences, at least in terms of information relating to the psycholinguistic and linguistic processes involved in bilingual language acquisition. And this is what the present study aims to achieve.

1.3 Nativeness

A layman's term to describe phonological interference would be *accent*. Accent (non target-like performance) is the result of several factors that relate to the quality and quantity of input, age of exposure to input, and rate/frequency of language use (e.g. BABATSOULI; KAPPA, 2011). While native competence is *sine qua non* in L1 acquisition, the differentiation is not as clear-cut in bilingualism. One parent's native language is often the other parent's L2 (e.g. MAJOR, 1977) and, as a result, there is second language exposure in bilingual acquisition, since native input providers to the bilingual child have at least one common language of communication between them. The presence or absence of the L2 community accounts for the difference between endogenous and exogenous 'bilinguality' (PIENEMANN; KEßLER, 2007). Paradis (2000:177) makes an 'interlanguage ambiguity hypothesis' arguing that crosslinguistic transfer in bilingualism is likely, when there is interlanguage ambiguity in the input. In spite of the several studies researching bilingual phonology and phonological interaction (see reviews in BABATSOULI; BALL, forthcoming; BABATSOULI; INGRAM, 2018; KEHOE, 2018), there is no study investigating interference in a bilingual's language exposed to input with interlanguage ambiguity.

1.4 This study

The present study addresses this gap by examining a toddler's bilingual acquisition of phonology in Greek and English, whereby English is acquired through interlanguage exposure in an exogenous context. The aim of the study is to look at patterns of phonological interference, and specifically, to winnow the child's melodic tiers by examining her substitutions (featural composition) for targeted consonant segments in her languages, also discussing markedness effects within the constraint-based nonlinear theoretical framework (BERNHARDT; STEMBERGER, 1998). This framework advocates that individual phonological units (e.g. segments) have underlying representations on one level that relate to other levels (e.g., features, prosody) in strictly geometrical hierarchies.

The framework also assumes that a re-ranking (or change of ranking) of constraints may be necessary at various stages of a given child's phonological development which cannot be accounted by strictly linear constraint demotion. Each child starts out with some stable ranking of constraints which cause unfaithfulness of the child's production to the adult target; the most frequent outputs are ranked as defaults. An internal component of the language system is assumed which compares child and target production and initiates re-ranking of constraints in the following stages of development. In the final stage, the constraint ranking reached allows the child's output to be faithful to the adult pronunciation.

The child participant's acquisition levels (in this study) in terms of vocabulary size, grammatical level, and consonant productions has been investigated in detail in Babatsouli (forthcoming1), where it is shown that the child's developing phonologies in Greek and English are equally strong despite the fact that English is her weaker language (in terms of definitions in BERNARDINI; SCHLYTER, 2004) due to compromised input in English.

Here, the ultimate goal is to decipher the psycholinguistic and linguistic processes involved in the child's phonological interference on a qualitative level, also backed by in depth quantitative evidence. Acquisition levels of consonants in the same child's bilingualism are exhaustively discussed in Babatsouli (forthcoming1).

2 Method

2.1 Child participant

The female child, raised in Greece by native-Greek parents, was exposed to the ambient language since birth; consistent exposure to her mother's native-like English input (fluent through higher education studies and long residence experience in English-speaking countries) started at age 1;0. The child spent most of her time during her first two years interacting with her mother. Consequently, exposure to English was larger in the year up to the child's second birthday. At 2;0, the child was enrolled in Greek-speaking daycare for 7 hours a day, 5 days a week, thus, relating in English with her mother during the remaining intervals. The mother's English phonetic inventory is listed next (Table 1) with respect to her target-like English consonants and transfers (the parentheses denote irregular use of transfers in the sense of FLEGE; DAVIDIAN, 1984, GASS; SELINKER, 1983, MAJOR, 2008, WEINREICH, 1953).

Table 1. The mother's English consonant repertoire

target English	p, (pʰ), b, d, g, t, (tʰ), k, (kʰ) m, (m̩), n, (n̩), ŋ, l, ɬ, l̩, ɹ, (ɻ), θ, ð, f, v, s, z, ʃ, ʒ, ʧ, ʤ, j, w, h
Transfers	k, kʰ → (c), g → (ɟ), ɹ → (ɾ), j → (ʝ), h → (x), (ç)

2.2 Data

The child's speech was recorded digitally (182 mins total) in daily interaction with the mother (mostly at home) using an Olympus WS11-311M audio recorder several times a week during the month of 2;7. Child utterances were transcribed by the author in IPA in 41 CHAT files in CLAN (MacWhinney, 2000); there were 785 English and 688 Greek utterances. A representative sample of the child's consonant realisations was acoustically analysed during frequent intervals using Praat (BOERSMA; WEENINK, 2018) to substantiate the reliability of transcription. The utterances amount to a total of 540 **word types**/2,374 **tokens** in Greek and 317/1516 (respectively) in English (Babatsouli, forthcoming1).

2.3 The phonological systems of Greek and English

For a recent comprehensive review of Greek phonology, see Babatsouli (2019) and for a comparison of Greek and English phonological systems, see Babatsouli (forthcoming1). Consonantal inventories in the two languages, in terms of common and language-specific phones are shown in

Table (2) (brackets denote allophones). Babatsouli (2017), studied the development of theta, /θ/, in a Greek English bilingual child longitudinally over several months.

Table 2. Greek and English consonants

	plosives	**Nasals**	**laterals**	**rhotics**	**fricatives**	**affricates**	**glides**
common	p b t d k g	m n ŋ ɱ	l		f v θ ð s z		
Greek only	[ᵐp ᵐb ᵑg c ɟ]	[ɲ]	[ʎ]	ɾ	[ç ʝ] x ɣ	ʦ ʣ	
English only	[pʰ tʰ kʰ]	ŋ [m̩ n̩]	[ɬ l̩]	ɹ [ɻ]	ʃ ʒ h	ʧ ʤ	j w

3 Results

The child's bilingual data with regard to substitution patterns are presented in this section. According to Jakobson (1941/1968), a system of phonemic contrasts in children's development is acquired gradually. For detailed theoretical elaborations on the acquisition of phonemes and feature contrasts you can see the review by Babatsouli (forthcoming2). Discussing the choice of substitution patterns below, the constraint-based nonlinear phonological framework and constraint names (Bernhardt & Stemberger, 1998:708-716) are used. The authors adopt the formalistic framework of optimality theory (Prince & Smolensky, 2004) to designate the process and introduce their own constraint names. For example, Not […] refers to constraints that do not allow an element in the child's output, Survived […] refers to constraints that force an element in the underlying representation to surface, and LinkedUpwards means that an element must be anchored in time relative to other elements for the purpose of preventing its deletion. The child's substitution patterns are shown in the following sub-section collectively.

3.1 Substitution patterns

The child's main substitution patterns that have a frequency of occurrence equal or larger than 5% are shown in Table 3. Common, different and similar (in some respect) consonantal sounds in the child's phonetic repertoire are investigated to reveal common tendencies or differences between the languages that may enlighten our understanding of phonological interference. For comparison, when substitutions are at a proportion of 5% or larger in one language, they are also shown in the other language, even if they are at a rate smaller than 5%.

The child's performance in the two languages shows common and different substitution patterns. Common and different patterns will be discussed next in relation to common target consonants as well as to similar phonemes between the two languages. Moreover, substitutions for consonants specific to each language will also be presented. Substitution patterns will be examined in relation to the target's word position.

