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Prosodic Influence in Bilingual Phonological Development: Evidence from a Portuguese-French First Language Learner

Leticia Almeida, Yvan Rose and M. João Freitas

1. Introduction

The literature on bilingual language development abounds with controversial claims about grammatical autonomy vs. interdependence of the two languages being acquired. Phonological studies of bilingual development suggest a relatively independent development of the two languages being acquired (Keshavarsz & Ingram 2002; Brulard & Carr 2003; Lleó 2006, among others). Other studies point to some degree of influence of one system over the other (Paradis 2001; Lleó et al. 2003, among others). Paradis and Genesee (1996) propose that interaction between the developing languages of a bilingual child can lead to three different situations: (a) transfer of a given structure from one language to the other, (b) acceleration, or (c) delay of the acquisition of a given structure in comparison with its acquisition by monolinguals.

Some studies report cases of transfer of a given language property. Paradis (2001) suggests transfer effects in a study on truncation patterns of 17 French-English bilinguals. She describes that French-English bilinguals exhibit a wS pattern in the truncation of English target words, unlike English monolinguals who exhibited a Sw pattern in line with the properties of the target language. Paradis (2001) explains this difference between English truncation patterns of monolinguals and bilinguals by a transfer of the truncation patterns of French target words in the bilingual context.

Several studies find cases of a delay in the development of bilingual's grammar in comparison with monolinguals. Kehoe (2002a) reports a delay in the development of reduced syllables in German by Spanish-German bilinguals. Even if bilinguals exhibit vowel reduction in their reduced syllables in German, their rate of vowel reduction is significantly lower than the monolingual's ones. Kehoe (2002b) shows similar results in her study of vowel acquisition by 3 Spanish-German bilinguals. She finds that these bilinguals experience no

* Leticia Almeida, Universidade Atlântica, lalmeida.uatla@gmail.com; Yvan Rose, Memorial University of Newfoundland, yrose@mun.ca, Maria João Freitas, Universidade de Lisboa, joaofreitas@fl.ul.pt. We would like to thank BUCLD 36 attendees, especially Daniel Swingley, for useful feedback and suggestions. Leticia Almeida's research was supported by a grant from FCT with the reference SFRH/BD/27733/2006.

difficulties in the acquisition of the Spanish vowel system whereas they have problems with the acquisition of the German vowel system. Kehoe (2002b) reports that bilinguals display lower rates of target production of vowels in German compared to monolinguals. Moreover, bilinguals tend to neutralize the functional contrast between long and short vowels in German. As opposed to this, the rates of target vowel production in Spanish are similar to the monolinguals. Kehoe (2002b) hypothesizes that the development of the German vowel system is delayed for the bilinguals due to the Spanish vowel system to which bilinguals are also exposed.

Focussing on the development of syllable codas, Almeida (2006) also finds a delay in the development of codas in European Portuguese by a French-Portuguese bilingual child as compared to French monolinguals. In contrast to Almeida (2006), Lleó et al. (2003) and Kehoe and Lleó (2003) show evidence for acceleration of the development of codas. Lleó et al. (2003) study the acquisition of codas by 5 German-Spanish bilinguals from 1;01 to 2;03. Kehoe and Lleó (2003) analyze the development of syllable structure by 3 German-Spanish bilinguals from 1;01 until 3;00. In these two studies, the authors suggest an interaction between the two phonological systems being acquired by bilingual children. In particular, these authors observe an acceleration of the development of syllable structure in bilinguals as compared to monolinguals. Kehoe and Lleó (2003) and Lleó et al. (2003) report that bilingual children acquire word-final codas in Spanish earlier than Spanish monolinguals and also have a greater segmental inventory in coda position. Spanish monolinguals develop codas late and they tend to produce word-medial codas before word-final codas whereas the reverse order of acquisition is attested for German monolinguals. Kehoe and Lleó (2003) argue that the development of codas by the bilinguals is similar to the one reported for German monolinguals but differ from the patterns exhibited by Spanish monolinguals: bilinguals acquire word-final codas before word-medial codas, as monolingual German children do. Thus, it seems that bilingualism promotes the acquisition of codas in Spanish in the sense that bilinguals are closer to the target language with respect to coda acquisition than monolingual Spanish children are.

