Syntactic transfer in a Cantonese–English bilingual child*

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Research on early bilingual development has suggested that syntactic transfer in bilingual acquisition is dependent on patterns of dominance and properties of the dual input the child is exposed to. In a case study of a Hong Kong bilingual child we present evidence of transfer from Cantonese to English in three areas where the two languages contrast typologically: wh-in-situ interrogatives, null objects and prenominal relatives are observed at a period when Cantonese is dominant as measured by MLUw. Comparisons with monolingual development show both qualitative and quantitative differences attributable to transfer. Language dominance is seen as the major determinant of transfer, with input ambiguity playing a role in the domain of null objects. While two distinct and separate linguistic systems are simultaneously developing in the bilingual mind, the pervasiveness of transfer implies a high degree of interaction between them. The findings show that the bilingual subject in our case study has taken a different path from monolinguals toward the target.

This paper reports findings on the syntactic development of a Cantonese–English bilingual child in Hong Kong, demonstrating a wide range of transfer effects from Cantonese to English. The specific ways in which Cantonese influence manifests itself in the development of English in the bilingual subject in different areas of grammar argue for a high degree of interaction between the two grammars. In one of the first systematic studies of syntactic acquisition of bilingual children involving this language pair, our analysis shows both qualitative and quantitative differences between bilingual and monolingual development. The pervasiveness of transfer effects is evident in three areas of grammar which involve core contrasts between Cantonese and English: wh-in-situ interrogatives, null objects and prenominal relatives are documented in the subject's English. These structures are either not found or are substantially less frequent in monolingual data. The findings are discussed in terms of language dominance as well as the possibility of input ambiguity. The bilingual data presented in this paper contribute empirically to the expanding database on bilingual acquisition, and theoretically to the study of cross-linguistic influence and interaction of linguistic systems in bilinguals.

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Cross-linguistic influence and syntactic transfer in bilingual development

While one major theme of research in bilingual acquisition is centered on the dichotomy between one unitary system and two differentiated systems in children who are simultaneously exposed to two languages (Volterra and Taeschner, 1978; Genesee, 1989; Meisel, 1989, among others), recent research has been moving beyond the issue of one or two systems, seeking to refine our understanding of bilingual development by addressing precise questions about the degrees of separation and interaction between the languages (Müller, 1998; Paradis, forthcoming). To capture the complexity of bilingual development and obtain a more detailed and nuanced picture of the issues involved, it is important to move beyond language differentiation and examine the details of the systematic interplay between the developing grammars. Moreover, studies of children acquiring different language pairs need to be carried out in order to capture the linguistic

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diversity of bilingualism and achieve generalizability across bilingual children. Studies involving different typological permutations will enrich the field and yield new theoretical and empirical insights.

Thus far, the collective weight of the empirical evidence suggests that bilingual children are able to differentiate between the two languages from early on (Genesee, 1989; Meisel, 1989; De Houwer, 1990; Genesee, Nicoladis and Paradis, 1995) but the picture with regard to transfer or cross-linguistic influence remains rather mixed. Some studies have suggested that separation of two grammars also implies autonomous development without interaction, hence developing grammars much like those of monolinguals (e.g. De Houwer, 1990). Meisel (1994) and Paradis and Genesee (1996) also reported the absence of cross-linguistic effects in their bilingual subjects for the structures investigated.[1] However, current views are more open to the possibility of interaction and cross-linguistic influence between the languages (Müller, 1998; Döpke, forthcoming). The development of separate grammars in bilingual children does not preclude cross-linguistic influence, which is only to be expected whenever two languages are simultaneously in contact during development. What is at issue is the nature of the influence and whether it constitutes transfer. We assume a working definition of transfer as "incorporation of a grammatical property into one language from the other" (Paradis and Genesee, 1996, 3).

One major question which current research addresses, then, is whether and to what extent interaction between the two occurs, and in which subcomponents of grammar. To determine whether there are transfer effects, comparison with monolingual development is called for to ascertain the degree of similarity and difference. In our discussion of bilingual data, we draw comparisons with monolingual data for the target structures wherever relevant to determine the transfer effects. Transfer may take the form of qualitative and/or quantitative influence: qualitatively, we seek to identify structures occurring in bilingual children's language which are not found in monolingual development, and which can best be attributed to structural influence of one language on the other; quantitatively, we need to determine any influence in terms of the frequency or productivity of structures instantiated in the target language, again by comparison with monolingual baseline data.

[1] In the DUFDE Project reported in Meisel (1994), out of the original 13 children, 5 who failed to develop balanced bilingualism were discontinued from recording (see Köppe, 1994, 15). It was not clear why bilingual subjects who lacked such balanced development, i.e. those with one language being more dominant were not included in the subsequent recording.

Furthermore, the conditions under which interaction takes place need to be specified and the directionality of influence ought to be predictable. Paradis and Genesee (1996) suggest that "Transfer is most likely to occur if the child has reached a more advanced level of syntactic complexity in one language than the other. Such a discrepancy could occur either because it is typical in the monolingual acquisition of the two languages, or because the child is more dominant in one of his or her languages" (Paradis and Genesee, 1996, 3). On this account, a discrepancy in syntactic complexity between the two languages is not necessarily due to dominance: it could also be the case that in a certain domain of grammar, one language is more developed than the other, in accordance with the typical acquisition schedules for monolingual children in each language. This possibility, which requires detailed comparison with monolingual development of each language, has not been studied extensively. On the other hand, a number of studies report incorporation of elements from a dominant to a less dominant language (Gawlitzek-Maiwald and Tracy, 1996; Hulk and van der Linden, 1996; Döpke, 1997). Language dominance can be measured most objectively by computing Mean Length of Utterance (MLU) for each language at different stages: the dominant language is expected to have a higher MLU value than the less dominant one. Less direct indications of dominance come from children's language preferences (Saunders, 1988). The amount of input from each language is thought to play a major role in determining language dominance (Döpke, 1992).

Another factor which may give rise to transfer in bilingual development is ambiguity of input: transfer may occur when "two different grammatical hypotheses are compatible with the same surface string" (Müller, 1998, 153). In her study, the directionality of transfer is unilateral, with German being the target of transfer regardless of whether it is the dominant language. This is attributed to the fact that German allows both verb–object order and object–verb order in subordinate clauses, while English has fixed verb–object order. Thus nothing gives rise to ambiguity in English and no transfer from German is expected. A similar explanation is offered by Döpke (1998) in her study of three German–English bilingual children. Citing evidence of cross-linguistic influence of English on German, Döpke argues that the partially overlapping structures in the input (verb–object patterns in German and English main clauses), being superficially similar, lead to the overextension of these non-target structures in subjects' German, a phenomenon which is not found in monolingual German children.

Another important finding in Döpke (1998) is that the bilingual subjects' non-target-like use of German verb affixes as a means to mark German and English as being different provides evidence for differentiation between the languages. Clearly, not one unitary but two separate systems are simultaneously developing with a considerable degree of interaction and cross-linguistic influence in the acquisition of German verb placement due to the structural complexity and ambiguity of the dual input. Evidence of transfer effects, then, in no way entails that there is a unitary linguistic system underlying bilingual acquisition: two distinct and separate systems are evident whose interaction may give rise to a range of non-target structures.

We shall return to the roles of dominance and input ambiguity in discussing our results. With respect to the three areas studied, dominance appears to be the major factor determining when transfer occurs, while input ambiguity may also play a role in the case of null objects.