Table 3. Main substitution patterns and deletions

Target	Substitutions & Deletions					Process
	Common			English	Greek	
LABIAL		E	G			
/f/	**s]**	**%**	0%			*apicalisation*
/v/	**m]**	**7%**	%			*nasal assimil.*
CORONAL						
/d/				**[t] 22%**		*devoicing*
/z/				**[s] 29%**	**[ʒ]** 9%	*devoicing* *laminalisation*
/ʃ/				**[s] 21%** **[z] 7%** **[ʦ] 7%**	n/a	*apicalisation* *ibid/voicing* *ibid/affrication*
/θ/	**ʃ]** **s]** **t]** **f]**	**2%** **3%** **7%** **%**	5% 7% % %			*laminalisation* *apicalisation* *stopping* *COR assimil.*
/ð/	**l]** **t]** **n]**	**5%** **%** **%**	0% % %			*Lateralization stopping* *COR assimil.* *nasalisation*
/ʦ/				n/a	**[ʧ]** 20%	*laminalisation*
/ʧ/				**[s] 38%** **[ʦ] 6%**	n/a	*deaffrication* *apicalisation*
/ʤ/				**[ʦ] 18%** **[dz] 18%** **[z] 9%**	n/a	*Apicalisation ibid* *deaffrication*
/ɹ/				**[l] 26%** **[v] 10%**	n/a	*lateralisation* *labialisation*
/ɾ/				n/a	**[l]** 46%	*lateralisation*
PALATAL						
[c]				n/a	**[t]** 82% **[p]** 11%	*fronting* *LAB assimil.*
[ç]				n/a	**[ʃ]** 41% **[s]** 27%	*fronting* *apicalisation*
/j/				**[ʒ] 13%** **[l] 12%**	n/a	*spirantisation* *lateralisation*
[ɟ]				n/a	**[t]** 21% **[l]** 16% **[ʒ]** 14%	*COR assimil.* *lateralisation* *fronting*
[ʎ]					**[j]** 54% **[l]** 23% **[ʒ]** 8%	*spirantisation* *depalatalisatin* *spirantisation*
VELAR						
/k/	**t]**	**6%**	0%			*fronting*
/g/	**d]** **t]** **ʤ]**	**5%** **1%** **%**	3% % 0%	**[ɟ] 5%**		*fronting* *ibid/devoicing* *metathesis* *palatalisation* *affrication*
/ŋ/				**[n] 53**	-	*fronting*
[ɬ]				**[ə] 22%** **[l] 17%**	n/a	*vocalisation* *develarisation*
/w/				**[v] 57%** **[l] 7%**	n/a	*labialisation* *LAT assimil.*
/x/				n/a	**[ʃ]** 38% **[s]** 23% **[t]** 5%	*laminalisation* *fronting* *COR assimil.*
/ɣ/				n/a	**[l]** 52% **[v]** 5% **[j]** 5%	*lateralisation* *LAB assimil.* *palatalisation*
GLOTTAL						
/h/				**[ʃ]: 46%** **[s]: 37%**	n/a	*laminalisation* *apicalisation*

3.2 Different substitutions for common consonants between the languages

There appear to be different substitutions for common consonants /d, z/ between the two languages (Table 4; the differences are depicted based on word position).

Table 4. Substitutions of /d, z/ on word position

	Initial		**Final**		**Medial**	
Pattern	**E**	G	**E**	G	**E**	G
d/→[t]	**8%** *6/73*	*/0*	**9%** *0/77*	/a	**%** */22*	% */17*
/z/→[s]	**0%** *0/1*	% */9*	**2%** *8/152*	/a	**%** */10*	% */37*
/z/→[ʒ]	**0%** *0/1*	1% */9*	**%** */152*	/a	**%** */10*	% */37*

Each of the patterns shown in Table 4 will now be discussed separately.

/d/→[t]. Devoicing of /d/ only occurs in English and mostly in word-final position as in *bed* [bet^{h}], *behind* [bɪʃaɪnt], *good* [dut], *inside* [ɪsaɪt̪], *playground* [beɪndaʊnt], *salad* [sælət̪]. Word-initial examples are: *down* [taʊn], *drink* [t^{h}ɪːn], and *daddy* [tadɪ]. /d/ only occurs in the child's Greek in word medial position where it is produced 100% adult-like; there is no word final /d/ in the Greek language. Therefore, even though /d/ is a common target in both languages, phonotactic distribution in the languages is largely different, leading to variability in the substitution pattern. As [+voice] is a terminal (i.e. secondary, non-privative articulator node) nondefault feature on the melodic tier, faithfulness to it appears first in word-initial positions (e.g. BERNHARDT; STEMBERGER, 1998, p. 224), as is the case here. Due to the Survived/LinkedUpwards(C-Root) constraints which rank lower than the Survive(Coronal, -continuant), which in turn ranks lower than the **Not(+voice)** constraint, yields the insertion of the default [-voice].

/z/→[s]. This devoicing again occurs only in English (32%) at word-final position. Examples are: *because* [vʊvɔːs], *close* [ʦoːs], *hands* [ʦants], and *toys* [t^{h}ɔɪs]. As in the case of word-final /d/ devoicing, deletion of the [+voice] leads to insertion of the default /s/ imposed by the constraints mentioned in the preceding paragraph with [-continuant] replaced by [+continuant]. The Greek language disallows word final /z/.

Devoicing of consonants, and especially word-finally, is a common developmental process in English (e.g. MAJOR, 1977; GRUNWELL, 1981). The preference for word-final as opposed to word-initial devoicing may be explained by the general principle that markedness occupies phycholinguistically prominent positions (e.g. SMITH, 2002). Smit (1993) finds that devoicing normally occurs in children younger than three years old, and that the frequency of occurrence depends on place and manner of articulation of the obstruent, with /z/ being devoiced more frequently than any of /b, d, g, v, ʤ/.

/z/→[ʒ]. In Greek, the main substitution of /z/ involves its laminalisation or backing to the [-anterior] manner of articulation at 11% and

8% for initial and medial word positions, respectively, even though /ʒ/ does not exist in standard Modern Greek. Examples are: *ζώα* /zoa/→[ʒoa] 'animals', *μαζί* /mazi/→[maʒi] 'together', *μπλούζα* /bluza/→[buʒa] 'blouse'. There is no final /z/ in Greek, so no conclusion can be drawn with respect to laminalisation in that position. Remarkably, /z/→[ʒ] is not present in the child's English /z/. However, it should be mentioned that [ʒ] is not always a clearly articulated post-alveolar fricative, nor is it a clear [Coronal, +voice +sibilant -anterior] articulation. This pattern is considered a universal, explained by the token of /alveolars/→[post-alveolars] (e.g. BERNHARDT; STEMBERGER, 1998). Ingram Christensen, Veach, and Webste (1980), among others, has reported blading with regard to word-initial /s/ in the early stages of the sound's development. Magoula (2000) reports /s/→[ʃ] in the phonetic inventory of Greek monolingual children, as well. The child here also blades /s/ in all word positions, but this is done at the low rate of 2% in each language, since she has acquired /s/.

In conclusion, only /z/→[ʒ] exists as a different substitution pattern between the two languages as /d/→[t] and /z/→[s] are different due to the difference in word position of the target between the two languages.

3.2 Substitutions for similar phonemes between the two languages

The pairs /j/ and [ʝ], /ɹ/ and /ɾ/, /h/ and (/x/, [ç]), /w/ and /ɣ/, though not common in the two languages, are similar in some respects with regard to their featural composition (see Appendix for consonant feature matrices of English and Greek) and share the same main substitution patterns, as discussed below.

/j/ vs. [ʝ]. Table 5 shows the substitutions patterns of /j/ and [ʝ].

Table 5. Substitutions of /j/ and [ʝ] on word position

	Initial		**Final**		**Medial**	
Pattern	**E**	G	**E**	G	**E**	G
/j/ [ʝ]→[l]	**3%** *9/152*	3%* *0/43*	**/a**	/a	**%** *0/4*	% */33*
/j/ [ʝ]→[ʒ]	**3%** *0/152*	%* */43*	**/a**	/a	**5%** */4*	7% */33*
[ʝ]→[t]	**/a**	7%* *6/43*	**/a**	/a	**/a**	% */33*

* arithmetic averages for [ʝ]→[l, ʒ, t] are 20%, 5%, 7%, respectively.

The palatal approximate /j/ and fricative [ʝ] only differ with respect to [consonantal], meaning that in the case of the glide there is wider constriction in the oral cavity allowing air to flow uninterruptedly, whereas in consonantal [ʝ], the constriction is narrower creating turbulence. In essence, their articulatory and acoustic difference is slight and it can only be accounted in terms of intensity of friction. In phonological development, glides are treated as consonantal sounds (e.g. SMITH, 1973).

The child's main substitutions for both targeted sounds are [ʒ] and [l], the latter being the result of lateral assimilations, as in *yellow* [leloʊ]~[lelə], a pattern also found in Smith (1973). Fricatives as a substitution for glides, as is the case of /j/→[ʒ], is an attested substitution pattern in monolingual phonological development in English (Ingram, 1989, Bernhardt & Stemberger, 1998). The glide /j/, besides being Dorsal[-back] is also Coronal[-anterior]. Therefore, the constraints that govern the substitution pattern /j/→[ʒ] are: Survived(Coronal, -anterior, +voice) lower than NOT(-continuant), which eliminates [ʤ]. As far as [ʝ]→[ʒ] is concerned, obstruents have been reported to substitute fricatives at a later stage in phonological development (Ingram et al., 1980). The Greek palatal fricative [ʝ] has a Dorsal[-back] articulation like English /j/ and, further, as Bernhardt & Stemberger (1998) argue, palatal fricatives have both a Dorsal and a Coronal place of articulation which may explain why [ʒ] substitutes both Greek [ʝ] and English /j/.