Some scholars have put forward hypotheses concerning the factors which may be responsible for the interactions observed. The first hypothesis concerns the notion of language dominance. Paradis (2001) suggests that some bilingual children are dominant in French and that this fact can explain the transfer from French into English in her study. Lleó and Rakow (2006) also emphasize that most of the studies conducted on German-Spanish bilinguals by Lleó and colleagues are based on data from children living in Germany; as mentioned above, these studies suggest effects of German onto the acquisition of Spanish. They thus suggest that the language of the community may play a role in the directionality of the influence attested between the two developing languages of a bilingual child.

The second hypothesis relates to the complexity of a given structure combined with its diminished exposure in a language due to the bilingual input.

It is well established that children learn language through positive evidence. If a structure is present only in one language, bilingual children may receive less input than monolinguals, which translates in lesser amounts of evidence for the learning of this structure. This fact can potentially lead to a delay in development. Lleó (2002) proposes that if a complex structure is present in only one language, then its acquisition will be delayed. (This would also explain the development of German vowel system studied in Kehoe (2002) reported above.) On the contrary, if a complex structure is present in both languages, then its acquisition should be accelerated. This is attested in the German-Spanish bilingual acquisition of codas (Lleó et al. 2003).

In this paper, we aim at contributing to the debates noted above. We focus on the simultaneous acquisition of phonology with new unpublished data from a Portuguese-French¹ first language bilingual learner named Barbara. In the sections below, we focus primarily on the development of syllable constituents, namely branching onsets and word-medial codas. The paper is organized as follows. In section 2, we outline the methodology of our case study. In section 3, we describe the development patterns of branching onsets in both target languages. We continue our description in section 4 with a description of coda development. We return to the discussion above in section 5, where we argue for the presence of cross-grammar influences in both directions (from Portuguese to French and vice versa), which we attribute to grammatical factors, as opposed to input-related influences. In a nutshell, we propose that the structure of each target grammar is primarily responsible for the asymmetries observed in Barbara's productions.

2. Methodology

As mentioned above, our corpus consists of longitudinal spontaneous speech from Barbara, a Portuguese-French bilingual child, whom we audio-video recorded approximately every second week at her home. 55 sessions were collected from the child's first productions (1;00) until 3;10. The recordings took place during unstructured play situations. The recordings of the two languages followed the one-person, one-language design. An interlocutor for each language was present; only the presence of the parent who spoke the language of the session was allowed. Each session lasted approximately 30 minutes. All sessions were phonetically transcribed; these transcriptions were performed and stored with the help of the software Phon (e.g. Rose & MacWhinney, to appear). All the searches were also performed on this software. The corpus analyzed contains a total amount of 22083 words in Portuguese and 21904 words in French. For the purpose of data analysis, we consider that a structure emerges when it is produced at least once in two consecutive sessions. We consider a given structure to be acquired when its productions reach at least 80% of accuracy in two consecutive sessions.

¹ Both language varieties are European.

Barbara was born and raised in Portugal in a bilingual family: her father is a native speaker of French and her mother a native speaker of Portuguese. Both speak to the child in his/her native language. Barbara has two older brothers who talk to her in both languages but predominantly in Portuguese. Before entering school at 3;07, Barbara spent most part of the day with her monolingual Portuguese grandparents. From these observations, we can establish that Barbara's early upbringing mostly took place in a Portuguese monolingual environment. However, she usually spent vacation time in a French-speaking country with her family. Also, each parent can communicate in the other's language and the family chooses to speak only in French on Saturdays. At 3;07, Barbara entered a French kindergarten at Lisbon.

At the beginning of data collection, Barbara showed a preference for talking in Portuguese. She would take longer to be interested to communicate with the French investigator. Also, she would typically never spontaneously decide to speak French to anyone except her father. Note also that this preference is restricted to her first productions and as she was growing up, this tendency progressively disappeared. It is also important to note that despite this initial preference, she also would never try to avoid talking in French and she would never choose to talk Portuguese to the French investigator, which suggests that she had developed the necessary sociolinguistic awareness and select the appropriate language to communicate with others.