Syntactic contrasts between Cantonese and English

The bulk of published studies in bilingual first language acquisition involve children whose languages are typologically close and/or genetically related, such as pairs involving English, Dutch, German, and French (De Houwer, 1990; Döpke, 1992; Genesee et al., 1995; Meisel, 1994, among others). The present study involves two typologically distant and genetically unrelated languages, namely English and Cantonese. This combination offers the potential for forms of transfer which do not arise with European language pairs, such as transfer of prenominal relative clauses, which are not instantiated in these languages. We focus on three such typologically significant contrasts between English and Cantonese and show that transfer effects are traceable to the structural differences. Establishing transfer will involve both qualitative and quantitative grounds: since null objects and even wh-in-situ do occur in monolingual children, to establish transfer will require showing that the bilingual child's language differs in kind and/or quantity.

We shall be concerned with the following three areas in which Cantonese and English differ: wh-interrogatives, null objects and relative clauses.

Wh-interrogatives

While English wh-interrogative sentences involve syntactic movement, Cantonese ones do not, at least in their overt syntax. Wh-interrogatives in English are formed by moving the wh-words to a sentence-initial position (assumed to be the Spec of CP), while wh-words in the Cantonese counterparts remain in-situ:[2]

(1) What did you eat?
(2) Lei5 sik6–zo2 mat1je5?
you eat-PFV what
"What did you eat?"
(3) Who ate the noodles?
(4) Bin1go3 sik6–zo2 di1 min6 aa3?
who eat-PFV CL noodlePRT
"Who ate the noodles?"

It should be noted that the contrast between Cantonese and English shows up most clearly in object questions (1) and (2), since subject questions in both languages have the wh-expression appearing in the initial position (3) and (4). The data we present below bearing on syntactic transfer therefore focus on the development of object questions, in particular, *what*-questions in the subject's English.

Null objects

While Cantonese allows both null subjects and null objects in finite clauses, English requires that the subject and object of transitive verbs be phonetically realized. Our discussion of transfer in the bilingual data will focus on the development of English null objects, since these present a clearer contrast with monolingual development than do null subjects (see note 10).

Cantonese is a pro-drop language and with respect to the licensing of empty categories exhibits similar properties to those described for Mandarin Chinese (Huang, 1984, 1992). In descriptive terms, the null objects must refer to referents previously mentioned in the discourse or otherwise recoverable from the context of utterance, as in the dialogue in (5):

(5) A: Gin6 saam1 hou2 leng3 wo3.
CL blouse very pretty PRT
"That's a nice blouse."
B: Ngo5 zung1ji3 aa3.
I like PRT
"I like (it)."

B's reply allows the object to be dropped since its referent is provided by A's question. Put in more theoretical terms, null objects are said to be licensed and identified by null topics: that is, the discourse

[2] Cantonese examples are transcribed orthographically in the JyutPing romanization system developed by the Linguistic Society of Hong Kong. Tones are marked numerically (1: high level, 2: high rising, 3: mid level, 4: low falling, 5: low rising and 6: low level). Abbreviations used in the glosses are CL for classifier, PFV for perfective aspect and PRT for particle.

referents to which null objects refer are structurally represented as null sentence topics (Huang, 1984). In (5), for example, the null object is a variable (x) bound by a null topic representing *gin6 saam1* "the blouse", as shown (in somewhat simplified form) in (5′):

(5′) [TOPIC]$_i$ ngo5 zung1ji3 x_i aa3
I like PRT
"I like (it)."

In this analysis, the typical null object structure is treated on a par with clear instances of topicalization such as (6) where the variable is bound by the overt topic:

(6) [$_{TOPIC}$ Gin6 saam1]$_i$ ngo5 hou2 zung1ji3 x_i aa3
CL blouse I much like PRT
"I really like the blouse."

Given that the analysis of null objects is assimilated to that of topicalization, a relationship is predicted between topicalization and null objects. We shall argue that such a relationship is reflected in the bilingual data.

Relative clauses

Like Mandarin Chinese, Cantonese has prenominal relative clauses (RCs), as in (7) where the modifying clause precedes the head noun, *jan4* "people", whereas in English it follows the head noun *people* (8):

(7) [[Ngo5 sik1 _ $_S$] go2 di1 jan4 $_{NP}$] zau2 saai3.
I know those CL people leave all
"The people I know have all left."
(8) [$_{NP}$ The people [$_{CP}$ (that) I know _]] have all left.

The type of relative clause in (7), termed a classifier relative in Matthews and Yip (1994), uses a demonstrative (*go2*) and classifier (*di1*) but no marker of subordination. This is characteristic of spoken Cantonese, as opposed to Mandarin and written Chinese, and hence represents the relevant type of relative clause as far as the language input addressed to young children is concerned. A notable property of such relative clauses is that they resemble a main clause. Thus the relative clause in (7) has, at least superficially, the same form as the main clause in (9):[3]

(9) [$_S$ Ngo5 sik1 go2 di1 jan4]
I know those CL people
"I know those people."

As we shall see, this resemblance has a number of implications. Methodologically, it means that such RCs with object gap like (7) and their transfer-based counterparts in English are not easy to identify in the child data, since they will resemble main clauses; theoretically, it raises the possibility that children could use such RCs without having to acquire any subordination strategies.

In theoretical terms, English relatives are generally assumed to be formed by wh-movement (in the case of wh-relatives) or by null operator movement (for *that*-relatives), following Chomsky (1986) and subsequent work. Cantonese relatives clearly do not involve the same kind of movement as their English counterparts. According to one analysis (proposed for Mandarin Chinese which Hawkins and Chan (1997) attribute to Huang (1980; 1995)), the gap in the relative clause is bound by a null topic, much as in the case of null objects outlined above:

(7′) [$_{CP}$ TOPIC$_i$ [$_{IP}$ Ngo5 sik1 x_i]] go2 di1 jan4 $_{NP}$]
I know those CL people
"The people I know"

Assuming such a structure, relativization in Chinese is derived along the same lines as null objects and topicalization. As in the case of topicalization, the null topic can either be derived by movement or be generated in situ.[4] Structures resulting from transfer will thus be qualitatively different from a target relative clause derived by wh-movement. In the case of Cantonese adult second language learners of English, Hawkins and Chan (1997) argue that their representation of English RCs involves pronominal binding by a base-generated null topic, rather than operator movement.

The subject, input conditions and data collection

The subject of the present case study, Timmy, is the first-born son of the co-authors, the mother being a native speaker of Hong Kong Cantonese and the father of British English. Longitudinal data of Timmy's language development were collected as part of two funded projects (RGC ref. nos. HKU336/94H and CUHK4002/97H). Timmy was exposed to Cantonese and English regularly from birth. The family lives in Hong Kong and follows the one-parent–one-language principle when addressing the

[3] The details are considerably more complex than presented here. Although the simplest type of object relative as in (7) resembles a main clause, evidence from double object and pretransitive constructions shows that the main clause and relative clause structures are not identical (Matthews and Yip, in press). However, only simple object relatives are at issue here since these are the structures which appear in the child data.

[4] Depending on whether the null topic is derived by movement or generated in situ, the gap in the relative clause may be occupied by a variable (x) or null pronominal (*pro*) respectively.

child. The language between the parents is mainly Cantonese with a great deal of English mixed in, as is characteristic of the speech of Hong Kong middle class families. Despite the one-parent–one-language principle, the quantity of input from the two languages is by no means balanced. On the whole, Timmy had more Cantonese than English input in his first three years. The language of the community is Cantonese and the extended family (the maternal grandmother and relatives) also speak Cantonese (and in some cases Chiu Chow).[5] Timmy started attending a bilingual kindergarten at 2;4 for three hours a day, with approximately equal amounts of input from each language; from 3;4, he attended a Cantonese monolingual kindergarten in the morning and an English monolingual kindergarten in the afternoon. At home, regular input in English came solely from the father and the family's Filipino domestic helper, while other English-speaking relatives visited only occasionally.[6] In a number of recording sessions he showed a preference for using Cantonese, even when the research assistants tried to induce him to speak English.

