

Finiteness and Null Arguments in Child Cantonese *

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In the pro-drop literature, various analyses have been proposed to capture a cluster of well known distributional properties of null arguments in child language. First, null subjects in early English are linked to the development of verbal inflections, in that the acquisition of tense marking coincides with the shift from a null-subject to a non-null subject grammar (cf. Guilfoyle 1984, Hyams 1992). Secondly, the null arguments in children acquiring English or German as a first language are restricted to root clauses and do not appear in embedded finite clauses (cf. Valian 1991, Rizzi 1994). Thirdly, in languages like English and German, null subjects are absent from sentences with fronted *wh*-elements, in both adult and child language. Fourthly, a subject-object asymmetry exists in child language, so that either null elements occur only in subject position and not in object position (as in English), or the frequency of null subjects outnumbers that of null objects (as in Chinese, cf. Valian 1991, Wang et al 1992).

In this paper, I will consider two recent proposals that have shown some success in accounting for the above characteristics of null arguments: those of Sano and Hyams (1994) and Rizzi (1994). The implications of these proposals for Chinese child language will be examined and evaluated using longitudinal data from Cantonese. While these proposals are attractive in being able to relate some of the distributional properties of pro-drop, I argue that they are empirically inadequate in explaining cross-linguistic differences in the acquisition data. I will also discuss the relevance of the child language findings for the analysis of pro-drop in adult Chinese

2. Two analyses of pro-drop

The study of Sano and Hyams (1994), based primarily on English data, links pro-drop in child language to children's use of root infinitive structures and the development of inflection. The theoretical analysis of Rizzi (1994) traces the restricted distribution of null arguments in early language to general principles of empty category identification and the possibility of truncated clausal structures.

2.1 The optional infinitive analysis of Sano and Hyams (1994)

Developing the proposal of Wexler (1993), Sano and Hyams attribute pro-drop in child language to the availability of root infinitives in early language, and characterize the null argument as PRO. This position enables them to capture several of the distributional regularities outlined above. If children's main clauses can be non-tensed, the subject position of these clauses will be ungoverned, and PRO will be licensed, hence the possibility of null subjects in root clauses (cf. Chomsky 1981). The subject/object asymmetry of null arguments then receives a ready explanation: the object position is always governed, prohibiting PRO. The absence of null subjects in embedded finite clauses follows from the fact that the subject of embedded finite clauses is always governed.¹

If the null arguments in child speech belong to the category of PRO, how does one account for the gradual disappearance of these null arguments in the language development of children who speak languages like English, and the continued presence of these elements in the languages of children who speak Italian or Japanese. The relationship between language acquisition and language variation is captured by means of a parameter called the I(nflection)-feature parameter, defined as in (1):

(1) I-feature parameter:

I feature(s) are specified (and must be checked off by V(erb) raising by or at LF)

+ : English, French, German, Italian..

– : Japanese....

(Sano and Hyams 1994: 546)

They assume that in languages that take the plus value of this parameter, e.g. English, the I features such as tense and agreement features must be checked off at least at LF. On the other hand, languages such as Japanese are unspecified for I features like agreement in view of the lack of morphological marking. In child language, the initial state is to assume the minus value of the parameter, so that children start off by assuming that I is unspecified. Since I is unspecified, the verb does not have to raise to I to check off feature. As a result the SPEC of the Inflectional Phrase (IP) is ungoverned and PRO is possible. That is what happens in the early grammar of the English speaking child. When English-speaking children acquire the inflectional system, they will become aware of the fact that I in English should be specified. Once I is specified, the verb will move to I at LF, and null subjects will no longer be possible as the SPEC of IP will be governed by a raised Verb. Children acquiring languages like Japanese will not need to raise V to I in their language development, because the I in adult Japanese is unspecified. Thus null subjects continue to be present in these languages.

In support of their proposal, Sano and Hyams produced empirical evidence from child English indicating that in sentences with modals, finite forms of the copular verb, or third person singular present tense -s, only a small percentage of null subjects were found.² Their analysis thus predicts accurately that the acquisition of finiteness will mean the end of the null subject period for the English-speaking child, and offers a revealing account for the distributional facts mentioned above.

Sano and Hyams do not make it clear which value Chinese should take on the I-feature parameter, though there is a suggestion that Chinese resembles Japanese in taking the minus value (p.544). Regardless of whether Chinese sets the I-feature parameter at the minus value, as in Japanese, or at the plus value, as in English, we can assume that the Chinese child, like the English child, starts off by assuming the minus value of the parameter. Then one should assume that the empty subjects in early Chinese are also PRO.³ If that is the case, it is conceivable that finiteness effects may be observed in early child language which are not observable in the adult language.