3. The development of branching onsets

French and Portuguese exhibit similar inventories in branching onset position: both systems allow four combinations of an obstruent followed by a liquid (Dell 1995 for French; Mateus and Andrade 2000 for Portuguese), as illustrated in the next table:

Table 1: Inventory of branching onsets in French and Portuguese

	Portuguese	French	Gloss
Plosive+rhotic	[pr]incesa	[pʁ]incesse	“princess”
Plosive+lateral	[pl]ano	[pl]at	“flat”
Fricative+rhotic	[fr]anco	[fʁ]anc	“direct”
Fricative+lateral	[fl]or	[fl]eur	“flower”

These four types of sequences are allowed both word-initially and word-medially. However, the phonetic format of the rhotic differs in both languages: it is an apical tap in Portuguese but a uvular fricative in French. For plosive+rhotic sequences, the first member of the sequence can assume one of the three major places of articulation. Also, plosive+lateral onsets only allow labial or velar consonants in the first position of the onset cluster. Finally, fricative+liquid onsets only allow labial in the first position.

Despite these phonological similarities, the monolingual acquisition of

branching onsets seems to proceed in quite a different fashion in the two languages under study. At the initial stage, both Portuguese and French learners are reported to reduce branching onsets to the first consonant, as it is also reported for most languages (Fikkert 1994; Freitas 1997; Rose 2000). When branching onsets emerge in both languages, the order of development of these sequences varies across French and Portuguese. The data available on the topic suggest that French learners develop CIV sequences before CrV sequences (dos Santos 2007; Kehoe et al. 2008).² This developmental pattern is different from the one reported for Portuguese monolingual children, in which CrV sequences tend to develop before CIV sequences (Almeida and Freitas 2010). Furthermore, Portuguese children acquire branching onsets very late and before reaching the mastery stage they may also go through a stage of vowel epenthesis between the two consonants of the target sequence (Freitas 2003). This developmental pattern is only marginally observed in monolingual French children (Rose 2000, dos Santos 2007, Kehoe et al. 2008).

The development of branching onsets in Barbara's productions in both languages is given in Figures 1 and 2. An "X" indicates that a particular type of branching onset is acquired (cf. section 2). We did not analyze voicing contrast so that "pl" stands for [pl] and [bl]. This is true for all types of branching onsets.

	fl	pl	fr	kl	pr	kr
2;04	X					
2;06		X				
2;10			X			
3;00				X		
3;03					X	
3;06						X

Figure 1. Order of development of branching onsets in Portuguese

	fl	pʁ	kl	kʁ	fʁ	pl	tʁ
2;04	X						
2;10		X					
2;11			X				
3;01				X			
3;03					X	X	
3;08							X

Figure 2. Order of development of branching onsets in French

The results of the development of branching onsets in Barbara's productions show that the acquisition of this structure proceeds during the same

² Note that it is not clear how this pattern relates to the development of target laterals and liquids in singleton onsets; it may well be the case that these patterns are influenced by segmental development.

developmental period: Barbara starts producing branching onsets by 2;04 in both languages. By this time, the only sequence that is systematically produced in both languages is /fl/. The order of development of the other types of branching onsets differs between the two target languages. Nonetheless, some aspects are common, for example the fact that /tr/ is the more problematic sequence in both languages. It is the last sequence mastered in either language, and it is not yet stable enough in Portuguese to be considered acquired at the end of data collection (3;10). Also, in both languages, the production of CIV sequences is favored. During a first period, only this type of sequences emerges in the child's productions, as illustrated in (1) from representative French examples.

(1) CIV production vs. CrV reduction in French:

glace	[ˈglas]	→	[ˈglas]	2;03	“icecream”
plein	[plɛ̃]	→	[plɛ̃]	2;09	“full”
bruit	[ˈbʁɥi]	→	[ˈβi]	2;05	“noise”
très	[tʁɛ]	→	[tɛ]	2;09	“very”

In Portuguese, some CrV sequences emerge at 2;04 but their production do not stabilize until 2;09. At this age, only /fr/ is stable. All CIV sequences are acquired by 3;00. Except for /fr/, no CrV sequence is mastered at this age. We can thus conclude that Barbara also shows an early preference for CIV sequences in Portuguese.