The data reported here are of two types: transcripts of longitudinal recordings and diary data. The longitudinal data come from a bilingual corpus created by regular audio-recording of five subjects at two-week intervals over a period of two years.[7] For each recording session, half an hour of interaction was recorded in each language. The researchers also sought to reproduce the one-person–one-language approach in the elicitation environment, by having one of the two research assistants involved in each recording session responsible for speaking each language, though English was a second language for all the assistants. Spontaneous speech data were recorded at the subject's home where the routines included activities such as playing with toys and reading story books. These speech data were transcribed by the research assistants.

The data of one of these five subjects, Timmy, from the period 1;05–3;06 will be the focus of our discussion. He is chosen because the availability in his case of diary data, complementing longitudinal recording, enables us to address a wider range of transfer phenomena: certain structures do not appear in the longitudinal corpus data, for a variety of reasons, as we shall see in the case of relative clauses.

The diary was kept from 1;03–6;00. During the period 1;06–3;06, when it was intended to supplement the audio-recording data, the diary includes several entries per week. Both parents were involved in recording the data in the two languages although the coverage of English data was more extensive than for Cantonese. The contexts of these data were mostly interaction between the child and parents at home or occasionally away from home. Relevant contextual information was given as far as possible in the diary entries.

The diary data are subject to the usual cautions. We suggest that they are reliable to the extent that they are systematic: all the patterns described here are instantiated at least three times, and frequently more. While a single example may or may not be significant, patterns produced on three or more separate occasions suggest a systematic pattern, reflecting developing competence rather than performance alone. How representative the diary data are presents a more serious problem: undoubtedly there is selection bias whereby unusual utterances are more likely to be recorded than unremarkable ones, and non-native-like examples at the expense of well-formed ones.

Measuring dominance: MLUw

In several respects, the pattern of development in Timmy's two languages reflects the dominance of Cantonese. We take MLUw as the most objective indicator of a child's linguistic development in each language, although it is not without its problems. The calculation of MLUw depends on decisions regarding what constitutes a word – a problem which has not been resolved, either in general or with regard to Chinese in particular. Our MLUw calculations are based on the word divisions as made in the transcripts, which are in turn modelled on Matthews and Yip (1994).[8]

[5] Chiu Chow (or Chaozhou) is the ancestral language of a sizeable minority in Hong Kong. It is spoken in eastern Guangdong province and belongs to the southern Min dialect group. Although diverging from Cantonese in many respects, it shares the broad typological characteristics at issue here, namely lack of wh-movement, null objects and prenominal relatives. The child has some passive knowledge of Chiu Chow but does not produce it.

[6] The question of what role the Filipino English spoken by the domestic helper has in the development of Timmy's languages is a pertinent one. As far as the broad structural features discussed in this paper are concerned, we observe that the English of the helper conforms to standard English: she does not, for example, use wh-in-situ interrogatives.

[7] Recordings were made at two-week intervals in principle, except when the subjects were away on holiday or otherwise unavailable. Certain recordings are unusable due to various reasons such as technical failure in the recording instrument or failure to elicit the less preferred language on a few occasions. Thus the data files used for purposes such as computation of MLU are not at regular bi-weekly intervals. Nevertheless there is at least one recording, if not two, represented for each month.

[8] Huang (1999) compared the MLUm and MLUw of the English data and showed that the two methods of calculation yielded essentially the same pattern of development.

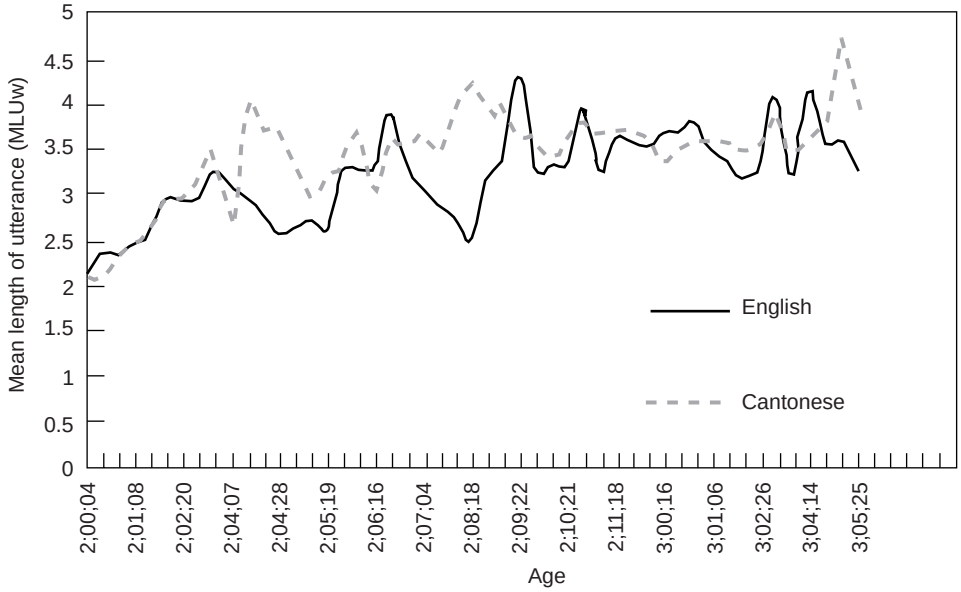

Figure 1. Mean Length of Utterance (MLUw) of the bilingual subject in English and Cantonese (based on Huang, 1999, 34)

As Döpke (1998, 564) observes, MLU is useful for within-language comparisons but may not be directly comparable across languages, especially those of different morphological types. Two lines of response to this problem can be pursued. Firstly, Cantonese and child English can both be treated as predominantly isolating languages, since in young children's English inflectional morphology is not yet in place. Secondly, MLU differentials between a bilingual's two languages can be used in a relative, rather than an absolute sense: to compare individual bilingual children with each other, and to show changes in dominance patterns over time. With these considerations in mind, let us consider Figure 1, showing the development of MLUw in Timmy's two languages.

Taken at face value, Figure 1 appears to show that Cantonese developed faster than English, especially in the period 2;01 to 2;08, while after age 2;09 the MLUw figures are closely matched. Given the uncertainty concerning comparability of MLUw across languages, however, this pattern allows for a number of interpretations. If the measures for the two languages concerned are valid and broadly comparable, the pattern is one of a period of Cantonese dominance followed by a period of more balanced development. If the first period is in fact an artefact of the calculation method (e.g., if the word divisions assumed for Cantonese have the effect of inflating MLUw), then the Cantonese MLUw should be lowered across the board: the gap between English and Cantonese would close in the initial period, followed by a period of *English* dominance after age 2;09. Alternatively, if the Cantonese MLUw is *under*-estimated, the evidence for dominance is even stronger than Figure 1 suggests. Since there is no independent reason to assume English dominance (see above on the input conditions and language preferences), the first interpretation seems most plausible: Cantonese is dominant, at least in a relative and probably in an absolute sense, in the period 2;01–2;08. Based on the data in Figure 1, the mean MLUw values for the whole period are 3.48 for Cantonese and 3.11 for English, although these are not amenable to statistical analysis since the two measures are, as stated, not directly comparable. On the whole, MLUw for both languages fluctuates considerably during the period of study: the fluctuation in English is quite unlike that of monolingual English-speaking children whose MLU generally increases smoothly over time (cf. Brown, 1973, 55).

