EARLY EFFECTS OF BILINGUALISM ON WH-QUESTION STRUCTURES: INSIGHT FROM SIGN-SPEECH BILINGUALISM[1]

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1. Introduction

In our long-term project, we are studying children who are simultaneously acquiring a sign language and a spoken language: either Brazilian Sign Language (Libras) and Brazilian Portuguese (BP), or American Sign Language (ASL) and English. Our goals are to explore the effects of this *bimodal bilingualism* as offering unique insight on the various ways in which a bilingual's languages might interact (Chen Pichler, Quadros & Lillo-Martin 2010; Lillo-Martin, Koulidobrova, Quadros & Chen Pichler in press; Lillo-Martin, Quadros, Koulidobrova & Chen Pichler 2009). In the present paper, we focus on the structure of WH-questions produced by the children in their spoken languages, and present our model of a bilingual language architecture which allows for the types of structures we observe.

The structures of interest in this paper are illustrated in (1). They are questions used in regular direct question contexts (not 'echo' or Common Ground contexts).

(1)	a.	You eat what?	b.	The ball rolls to where?	*in situ/final*
(2)	a.	What you buy what?	b.	Where Mommy where?	*doubling*
(3)	a.	Que eu quero que?	b.	Onde está o livro onde?	*doubling* (BP)

Examples like these are produced by ASL/English or Libras/BP bimodal bilinguals. In order to see whether their appearance in the spoken languages might

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be related to bilingualism, let us briefly turn to a review of the structure of WH-questions in ASL and Libras (based on Nunes & Quadros 2007; Petronio & Lillo-Martin 1997).

In both of these sign languages, WH-elements may appear in the sentence-initial position (4). WH-elements may also appear in situ (5), without the need for a particular Common Ground context. In addition, WH-elements may appear 'doubled', showing up in both the initial and sentence-final position (6). These cases are described as emphatic by some authors (e.g., Nunes & Quadros 2007). Finally, WH-elements may appear in the sentence-final position (7). Many such cases may be considered *in situ*, but they may also be derived in a way similar to the double structures, with only the final copy appearing. In this paper, we will use the label *in situ/final* acknowledging that it is impossible to distinguish the analysis in all the cases discussed here.

(4) a. wh
WHO BUY CAR
'Who bought a car?'

b. wh
WHO YOU LIKE
'Who do you like?'

(5) wh
JOHN SEE WHO TODAY
'Who did John see today?'

(6) a. wh
WHO JOHN SEE WHO
'WHO did John see?'

b. wh
WHAT JOHN BUY WHAT
'WHAT did John buy?'

(7) a. wh
JOHN SEE WHO
'Who did John see?'

b. wh
BUY COFFEE WHERE
'Where did (you) buy coffee?'

Given that examples as in (1) are produced in contexts other than typical for *in-situ* questions in English, and neither English nor BP permits doubling of the WH-element as in (2)-(3), while the sign languages do permit such structures, it seems safe to suggest that these examples illustrate some type of apparent cross-linguistic influence, in which structures from the sign language show up with words of the spoken language.

Cases in which children produce structures illustrating this type of cross-linguistic influence are not unheard of (e.g., Yip & Matthews 2007 on WH-in-situ in the English of Cantonese-English bilinguals). However, it is important to note that these types of structures are not restricted to children in an early stage of development. They are also observed among bimodal bilingual adults, who – in the sociolinguistically appropriate contexts – combine aspects of their languages in ways that include producing utterances with the words of one language but the structure of the other (Emmorey et al. 2008). We use the term 'code-synthesis' to

include this type of language mixing along with code-switching in the traditional sense and code-blending (bilingual use of signs and speech).

Note that bimodal bilinguals are not unique in their (adult) use of such mixed structures. González-Vilbazo & López (in press) describe another instance in the productions dubbed 'Esplugish' produced by Spanish-German bilinguals in the German School of Barcelona. One example discussed by González-Vilbazo & López concerns code-switching with light verbs. As they describe the phenomenon, "in the Esplugish light verb construction the VP is composed of a German lexical verb and the other lexical items can also be German but the linearization, prosody and expression of focus/background of the VP follow Spanish patterns."

These findings tell us that the use of structure from one language along with the words of another language is a bilingualism effect that is not restricted to children whose grammars are still developing. Rather, it must fall out from the nature of the bilingual's language architecture. Our philosophy is that this architecture should not have special mechanisms and constraints specifically for bilinguals, but it should be the same as that used for monolinguals (MacSwan 2000), with two sets of lexical elements. Our diagram of this model is given in Figure 1.