2.2. The truncation analysis of Rizzi (1994)

Rizzi (1994) gives an elegant account of the distribution of null arguments by formulating an empty category principle for identification. Not only does it take into account the root clause domain and the subject/object asymmetry of pro-drop in languages like English, but it also

considers the additional fact that null subjects are never found in sentences with fronted wh-phrases. He sees similarities between languages like German and Chinese in terms of the availability of discourse identification of empty categories, as both languages allow zero topics that can be identified from discourse (cf. Huang 1984). Rizzi's formulation depends crucially on how operator-bound empty categories, in particular null constants, are identified. His Empty Category Principle (ECP) for identification is given in (2) below (p.162).

(2) ECP (identification)

Empty categories <-p> must be chain-connected to an antecedent, if they can.

(<-p> empty categories include NP traces, variables and null constants bound by null operators)

A wh-trace bound by a question operator, illustrated in (3a), is a variable, as its reference can range over the values permitted for the wh-phrase (in this case, the set of persons who John will see). A null constant, illustrated by the trace in (3b), differs from a wh-trace in that it does not range over a set of values but rather is fixed to an antecedent. The null operator in a tough construction is not quantificational in the same sense as a wh-operator (as in 3b).

(3a) Who_i will John see t_i ?

(3b) John is easy [OP_i [to please t_i]]

The ECP principle for identification is used by Rizzi to analyze topic-drop in German. Sentence (4a), meaning "I bought this yesterday", is an example of null object, and will be analyzed as in (5a); sentence (4b) illustrates subject drop, and has (5b) as its corresponding structure.⁴

(4a) _ habe ich gestern gekauft
have I yesterday bought

"I bought (this) yesterday"

(4b) _ habe es gestern gekauft
have it yesterday bought

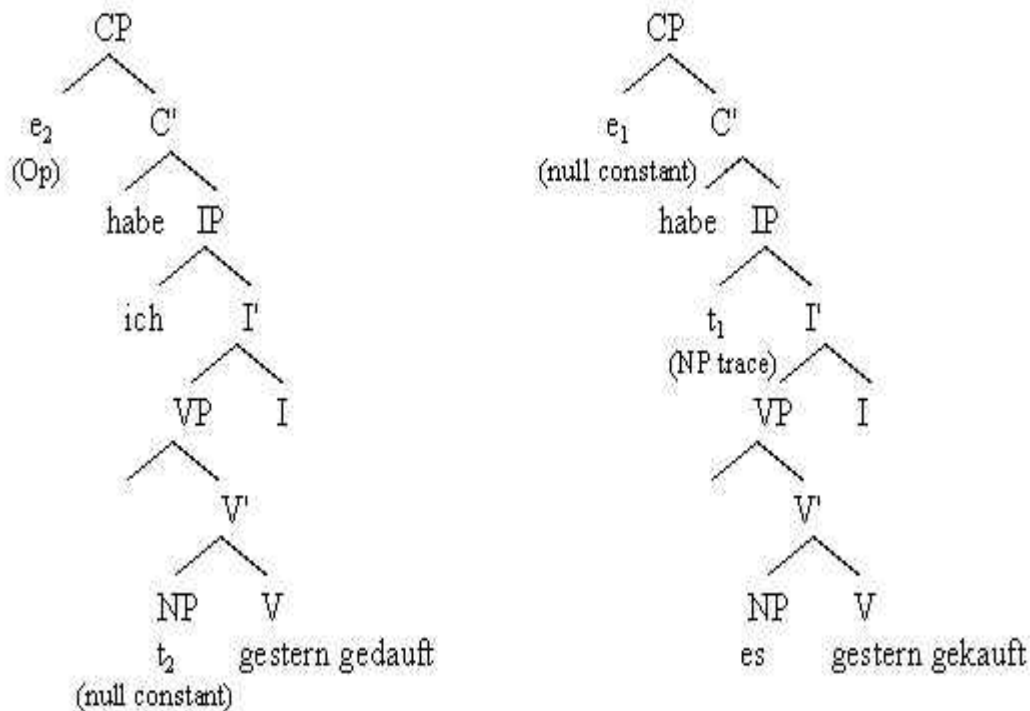
"(I) bought it yesterday"

How can a null object be licensed and identified in German? As shown in (5a), the object empty category is a null constant bound by the null operator in the SPEC of CP position. Since German, like Chinese, can have null topics identified from discourse, the structure is well-formed. The null constant is chained to the null operator, observing the ECP for identification. The null operator itself need not be so chained, since there is no potential antecedent. It picks up its reference from discourse.

Sentence (4b), with the subject dropped, has the structure given in (5b). In Rizzi's analysis, the empty category in SPEC of CP position is really in an argument (A) position since it is linked to a subject and is construed with agreement. The chain is thus an A chain and the subject trace in SPEC of IP is an NP trace.⁵ Occupying the SPEC of CP makes it impossible for the null constant to have a clause-internal antecedent. The null constant in this case is therefore exempt from the antecedent requirement. The configuration thus satisfies the ECP for identification. The null constant, like the null operator, can pick up reference from discourse.