Case study I: wh-movement

As shown above, Cantonese and English contrast straightforwardly with respect to wh-movement in wh-interrogatives, which is obligatory in English but unknown in Cantonese. Our subject Timmy passed through a stage at which wh-phrases are commonly left in situ. Examples from diary data include:

(10) This on the what? (2;04)
(11) You go to the what? [sitting in the car, asking Daddy] (2;05)
(12) This what colour? (2;10)
(13) The snail why live in the water? (3;04)

Similar examples in a Cantonese–English bilingual child in Singapore have been reported by Kwan-Terry (1986, 23):

(14) You are doing what? (3;06)
(15) This is for making what? (3;09)
(16) We are going to eat where? (3;09)

The placement of *what* in (10) matches the Cantonese counterparts as illustrated earlier in (2). Timmy also uses *to the what* to mean "where" (11). The placement of *what colour* in (12) and *why* as in (13) also matches the adult Cantonese word order:[9]

(17) Li1 go3 mat1je5 ngaan4sik1 aa3?
this CL what colour PRT
"What colour is this?"
(18) Zek3 wo1ngau4 dim2gaai2 zyu6 hai2 seoi2 dou6?
CL snail why live in water there
"Why does the snail live in the water?"

The development of Cantonese wh-questions in Timmy exhibits a similar pattern to the monolingual counterparts in terms of acquisition order and schedule; the earliest spontaneous productive use of in situ wh-questions occurred at age 1;08;25 (Peng 1998). A Cantonese example parallel to the English cases cited is (19):

(19) Li1dou6 mat1je5 aa3? (1;11;21)
here what PRT
"What is in here?"

These early acquired in situ wh-questions serve as a basis for transfer from Cantonese to English.

Examples of wh-in-situ are not unknown in adult English as in "echo" questions, which are licit only in pragmatically governed contexts where the speaker questions a constituent in the previous utterance:

(20) A: I forgot to bring the keys.
B: You forgot to bring what?

In analyzing wh-in-situ structures in the bilingual data, care was taken not to include such cases as instantiating transfer since in principle such structures can also be found in monolingual corpora. However, both qualitative and quantitative differences can be noted between monolingual and bilingual data.

Qualitative comparison

Most monolingual examples of wh-in-situ as represented by Eve's data are (partial) repetitions or echoes of the prior utterance produced by the adult:

(21) MOT: Do you know where?
EVE: Know where? (from EVE05.CHA Line:1230 (1;08))
(22) MOT: He's eating what?
EVE: eating what? (from EVE05.CHA Line:1259 (1;08))
(23) EVE: Where clam chowder.
EVE: Where clam chowder.
MOT: What?
EVE: Clam chowder what? (from EVE07.CHA Line:1598 (1;09))

These examples clearly do not indicate a developmental phenomenon, but are modelled directly on the parental input. In the bilingual data, crucially, the questions with in-situ wh-expressions are non-echo object questions where the wh-word should be preposed. Especially revealing of the child's developing grammar are examples where an adult prompts or poses a question formed by wh-movement, but the child responds with a wh-in-situ question as illustrated in the following examples from the transcript data:

(24) INV: Ask her how many cars there are here.
CHI: Is what? (2;04)
(25) INV: Look, what do they want?
CHI: It's a what? (2;07)

A similar example from diary data is (26):

(26) FAT: What does it say? (on the card)
CHI: Say what? (2;05)

The diary data also include the following case in which the parent reformulates the child's wh-in-situ question as one with wh-movement. The child responds with the wh-word both preposed and in situ – *what is it for what?*, before reverting to the wh-in-situ version and finally arriving at the preposed form:

(27) CHI: It is for what? (2;05)
FAT: What is it for?
CHI: What is it for what?
CHI: It is for what?
CHI: What is this for?

The child's reluctance to reformulate his question with the wh-word preposed suggests that his own grammar at this stage generates the in-situ structure.

Quantitative comparison

Quantitatively, the percentage of wh-in-situ is far higher in the bilingual corpus data. Peng (1998) compared the bilingual data with the monolingual

[9] See Peng (1998) for the development of different types of wh-questions such as those with *what, where, how, who, why* and *whose* in Timmy's recording data. The overwhelming majority of in-situ cases involve *what*-questions, 58 per cent of which remain in-situ over the course of the study.

Table 1. *Distribution of* wh-*expressions in questions produced by a monolingual English-speaking child (Brown, 1973) and the bilingual subject (based on Peng, 1998, 70–71)*

Monolingual child – Eve				Bilingual child – Timmy			
Age	MLUw	Occurrence of wh-expressions	Wh-in-situ	Age	MLUw	Occurrence of wh-expressions	Wh-in-situ
1;08	2.097	11	2	1;11	2.009	1	0
1;09	2.369	17	1	2;00	2.294	0	0
1;10	2.982	14	0	2;04	2.573	6	3
1;11	2.864	28	2	2;07	2.867	19	16
1;12	3.226	95	0	2;10	3.270	4	2
2;00	3.115	43	0	2;11	3.196	2	2
2;01	3.530	91	0	3;00	3.458	2	0
		% of wh-in-situ:	1.6%			% of wh-in-situ:	67.6%

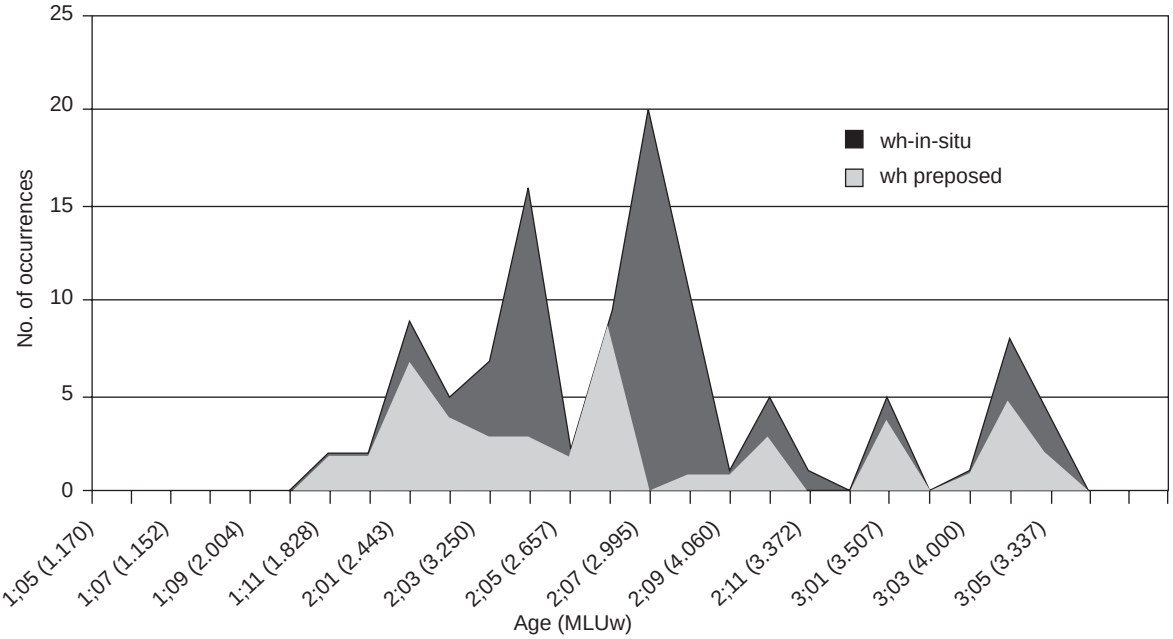

Figure 2. Development of *what*-questions in the bilingual subject (Peng, 1998, 75)

English-speaking subject Eve's data from the Brown Corpus (1973). One file was randomly selected from each month from the monolingual data and matched with a file of similar MLUw from the bilingual data in order to achieve comparability (see Table 1).