The lateral assimilation pattern, /j/, [ʝ]→[l], mostly occurs at word initial position, while /j/, [ʝ]→[ʒ] in word medial position. It is noted that in the child's Greek, [ʝ] is found to substitute many consonantal segments including /z/ (also in MAGOULA, 2000). However, the reverse pattern [ʝ]→[ʒ, z] is not reported, while here [ʝ]→[z] also appears at the smaller rate of 3%. In English, /j/→[z] is present at 4%. These substitution patterns may be additional proof of the phonetic similarity between /j/ and [ʒ] in development. Furthermore, there exists the substitution pattern [ʝ]→[t] only at word initial position (weighted average 37%) as a result of coronal assimilation in the word *γιατί* [ʝati]→[tati] 'why/because' (16 out of 22 different instances), while there are 10 targeted word types with [#ʝ]. English /j/ also becomes [t] but only once in *yes*, whose productions at different instances involved mainly [ʒ] and [z] for /j/. Bernhardt and Stemberger (1998) report [ʝ] (and [ʒ]) as one of the substitution patterns of developing /j/, though stopping of fricatives to [Coronal] is also universally common.

/ɹ/ vs. /ɾ/. Table 6 depicts the substitution patterns of /ɹ/ and /ɾ/.

Table 6. Substitutions of /ɹ/ and /ɾ/ on word position

	Initial		**Final**		**Medial**	
Pattern	E	G	E	G	E	G
/ɹ ɾ/→[l]	**1%** *8/44*	3% */15*	**3%** *3/69*	/a	**1%** */83*	47% *157/331*
/ɹ/→[v]	**3%** *9/44*	/a	**%** */69*	/a	**%** */83*	n/a

The central liquid is [+consonantal] in Greek (flap /ɾ/), but [-consonantal] in English (approximant /ɹ/). In both languages, rhotics have [l] as the dominant substitution (26% and 46% respectively cumulatively for all word positions). In both languages, the [l] substitution appears in all possible word positions. Examples are: *rabbit* [labɻtʰ], *restaurant* [lestant], *story* [stɔlɪ], *bear* [beəl], *car* [tɑ:l], *sister* [sistəl], *together* [tʊʤelələ], in English and *ρωτάς* /ɾotas/→[lotas]~[lodas] 'ask', *χέρος* [ʝeɾos]→[ʝelos] 'old man', *ευχαριστώ* /efxaristo/→[falisto] 'thanks', *κατάφερα* /kataferа/→[tatafela] 'I suceeded'.

However, in English it is dominant in initial and final positions. The reason is that, in English, out of 83 /ɹ/ targets in medial position, 66 are involved in clusters where they are deleted all the time. On the other hand, in Greek where /ɾ/ gets deleted in clusters 97% of the times, the proportion of clusters in medial position is not as large as in English, 44% (146/331) vs. 80% (66/83). That's why, in Greek medial position, /ɾ/→[l] is a dominant pattern. The lateral as a substitution for consonantal rhotics is a known process crosslinguistically (e.g. BERNHARDT; STEMBERGER, 1998 and references therein; MAGOULA, 2000). /ɹ/ being a glide, it is not surprising that is substituted by [w] in monolingual and bilingual English (e.g. LEOPOLD, 1949; SMITH, 1973), keeping faithful to Survived(Labial, -consonantal) ranking lower than Not(Coronal). The /ɹ/→[l] pattern is not entirely unusual even in monolingual English (e.g. Smith, 1973), however, less common (BERNHARDT; STEMBERGER, 1998:306 in coda). Because [-consonantal] is highly marked and not yet contrastive in the child, the lateral is the nearest sonorous alternative to its target. Thus, /ɹ/→[l] is governed by the constraints Survived (Coronal, +sonorant) ranking lower than Not(-consonantal).).

The fact that the child here has an underlying representation for English /ɹ/, that is different to that of Greek /ɾ/, is evidenced in the existence of the /ɹ/→[v] pattern only in English, in word-initial position. The tokens are *read* [viːd]~[wiːd̪], *reading* [viːdɪn], *red* [ved], *room* [vuːm] and *run* [vʌn]. In the last two words both patterns, [l]~[v], are interchanged in her productions at different instances. It is argued that, as Not(-consonantal) ranks high at this stage, faithfulness to the alveolar approximant comes through Survived(Labial). [Labial] is the secondary articulation of both the alveolar approximant, [ɹ], and of the velar glide, [w], which usually substitutes monolingual English /ɹ/ (BERNHARDT; STEMBERGER, 1998). The labial voiced fricative, /v/, never appears as a substitution of the Greek rhotic which does not have any secondary articulation.

/h/ vs. /x/, [ç]. Table 7 shows the substitution patterns of /h/, /x/ and [ç] at each word position.

Table 7. Substitutions of /h/ and /x/, [ç] on word position

	Initial		**Final**		**Medial**	
Pattern	**E**	G	**E**	G	**E**	G
/h x/→[s]	**8%** *5/40*	2% */22*	**/a**	/a	**%** */1*	1% */18*
/h x/→[ʃ]	**5%** *8/40*	6% */22*	**/a**	/a	**00%** */1*	9% */18*
/x/→[t]	**/a**	% */22*	**/a**	/a	**/a**	1% */18*
[ç]→[s]	**/a**	5% */8*	**/a**	/a	**/a**	0% *1/55*
[ç]→[ʃ]	**/a**	3% */8*	**/a**	/a	**/a**	5% *5/55*

Here the difference between English and Greek targets lies both in the [±consonantal] contrast and in privative articulator node: [Glottal] for /h/ and [Dorsal, ±back] for /x/, [ç]. With the exception of /x/→[t] at only word medial position, all three phonemes share the same substitutions: [s] and its

bladed version [ʃ]. Examples in English include: *hello* [sɔloʊ]~[ʃʌloʊ], *help* [seəp], *here* [ʃiəl]~[siə], *hiding* [saɪdɪn], *hold* [ʃoɬ]~[soid], *behind* [bɪʃaɪnt]. In Greek, examples for /x/→[s, ʃ] are: *χρώμα* /xɾoma/→[ʃoma] 'colour', /xoɾepsume/→[ʃolepsume]~[solepsume] 'dance', *έχω* /exo/→[ɛʃo] 'have', *δαχτυλίδι* /ðaxtiliði/→[ðastilili] 'ring', while for [ç]→[s, ʃ] are: *χειμώνας* [çimonas]→[ʃimonas] 'winter', *όχι* [oçi]→[oʃi]~[osi] 'no', *έρχεται* [eɾçete]→[esete] 'coming', *πιάτο* [pçato]→[sato] 'plate', *μάτια* [matça]→[maʧa] 'eyes', *πιάσω* [pçaso]→[pʃaso] 'catch'. For /h/, Not(Glottal, -consonantal) ranks higher than Survived(-voice, +continuant). The palatal fricative, [ç], in Greek has the same underlying representation with /x/, being its allophone. Therefore, their common pattern of substitution is not surprising in that fronting of velars and palatals is a widespread phenomenon in development (JAKOBSON, 1941/1968, GRUNWELL, 1981). The usual substitution of /h/ in monolingual English children is deletion (e.g. SMITH, 1973, BERNHARDT; STEMBERGER, 1998), but /h/ here has a low rate of deletions at 2%, cumulatively for initial and medial positions.

Knowing that [x] transferred to /h/ in the mother's input, it is not clear whether the child has an underlying representation of /h/ that is different than /x/ or whether it is her individual propensity for front articulations that equates /h/ and /x/→[Coronal, sibilant]. Interestingly, the reverse, /s/→[h], has been reported as a substitution pattern both in monolingual English and Portuguese Spanish (BERNHARDT; STEMBERGER, 1998) indicating that if [Glottal, -consonantal] was in the child's system, but say [+sibilant] was not, then that pattern may have also surfaced in this child's productions, both as target and substitution. It is noted that [s] is more prevalent in initial than medial position for all three targets. The same is true if [s] and [ʃ] are considered as one phone.

Last, the Greek voiceless velar fricative is stopped to the default coronal, /x/→[t], in the same assimilatory process that was discussed for [j]. This solely occurs in the two grammatical forms of a single word type: *ξέχασα* /ksexasa/→[tetasa], *ξέχασες* /ksexases/→[tetases] 'I/you forgot'.

/w/ vs. /ɣ/. In Table 8, the substitution patterns for /w/ and /ɣ/ at each word position are shown.