(5a)

(5b)



While null operators and null constants in SPEC of CP can both be discourse-identified in German, the two types of empty categories should be distinguished: the null object bound by a null operator can only have third person reference, indicative of the properties of topic-variable chains (cf. Rizzi 1994). On the other hand, the null subject in German is not so limited in person; it is not bound by a null operator, but is coindexed with a null constant.

- (6) Wann hat *(er) angerufen?
 when has he telephoned "When did *(he) telephone?"

Besides accounting for the possibility of both subject drop and object drop in German, and the semantic differences between them, Rizzi's analysis can also explain why sentences involving fronted elements, such as (6), are ill formed if the subject is dropped. In a tree like (5b), if the SPEC of CP is occupied by fronted elements, the empty category in the SPEC of IP will have a potential antecedent. The empty category, however, cannot be identified by the fronted wh-element, which is a quantificational operator in an A' position.⁶ This results in a violation of the ECP (identification).

The presence of null subjects in child English follows naturally from this line of reasoning. English not being a discourse-oriented language, it cannot have null topics that pick up reference from discourse. In other words, while in principle nothing would bar null operators from occurring in the Spec of CP for English, these elements will not be discourse-linked. In a typical clause structure, the empty category in SPEC of IP will therefore fail to be discourse-identified. Null subjects are therefore prohibited in adult English except in specific registers. However, Rizzi considers the possibility of another option for children. He assumes that children may not realize that the root clause is CP. If no material is in CP, children may truncate the tree by peeling off from the top, so only the IP is left. In this case, the empty

- (9c) Zhangsan shuo [e hen xiang e]
 Zhangsan say quite miss
 "Zhangsan said that e_{1,2,3p} missed e_{1,2,3p}"

Secondly, the prohibition against discourse identification in embedded contexts does not hold of adult Chinese, as null subjects and objects in embedded clauses can be discourse identified in the language. (9c) shows that the embedded subjects and objects are free to take on first, second and third person reference, subject only to the constraints of the Binding Principle. Here, again, one might ask if the restriction which does not hold in the adult language may be observed in child language.

Thirdly, if discourse identification is always achieved via the null topic in the SPEC of the matrix CP, as proposed by Rizzi, would one expect to find empty categories in Chinese if the SPEC of CP is already occupied by other elements, e.g. wh-phrases or sentence final particles? It should be noted that this restriction clearly does not govern adult Chinese, as evidenced in the Cantonese sentences in (10). The null subject in (10a) cooccurs with a wh-phrase, and that in (10b) with a yes-no question particle. It is clear that in Chinese, neither a wh phrase at SPEC of CP at Logical Form nor a yes-no question particle occupying that position at surface structure blocks discourse identification of the null subject.⁷

- (10a) e kammaan heoi zo bindou aa3?
 yesterday go asp where sfp
 "Where did you/she/he go yesterday?"
- (10b) e kammann heoi zo tai hei aa4?
 yesterday go asp see movie Q-sfp
 "You/she/he went to movies yesterday, didn't you?"

Given the Chinese facts, either the interrogative elements in the above Chinese sentences should not be analyzed as occupying the SPEC of CP position, or Rizzi's ECP for identification is specific to languages like German, or the principle should be understood as applying only as a default option. In other words, children may adopt the ECP principle for identification in their initial grammar, which will prohibit empty categories in a wh question and sentences with question particles.

The above issues raised by Rizzi's study, as well as those addressed by Sano and Hyams, will be examined in light of longitudinal data from Cantonese, which behaves like Mandarin with respect to the distribution of null arguments sketched above. In this Chinese dialect, null subjects and objects can occur in both matrix and embedded clauses, and their reference is not restricted with respect to person. Further, sentences with lexical elements analyzed as occupying the SPEC of CP are also well-formed.

3. Finiteness, clause structure and null arguments in Cantonese

The present study investigates the following issues, arising from the two studies reviewed above, using longitudinal data from a Cantonese-speaking child (MHZ) observed from 1;07 to 2;08 in 26 sessions, drawn from the Hong Kong Cantonese Child Language Corpus (cf. Lee and Wong 1998).

- (a) whether finiteness (as reflected in the use of modals, aspect markers and sentence final

- particles) prohibits null arguments in early development;
 (b) whether null arguments in early Cantonese are related to truncated structures;
 (c) whether discourse-identified null arguments can be found in embedded clauses;
 (d) whether null objects are restricted to the third person in early Cantonese.