In the data files represented in Table 1, only 1.6 per cent of Eve's wh-questions had in-situ wh-expressions (1;08–2;01) while 67.6 per cent of Timmy's wh-questions were in-situ ones (1;11–3;00).

Apart from the rare occurrences of wh-in-situ modelled on the parental utterances, the placement of wh-expressions in the overwhelming majority of Eve's wh-questions is correct. Monolingual data as represented by Eve show that wh-expressions in wh-questions uniformly appear clause-initially, in striking contrast with the bilingual data. Figure 2 shows the frequency of Timmy's object questions with *what* from age 1;11–3.06. A first stage shows preposed *what* (largely in formulaic utterances), followed by a period where *what* in situ predominates (from 2;03) and finally another period where the two forms alternate (2;10 onwards).

Interestingly, the peaks in wh-in-situ correspond to peaks in the MLUw differential illustrated earlier (Figure 1): between ages 2 and 3, there are two periods when (a) MLUw for Cantonese exceeds that for English (2;04–2;06, 2;08–2;09), and (b) the proportion of wh-words left in-situ peaks (2;05 and 2;08). More generally, transfer is most evident between ages 2;01–2;10, after which MLUw for English catches up with that for Cantonese. We thus have quantitative evidence for the correlation between dominance and transfer of wh-in-situ.

The findings on the development of wh-questions

in English evidence a stage where systematic influence of Cantonese manifests itself in the form of wh-in-situ structures. Such structures have never been claimed to represent a developmental stage in monolingual English-speaking children. These wh-in-situ structures persist in Timmy's grammar for a rather extended period as shown in Figure 2: even toward the end of the recording period, Timmy still produced quite a number of them. However, they were unlearned gradually soon afterwards as his English progressed, as indicated by diary records. This contrasts with the development of null objects which, as we shall see, are much more recalcitrant and take a longer time to unlearn.

Case study II: null objects[10]

As discussed earlier, Cantonese allows null objects referring to entities present or recently mentioned in the discourse context. The child's English appears to show such null objects:

(28) INV: And does Panda like it there, at Popo's house?
CHI: I like. (2;07;00)

Cantonese influence may immediately be suspected here. However, the case for transfer is considerably more complex than it is in the case of wh-in-situ. Firstly, the question of what verbs are obligatorily transitive in adult English is far from straightforward. Ingham (1993) discusses the optionality of objects in adult English and in a monolingual English-speaking child, pointing out that omission of a referential object is grammatical with certain verbs:

(29) They ran away but we followed (them).
(30) John aimed at the target and missed (it). (Ingham, 1993, 96)

The verbs Ingham identifies as allowing an optional object in the monolingual data include *kick, read, touch, bang, draw, push, see, wash* and *eat*. In analyzing null objects, care should be taken not to count these grammatically optional cases as instances of null objects. We shall return to this point in the section on quantitative comparison below. The acquisition task facing the child is thus a matter of determining which verbs are obligatorily transitive and which ones are optionally transitive. For example, in our bilingual diary entry (31) below, one senses a null object, yet the verb *eat* is not obligatorily transitive (cf. *I've already eaten*, which would be grammatical in the same context):

(31) I already eat. (2;03;29) [pointing to plate of fruit]

A second problem is that what is an obligatorily transitive verb in adult language may not be so for the child. The verb *want*, for example, may be treated by the child either as an optionally transitive verb, or as a transitive verb allowing null objects:

(32) FAT: Timmy, you want the rest of this?
CHI: I don't want. (2;07;07)

A third difficulty in identifying transfer is that null objects appear as a developmental feature in English monolingual data (Wang, Lillo-Martin, Best and Levitt, 1992). Despite these difficulties, qualitative and quantitative differences between the monolingual and bilingual cases can nevertheless be observed.

Qualitative analysis

Qualitative differences may be discerned where the verb is being used in a Cantonese sense, like *have* in (33)–(34):

(33) INV: Where's your school bag?
INV: Any books in it?
CHI: Still have. (2;07;28)
(34) CHI: There have shark. (2;10;28)

Apart from the null subject and object, we may note here the existential use of *have* which suggests transfer from the Cantonese verb *jau5* as in the adult Cantonese sentence (35):

(35) Zung6 jau5.
still have
"There are still some (there)."

The existential use of *have* is frequent in Timmy's English and sometimes appears parallel to the Cantonese *jau5*, as in the following code-switched utterance where the Cantonese existential sentence is juxtaposed with the English one:

(36) [arriving home with Grandmother carrying soup]
CHI: Jau5 tong1 jam2 aa3. Have soup. (2;05;08)
have soup drink PRT
"There's soup to drink."

Another example illustrating a null object involves the verb *put*:

[10] The development of null subjects in the bilingual subject will not be discussed in this paper. Huang (1999) found neither qualitative nor quantitative differences between monolingual and bilingual development as far as null subjects are concerned. However, the unlearning of null subjects by the bilingual subject may take a longer time than the monolingual counterparts as the parents observe that both null subjects and null objects persist well into age six. The recording of the subject ended at 3;6 and development of null arguments beyond that point cannot be studied based on longitudinal data.

(37) INV: Where shall we stick it? (2;05;05)
CHI: Put here.

Out of a total of 60 occurrences of this verb in Timmy's transcript data, 14 cases (23.3 per cent) are without the direct object. This non-target-like structure whereby *put* is directly followed by a locative phrase resembles the Cantonese structure:

(38) Fong3 (hai2) li1dou6
put at here
"Put here."

Such null object structures involving *fong3* "put" and dative verbs like *bei2* "give" are commonly found in Timmy's Cantonese (Huang 1999) which serves as the basis for transfer into English. Consider also diary data in which an English utterance with null object follows a synonymous Cantonese one (39) and the occurrence of null objects in code-switched utterances (40):

(39) [seeing father replacing batteries]
Jiu3 maai5 aa3. Have to buy. Have to buy battery at Mannings. (2;10;22)
need buy PRT
"We have to buy some."

(40) Ngo5 jiu3 close... I cannot close. [trying to close door] (2;02;22)
I want close
"I want to close it."

These cases suggest that the Cantonese and English structures are indeed parallel for the child.

A further qualitative argument involves the analysis of null objects and their relation to null topics, as outlined above in relation to adult Cantonese. This analysis predicts a relationship between topicalization of objects and the occurrence of null objects. In cases like (41) we can see how a topicalized object paves the way for a subsequent null object:

(41) Schoolbag put here, put at the door. (2;07;12)

In the first clause, the object (*schoolbag*) of the verb *put* has been topicalized; in the second clause, the missing object of *put* refers to the same topic. This is the essence of Huang's (1984) theoretical analysis of null objects alluded to earlier. The same analysis can be extended to cases where the topicalization is implicit rather than overt:

(42) You bought this for me. Last time you bought. I know you bought. (2;07;11)

Here the object *this* is introduced as the object of *bought*, and then becomes the (null) topic of the following discourse, thereby licensing the null objects in the following two clauses:

(42′) You bought $[\text{this}]_i$ for me. $[\text{TOPIC}]_i$ last time you bought x_i.
$[\text{TOPIC}]_i$ I know you bought x_i.