(2) Examples of CIV production and CrV reduction in EP:

flores	[ˈflɔr]	→	[ˈfloɫɐ]	2;04	“flower”
Pluto	[ˈplutɔ]	→	[ˈplutɔ]	2;07	“proper name”
livro	[ˈlivɾu]	→	[ˈliβu]	2;04	“book”
grande	[ˈɡɾɛ̃di]	→	[ˈgɛ̃di]	2;08	“big”

Crucially, Barbara also skips the epenthesis stage well documented for Portuguese monolinguals, as discussed above. The cases of vowel epenthesis between the two consonants of a target branching onset are only rarely attested, in either languages. In fact, Barbara acquires branching onsets earlier than Portuguese monolinguals typically do, skipping the vowel epenthesis stage altogether. In this sense, we argue that the development of branching onsets in Portuguese is accelerated in Barbara's productions as compared to Portuguese monolinguals.

To sum up, in our data, we observe an interaction between the two languages being acquired by the child in the sense that the development of one structure shows a unique pattern (emergence of CIV sequences before CrV sequences and no vowel epenthesis). This pattern is similar to the one reported for monolingual French children but different from the one observed for Portuguese monolinguals. This interaction leads to an acceleration of the development of branching onsets in Portuguese, due to a positive influence of

French.

4. The development of word-medial codas

French is virtually unrestricted concerning its word-medial codas inventory: almost all consonants can appear in this syllable position (Dell 1995). In contrast to this, Portuguese is highly restricted: only three consonants are allowed in this position: the fricative /s/ and the liquids /r/ and /l/ (Mateus and Andrade 2000).

Table 2: Inventory of word-medial codas in French and Portuguese

	Portuguese	French
Plosive	-----	o[p]server; ane[g]dote
Fricative	fe[ʃ]ta; a[ʒ]neira	a[f]te, a[s]pirine,
Lateral	bo[l̥]so	a[l]gue
Rhotic	cu[r]va	po[ʁ]ter

These two languages also differ concerning the patterns of monolingual acquisition of word-medial codas. French monolinguals are reported to develop all consonants in word-medial coda position at the same time (Rose 2000; dos Santos 2007) whereas Portuguese monolinguals typically develop fricative codas before liquids (Freitas 1997; Correia 2004).

Figures 3 and 4 illustrate the development of word-medial codas in Barbara's productions in French and Portuguese. A "X" indicates acquisition whereas a "|" indicates emergence but not complete acquisition.

	[ʃ, ʒ]	[r]	[l̥]
1;10			
2;04	X		
2;09			
3;01		X	
3;10			

Figure 3. Development of word-medial codas in Portuguese

	[s]	[ʁ]	Plosives	[l]
1;10				
2;04	X			
2;09				
3;01			X	
3;03		X		
3;06				

Figure 4. Development of word-medial codas in French

The figures show that word-medial codas emerge at the same age in both languages (2;04). At this age, Barbara only produces fricative codas, in both of her target languages. Later, at 2;09, liquid codas emerge, also in both languages, except from the French lateral, which is hardly attempted. Plosives, which only occur in French, are the last type of codas to emerge, at 3;01.

As for branching onsets, Barbara exhibits a unique pattern of development for her word-medial codas in both languages: she develops fricative codas prior to the other types of codas.

(3) Production of fricative codas and deletion of liquids in Portuguese:

buscar	[bu ^h 'kar]	→	[is ^h 'ka]	2;04	“to search for”
mostrar	[mu ^h 'trar]	→	[us ^h 'ta]	2;04	“to show”
porco	[^h 'porku]	→	[^h 'pok ^w]	2;04	“pig”
alta	[^h 'a ^h tə]	→	[^h 'ate]	2;04	“tall”

(4) Production of fricative codas and deletion of liquids and plosives in French:

restaurant	[^h ɛsto ^h 'vã]	→	[^h esto ^h 'nã]	2;04	“restaurant”
triste	[^h 'tɹist]	→	[^h 'tistɪ]	2;07	“sad”
parc	[^h 'pɑrk]	→	[^h 'pɑkœ]	2;05	“park”
docteur	[dɔk ^h 'tœʁ]	→	[to ^h 'tœʁχ]	2;09	“doctor”

This pattern of acquisition is attested for Portuguese monolingual children, but finds no correspondence with what is described for French monolingual children, who acquire all types of consonant at the same time (Rose 2000; dos Santos 2007), if one excludes issues pertaining to segmental development only (e.g. absence of a given cluster because of the child’s inability to produce one of the phones contained in that cluster).