The model incorporates elements of minimalist syntax and distributed morphology. The roots and morphemes that are the input to the syntactic derivation can come from Language_x, Language_y, or in fact from both. Similarly, at Vocabulary Insertion, elements from either language can be used, provided their feature requirements are met. These concepts give us code-switching, code-blending, and apparent cross-linguistic influence.

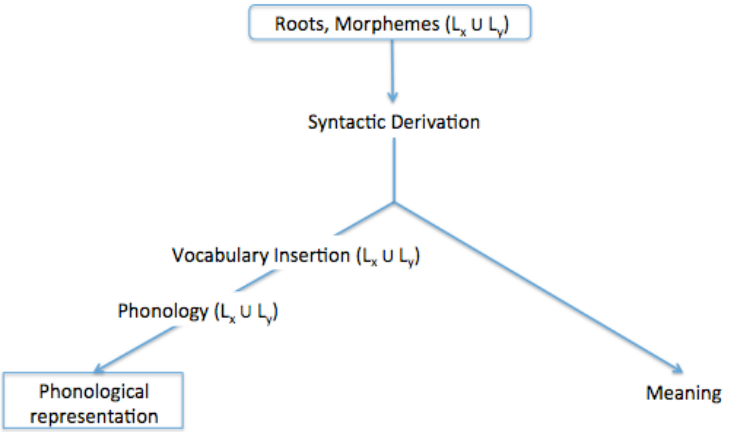

Figure 1. Bilingual language synthesis

Under this model, how would examples of sign-influenced speech such as those in (1)-(3) be derived? Let us consider the proposal by Tieu (2010) for Cantonese-English bilinguals (data from Yip & Matthews 2007). Pires & Taylor (2007) propose that in English, WH-in-situ is licensed when the set of possible answers is part of the Common Ground. They argue for a distinct null question complementizer that does not trigger movement of the WH-phrase, in addition to the complementizer which is associated with movement. Tieu suggests that English therefore has two (relevant) question complementizers, but Cantonese has only one, which can be used in either regular or Common Ground contexts. When the bilingual child is speaking English, the Cantonese complementizer may be chosen. This would result in production of WH-in-situ in non-Common Ground contexts.

Similary, we would propose that ASL and Libras have *three* WH-complementizers: one triggers movement, one is used in Common Ground contexts, and the third does not trigger movement but also does not require Common Ground contexts – allowing for WH-in-situ in regular direct questions. This allows for the bimodal bilingual children to produce WH-in-situ in their spoken langauges.

Our account for the presence of 'doubling' structures in BP and English follows similar lines. Nunes & Quadros (2004) account for doubling by proposing a functional element with a [+focus] feature. According to Nunes' (2004) theory of linearization, both copies of the focused element may be pronounced following morphological fusion of the focus head with the focused element. We assume that choosing the [+focus] functional element during a derivation using words from the spoken language can result in doubling structures such as those shown in (2)-(3).

Our proposal thus leads us to expect that bimodal bilingual children may use WH-in-situ and WH-doubling structures that are not attested in the speech of monolingual English- or BP-speaking children. In the next section we describe the study we conducted to test this prediction.

2. The study

Method

We analysed spontaneous production data consisting of videotaped naturalistic play sessions. These sessions were filmed weekly, with different sets of experimenters interacting with the children in order to target either their sign language or their spoken language. The interlocutors are all bilingual and they do sometimes code mix with the children, even though they aim for the use of one language or the other.

The videos were transcribed using ELAN (EUDICO Linguistic Annotator software developed and distributed for free by the Max Plank Institute for Psycholinguistics, Nijmegen; http://www.lat-mpi.eu/tools/elan/), following the procedure detailed in Chen Picher, Hochgesang, Lillo-Martin & Quadros (2010). Transcripts were searched and coded with review of the audio-video information.

Participants

In this paper we present results from two bimodal bilingual children acquiring ASL/English, and one child acquiring Libras/BP (all males). The age range of the period investigated and the approximate total number of child utterances are provided in Table 1.