To the extent that the syntax of null objects in the child's English can be captured by the analysis proposed for Chinese, the argument for transfer of syntactic structure is supported. Such transfer should be characterized at the level of internalized competence, or I-interlanguage (Yip and Matthews, 1995).

Quantitative comparison

Huang (1999, 2000) calculated the percentage of null objects in Timmy's longitudinal transcript data, taking into account all obligatorily transitive verbs including *put* and dative verbs like *give*. As Figure 3 shows, the percentage of null objects in the first eight recording sessions (2;04–2;08) ranges from 9.1 to 28.6 per cent, a higher range than has been reported in any monolingual studies. This period overlaps with that of wh-in-situ (cf. Figure 2) and dominance of Cantonese as measured by MLUw (Figure 1). In the subsequent period from 2;09–3;06, the rate drops but remains consistently above 5 per cent.

In the parallel development of Timmy's Cantonese in the same period (2;04–2;08), the rate of null objects ranges from 12.3–35.3 per cent and is consistently above 10 per cent throughout the whole period, remaining between 22.9–35.8 per cent toward the end of the recording period (3;04–3;06) according to Huang (1999).[11] These figures are comparable to those reported for monolingual children acquiring Cantonese (40.9 per cent in Wong, 1998) and Mandarin (22.5 per cent in Wang et al., 1992). Comparing the null object rate in Timmy's two languages, the range is especially similar during 2;04–2;08.

In monolingual English corpora, different percentages of null objects are found depending on the criteria used. An asymmetry has been widely noted between the prevalence of null subjects on the one hand and the relative rarity of null objects on the other in early child English (Wang, Lillo-Martin, Best and Levitt, 1992; Hyams and Wexler, 1993). According to Hyams and Wexler (1993, 426), the average null object rate for Adam (2;5–3;0) and Eve (1;6–2;1) from Brown's monolingual corpus was around 8–9 per cent. These figures include a number

[11] The calculation of these figures in Timmy's Cantonese was based on the number of transitive verbs, i.e. VO structures excluding ditransitive verbs and verbs with more than one complement such as *baai2* "put". This method of calculation was adopted in order to achieve comparability with studies of monolingual Cantonese children.

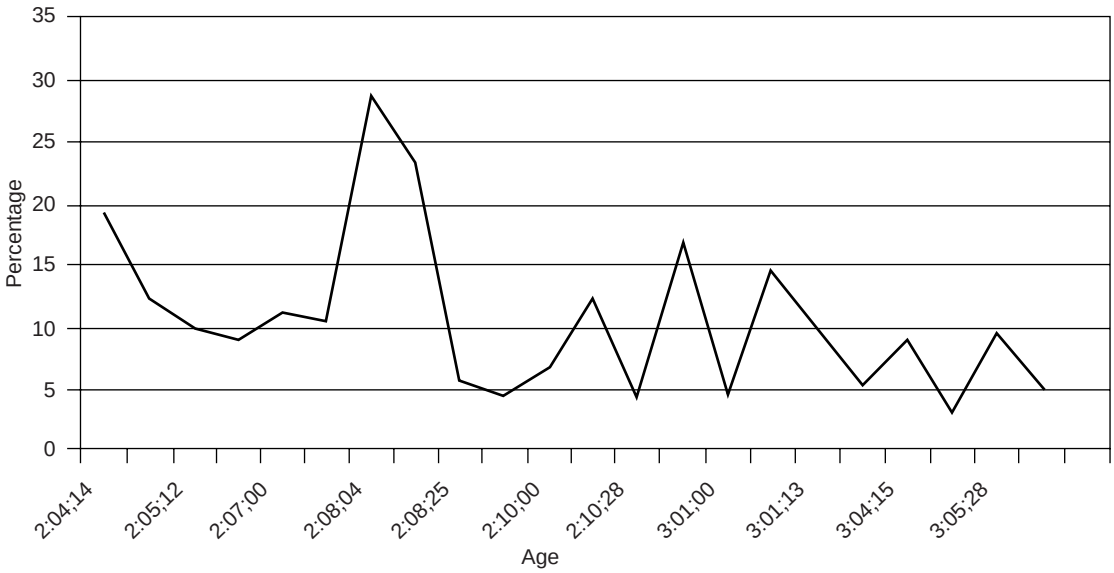

Figure 3. Percentage of null objects in the bilingual subject's English data (Huang, 1999, 80)

of optionally transitive verbs (such as *read*, *wash* and *eat*), and thus over-estimate the rate of null objects. Applying stricter criteria, i.e. counting only cases where overt objects are obligatory in adult English, Huang (1999, 2000) found only 4–5 per cent in samples of data from Adam. Valian (1991) in a cross-sectional study reported an initial 7 per cent null object rate for monolingual English-speaking children whose MLUm ranged from 1.77 to 2.49, and a low percentage around 2–3 per cent for those whose MLUm ranged from 3.39 to 4.22. Another cross-sectional study by Wang et al. (1992) yielded an average null object rate of 3.75 per cent in American children's production data, with the rate ranging from 8.3 per cent for the two-year olds (MLUm=3.51) to essentially none for older subjects. Wang et al. (1992, 251) concluded that "the English-speaking children did not show evidence of a grammar that allows null objects". It is evident that these monolingual figures are substantially lower than those for our bilingual subject.

To summarize, Timmy's English clearly differs from monolingual children's in that null objects are licensed in his grammar due to cross-linguistic influence from Cantonese. Compared to wh-in-situ interrogatives, the non-target-like use of null objects takes a longer time to unlearn: the diary record suggests that they persisted well into age six, though with decreasing frequency, with verbs such as *find, like, want* and *have*. Another factor that makes unlearning difficult is the ambiguity that English verbs pose – which ones are obligatorily transitive and which ones are not – an issue which we take up again in the discussion section. This is another case suggesting that bilinguals tend to take longer detours before they reach the target. In the case of adult Chinese learners of English, it has also been noted that null objects are more difficult to detect and unlearn than null subjects (see discussion in Yip, 1995). However, young bilingual children stand a better chance of acquiring the target properties than adult second language learners whose grammars may remain fossilized with the recalcitrant null objects.

Case study III: relative clauses

English relatives

Relative clauses emerge in the diary data in Timmy's English as early as 2;07:

(43) Where's the motor-bike? You buy the motor-bike? That you buy the motor-bike.
Where's you buy that one, where's you buy that one the motorbike? (2;07;03)

Note here that the utterance *You buy the motor-bike* is not to be interpreted as a full main clause ("Did you buy the motor-bike?"), as this interpretation would be incompatible both with the following linguistic context (*Where's you buy that one?*) and with the extra-linguistic context, in which the child is looking for a certain toy. Rather, the utterance is a relative clause ("the motorbike that you bought") being used to specify a particular toy. The structure therefore follows the Cantonese prenominal pattern described in (7) above:

(43′) Where's [[you buy _ $_S$] that one $_{NP}$],
where's [[you buy _ $_S$] that one the motorbike $_{NP}$]

The same analysis is applicable to (44):

(44) I want to watch videotape. Butterfly. Patrick buy that one.
I want Pet-Pet buy that one videotape. (2;11;25)

Although *Patrick buy that one* might appear to be a main clause, *I want Pet-Pet buy that one videotape* cannot mean "I want Pet-Pet to buy that one", because the videotape has already been bought. The applicable analysis is therefore as follows:

(44′) [Patrick buy _ $_S$] that one $_{NP}$].
I want [[Pet-Pet buy _ $_S$] that one videotape $_{NP}$].