Table 8. Substitutions of /w/ and /ɣ/ on word position

	Initial		**Final**		**Medial**	
Pattern	**E**	G	**E**	G	**E**	G
/w ɣ/→[v]	**9%** *1/70*	8% */17*	**/a**	/a	**%** */2*	% */62*
/w ɣ/→[l]	**%** */70*	7% */17*	**/a**	/a	**0%** */2*	3% *3/62*

These [Velar] phonemes contrast with regard to [consonantal] and the secondary [Labial] articulation of /w/. Although their two main substitutions [v l] are common, their proportions are different for the two targets because the underlying process is not the same. [v] is produced at 57% and 5% for /w/ and

/ɣ/, respectively, while [l] at 7% and 52%, cumulatively at all word positions. The comparison holds true at each word position as well, except for medial English where there are insufficient tokens, only two. It is noted that the lesser of the two substitutions for each phoneme is a result of assimilation, for example, *flower* [fa:lɔɬ] (lateral), *γαύγισε* [ɣavʝise]→[vavise] 'barked' (labial), common in phonological development (e.g. SMITH 1973, etc.).

Examples of /w/→[v] not involving assimilation are: *way* [veɪ], *want* [vont]~[vɔt], *water* [votəl], *window* [vɪndɔʊ]. This pattern of spirantisation has been reported in the literature for monolingual English development (e.g. BERHNARDT; STEMBERGER, 1998). As both [-consonantal] and [Velar] are highly marked in this child's productions (BABATSOULI, forthcoming1), the glide is prohibited resulting in the [+consonantal] segment that is faithful to the secondary [Labial] articulation of /w/. Thus, Survived (Labial, +voice), where the default in sonorants [+voice] is also respected, ranks lower than Not(-consonantal).

With regard to /ɣ/→[l], one could argue again in favour of assimilation, as in e.g. *αλογάκι* /aloɣaci/→[alolati] 'horsey', *γάλα* /ɣala/→[lala] 'milk'. However, in Greek the substitution is retained even in the absence of /l/ in the word, as in *γω* /ɣo/→[lo] 'I', *φάγαμε* /faɣame/→[falame] 'we ate'. Liquid replacement of fricatives, though infrequent, has been reported in development (e.g. Ingram et al. 1980; Bernhardt & Stemberger, 1998). This substitution pattern is also found in the phonetic inventories of monolingual Greek children (e.g. MAGOULA, 2000). Here, the constraint Not (Velar, -sonorant, +central) ranks higher than the constraint Survived (+voice, +continuant).

Common substitution patterns across the languages

Common substitution patterns for common consonant targets across the two languages will now be discussed. Table 9 shows the substitution patterns for /f/ and /v/.

Table 9. Common substitutions for /f/ and /v/ across the languages

	Initial		**Final**		**Medial**	
Pattern	**E**	G	**E**	G	**E**	G
/f/→[s]	**%** */29*	% */51*	**%** */2*	/a	**3%** */16*	8% */58*
/v/→[m]	**00%** */1*	% */28*	**%** */8*	% */1*	**%** */5*	% */35*

Each of the patterns shown in Table 9 will now be discussed separately.

/f/→[s]. This is a substitution pattern dominant in Greek at 20% but also found in English at 6%, cumulatively for all word positions, but the pattern appears mostly in word medial position. Examples are: *αυτά* /afta/ [asta] 'these', *αυτί* /afti/→[asti] 'ear', while in English it only appears in *further* [sevə] and *breakfast* [bɛstats]. It is observed that this pattern materialises in words

containing an /f/ cluster. Although /f/→[s] is found only in such cluster-containing words, the reverse is not true, that is, not all /f/ word types containing a cluster are produced with [s] as a substitution. This high ranking of [Coronal] over [Labial] is a less common pattern in development, especially in English (BERNHARDT; STEMBERGER, 1998:291), where acquisition of [f] precedes that of [s] (e.g. TEMPLIN, 1957; MOSKOWITZ, 1971).

/v/→[m]. This pattern occurs only in the Greek *Venizelo* /venizelo/ 'Venizelos(a name)' pronounced as [mɛmizɛlo] at 2;7.10 and [menizelo] at 2;7.06 in her English and Greek speech, respectively. In the first case, there is a bidirectional assimilation, whereby the coronal /n/ assimilates to the [Labial] of [v] becoming [m] but retaining [+nasal]. The [nasal] feature, in turn, spreads to the left and triggers nasal assimilation of [v] →[m]. It is known that [nasal] spreads from right-to-left only (e.g. Ladefoged, 1993). However, in the only other word in English with nasal to the right of /v/ and in the majority of words in Greek, these constraints are not applicable, since /v/ is produced correctly. These words are: *pavement* [peɪvmən], *βάζανε* /vazane/→[vazane] 'put', *βουνά* /vuna/→[vuna] 'mountains', *βρούμε* /vɾume/→[vume] 'to find', *καταλαβαίνει* /katalaveni/→[talaveni] 'understands'.

Table 10. Common substitutions for /θ/ between the languages

	Initial		**Final**		**Medial**	
Pattern	**E**	G	**E**	G	**E**	G
/θ/→[s]	**8%** */8*	9% *5/130*	**%** */3*	n/a	**00%** */1*	6% *5/54*
/θ/→[ʃ]	**8%** */8*	4% *7/130*	**7%** */3*	n/a	**%** */1*	6% *5/54*
/θ/→[t]	**5%** */8*	1% *4/130*	**%** */3*	n/a	**%** */1*	% */54*
/θ/→[f]	**%** */8*	% */130*	**3%** */3*	n/a	**%** */1*	% */54*

Each of the patterns shown in table 10 will now be discussed separately.

/θ/→[s]. The apicalisation pattern in /θ/→[s] (33% English, 27% Greek, cumulatively for all word positions), is a common developmental pattern in both languages (e.g. INGRAM ET Al., 1980; PAL, 1995). The constraint Not[-strident] ranks higher than Survived(Coronal, -voice +continuant) in the substitution [s] for /θ/ in the child's productions. Examples are: *Dorothy* [dəɹəs.zɪ], *thank* [sent], *ήρθε* /iɾθe/→[ise] 'came', *παραμυθάκι* /paɾamiθaki/→[pamisati] 'fairy tale'. In Greek, the substitution pattern is more prevalent in medial position, while in English there is not enough data to tell.

/θ/→[ʃ]. Laminalisation of the voiceless interdental (42% English, 45% Greek, cumulatively for all word positions) is also strongly present in both languages as a /θ/→[s] variant. This laminalisation pattern (as substitution pattern for the child's fricatives was discussed earlier (see /z/→[ʒ]). Examples are: *both* [boʊʃ], *thank* [ʃɛnt], *ήθελες* /iθeles/→[iʃeles] 'you wanted', *θέλω*

/θelo/→[ʃelo] 'I want'. Cumulatively, /θ/→[s, ʃ] in Greek is more prevalent in medial position than in word initial position, 92% vs. 63%.

/θ/→[t]. Another common substitution process for the voiceless interdental between the two languages is its stopping. In English it occurs only in word initial position and at 25%, e.g. *through* [tu]. In Greek, its overall proportion is 9%, e.g. θέλω /θelo/→[telo] 'I want', being more prevalent in word initial position than in medial position, 11% vs. 4%. Here, the nondefault terminal feature [+continuant] is not contrastive, thus, the constraint Not(+continuant) ranks higher than Survived(Coronal, -voice) resulting in the default for place, manner and laryngeal features, [t]. In this substitution pattern for /θ/ as well as in the two previous patterns, [Coronal] is the highest ranked default for [place], faithful to the target.

/θ/→[f]. Last, to a lesser degree**,** labialisation of the voiceless interdental occurs overall at 8% and 1% in English and Greek, respectively, only in the functional words *both* [boʊfs] and *θa* [fa] 'will'. It is known that the nodefault [Labial] is sometimes preferred in development to the [Coronal] when there is a co-occurrence of the terminal feature [+continuant] (BERNHARDT; STEMBERGER, 1998).

In Table 11, the substitution patterns for /ð/ at each word position for each language are shown.

Table 11. Common substitutions for /ð/ between the languages

	Initial		**Final**		**Medial**	
Pattern	**E**	G	**E**	G	**E**	G
/ð/→[l]	**2%** *2/102*	7% *8/103*	*/0*	/a	**7%** */9*	2% *2/72*
/ð/→[t]	**%** */102*	1% *1/103*	*/0*	/a	**%** */9*	% *2/72*
/ð/→[n]	**%** */102*	% */103*	*/0*	/a	**%** */9*	% */72*

Each of the patterns shown in Table 11 will now be discussed separately.