Table 1. Bimodal bilingual participants

Name	Languages	Age Range	# Sessions	# Utterances
Ben	ASL/Eng	1;11-3;03	18	~6000
Tom	ASL/Eng	1;11-4;05	31	~6000
Igor	Libras/BP	2;01-3;02	7	~3000

In addition to the data from bilingual children, we examined monolingual English and monolingual BP data for comparison. For monolingual English, we consulted CHILDES (MacWhinney 2000) data from four children, as detailed in Table 2. We coded data from Adam and Nina, and we rely on Tieu's (2010) description of data for Eve and Naomi.

Table 2. Monolingual English data

Name	Age Range	# Sessions	# Utterances
Adam	2;03-2;11	12	~10,000
Eve	1;06-2;03	20	
Naomi	1;03-4;09	93	~12,000
Nina	1;11-2;11	38	~22,000

For monolingual BP, we rely on data for two children reported in the literature: the child Gabriela studied by Sikansi (1999), and the child N studied by Grolla (2005), as described in Table 3.

Table 3. Monolingual BP data

Name	Age Range	# Sessions
Gabriela	2;04-3;10	26
N	2;00-4;00	53

Procedure

For the bimodal bilingual children, the following procedure was used. Files were searched for the occurrence of WH-phrases. Lines with WH-phrases were coded with review of the audio/video. Usable utterances were coded as WH-initial, WH-in-situ/final (in most cases, it is not possible to distinguish between these), or WH-doubled. "WH+that" utterances were excluded as formulaic.

For the data from Adam and Nina, files were reviewed using CLAN and categorized in the same way as for the bilingual participants, except the analysis was based on the text only. For Eve and Naomi, we rely on Tieu's (2010) report that they "produced no *what*-in-situ questions." For the data from Gabriela and N, we rely on results reported by Sikansi (1999) and Grolla (2005) respectively.

Results

The results of our analysis for data up to the age of 2;11 are reported in Table 4, where we present the proportion use of sentence-initial, *in-situ* / final, or double WH-elements, and the age of the earliest *in-situ* / final WH-elements observed.

Table 4. Results up to 2;11

Participant	Sentence-initial	*In situ* / final	Double	Earliest *in situ* / final
Ben	.865	.02	.115	2;00
Tom	.92	.07	0	2;04
Igor	.94	.01	.05	2;01
Adam	.998	.002	0	2;08
Eve	1.0	0	0	--
Naomi	1.0	0	0	--
Nina	.993	.007	0	2;09
Gabriela	1.0	0	0	--
N	1.0	0	0	(3;09)

Single sample t-test shows significant differences between Ben and English monolinguals ($p < .0001$), between Tom and English monolinguals ($p < .0001$), and between Igor and BP monolinguals ($p < .05$) in the use of non-initial structures.

After 2;11, Ben and Tom continue to use some WH-*in-situ*, but no doubles. Adam produces more (generally licit) WH-*in-situ* starting around 3;02 (Tieu 2010). Igor stops using non-fronted WH (through the end of the period of coded data, 3;02). Grolla (2005) reports that the first use of WH-*in-situ* for N is at 3;09.

3. Discussion

We see that with respect to their early WH-constructions, the bimodal bilingual children are significantly different from their monolingual English- and BP-speaking counterparts. Although their use of non-fronted WH-structures is not of high frequency, it is greater, and earlier, than for monolinguals. Should we attribute these utterances to incomplete knowledge of the spoken languages? A temporary non-target parameter setting?

We do not think that is the best approach. The children overwhelmingly use target WH-forms in their spoken English and BP, indicating knowledge of WH-fronting by almost any standard. Furthermore, we would not want to propose a model in which bimodal bilingual children 'outgrow' the use of *in situ* and doubled WH-questions, if they are attested in the production of bimodal bilingual adults.

Instead, we take it that the language architecture makes these structures available. They are automatically permitted by the model we advocate. The children need not learn to produce them, nor to expunge them from their grammars. Given the highly bilingual contexts of observation, such structures are not completely inappropriate. Over time, the children undoubtedly develop their sensitivity to the sociolinguistic conditions in which language synthesis is used. In addition, the children – like monolinguals – must determine the conditions that make Common Ground *in-situ* forms licit in their spoken languages.

Our model makes numerous empirical predictions. One clear prediction is that there might be evidence of the spoken languages in the children's sign language WH-questions. This prediction is examined in Lillo-Martin, Koulidobrova, Quadros & Chen Pichler (in press). Other on-going research examines language synthesis in other bimodal bilingual structures, and expectations for such cases in unimodal bilinguals.

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