5. Discussion

Our data suggest that interaction can take two different output forms in a single child. First, based on the developmental patterns observed for branching onsets in section 3, we found an influence from one language on the other is attested, in the sense that only one pattern of development governs her productions in both languages. This influence is attested from French into Portuguese and leads to an acceleration of the development of branching onsets in Portuguese as compared to monolinguals, as Barbara skips the vowel epenthesis stage attested for Portuguese monolinguals. Second, based on the development of codas, we find an effect and a direction of cross-language influence to be different. The effect occurs from Portuguese into French and leads to a delay of the development of word-medial codas in French as compared to monolinguals. We argue that the initial stage in which only fricative consonants are allowed in coda in Barbara’s productions in both languages is the result of the grammatical properties of the target Portuguese system, which favors fricatives in this position and, crucially, prohibits plosives.

In sum, we find an acceleration effect in the development of branching onsets in Portuguese and a delay in the development of word-medial codas in French. This shows, first, that the development of not only syllable structure in general but also that of particular domains within syllables can potentially be vulnerable to interactions between the developing languages of bilingual children. As mentioned in the introduction, such interactions between the two languages of bilingual children have also been highlighted in several other studies conducted by Lleó and colleagues (especially the line of research produced by Lleó, Kehoe and their colleagues).

Second, an interesting finding of the current study is that interactions occur in both directions: we found an influence from French to Portuguese in the development of branching onsets, and an influence of Portuguese onto French in the development of word-medial codas. Moreover, this bi-directional interaction takes place over the same developmental period (between 2;03 and 3;01). This finding basically contradicts claims that language dominance can be the sole predictor for the direction of the inter-linguistic influence in bilingual children (Paradis 2001); it is indeed impossible for the child to be dominant in both languages at the same time. The patterns displayed by Barbara also contradict predictions based on the dominant language of the community, since interaction is attested in the two possible directions (cf. Lleó and Rakow 2006). Instead, we argue that the two directions of influence we observe in Barbara's data are likely to occur in the context of a balanced bilingual, while the two predictions we are falsifying above are more likely to occur in bilingual learners with a clear language dominance, be it driven by the household or the community setting of the learner. Fundamentally, however, we cannot reduce the explanation to input only; the influences we observe are clearly at the level of the phonological grammar of the child and, as such, deserve a full grammatical consideration, independent of potential external influences such as frequency pressures from the input (e.g. Rose 2011).

Lleó (2002) proposes that if a complex structure is present in only one language, then its acquisition will be delayed. On the contrary, if a complex structure is present in both languages, then its acquisition will be accelerated. Barbara's phonological development also partially contradicts this hypothesis. Both branching onsets and word-medial codas involve complexity at the level of syllable structure (branching structures in onsets and rhymes, respectively), in both languages. Under Lleó's (2002) hypothesis, we should find an acceleration of the development of these structures in both languages, given the bilingual context of acquisition under investigation here. As we have seen, acceleration is attested for branching onsets only. However, the development of word-medial codas is delayed in French. We contend that the central issue driving the patterns observed concerns not the presence/absence of a given structure in both languages, but rather the types of distributional facts that constrain the manifestation of these structures in the target languages. In Portuguese, word-medial codas are highly constrained and limited to three different types: fricatives, lateral and rhotic. French allows for one more type of codas, plosives,

making the inventory of possible codas much larger in this language. Barbara is thus exposed to a greater variety of codas through French. This difference between the two languages allows us to compare Barbara's situation to the situation of the German-Spanish bilinguals studied in Lleó et al. (2003): those bilinguals are also exposed to a greater variety of codas through German. Following Lleó (2002)'s hypothesis and the results of Lleó et al. (2003) study, we should expect acceleration of coda acquisition in Portuguese, since the bilingual child receives more positive evidence for codas than monolingual Portuguese children. However, the development of French codas is delayed: segmental development of codas is slow compared to monolinguals. Thus, the prediction based on structure complexity and the quantity of positive evidence available cannot account for all our results. Rather, other aspects must be considered, including the analytical ambiguity present in the input, which may influence a child's analysis of any of the target languages, as well as generalizations across these languages (see Almeida 2011 for additional discussion).