/ð/→[l]. The lateralisation is the main substitution pattern of the voiced interdental fricative, overall at 25% in English and 40% in Greek. The pattern seems to be more prevalent in medial than in word initial position in both languages. However, a closer examination reveals that the size of this gap is due to the large proportion of function words in word initial /ð/ for which the substitution pattern in question is not as prevalent as in other words. In English, the proportion is at 100% (6/6) while in Greek is at 33% (7/21) with a proportion of tokens at 74% (76/103), yielding arithmetic averages of 37% and 49% for word initial and medial positions in Greek, respectively. Examples of the lateralisation pattern in the two languages are: *that* [læt], *this* [lɪs], *other* [ʌlə], *together* [tʊʤelə], *δώσει* /ðosi/→[losi] 'give', *εδώ* /eðo/→[elo] 'here', *μουσούδα* /musuða/→[musula] 'muzzle'. Here, the constraint Not(-sonorant, +central) ranks higher than Survived(Coronal, oral) forcing [lateral] to surface

in both languages. Interestingly, the same constraint is also found in Greek *εδώ* /eðo/→[eʌo]~[eɬo].

Lateralisation of /ð/ is largely uncommon in both monolingual English and Greek development. In monolingual English, [d] is the dominant substitution (e.g. MCLEOD, 2007) which is found at only 1% here in English and Greek. PAL (1995) and Magoula (2000) only report stopping, apicalisation and palatalisation of /ð/ for monolingual Greek children, patterns that are also found in this child's data, though infrequently. It can be argued that the child is at a more advanced stage in her development. Lateralisation of /ð/ is discussed as a possible, yet infrequent, developmental variant in English though argued to be more frequent in Spanish and Greek (BERNHARDT; STEMBERGER, 1998; INGRAM ET AL., 1980).

/ð/→[t]. Stopping of /ð/ is present at 5% in English and 7% in Greek, overall. The constraint Not(+voice, +continuant) ranks higher than Survived(Coronal, +anterior) resulting in [t], the default for place, supralaryngeal and laryngeal features. This pattern is very common in the early stages of monolingual development crosslinguistically, but also in Greek and English (e.g. MCLEOD, 2007). Examples are: *εδώ* /eðo/→[ɛtʰo] 'here', *Σπυριδούλα* /spiɾiðula/→[pititula] 'a name'.

For most tokens, however, the coronal default is preferred for different reasons in the two languages. /ð/→[t] in English occurs in function words (*the*, *this*) because they are prosodically weaker; it is known that the less marked choice is preferred in less prominent prosodic positions (e.g. BERNHARDT; STEMBERGER, 1998). On the other hand, the majority of /ð/→[t] in Greek is a result of assimilation spreading [-voice, -continuant] to the left in the produced word and ranking it higher than the terminal nondefaults [+voice, +continuant] expected in /ð/. Examples include *δείξω* /ðikso/→[titso] 'show', *δικό* /ðiko/→[tito] 'mine'. This explains why the pattern /ð/→[t] is more prevalent in word initial position.

/ð/→[n]. This realisation pattern is at 8% in English vs. 1% in the Greek word *εδώ* /eðo/→[eno] 'here'. The English words are: *the* [nə], *there* [neə] and *this* [nɪs]. The /fricative/→[nasal] pattern of substitution has been reported in the literature (BERNHARDT; STEMBERGER, 1998). The child's /ð/→[n] pattern is governed by the constraint Not(oral) ranking higher than Survived (Coronal).

Ingram et al. (1980) report the following stages in the acquisition of word initial fricatives in English before the final stage of complete acquisition: Stage 1: deletions; Stage 2: stops; Stage 3: liquids, glides and, subsequently, obstruents. With regard to her interdental fricatives,the child of this study is between Stages 2 and 3, though closer to Stage 3, because [t s ʃ l n] dominate the substitutions not only in word initial position, as reported by Ingram et al. (1980), but in all word positions.

In Table 12, substitution patterns for /k/ and /g/ in each language are shown.

Table 12. *Common substitutions for /k/ and /g/ between the languages*

	Initial		**Final**		**Medial**	
Pattern	**E**	G	**E**	G	**E**	G
/k/→[t]	**4%**	8%	**4%**	/a	**3%**	91%

	8/69	*06/120*	*4/64*		*8/41*	*08/119*
/g/→[d]	**3%** *0/36*	*/0*	**0%** */23*	/a	**1%** *5/21*	3% */12*
/g/→[t]	**%** */36*	*/0*	**1%** *4/23*	/a	**0%** */21*	% */12*
/g/→[ʤ]	*/36*	*/0*	*/23*	/a	**%** */21*	0% */12*

Each pattern shown in Table 12 will now be discussed separately.

/k/→[t]. This is the dominant substitution of /k/ in both languages (86% English, 90% Greek overall). Examples include: *back* [bæt], *car* [tɑ:l], *close* [tʰo:z], *duckling* [dʌtlɪn], *Mickie* [mɪtɪ], *εκκλησία* /eklisia/→[etisia] 'church', *κακός* /kakos/→[tatʰos] 'bad', *σκαμνί* /skamni/→[tami] 'stool', etc. Fronting to [Coronal] is known to be a universal in the acquisition of the velar stops prevalent crosslinguistically (e.g. Leopold, 1949; Smith, 1973; PAL, 1995). The nondefault privative node, [Dorsal], is cancelled permitting default [Coronal] to surface through the constraint Not(Labial, Dorsal) ranking higher than Survived(-voice, -continuant).

/g/→[d]. Similarly, /g/ is fronted to [Coronal] at 65% in English and 33% in Greek, overall, with 22 and 6 word types in English and Greek, respectively. However, the proportion at word final position is smaller because of /d/ devoicing. Examples of /g/→[d] are: *again* [əden], *big* [bɪd], *get* [det], *αγκαλίτσα* /agalitsa/→[adaliʧa] 'hug', *μαγκώσει* /magosi/→[madoʦi] 'to jam', *φεγγαράκι* [fega'ɾaci]→ [feɖaɟalati] 'moon'.

/g/→[ʤ]. Lenition of /g/ to the voiced affricate is evidenced at 50% in Greek and 3% in English, overall. The lexical dependence of this pattern in Greek is evident in the multiple occurrence at different instances of the word *αγκαλιά* [agaʎa]→[adʒaɟa]. This /g/→[ʤ] pattern is in agreement with faithfulness to [Coronal] found in the /Velar/→[Coronal] pattern elsewhere in the child's two languages but also, universally, in development. However, here the laminalisation seems to result from assimilation to [j] in the output, under the assumption that Greek palatals are both [Coronal, -anterior] and [Dorsal, -back], as generally reported for palatals by Bernhardt and Stemberger (1998). The fricative, [j], in the child's output is a substitute of [ʎ] because [lateral] ranks low in the output; it is known that less sonorous outputs are preferred in development (e.g. Bernhardt & Stemberger, 1998). Further proof for this comes from the word *αγκαλίτσα* /agalitsa/ pronounced [adaliʧa] where the lack of [ʎ]→[j] in the word results in the more dominant /g/→[d] pattern. In English, /g/→[ʤ] is present 1 out of 6 times in the word *again* [əʤen] and 1 out 3 times in the word *glass* [ʤas].

/g/→[t]. Fronting and devoicing of /g/ to [t] is evidenced at 21% in English and at 8% in Greek, overall, and mostly in word final position in English as word final /g/ in not allowed in the Greek language. Examples are *big* [bɪtʰ]~[bɪtʰ], *dog* [dɔt] and *egg* [e:ft], though there is also a token of word-initial devoicing in *green* [ti:n]. In Greek, devoicing is found in a single word, *στ'αγγλικά* /staglika/→[tatida] 'in English', instead of *[tadita], where [+voice] is involved in metathesis.

Substitutions for remaining consonants specific to each language

Remaining language-specific consonants, that is, English [ɬ] and Greek /ʦ/ [c ʎ] are discussed below; note that /ɹ/ and /ɾ/, /j/ and [ʝ], /w/ and /ɣ/, /h/ and (/x/, [ç]) were discussed above in relation to each other, respectively.

A. Substitutions for English [ɬ]

In Table 13, the substitution patterns of [ɬ] are shown.