Several facts about Cantonese are in order before we report the findings. First, as mentioned above, Cantonese behaves like Mandarin Chinese with respect to the referential properties of empty categories. Second, Cantonese has an extremely rich sentence final particle system; the average adult speaker is said to be in command of several dozens of these particles which signify mood, modality and quantification (cf. Kwok 1984, Leung 1992). Sentence-final particles, which can only occur in root clauses, can be divided into two types: non-interrogative particles and interrogative particles. An example of a non-interrogative particle is the neutral particle *aa3*, whose function is to make the utterance sound complete or make it sound not so blunt, as illustrated in (11a). This particle can be attached to the end of an affirmative utterance without changing the latter's declarative nature. It can also be attached to the end of a question without changing the latter's interrogative status, as in (11b-c).

- (11a) Johnny lei4 zo2 ?(aa3)
 come asp sfp "Johnny has arrived"
 (11b) nei5 lei4 m4 lei4 aa3?
 you come not come sfp "Are you coming?"
 (11c) bin1 go3 lei4 aa3?
 who come sfp "Who is coming?"

Interrogative particles differ from non-interrogative particles in their being able to turn a statement into a question. Thus the sentence *keoi5 lei4 's/he come'* can be understood as 'he is coming'. However, when the interrogative particle *aa4* is added to it, the utterance becomes an yes-no question, as in (11d). When the wh-interrogative particle *le1* is added to a NP, the utterance signals a where-question (as in 11e).

- (11d) keoi5 lei4 aa4?
 s/he come q-sfp "S/he is coming, isn't s/he?"
 (11e) baa4 baa1 le1?
 dad q-sfp "Where is dad?"

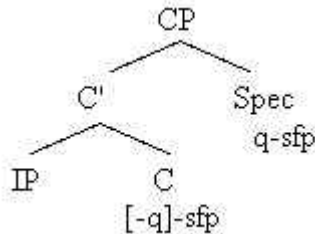
Some sentence final particles signify focus meanings, such as 'only', and can focus on anything within the sentence. They can occur in concatenation with other sentence final particles in a restricted order. Thus, (11f) shows the focus particle *zaa3* occurring before the interrogative particle *aa4*. As is clear from the English gloss, the question particle has the restrictive focus 'only' within the scope of the question operator.

- (11f) keoi5 tai2 zo2 saam3 bun2 syu1 zaa3 aa4?
 s/he read asp three CL book only q-sfp
 "S/he only read three books, didn't s/he?"

We assume the structure of (12) in our representation of sentence final particles, following Law and Neidle (1991). Non-interrogative final particles would occupy the head position of the complementizer phrase, and interrogative final particles the specifier position of the CP, which occurs after the head. This tree can predict the ordering of

question sfps after the noninterrogative sfps. It also has the advantage of ruling out sentences with two interrogative sfps, as in (14c), which contains the interrogative particles *aa4* and *me1*.⁸

(12)



- (13a) keoi5 lei4 aa4
s/he come q-sfp 'S/he is coming, isn't she?'
- (13b) . keoi5 lei4 me1
s/he come q-sfp 'Isn't s/he coming?'
- (13c) *keoi5 lei4 aa4 me1?
s/he come q-sfp q-sfp

Final particles are traditionally seen as an optional category. However, it may be observed that sentences often sound incomplete without a particle, as indicated in (11a). Given the fact that Chinese dialects are generally not morphologically marked for finiteness distinctions, one may consider final particles as one of the means of encoding finiteness, in addition to other means such as aspectual marking and modal auxiliaries (cf. Huang 1982).⁹ This is not an implausible proposal as the semantic conception of finiteness is related to the completeness of the message being communicated. As Jespersen puts it, what distinguishes finite verbs from non-finite verbs is that a finite sentence "is rounded off as a complete piece of communication" whereas a nonfinite string "lacks that peculiar finish" (cf. Jespersen 1965: 87).

The third fact about Cantonese relevant to our analysis is that as shown in Lee, Wong and Wong (1995), functional categories such as aspect, modal, final particles and classifiers emerge early in Cantonese child language. These categories appear in the language of Cantonese-speaking children between 1 year 9 months and 1 year 11 months old.

4. Null arguments in child Cantonese

4.1 Subject and object drop in Cantonese, Mandarin and English

Table 1 provides background information about null arguments in MHZ and two other Cantonese children, drawing from the studies of Man (1993) and Sze (1997). These findings are similar to those of Wang et al (1992) given in Table 2. First, there was a high proportion of null subjects in these children at different stages of their development, ranging from 56% to 81%. The children also showed a sizable object drop, allowing this from 31% to 58% of the time. However, as in Wang et al's study, the amount of object drop was generally less than that of subject drop. The figures from Cantonese data are slightly higher than those of Wang Qi et al's probably because the Cantonese-speaking children were younger than the Mandarin-speaking subjects.¹⁰

Table 1: Null NPs in Child Cantonese: longitudinal data from three children (based on Man 1993 and Sze 1997)¹¹