References

- Almeida, Letícia (2011). *Acquisition de la structure syllabique en contexte de bilinguisme simultané portugais-français*. Ph.D Thesis. Universidade de Lisboa.
- Almeida, Letícia (2006). *Acquisition des codas non finales par un enfant bilingue portugais-français*. M.A. Thesis. Universidade de Lisboa.
- Brulard, Ines & Philip Carr (2003). French-English bilingual acquisition of phonology: one production system or two? *The International Journal of Bilingualism*, 7, 177-202.
- Correia, Susana (2004). *A Aquisição da Rima em Português Europeu - ditongos e consoantes em final de sílaba*. M.A. Thesis. Universidade de Lisboa.
- Dell, François (1995). Consonant clusters and phonological syllables in French. *Lingua*, 95, 5-26.
- Freitas, Maria João (2003). The acquisition of onset clusters in European Portuguese. *Probus*, 15, 27-46.
- Freitas, Maria João (1997). *Aquisição da estrutura silábica em Português Europeu*. Ph.D Thesis. Universidade de Lisboa.
- Johnson, Carolyn & Paige Lancaster (1998). The development of more than one phonology: a case study of a Norwegian-English bilingual child. *The International Journal of Bilingualism*, 2, 265-300.
- Kehoe, Margaret (2002). Developing vowel system as a window to bilingual phonology. *International Journal of Bilingualism*, 6, 315-334.
- Kehoe, Margaret & Conxita Lleó (2003). "The Acquisition of Syllable Types in Monolingual and Bilingual German and Spanish Children". In Barbara Beachley, Amanda Brown & Frances Conlin (eds.), *BUCLD 27 Proceedings*, 402-413. Somerville, MA: Cascadilla Press.
- Kehoe, Margaret, Géraldine Hilaire-Debove, Katherine Demuth & Conxita Lleó (2008). The structure of branching onsets and rising diphthongs: evidence from the acquisition of French and Spanish. *Language Acquisition*, 15, 1, 5-57.
- Keshavarz, Mohammad & David Ingram (2002). The early phonological development of a Farsi-English bilingual child. *The International Journal of Bilingualism*, 6, 255-

- Lleó, Conxita (2006). The acquisition of prosodic word structures in Spanish by monolingual and Spanish-German bilingual children. *Language and Speech*, 49, 205-229.
- Lleó, Conxita (2002). The role of markedness in the acquisition of complex prosodic structures by German-Spanish bilinguals. *The International Journal of Bilingualism*, 6 (3), 291-313.
- Lleó, Conxita & Martin Rakow (2006). The prosody of two-word utterances by German and Spanish monolingual and bilingual children. In Conxita Lleó (ed.), *Interfaces in Multilingualism: Acquisition and representation*, 1-26. Amsterdam/Philadelphia: John Benjamins.
- Lleó, Conxita, Imme Kuchenbrandt, Margarer Kehoe & Cristina. Trujillo (2003). Syllable final consonants in Spanish and German monolingual and bilingual acquisition. In Natascha Müller (ed.), *(In)vulnerable Domains in Multilingualism*, 191-220. Amsterdam: John Benjamins.
- Mateus, Maria Helena Mira & Ernesto d' Andrade (2000). *The Phonology of Portuguese*. Oxford: Oxford University Press.
- Paradis, Johanne (2001). Do bilingual two-year-olds have separate phonological systems? *The International Journal of Bilingualism*, 5, 19-38.
- Paradis, Johanne & Fred Genesee (1996). "Syntactic Acquisition in bilingual children: Autonomous or interdependent?". *Studies in Second Language Acquisition*, 18, 1-25.
- Rose, Yvan (2000). *Headedness and Prosodic Licensing in the L1 Acquisition of Phonology*. Ph.D Thesis. McGill University.
- Rose, Yvan (2009). Internal and External Influences on Child Language Productions. In François Pellegrino, Egidio Marsico, Ioana Chitoran & Christophe Coupé (eds.), *Approaches to Phonological Complexity*, 329-351. Berlin: Mouton de Gruyter..
- Santos, Christophe dos (2007). *Développement phonologique en français langue maternelle*. Ph.D Thesis. Université Lumière Lyon 2.