Table 13. Substitutions for English [ɬ]

Pattern	Initial	Final	Medial
[ɬ]→[ə]	**n/a**	**11%** *3/28*	**39%** *7/18*
[ɬ]→[l]	**n/a**	**29%** *8/28*	**0%** *0/18*

The child's substitution processes with regard to the velarised lateral are at 22% for [ɬ]→[ə] and 17% for [ɬ]→[l], overall. These two patterns are consistent with those found in monolingual and bilingual English development (e.g. LEOPOLD, 1949, SMITH, 1973, BERNHARDT; STEMBERGER, 1998). The first pattern in this child's English occurs mostly at word medial position in the words *help* [seəp] and *milk* [mɪət], while the second occurs at word final position in the words *cereal* [silɪəl], *girl* [del], *school* [stʊl], *snail* [sn̪eəl] and *wall* [vol]. It looks like the first pattern is preferred in cluster context, while the second is preferred in singleton context.

B. Substitutions for Greek specific consonants

Table 14 depicts quantitatively the substitution patterns for /ʦ/, [c] and [ʎ].

Table 14. Substitutions for Greek /ʦ/, [c], [ʎ]

Pattern	Initial	Final	Medial
/ʦ/→[ʧ]	50% *4/8*	n/a	12% *4/33*
[c]→[t]	78% *94/121*	n/a	92% *46/50*
[c]→[p]	15% *18/121*	n/a	0% *0/50*
[ʎ]→[ʝ]	0% *0/1*	n/a	58% *7/12*
[ʎ]→[l]	100% *1/1*	n/a	17% *2/12*
[ʎ]→[ʒ]	0% *0/1*	n/a	8% *1/12*

The Greek affricate /ʦ/ is laminalised to [ʧ] at 20%, overall, following the same process discussed above for fricatives. The pattern is more prevalent at word initial position than in medial position. Examples include: *τσουρέκι*

[tsuɾeci]→[ʧuleti] 'bun', *κατσαρόλα* /katsaɾola/→[taʧalola] 'pan'. With regard to palatals [c] and [ʎ], major substitutions enforce depalatalisation to the coronal place of articulation, retaining faithfulness to respective laryngeal and supralaryngeal features.

Therefore, [c] becomes [t] at 82%, overall, matching the substitution pattern of /k/, which is the underlying representation of this allophone in Greek, e.g. *και* [ce]→[te] 'and', *κιόλας* [colas]→[tolas] 'already', *κύκλο* [ciklo]→[tito] 'cirlce', *λουλουδάκια* [luluðaca]→[lululata] 'flowers'. Moreover, [c] becomes 15% [p] word-initially in assimilation to [Labial] in the word, as discussed above for other consonants. It is only found in grammatical variants of the word type *κοιμάζαι* /cimate/→[pimate], *κοιμηθώ* /cimiθo/→[pimiso], *κοιμηθεί* /cimiθi/→[pimisi], *κοιμηθούμε* /cimiθume/→/pimisume/ 'sleep'.
Also, [ʎ] depalatalises to [l] at 23%, overall, constrained by Not(-anterior) ranking higher than Survived(Coronal, +lateral), under the supposition that [ʎ] is [Coronal, -anterior]. On the other hand, assuming that [ʎ] is [Dorsal, -back], then the substitution [l] for [ʎ] is constrained by Not(Dorsal) ranking higher than Survived(+lateral), as in *λιοντάρι* /ʎodaɾi/→/lodali/ 'lion', *μαλλιά* /maʎa/→[mala] 'hair'.

On the other hand, [ʎ] becomes [j] in the words *αγκαλιά* /agaʎa/→[adʒaja] 'hug' and *σχολιό* /sxoʎo/→[ʃojo] 'school' and [ʒ] in the word *δουλειά* /ðuʎa/→[ʒuʒa] 'work'. It has been reported in the literature (e.g. Smith, 1973) that /l/ becomes [j] during development. Here, also [Dorsal] predominates at the loss of [lateral].

4 Discussion

There are two main perspectives from which phonological interference can be operationalised in this child. One is, judging the nature of substitutions compared to input and, the other, comparing their nature between the languages.

Comparing to input

As seen in Table 1, the English input received by the child is target-like with respect to the majority of sounds in the native-English phonetic inventory. Intermittent use is found in inconsistent realisation of the /ɹ/ phonemic contrast, and the phonetic realisations necessitated by English-specific allophones in complementary distribution (CP) (aspirated stops, syllabic consonants) and in transfers (e.g. Major, 2008) of respective Greek-specific allophones in CP (palatal stops/fricatives, but not the lateral), backing evidence that rhotics and allophones are marked in second language acquisition (e.g. ARCHIBALD; FORTHCOMING; ECKMAN, ELREYES, IVERSON, 2003, and refs. therein). Aspiration and syllabic consonants will not be tackled in this article because their investigation necessatites different analytical approaches (acoustics, prosodic analysis).

The mother's intermittent transfers with regard to the rhotic and palatal stops has led to: i) two types of substitutions for the child's English rhotic productions, [v l], and ii) consistent substitutions across English targeted

/k g h/ in the contexts where the Greek palatalisation rule for /k g x ɣ/ holds (Babatsouli, 2019a). These is further evidence that interlanguage ambiguity in the input affects operational bilingual performarce. Backing this further, what is interesting is that the lack of palatal lateral transfer in the mother's speech has directly translated into a lack of such interference in the child's productions between the two languages, i.e. no /lɪft/→[ʎɪft].

Overall, it can be maintained that the operation of phonological interference is better investigated in terms of cross-language comparisons in the child's languages.

Comparing between languages

Regarding shared consonants, degree of separation of languages is evident in:

rate variability of *common* substitutions between the languages, e.g. /θ/→[t]: 17% (English) 9% (Greek) (e.g. *through*, *καθήσει* /kaθisi/ 'to sit'); /g/→[d, t]: 86% (English), 41% (Greek) (e.g. *good*, *αγκαλίτσα* /galitsa/ 'hugDIM'), and

the nature of *different* substitutions, e.g. English assimilatory /θ/→[f] (e.g. *both*), and Greek /g/→[ʤ] (e.g. *αγκαλιά* /agaʎɐ/ 'hug'), /z/→[ʒ] (e.g. *ζώα* /zoa/ 'animals').

Furthermore, separation is evidenced in different substitutions for similar consonants, e.g. /rhotic/→[v] in English only (e.g. *run*), approximating English norm [w], and in the normative behaviour of language-specific sounds, such as /ɬ/→[vocalic] (LEOPOLD, 1949, SMITH, 1973), e.g. *small* [smɔʊ]. Also, devoicing of /d z/ is found in English only, mostly in the English-specific word final position which is normative in child (e.g. INGRAM, 1989) and second-language development (e.g. FLEGE; DAVIDIAN, 1984), as well as a universal tendency for articulatory economy (OHALA; RIORDAN, 1980). As shown earlier, the child's substitutions are in agreement with norms and universal phonological processes, such as assimilation, fronting, stopping, vocalisation (e.g. BABATSOULI, 2019A, INGRAM, 1989, BERNHARDT; STEMBERGER, 1998, MCLEOD; BLEILE, 2003; PAL, 1998). There are few individual variation examples:

> /ð/→[l] in both Greek and English (e.g. ***th****is*, *δώσε* /**ð**ose/ 'give') and
>
> /f/→[s] (e.g. *break****f****ast* [bɛ**s**tats], *αυτά* /ɐftɐ/→[ɐstɐ]
>
> These contrasting monolinguals' typical substitution patterns, /ð/→[d] and /f/→[p] respectively, though these substitutions are also infrequent in monolingual English development (e.g. INGRAM ET. AL, 1980).

Is there interference?

Is the intereference? Yes, the following substitution patterns in the child's English speech show evidence of dominant (Greek) to weaker (English)

language phonological interference, since these patterns are either not reported as monolingual English substitutions in the case of:

> /h/→[s ʃ], e.g. *help* [seəp], *hold* [ʃoɬ] where /h/ deletion is predominant (only 2% in this child), and
> /f/→[s], e.g. *further* [sevə], since acquisition of /f/ precedes that of /s/ in monolingual English (e.g. TEMPLIN, 1957, MOSKOWITZ, 1971), or they are considered rare, and at other times context-specific as in the case of /ɹ/→[l] (i.e. only in codas) and /v/→[m] (i.e. lexically dependent assimilation) (e.g. BERNHARDT; STEMBERGER, 1998, MCLEOD; BLEILE, 2003).