Child	Stages	Age	MLU	No. of utterances	% of null subjects	% of null objects
CGK	I	1;11-2;0	2.40	623	78	58
	II	2;2-2;3	2.95	1407	72	49
	III	2;4-2;5	3.52	822	59	39
	IV	2;7-2;9	3.46	906	56	42
WBH	I	2;3-2;7	2.31	830	81	49
	II	2;9-2;11	2.85	841	71	31
	III	2;11-3;1	3.06	688	60	31
	IV	3;3-3;4	3.08	475	68	38
MHZ	I	1;7-1;11	1.44	553	75.0	51.6
	II	2;0-2;3	1.93	1132	70.0	41.4
	III	2;4-2;8	2.50	707	65.5	43.2

Table 2: Null NPs in Child Mandarin (cross-sectional data from Wang et al 1992)

	Stages	Age	MLU	% of null subject	% of null object
Children	I	2	3.41	55.7	20.2
	II	3	4.41	45.7	21.4
	III	4	5.28	38.2	26.0
Adults				45.6	40.1

Table 3: Null NPs in the speech of American children (cross sectional data from Valian 1991 and Wang et al 1992)

	Stage	Age	MLU	% of null subject	% of null object
Valian (1991)	I	2;0	1.77	31	7
	II	2;5	2.49	11	7
	III	2;5	3.39	7	2
	IV	2;7	4.22	5	3
Wang et al (1992)	I	2	3.51	26	8.3
	II	3	4.65	4	3
	III	4	4.28	13	0

Table 3 gives parallel figures for English speaking children, based on Valian (1991) and Wang et al (1992). It is clear that American children dropped subjects at a much lower rate than the Cantonese or Mandarin children. They used null subjects only 26-31 % of the time around two years old, but then that figure quickly declined to 10% or lower. American children dropped objects only minimally at 8% or less.

4.2 Finiteness and null arguments

In connection with the issues raised by the studies of Sano and Hyams (1994) and Rizzi (1994), the first area to examine is whether arguments will be dropped in finite contexts. As is well known, Chinese does not have clear morphological markings for finiteness. The criteria proposed by Huang (1982) are that if a sentence takes aspect marking or contains a modal, then it should be considered finite. Further, as suggested above, if a sentence contains a sentence final particle, it is finite, in that a final particle marks the presence of a root CP, and adds the modality that makes the sentence complete.

Table 4 gives the null argument figures for sentences containing modal auxiliaries. In the speech of the child MHZ, only a limited number of modals were used. But it is clear that the presence of modals did not prohibit null subjects or objects. In fact, the subjects of these sentences were invariably omitted, and objects were dropped 78% of the time. Some examples of these sentences are given in (14).

Table 4: Null NPs in sentences with modal auxiliaries used by MHZ

Age	Modals	No. of sentences with modals	No. of null subjects	% of null subjects	No. of transitive clauses	No. of null objects	% of null objects
1;11-2;6	wui3 會 'will'; ho2ji3 可以 'can'; dak1 得 'can'	11	11	100%	9	7	78%

(14) Examples of sentences containing modals used by MHZ:

(a) (MHZ: 2;2;26)

Adult: zyun m zyun dak aa3? (talking about a toy)
turn not turn can sfp "Can (it) turn?"

MHZ: zyun dak
turn can "(it) can turn"

(b) (MHZ: 2;5;19)

Adult: ho m hoji bei ngo waan aa3? (referring to a toy object)
can not can let me play sfp "Can you let me play (it)?"

MHZ: m hoji aa3?
not can sfp "(no, I) cannot"

MHZ: ngo diudiu jyu
I fish fish "I am fishing"

(c) (MHZ: 2;6;18)

Adult: neigo fulougwattau
this skeleton-bonel "this is a skull"

MHZ: houdo ngaazai

many teeth	“(there are/it has) many teeth”
MHZ: wui ngaau jan	
will bite person	“(it) will bite people”

Table 5 shows the occurrence of null arguments in sentences with aspectual marking. Again, one does not see any restriction on empty categories despite the fact these clauses are finite. For the period before two years old, the percentage of null subjects in these sentences was 100% and that of null objects 67%. In the later two year old period, 62% of the subjects and 43% of the objects were dropped.

Let's now look at sentence final particles that terminate sentences containing at least a verb. As we can see from Table 6, between one seventh and one third of the child's utterances end with a final particle. The percentage of null subjects and null objects ranged from 71% to 77%, and the percentage of null objects was maintained at around 38%. If we are correct in taking final particles as indicators of finiteness, finiteness had no effect on the occurrence of empty elements.