Here it is of interest to observe what the child is using the relative clauses for. In (44) he begins by asking for a particular videotape, then realizes that the addressee cannot identify which tape is at issue. In order to identify it, he first specifies the subject matter (butterflies) then uses a relative clause (*Pet-Pet buy that one videotape*) to identify the tape unequivocally through its buyer. Another relative clause concerns the same tape when it was first bought:

(45) This is who buy? Have butterfly? You bought that have butterfly?
[referring to a new video tape with a butterfly on the cover]
[later] You buy that tape is English? (2;10;25)

In these examples, we see clearly the discourse function of relative clauses in restricting the reference of a noun phrase. This may explain a striking finding in our data: for the same child, there are no clear examples of the structure in the English longitudinal recordings, while in the diary, some 25–30 examples are recorded. Consequently, the data cited here are all from the parents' diary. To explain the absence of RCs in the longitudinal corpus, one possibility might be that RCs are merely a low frequency structure and the recording time is not sufficient for such structures to occur naturally. However, the corpus contains some 25 files, each representing at least half an hour's speech in each language, making a total of around 50 hours. An alternative explanation would appeal to the discourse functions of RCs. In speaking to his parents, the child uses RCs to identify objects on the basis of shared knowledge, typically involving family members and activities. A typical example is (46) where the child is looking for a gun given to him by "Santa Claus" at a pre-Christmas family lunch:

(46) Where's the Santa Claus give me the gun? (2;07;05)
[i.e. the gun Santa Claus gave me]

The research assistants conducting the recording have a much smaller repertoire of knowledge and experiences shared with the child, so the opportunities for the child to use RCs for this purpose are much reduced. The utterance (46), for example, would make no sense to the research assistants who were not present at the pre-Christmas lunch. Similarly, comprehension of the relative clause in (44) above depends on the addressee's knowledge that the child's uncle Patrick (also known as Pet-Pet) has bought a certain videotape for him. Such "inside information" is known to the parents but not to the research assistants who visit at most once per week. Given this methodological problem, we would expect RCs to be equally rare in the Cantonese transcript data. Indeed, we have identified only one example, and even this is far from being a prototypical RC:

(47) CHI: co5 fei1gei1 go2 di1 ze4ze1 bei2 ngo5 gaa3. (3;02;26)
sit plane those CL sister-sister give me PRT
"(These are) given to me by those ladies on the plane."

This refers to a toy given to the child by the flight attendants ("big sisters"). This could be analyzed as a subject relative ("the ladies who take the plane") as indicated by the subject gap in (47′):

(47′) [[_ co5 fei1gei1$_S$] go2 di1 ze4ze1 $_{NP}$] bei2 ngo5 gaa3

Alternatively, it could mean "the ladies associated with taking the plane", in which case the head noun *ze4ze1* (sisters) would bear no grammatical relation to the predicate *co5 fei1gei1* "sit plane" (meaning to take a plane). Rather, it would be a relationship by way of association, of the kind often found in Chinese topic–comment structures: there would be no gap and the structure would arguably not constitute a relative clause at all.

Cantonese relatives

At the same time as they appear in English, Cantonese relative clauses of a similar type are recorded in the diary data:

(48) Jan maai5 go2 tiu4 (2;07;04)
Jan buy that CL
"The one that Jan bought" [The child wants to wear a certain pair of pants]

This is a classifier relative of the type described earlier, with the classifier *tiu4* denoting an elongated

object (in this case a pair of pants) but the head noun is omitted, as in *Patrick buy that one* (44).[12]

(49) Po4po2 maai5 di1 tong4–tong2 ne1? (2;07;12)
Grandma buy CL candy-candy PRT
"What about the candies Grandma bought?"

(50) Ngo5 waak6–zo2 go2 go3 hou2 leng3 ge3 je5,
I draw-PFV that CL very nice PRT thing
"That nice thing I drew,"
go2 go3 waak6 hou2 leng3 ge3 je5 hai2 bin1 aa3? (2;09;05)
that CL draw very nice PRT thing is where PRT
"Where's the nice thing I drew?" [looking for his own drawing]

(51) Go2 di1 Lego le1, Mannings maai5 go2 di1 Lego le1? (2;10;14)
that CL Lego PRT, Mannings buy that CL Lego PRT
"What about the Lego we bought at Mannings?"

There is even a Cantonese example involving the same referent as the English example (46) above:

(52) Santa Claus bei2 lei5 go3 coeng1 le1? (2;08;25)
Santa Claus give you that gun PRT
"What about the gun Santa Claus gave me?"

This refers to the same gun as (46) (it also exhibits pronoun reversal, using *lei5* "you" to refer to himself). The above are virtually well-formed classifier relatives, though a few minor problems are noticeable.[13] In structure and function they parallel English examples such as (43)–(46). Given the productive use of this structure, the role of transfer in the English examples can be clearly established. Assuming the topicalization analysis as shown above in (7′), the structure for (46) would be as follows:

(46′) $[_{CP}$ TOPIC$_i$ $[_{IP}$ Santa Claus give me $x_i]$ that gun $_{NP}]$

We are not aware of any reports of comparable prenominal relatives in monolingual English development. It is nevertheless interesting that Hawkins and Chan (1997) suggest that adult Cantonese learners of English have a similar transfer-based structure for postnominal relatives in their interlanguage, involving a null topic rather than wh-movement. This illustrates the divergence between our bilingual subject's development and that of monolingual children, and its affinities with second language acquisition.

Recalling our discussion of relative clauses in Cantonese, we should note that the relatives used by the child, in both English and Cantonese, closely resemble main clauses, at least in terms of surface order. The child's relatives might be considered in typological terms as internally-headed relatives – that is, with the internal structure of a clause but the external syntax of a Noun Phrase. Matthews and Yip (in press) argue that only a subset of classifier relatives, namely those involving relativization of a direct object, are susceptible to such an analysis. But most of our subject's examples are precisely of this type.

From prenominal to postnominal relatives

The Cantonese-based relatives serve as a stop-gap measure or "relief strategy" before the target structure has been acquired in English. The diary record suggests that postnominal relative clauses first emerge at around age 3;04. Between ages 3 and 4, target-like relatives appear to alternate with those formed with resumptive pronouns, as in (53) and (56):

(53) It's like the one you bought it. [seeing picture of toy car]
It's not like the one you bought it [seeing difference] (3;04;07)

(54) I want to build the car we saw in Mannings.
I want to build the one we saw in Mannings. (3;10;30)

(55) Daddy, where's the gun you put water in? (3;11;01)

(56) I want the sweet, the sweet that you put it there yesterday (4;0;03)

It is notable that these are all of the null operator type, with or without *that* present, as opposed to the wh-type. These structures and the transition from prenominal to postnominal relatives are discussed in Matthews and Yip (under review), incorporating evidence from a second subject with a similar dominance pattern.

Discussion

We have presented three case studies of syntactic transfer from Cantonese to English in a bilingual child. The dominance of Cantonese in our subject is reflected in MLUw, language preference and input patterns. The directionality of transfer appears to be due to dominance, and the relationship is confirmed by the close match between MLUw differential and

[12] Similar examples are reported in Singaporean bilingual children (Gupta, 1994, 90):
My this can change one ah [i.e. mine is the sort that can change]

[13] For example, a word order problem arises in the example (50), where the original RC is well formed but the reformulation using it in a main clause is not.

transfer: wh-in-situ interrogatives (Figure 2) and null objects (Figure 3) have been shown to be most prevalent in the period from 2;04 to 2;09 during which the MLUw for Cantonese is markedly ahead of that for English (Figure 1). The period of transfer of prenominal relative clauses also begins during this period, at age 2;07. Together, these findings implicate dominance of Cantonese as a major factor determining transfer.