With regard to English /ɹ/, the fact that the child has an underlying representation of the English rhotic, /ɹ/, that is different to the Greek one, /ɾ/, is evidenced in the existence of the /ɹ/→[v] pattern only in English, at word-initial position. The tokens are *read* [viːd]~[wiːd̪], *reading* [viːdɪn], *red* [ved], *room* [vuːm] and *run* [vʌn]. In the last two words both patterns, [l]~[v], are ephemerally interchanged in her productions at different instances. [Labial] is the secondary articulation of both the alveolar approximant, [ɹ] and of the velar glide [w] which usually substitutes monolingual English /ɹ/ (BERNHARDT; STEMBERGER, 1998). Unlike English monolinguals that acquire /w/ relatively early (Smit, 1993), the child here shows considerable delay in the acquisition of her English /w/ mostly because of its [Dorsal] articulation that is a problematic feature in this child (BABATSOULI, 2015) and because of it being [-consonantal], that is phonemically illegal for consonants in Greek. The child uses [v] alongside [l] as substitutes for /w/ in development. This is, thus, the reason that [v] instead of [w] appears as the predominant English-specific substitution for the rhotic in English. Because the Greek rhotic does not share the [Labial] secondary articulation of /ɹ/, the voiced labial fricative /v/, never appears as its substitution in this child's or monolingual Greek-speaking children's developmental substitutions (PAL, 1995). The fact that both /ɾ/ and /w/ are substituted by [l] further shows the child's Greek interference on her English in terms of 'overdifferentiation' on the featural level.

That [s h] are exchangeable due to similarity in their featural composition, is further exemplified by the fact that /s/→[h] is a substitution pattern both in monolingual English, Portuguese, and Spanish (BERNHARDT; STEMBERGER, 1998). Furthermore, knowing that [x ɾ] transferred to /h ɹ/ respectively in the mother's input, it is not clear whether the child actually has underlying representations of /h/ /ɹ/ that are distinctly different from /x/ /ɾ/ respectively, or whether it is her individual propensity for i) front articulations that equates /h/ and /x/→[Coronal, sibilant] and ii) for lateralisation that equates /ɹ/ and /ɾ/→[Lateral] (as also supported by the child's preference for lateral in substituting /ð/ in both labguages, and /ɣ/ in Greek, as opposed to a respective stop/fricative with the same place of articulation).

Among the patterns discussed, /h/→[s ʃ] is evidence of *underdifferentiation* (the L2 phonemic contrast is clearly not distinguished and thus confused), and /ɹ/→[l] is evidence of *overdifferentiation* (the L1 phonemic

distinctions are imposed on the weaker language) in certain contexts. Both of the substitution patterns for /h/ and /ɹ/ are transfers in the sense of 'static elements'suggested by Grosjean (2012), while /f/→[s] in *further* [sevə] seems to be an ephemeral pattern, what Grosjean has referred to as 'interference or dynamic element'. The reverse pattern of ephemeral interference from weaker English to dominant Greek is found mostly in the rare voicing of the child's Greek word final /s/, e.g. *κούκλες* /kukles/→[kukle**z**] 'dolls', which is illegal in Greek but transferred from English phonotactics which permit word final /z/ in the plural of some nouns (e.g. *boys*). Other interference from English to Greek involves evidence of minimal reduction of Greek vowels (illegal in Greek but phonotactically permissible in English). Elaborating on this is beyond the scope here, however, where only consonants are examined. There is no evidence of static transfer from the child's English to her Greek.

Furthermore, there is evidence of separate mental representations for Greek /ɣ/ and English /w/. So, while both of these [Dorsal] sounds share [l v] as substitutions, the lateralisation of the Greek voiced velar fricative, /ɣ/→[l] e.g. *γύρω* /lio/ 'around', and the spirantisation of the English glide, /w/→[v]. (e.g. *way*→[veɪ]) (52%, 57%, respectively) are systemic substitutions rather than cross-language interferences, in that they match respective normative substitutions (e.g. MCLEOD; BLEILE, 2003; PAL, 1995). At the same time, the reverse patterns, /ɣ/→[v] and /w/→[l] at significantly smaller proportions, are assimilatory in both languages, e.g. *flower*→[faːlɔɬ] (i.e. regressive assimilation to the lateral substituting /ɹ/), and *γάβγισε* /ɣavjise/→[vavise] (i.e. regressive assimilation to the labial in the word), a process also known to be universally present (e.g. BERNHARDT; STEMBERGER, 1998, SMITH, 1973).

Regarding common sounds between the languages, substitution patterns of /θ/, where [s ʃ] are overwhelming more than [t] in both languages, is also evidence of 'acceleration' (static positive transfer from L1 to L2) in the child's bilingualism, since /s/ is acquired earlier in Greek than in English (e.g. BABATSOULI, 2017), which also explains the use of [s] and its bladed counterpart as a substitute for several unvoiced fricatives, including /θ/. The same argument holds for /ð/→[z] and its bladed counterpart in both languages. The reverse interference phenomenon, i.e. 'delay' is supported by the substitution patterns for palatal stops [c ɟ], obligatory allophones of /k g/ respectively, in Greek (BABATSOULI, 2019) that are transferred by 'overdifferentiation' into the child's English. The phonotactic rule is so predominant in Greek, and the differentiation regarding [±back] on the phonetic rather than the phonemic level (thus more marked) are such that they overpower velar stop production in English as far as both child's, the mother's speech, and Greek L2 English speech is concerned (BABATSOULI; KAPPA, 2011). Last, lenition of /g/ to the voiced affricate, /g/→[ʤ], is the overwhelming pattern in Greek mostly due to an assimilation pattern as seen earlied, but its infrequent occurrence in English, e.g. *again* [əʤen] and *glass* [ʤas], is another example of nonstatic, dynamic interference between the child's developing phonologies.

Overall, nevertheless, despite the variations in phonetic detail, the substitution patterns in the two languages share a common underlying system. Such a finding has been previously explained as a result of language similarity

(e.g. BUNTA ET AL., 2006). The child's hierarchy for substitutions is: /Coronal/→[Coronal] <[Labial]-/Dorsal/→[Coronal]<[Labial]<[Dorsal] which agrees with Prince and Smolenksy's (2004) [Coronal] as the universal unmarked default. Furthermore, when the child's substitutions are compared to those in adult second-language (L2) English from different L1s, similarities also surface: e.g. L2 English: /ð ɹ/→[l] spoken by native Chinese and Japanese speakers, and /θ/→[s f t] spoken by Dutch and French speakers (BRANNEN, 2002). The evidence, therefore, speaks in favour of universal patterning in developmental speech, child and adult second language, crosslinguistically.

As we have seen, where there is difference in the two grammar systems, it has been more difficult for the child to acquire the finer details involved in the phonological system and phonotactics of her English, resulting in higher tendency for phonological interference from the dominant to the weaker language. The effect of the compromised quality exposure to some of the English sounds (that are themselves transfers in the input) should also not be underestimated. This is supported by the fact that other phonotactic features (e.g. the production of velarised consonants, where there is no transfer in the input) show respective monolingual developmental patterns, and signs of transfer/interference.

By and large, the study has provided evidence and argumentation in favour of the presence of active phonological interference (in the presence of system separation in bilingualism) that is supported at both the surface and underlying levels of the melodic tiers in the bilingual child's language pair. A strength of the study is its comprehensive qualitative and quantitative presentation of the data that support the resulting analysis and reasoning. The most important limitation concerns its single-case study design, a methodological approach that is by default not easily generalisable to account for patterns in larger populations. Nevertheless, the study advances our understanding of bilingualism and cross-language interaction crosslinguistically and does so, especially, with regard to an under-represented language pair in bilingual phonological research. There are no other published results on other children's early phonological development in Greek-English bilingualism. The results presented in this article provide new data and inferences, and have supported theories on early childhood bilingualism.

5 Conclusive remarks

This study has winnowed phonological interference by studying the choice of consonantal sound substitutions in the developing Greek and English phonologies of a bilingual girl, for a month at age 2;7. Comprehensive quantitative results and respective qualitative assessment, based on the child's naturalistic utterances in both languages during routine interaction with her caregiver, has provided a unique opportunity to zoom in onto her bilingual phonological development at the surface and underlying levels of melodic tiers. This has shed light on the nature of transfer and interference between a pair of languages that is under-represented in the literature with regard to i) their combination (being typologically different), and ii) the fact that one of them (English) is acquired in an exogenous context via primarily single-person exposure to linguistic input. The study has shown that similar psycholinguistic processes known to operate in child bilingual exposure at large, also operate in

this child's bilingualism despite the special sociolinguistic circumstances, and that her phonological systems show both separation and cross-language interaction. Further, the study has provided substantial evidence of known and less supported inferences with regard to the nature of phonological interaction in bilingualism.

REFERENCES

BABATSOULI, E. (forthcoming1). Portrait of a developing phonology in child L2 English and L1 Greek. In BABATSOULI, E.; BALL, M. J. (Eds.), **An anthology of bilingual child phonology**. Bristol, UK: Multilingual Matters.