Table 5: Null NPs in sentences with aspect markers used by MHZ

Age	Aspect markers	No. of sentences with aspect markers	No. of null subjects	% of null subjects	No. of transitive clauses	No. of null objects	% of null objects
1;9-1;11	zo2 (PERF)	20	20	100%	3	2	67%
2;0-2;8	zo2 (PERF); zyu3 住 (DUR); gan2 緊 (PROG); gwo3 過 (EXPERIE NTIAL)	73	45	62%	49	21	43%

Table 6: Null NPs in sentences with final particles produced by MHZ¹²

Age	Total no. of utterances	No. of utterances with final particles	No. of null subjects	% of null subjects	No. of null objects	% of null objects
1;7-1;11	553	77	59	77%	29	38%
2;0-2;8	1839	687	487	71%	260	53%

4.3 SPEC of CP and null arguments

To account for the German data, Rizzi's principles only allow the matrix topic to be discourse

identified (cf. 8). As we observed earlier, this principle does not apply to adult Chinese (Mandarin or Cantonese), but it would be of interest to see whether it is observed in child Cantonese. If we assume that interrogative final particles occupy SPEC of CP, then null topics should be disallowed in sentences with these particles, and in turn the variables linked to these topics should be illicit. There is no evidence, however, for any blocking effect of interrogative final particles. Of the 77 utterances with final particles produced before MHZ was two years old (see Table 6), only one interrogative particle was used, in a sentence with a null subject. Of the 687 utterances with final particles used during the two year old period, only two interrogative particles were found, one in a sentence with a null subject, and the other in a sentence with a null object (cf. Table 7).

Table 7: Null NPs in yes-no questions and wh-questions produced by MHZ

Age	Question type	No. of questions	Total no. of null subjects	% of null subject	No. of transitive clauses	Total No. of null objects	% of null object
1;7-1;11	Yes-no Q (particle Q)	1	1	100%	0		
2;0-2;8	Yes-no Q (intonation)	1	1	100%	1	0	0%
	Yes-no Q (particle Q)	2	1	50%	2	1	50%
	Yes-no Q (A-not-A)	1	1	100%	1	0	0%
	what-Q (<i>mat1je5</i>)	4	0	0%	4	0	0%
	who/which-Q (<i>bin1go3</i>)	2	0	0%	2	0	0%
	where-Q (<i>bin1dou6</i>)	4	2	50%	4	0	0%
	why-Q (<i>dim2gaai2</i>)	2	1	50%	2	0	0%
		total=17					

Another element that may block discourse identification is wh-phrases. In standard GB analysis, wh-phrases in Chinese move to SPEC of CP at Logical Form (cf. Cheng 1991). In some current analysis (cf. Aoun and Li 1993), it is argued that the an empty question operator moves to SPEC of CP at S-structure in languages like Chinese, or null wh-operators are base-generated there. In either analysis, the configuration will block discourse identification of empty categories because of (8). Empirically, however, this kind of prediction is not borne out, as shown by Table 7, which reports the questions produced by the child. Only one particle question was recorded for the child before 2;0. During the period 2;0 through 2;8, a total of 17 spontaneous questions were found, of which 12 were question word questions. Three null arguments were evidenced in these question, resulting in an argument drop rate of 25%. One cannot draw a firm conclusion here because of the small number of tokens, but at least the data show that children could drop arguments in question word questions. Further the fact that arguments were not dropped in some question types (e.g. *mat1je5* 'what' questions) might have been due to pragmatic factors. In a two argument sentence in which the

child asks a question of the form 'This is what?', there may be a pragmatic need for the child to make explicit the entity to which a property is being ascribed. No argument drop will occur, as the subject NP is needed to refer to the entity being described, and the object wh-phrase must be present to encode the property.

4.4 Null arguments in embedded clauses

It has been shown that neither finiteness nor operators in SPEC of CP seem to suppress empty categories in child Cantonese. The next question concerns the possibility of discourse identification in embedded clauses. Are empty categories found in embedded clauses in the speech of the Cantonese child. The answer can be sought from Table 8, which gives information about the embedded clauses produced by MHZ as well as two other Cantonese children from an earlier study.¹³ It can be observed that even two year old Cantonese children used embedded clauses substantially, with 89 embedded clauses for MHZ, and more than a hundred for the other two children. MHZ dropped subjects 93% of the time, and omitted between 54% and 69% of the objects. The other two children (CGK and WBH) dropped subjects 85% to 100% of the time, and about 40% of their objects. These data indicate that arguments can be dropped quite freely in embedded clauses, contrary to the predictions of Rizzi's principles. The argument drop rates for subordinate clauses also corroborate the subject/object asymmetry observed in main clauses: subject drop exceeded object drop. The abundance of null elements in embedded clauses in child Cantonese contrasts sharply with the absence of such elements in child English. In the study of Valian (1991), no null subjects were found in the 132 tensed subordinate clauses produced by the 21 American children she studied (Valian 1991: 65)