As we noted in the background to this paper, however, an alternative possibility is that (for example) relative clauses emerge earlier in Cantonese than in English, in accordance with the typical acquisition schedules for monolingual children. In the interim period, the Cantonese structure could then undergo transfer without dominance playing a causal role. Both points remain to be investigated: whether in fact relative clauses emerge earlier in Cantonese than in English is not known, while transfer of prenominal relatives has yet to be observed in balanced or English-dominant bilingual children. If confirmed, these points would support the alternative interpretation of transfer as offered by Paradis and Genesee (1996).

The possibility of input ambiguity should also be considered as a factor in transfer (Müller, 1998). For the case of wh-movement, this does not seem plausible as the evidence is hardly ambiguous: only "echo" questions would suggest that wh-movement is optional in English, and these are (a) of low frequency, (b) restricted to very specific pragmatic functions. Regarding relative clauses, there is again little scope for ambiguity since there is nothing in the native English input which could be analysed as a prenominal relative clause. For the case of null objects, however, input ambiguity may well be a factor. In fact, many transitive verbs in English do occur without objects, as described by Ingham (1993) who discusses the issue of direct object omissibility as in verbs such as *follow, miss* and *join:*

(57) The team was doing well, so Mary joined (it).

Assuming that such examples are exemplified in the input to the child, the difference between Cantonese (allowing discourse-recoverable null objects) and English (not allowing such null objects) may not be obvious to the child. That is, the English input is often consistent with the postulation of null objects. For example:

(58) Let's eat.

When there is food on the table, this would be compatible with a transitive interpretation in which the food is taken to be a null object. This kind of ambiguity in the input data poses an acute problem of learnability, which is compounded in the case of the bilingual child by influence from Cantonese.

Influence of English on Cantonese

Overall, there is very little in the development of Timmy's Cantonese that we can attribute to the influence of English in the period under study. In the areas studied the influence is unidirectional: there is no evidence of wh-movement or postnominal relative clauses in Cantonese, for example. The development of Cantonese closely parallels that of monolingual children, as has been shown with respect to the development of wh-questions and null objects by Peng (1998) and Huang (1999) respectively.

One area where English influence on Cantonese might be implicated involves postverbal prepositional phrases, as in (59)–(60):

(59) Ngo5 sik6–zo2 je5 [$_{PP}$ hai2 uk1kei2].(2;07;30)
I eat-PFV things at home
"I've eaten at home."

(60) Ngo5 saang1–zo2 [$_{PP}$ hai2 ji1jyun2 go2dou6] aa3. (2;08;07)
I born-PFV at hospital there PRT
"I was born in the hospital."

These are not grammatical in adult Cantonese, where the prepositional phrases would come before the verb:

(61) Ngo5 [$_{PP}$ hai2 uk1kei2] sik6–zo2 je5.
I at home eat-PFV things
"I've eaten at home."

(62) Ngo5 [$_{PP}$ hai2 ji1jyun2 go2dou6] saang1 (ceot1 lai4) aa3.
I at hospital there born (out come) PRT
"I was born in the hospital."

The ungrammatical order in (59) and (60) could reflect influence from English syntax. The difficulty in determining such influence is that structures quite close to these are found in adult Cantonese. While not possible with the verbs used by the child in (59)–(60), postverbal prepositional phrases do occur with certain intransitive verbs as in (63):

(63) Ngo5 lau4 hai2 uk1kei2.
I remain at home
"I stay at home."

Consequently there is the possibility of over-generalizing the pattern in (63) to transitive verbs, resulting in the non-target utterance (59). It has yet to be established whether the child's Cantonese development here differs quantitatively or otherwise from

monolingual development.[14] What can be said at this point is that if there is influence from English to Cantonese, it is relatively subtle, affecting only the frequency or productivity of structures such as the above for which there is a precedent in Cantonese (along the lines argued by Hulk and van der Linden, 1996). This is quite different from the influence from Cantonese to English, which is qualitatively striking as in the case of wh-in-situ and prenominal relatives, where there is no precedent in English.

Beyond transfer

A remaining issue concerns the ultimate resolution of the non-native-like features to which transfer gives rise: do they last indefinitely, or drop out at a later stage of development? The patterns of transfer we have identified are characteristic of a period, between age 2 and 3, in which the child's Cantonese is more developed and provides a temporary means to construct complex structures, such as relative clauses, which he has yet to acquire in English. Beyond this period, diary data and our close observation suggest that target-like competence is achieved between ages 4 and 5 in the case of wh-movement and relative clauses. The case of null objects is more lasting, for reasons of learnability as outlined above, and its ultimate resolution remains to be investigated.

Finally, it should be stressed that our argument for transfer should not be taken to indicate confusion between the two languages, just as it does not indicate a single grammatical system for both languages. If confusion were really present we would expect to see, for example, questions formed with and without wh-movement, or relative clauses sometimes preceding and sometimes following the noun, in both languages. Transfer is not unconstrained: it is overwhelmingly unidirectional in our case study, as a function of the subject's dominance pattern, and limited to specifiable developmental periods.

Conclusions

In this case study, several properties prove to be transferable in the early development of a Cantonese-dominant bilingual child whose English shows substantial and systematic influence of Cantonese. Dominance is determined by comparing the MLUw values in the two languages over time. The MLUw of Cantonese is shown to be higher in general and especially in the period up to 2;09, thus developing at a faster rate and at a greater level of complexity, which favours transfer of Cantonese structures into English. Our investigation of longitudinal and diary data has shown how Cantonese influence is manifested in three core areas of English grammar:

(i) Non-echo wh-in-situ interrogatives, especially object what-questions are produced in-situ frequently during the period from 2;01 and 2;10;
(ii) Structures with null objects are more frequent and productive in Timmy's data than in monolingual data, especially from 2;04 and 2;08;
(iii) Prenominal relative clauses based on a Cantonese pattern are recorded regularly in the diary data between age 2;07 and 2;11.

Taken together, syntactic transfer in the three domains can be considered pervasive in the development of the bilingual subject. Language dominance appears to be the major factor determining the directionality of transfer, while input ambiguity may also play a role in the case of null objects.

We have argued that the bilingual data show both qualitative and quantitative differences from monolingual data. Qualitatively, as in the case of wh-in-situ interrogatives and prenominal relatives, the Cantonese-based structures are not known to constitute a developmental stage in monolinguals. Quantitatively, as exemplified by null objects, the frequency of non-target-like structures is substantially higher than in monolinguals: though null objects occur in both monolingual and bilingual child English, the quantitative difference between the two argues strongly for a role for cross-linguistic influence in bilingual development. While two distinct and separate linguistic systems are clearly developing simultaneously in the bilingual mind, there is considerable interaction between the two, resulting in a developmental profile that is quite unlike the monolingual counterpart. The findings show that the bilingual subject in our case study has taken a different path from monolinguals toward the target.

[14] Another case where English influence may be implicated is the separation of verb–particle constructions, where the child occasionally produces (i) rather than the Cantonese order as in (ii):

(i) Baai2 keoi5 dai1
put her down
(ii) Baai2 dai1 keoi5
put down her

Here, again, there are other contexts in which verb–particle combinations can be separated (Matthews and Yip, 1994, 212), giving rise to a potential case of input ambiguity which could explain transfer from the non-dominant language.

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