Phonological Systems in Conflict: The Acquisition of Stress in Bilingual French-English

Natália Brambatti Guzzo, Heather Goad, and Megan Deegan (McGill University)

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In the literature on language acquisition in simultaneous bilinguals, there is much debate as to whether learners start the acquisition process with a single system for both languages (e.g., Celce-Murcia, 1978; Toribio and Brown, 1995) or whether there is evidence for early language differentiation (e.g., Genesee, 1989). Evidence for the former view is based on the observation that children seem to alternate between the two systems or use properties of one of the systems in the other. The latter view, however, does not prevent interaction, specifically through transfer from one system to the other. Thus, with the evidence available to date, it is difficult to arbitrate between these two views. In this paper, we argue that stress provides a novel way of exploring this question. When the two languages exhibit different stress systems (where, for example, main stress is assigned to distinct positions within the phonological word), bilingual children may impose one system on top of the other, such that the syllables targeted by stress in each language may *both* surface as prominent. We refer to this as STRUCTURE BLEND.

French and English are an ideal language pair to investigate this issue because their stress systems are strikingly different. In English, final syllables are extrametrical (e.g., [(ˈkænə)$_{Ft}$<də>] *Canada*) and heavy penultimate syllables attract stress (e.g., [və(ˈræn)$_{Ft}$<də>] *veranda*) (Hayes, 1995). In French, on the other hand, stress is final and required only at the phrasal level (e.g., [lə pəti gaʀˈsɔ̃] *le petit garçon* 'the small boy') (Jun and Fougeron, 2000). For two-syllable words, the word forms under focus in the present study, English and French are fundamentally different: while English exhibits trochaic rhythm (1a), French exhibits iambic rhythm (1b).

(1) (a) English trochaic rhythm: (b) French iambic rhythm:

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   *     .                                      .     *
  dæ    di    daddy                            pa    pa    papa  'daddy'
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Previous research on the bilingual acquisition of the prosodic structures of this language pair suggests that two-year-old children have separate phonological systems (Paradis, 2001). In production tasks with nonce 4-syllable words in the two languages, bilingual children (i) tend to preserve odd-numbered syllables from the right edge of the word when producing French items, and (ii) truncate words into trochees when producing English items, mirroring the behavior of monolingual children for each of the target languages.

We contend, however, that evidence for language separation can be amplified by the experimental setting and the empirical phenomenon examined. Concerning the former, the way in which data are collected may cause language separation in bilingual children to be overrepresented. In Paradis's (2001) study, the children were asked to repeat the nonce words in a play setting, with the bilinguals being tested on two separate occasions, once for each of the target languages. We propose that in a naturalistic setting where children are allowed to interact freely with their interlocutors, they will be more likely to draw from both phonological systems that are available to them. As a result, prosodic interference from one system into the other will be observed more frequently.

To test this, we analyzed data from a French-English simultaneous bilingual (age 1;11; anglophone mother, francophone father). The child was videotaped for 45-60 minutes on three occasions, and 20 minutes of each session were orthographically and phonetically transcribed (as described in Genesee, Nicoladis and Paradis, 1995). At the time of the recordings, the child was dominant in French, as he had started to attend a French language daycare. An analysis of the child's productions focusing on his syntactic representations for negation, finiteness and use of subject pronouns indicates that the child has separate syntactic systems for each of the languages (Genesee et al., 1995). These, however, are areas of the grammar where structure blend is not possible.

For the present study, two linguists listened to and retranscribed the child's productions, and items for which the transcriptions did not match were removed from the analysis. Items containing unintelligible material, onomatopoeia and interjections were also excluded, as well as monosyllables (such as English *car, gone, no*, and French *non* 'no', *jus* 'juice'), compounds (such as English *Big Bird*) and two-syllable phrases (such as English *all gone* and French *beau bec* 'nice kiss'). All the remaining items corresponded to phonological words containing two or three syllables, with stress in the English target items being invariably on the penultimate syllable (e.g., *tractor, another, neighbor*), and stress in the French items being invariably on the final syllable (e.g., mɛrˈsi *merci* 'thank you', veˈlo *vélo* 'bike'). A total of 144 items were included in the analysis (35 in English and 109 in French, reflecting the child's dominance in French).

The items were coded for language (English or French) and match/mismatch (whether the rhythmic pattern produced by the child matched the expected rhythmic pattern). Items labeled as mismatches were further coded for the type of mismatch that they exhibited. 28.6% of the English items and 72.5% of the French items displayed the expected rhythmic pattern, with the difference between the two languages being statistically significant ($\hat{\beta} = 1.88$, p < 0.0001).

Considering the production mismatches for both languages, 63.6% correspond to stress shift (2), while the rest correspond to the addition of another main stress or a secondary stress (3).

(2)　　(a) Stress shift in English:

	.	*				.	*	
	dæ	di	*daddy*			e	bɛ	*neighbor*

　　　　(b) Stress shift in French:

	*	.				*	.	
	tɔ	mæt	(tɔˈmat) 'tomato'			tɪ	mi	(fiˈni) 'finished'

(3)　　(a) Addition of another stress in English:
　　　　　ˈnaˈdʒ　　*another*　　　　　　　ˈtækˌtæ　　*tractor*

　　　　(b) Addition of another stress in French:
　　　　　ˈvɛˈlo　　(veˈlo) 'bike'　　　　　ˌãˈkɔ　　(ãˈkɔʀ) 'still'

We propose that these mismatches stem from different mechanisms. On the one hand, instances of stress shift correspond to prosodic TRANSFER: stress shifts when the child applies the rhythmic pattern of one language onto the other. On the other hand, we attribute the addition of another stress to prosodic STRUCTURE BLEND: the child combines the rhythmic patterns of the two languages, which results in two-syllable productions with two stresses.

Considering both languages individually, the majority of mismatches in both English and French are due to prosodic transfer, although the proportion is considerably higher for English (72%, vs. 56.7% for French). This suggests that language dominance plays a role in the type of influence one language will have over the other, as transfer of prosodic structure is more frequent from the dominant language. The dominant language is targeted more frequently by prosodic structure blend. The existence of blend implies that the prosodic structure of one system cannot be overridden by the prosodic structure of the other system; instead, one system is imposed on top of the other. The observation that blend is more frequent in French than English is consistent with the idea that French, being the child's dominant language, is more resistant to the effects of the competing prosodic system. Given that most of the French productions match the expected prosodic pattern, it seems that the child has differentiated systems for stress. This indicates that blend does not correspond to the existence of a single system, but rather the direction of the influence from one system into the other.