To give some idea about the complex sentences used by children, it should be noted that the control constructions consisted of familiar control verbs such as *bong1* 'help' or *jiu3* 'want', which are three-argument verbs taking an infinitival clausal complement with an obligatory null subject. The constructions also included matrix verbs such as *sik1* 'know-how-to', *waan2* 'play' or *maai2* 'buy', which subcategorize for a clausal complement that must have a null subject.¹⁴ The control structures used by MHZ are exemplified in (15). The sentences with main verbs that can take finite clauses as complements (ie clauses with potential lexical subjects) consisted of verbs like *paa2* 'fear', *waa6* 'say', *zung1ji3* 'like', or *gei3dak1* 'remember'. These complex sentences are illustrated in (16). Table 9 gives the list of matrix verbs used in these complex sentences. As can be seen from the figures, the children seem to first use control constructions before moving on to sentences with main verbs that can take finite clausal complements.

Table 8 : Null NPs in Child Cantonese: embedded clauses of complex sentences*

Child (Age range)	No. of embedded clauses	No. of potential null subject sites	No. of null subjects	% of null subjects	No. of potential null object sites	No. of null objects	% of null objects
CGK (1;11-2;9)	> 188	13	11	85%	188	78	41%
WBH (2;3-3;4)	> 114	2	2	100%	114	46	40%
MHZ (1;7-1;11)	14	0	0		13	9	69%
MHZ (2;0-2;8)	75	28	26	93%	69	37	54%

*The figures for CGK and WBH are taken from Man (1993). The embedded clauses counted included all subordinate clauses, whether finite or nonfinite. The sentences containing these embedded clauses consisted of transitive clauses with main verbs subcategorizing for clausal complements, control structures such as 'pivotal' constructions, as well as sentential subjects, extent complements, and relative clauses, but excluded serial verb constructions. Possible null NP sites indicate subject or object positions in which a lexical NP can potentially occur.

(15) Complex sentences used by MHZ with matrix control verbs:

(a) (MHZ 1;11; 06)

houzeon bong nei [oliu]

MHZ help you urinate

“MHZ (will) help you urinate”

(b) (MHZ 2;8;06)

Adult: gam ngodei jung m man lei zou matje hou aa3?

so we use five dollars for do what good sfp

“So what should we use the five dollars for?”

MHZ: maai je [sik] laa3

buy thing eat sfp

“(we) buy things to eat”

(c) (MHZ 1;9;25)

Adult: nei sik m sik cai aa3?

you know not know build sfp “Do you know how to build (things)”

MHZ: sik [caai]

know build

“(I) know how to build (things)”

(16) Complex sentences used by MHZ with matrix verbs that can take finite complements:

(a) (MHZ 2;3;09)

Adult: nei paa m paa zit aa3
you fear not fear tickle sfp

Bernard: ngo m paa [zit]
I not fear tickle

“I don’t fear that e will tickle (me)”

(b) (MHZ 2;5;04)

maamaa waa [mhou haam]
mother say not cry

“Mom says that (one/I) should not cry”

(c) (MHZ 2;5;04)

ngo zung ji [sik saigwaa]
I like eat water-melon

“I like to eat watermelon”

Table 9: Matrix verbs used by MHZ in complex sentences:

Age	No. of embedded clauses	Matrix verbs used
1;7-1;11	14	Control verbs: (a) <i>bei2</i> 俾 ‘give/let’; <i>bong1</i> 幫 ‘help’; <i>jiu3</i> 要 ‘want’ (b) <i>sik1</i> 識 ‘know-how-to’; <i>waan2</i> 玩 ‘play’;
2;0-2;8	75	Control verbs: (a) <i>bei2</i> 俾 ‘give/let’; <i>bong1</i> 幫 ‘help’; <i>jiu3</i> 要 ‘want’ (b) <i>sik1</i> 識 ‘know-how-to’; <i>waan2</i> 玩 ‘play’; <i>lo2</i> ‘get’; <i>jau5</i> 有 ‘have’; <i>cai3</i> 砌 ‘build’; <i>caau2</i> 炒 ‘fry’; <i>zyu2</i> 煮 ‘cook’; <i>maai2</i> 買 ‘buy’; <i>bat1</i> ‘fetch with spatula or spoon’ Verbs that can take finite complements: <i>paa3</i> 怕 ‘fear’; <i>soeng2</i> 想 ‘hope’; <i>waa6</i> 話 ‘say’; <i>gei3dak1</i> 記得 ‘remember’; <i>zung1ji3</i> 鍾意 ‘like’; <i>baan6</i> 扮 ‘pretend’;

If one looks at some examples of the empty categories in finite embedded clauses, one can see that they are not identified by another constituent elsewhere in the sentence, but rather from discourse. For example, in (16a) *ngo m paa zit* ‘I-not-fear-tickle’, it is clear that the empty subject of the embedded verb *zit1* ‘tickle’ is not identified by another argument in the

sentence, since the child is saying “I’m not afraid of someone else tickling me”. Similarly in (16b) when the child says *maamaa waa mhou haam* ‘mom-say-not cry’, the empty subject of *haam3* ‘cry’ is not identified by the matrix subject *maamaa* ‘mom’, but rather by another person, presumably the child himself. These are clear instances of discourse identification.