BABATSOULI, E. (forthcoming2). Prolegomena. In BABATSOULI, E. (Ed.), **On under-reported monolingual child phonology**. Bristol, UK: Multilingual Matters.

BABATSOULI, E. A phonological assessment test for child Greek. **Clinical Linguistics and Phonetics.** 2019.

BABATSOULI, E. Bilingual development of theta in a child. **Poznan Studies in Contemporary Linguistics**, v. 53, n.2, p. 157-195. 2017.

BABATSOULI, E. Technologies for the study of speech: Review and an application. **Themes in Science and Technology Education**, v. 8, n. 1, p. 17-32, 2015.

BABATSOULI, E; BALL, M. J. (forthcoming). Introduction. In BABATSOULI, E; BALL, M. J. (Eds.), **An anthology of bilingual child phonology**. Bristol, UK: Multilingual Matters.

BABATSOULI, E; INGRAM, D. Prologue. In BABATSOULI, E; INGRAM, D (Eds.), **Phonology in protolanguage and interlanguage** (pp. 1-23). Sheffield, UK: Equinox Publishing, 2018.

BABATSOULI, E; KAPPA, I. Transfer of Greek palatals in L2 English. In WREMBEL, M; KUL, M.; DZIUBALSKA-KOŁACZYK, K (Eds.), **Achievements and perspectives in the acquisition of second language speech: New Sounds** Frankfurt: Peter Lang, *2010*. p. 27-42.

BABATSOULI, E; NICOLADIS, E. The acquisition of English possessives by a bilingual child: Do input and usage frequency matter? **Journal of Child Language**, v. 46, n.1, p. 170-183, 2019.

BERNARDINI, P; SCHLYTER, S. Growing syntactic structure and code-mixing in the weaker language: the Ivy Hypothesis. **Bilingualism: Language and Cognition**, v. 7, n.1, p. 49–69, 2004.

BRANNEN, K. The role of perception in differential substitution. **Canadian Journal of Linguistics - Revue Canadienne de Linguistique**, v. 47, p. 1-20, 2002.

BRIÈRE, E. J. **A Psycholinguisitc study of phonological interference**. The Hague/Paris: Muton. 1968.

BUNTA, F; DAVIDOVICH, I; INGRAM, D. The relationship between the phonological complexity of a bilingual child's words and those of the target languages. **International Journal of Bilingualism**, v. 10,. 1, p. 71-88. 2006.

ECKMAN, F. R; ELREYES, A; IVERSON, G. K. Some principles of second language phonology. **Second Language Research**, *v.* 19, n. 3, p. 169-208, 2003.

EDWARDS, J. G. H.; ZAMPINI, M. L. (Eds.) (**Phonology and second language**, Philadelphia: John Benjamins, 2008.

FLEGE, J. E; DAVIDIAN, R. Transfer and developmental processes in adult foreign language speech production. **Applied Linguistics**, v. 5, n. 3, p. 23-347, 1984.

GASS, S. M; SELINKER, L. (Eds.) **Language transfer in language learning**. Cambridge, MA: Newbury House, 1982.

GROSJEAN, F. **Studying bilinguals***,* Oxford: Oxford University Press, 2008.

GROSJEAN, F. (2012). An attempt to isolate and then differentiate transfer and interference.**International Journal of Bilingualism**, v.16, n. 1, p. 11-21, 2012.

GRUNWELL, P. The development of phonology. **First Language***,* n. 3, p. 161-191, 1981.

HAMBLY, H; ET AL. The influence of bilingualism on speech production: A systematic review. **International Journal of Language and Communication Disorders**, v. 48, p. 1-24, 2013.

INGRAM, D. e al. The acquisition of word-initial fricatives and affricates in English by children between 2 and 6 years. In YENI-KOMSHIAN, G. H; KAVANAUGH J. F; FERGUSON, C. A. **Child phonology, Vol. I: Production**. New York: Academic Press, 1980. p. 169-192

JAKOBSON, R. **Child language, phonological universals and aphasia**. The Hague: Mouton. 1941/1968.

KEHOE, M. Crosslinguistic interaction in early bilingual phonology: A critical review. In Babatsouli, E; Ingram, D. (Eds.), **Phonology in protolanguage and interlanguage** . Sheffield, UK: Equinox Publishing, 2018. p. 49-75.

LEOPOLD, W. F. **Speech development of a bilingual child: A linguist's record**. Evanston, IL: Northwestern University Press, 1949.

LLEÓ, C; CORTÉS, S. Modeling the outcome of language contact in the speech of German-Spanish and Catalan-Spanish bilingual children, **International Journal of the Sociology of Language**, *221*, 101-125, 2013.

MAJOR, R. C. Phonological differentiation of a bilingual child. **Papers in Psycholinguistics and Sociolinguistics. Working Papers in Linguistics**, v. 22, p. 88-122, 1977.

MAJOR, R. C. Transfer in second language phonology. In J. G. H. Edwards & M. L. Zampini (Eds.), **Phonology and second language acquisition** Philadelphia/Amsterdam: John Benjamins, 2008. p. 63-94.

MACWHINNEY, B. **The CHILDES project: Tools for analyzing talk**. Mahwah, NJ: Lawrence Erlbaum, 2000.

MAGOULA, E. **The acquisition of the phonological system in Modern Greek: The case of consonants**. Unpublished doctoral dissertation. University of Athens, Greece, 2000.

MCLEOD, S. **The international guide to speech acquisition**. Clifton Park, NY, Thomson Delmar Learning, 2007.

MCLEOD, S; BLEILE, K. Neurological and developmental foundations of speech acquisition. Invited seminar presentation at the **American Speech and Hearing Association Convention**, November 2003, Chicago, IL.

MEISEL, J.'Early differentiation of languages in bilingual children', in K. Hyltenstam & L. Obler (eds.), **Bilingualism across the lifespan: Aspects of acquisition, maturity and loss**. Cambridge: Cambridge University Press, 1989. p.13-40.

MOSKOWITZ, A. I. **Acquisition of phonology**. Unpublished doctoral issertation, University of California, Berkeley, USA, 1971.

MOULTON, W. (1962). Toward a classification of pronunciation errors. **Modern Language Journal**, n. 46, p. 101-109, 1962.

Nespor, M. **Phonology**. Athens: Patakis Publication (adapted for Greek by A. Ralli & M. Nespor), 1999.

OHALA, J; RIORDAN, C. Passive vocal track enlargement during voiced stops. **Report of the Phonological Laboratory UC Berkeley**, n. 5, p. 78-87, 1980.

ODLIN, T. Cross-linguistic influence. In DOUGHTY, C; LONG, M. H. (Eds.), **The handbook of second language acquisition**. Cambridge, MA: Blackwell, 2008. p. 436-486.

PARADIS, J. Beyond 'One system or two': Degrees of separation between languages of French - English bilingual children. In DÖPKE, S (Ed.), **Cross-linguistic structures in simultaneous bilingualism.** Amsterdam/Philadelphia: John Benjamins, 2000. p. 175-2000.

PARADIS, J; GENESEE, F.'Syntactic acquisition in bilingual children: Autonomous or inderdependent?' **Studies in Second Language Acquisition,** v. 18*,* n. 1-25, 1996.

PIENEMANN, M; KEßLER, J. Measuring bilingualism. In: AUER, P; WEI, L. (Eds.) **Handbook of multilingualism and multilingual communication** The Hague: Mouton de Gruyter, 2007. p. 247-267.

PRINCE, A; SMOLENSKY, P. **Optimality theory: Constraint interaction in generative grammar**. Oxford: Basil Blackwell, 2004.

SMIT, A. B. Phonologic error distributions in the Iowa-Nebraska articulation norms project: Consonant singletons. **Journal of Speech and Hearing Research***,* v. 36, p. 533-547, 1993.

SMITH, J. **Phonological augmentation in prominent positions**. Unpublished doctoral dissertation. University of Massachusetts, Amherst, USA, 2002.

SMITH, N. V. **The acquisition of phonology: A case study**. Cambridge Studies in Linguistics 25, Cambridge: Cambridge University Press, 1973.

TEMPLIN, M. **Certain language skills in children: Their development and interrelationships**. 1957. Monograph. The University of Minnesota Press, 1957.

VOLTERRA, V; TAESCHNER, T. The acquisition and development of language by bilingual children. **Journal of Child Language**, Cambridge, v. 5, p. 311-326, 1978.

WEINREICH, U. **Languages in contact: findings and problems**. Mouton: The Hague, 1953.

WEINREICH, U. **Explorations in semantic theory**. Mouton: The Hague, 1966.

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