4.5 Referential range of null objects

The last issue addressed by our data is whether the null objects, analyzed as topic bound variables, are limited to third person. Table 10 gives the breakdown figures for the objects of transitive verbs that can take single nominal objects, classified according to person and also whether the object is null. It is clear that the child used much more third person than first or second person objects. During the period of observation, only 16 first person objects, and 14 second person objects were recorded. In contrast, a total of 1288 third person objects were found.

If null objects are topic-bound variables characterized by third person reference, as assumed by both Sano and Hyams (1994) and Rizzi (1994), one should not expect to find first or second person null arguments. Our data indicate that the child omitted objects having first and second person reference. Some examples of first and second person object drop are given in (17). In (17a,b), the null object referred to the speaker, while the null object in (17c) pointed to the hearer.

Table 10: First, second and third person null objects produced by MHZ*

Age	No. of 1st person objects	No. of 1st person null objects	% of 1st person objects being null	No. of 2nd person objects	No. of 2nd person null objects	% of 2nd person objects being null	No. of 3rd person objects	No. of 3rd person null objects	% of 3rd person objects being null
1;7-1;11	8	7	88%	3	2	67%	336	164	49%
2;0-2;8	16	16	100%	11	5	45%	952	408	43%

*Only clauses with transitive verbs that take single nominal objects are included in this count.

(17a) (MHZ 1;10, wanting his mother to hug him)

MHZ: maamaa pou
 mom hug “mother hug (me)”
 Mother: dimgaai jiu maamaa pou aa3?
 why want mother hug sfp “why do you want mom to hug (you)?”

(17b) (MHZ 1;9, building things with toy blocks)

Investigator: zeze bong nei hou m hou?
 sister help you good not good “Is it ok for sister to help you?”
 MHZ: m bong
 not help “(you don’t need to) help (me)”

(17c) (MHZ 2;4, playing with a pair of scissors)

Investigator:	nei bei ngo, faaidi	
	you give me, quick	“Give (it to) me, be quick”
MHZ:	m bei a3	
	not give sfp	“(I) won’t give (it to you)”

Third person null objects far outnumbered first and second person null objects: only 30 null objects referred to the first or second person, while up to 572 null objects signified third person. On the surface, one may say that the pattern reflects the preponderance of third person null objects, and thus confirms the referential restriction hypothesis. However, direct comparison of absolute frequencies of null arguments according to person is not entirely appropriate, as the child used third person reference much more than first or second person reference. For a fair comparison, one should check percentage figures to see if the propensity for objects to be null is greater with third person objects than with first or second person objects. The figures in Table 10 show a much stronger tendency for first person objects than for third person objects to be null. The percentage figure for second person null objects was slightly higher than that for third person null objects. The data taken together therefore disconfirm the hypothesis that null objects are topic-bound variables restricted to third person reference.

5. Reconsidering the discourse-oriented parameter

Our investigation of Cantonese child language has led to a number of clear findings. The use of putative finiteness markers in Cantonese (aspect markers, modals, and sentence final particles) from the earliest stages of their occurrence did not prohibit null arguments. Null subjects in Cantonese appeared in Yes-no particle questions, A-not-A questions, as well as question word questions. They did not appear to be licensed by truncated structures. Clear evidence can be found for discourse identified null arguments in finite embedded clauses. Topic-bound null objects involved first and second person references, and were not limited to third person. As we observed at the beginning of the paper, the two proposals accounting for pro-drop are not valid for adult Chinese. Now we have demonstrated that they do not apply to child Cantonese.

The child language data also shed light on fundamental differences between German and Chinese. While both are 'cool' languages in permitting discourse-identified zero topics, important differences between the two languages remain that are not satisfactorily dealt with in the original formulation of Huang (1984). Rizzi's treatment succeeds in accounting for why null arguments can appear in some restricted finite contexts in German. In addition, his theory, like that of Huang (1984), has the advantage of allowing one to relate topic drop in German adult and child language to properties of discourse orientation in Chinese/ Japanese type languages. But one could query whether the way discourse identification is achieved in German is the same as it is in Chinese, as unlike those in German, null objects in Chinese are not restricted to the third person, and null arguments in embedded clauses can pick up reference from discourse. Specifically, are principles like the ECP for identification as proposed by Rizzi valid for languages like Mandarin or Cantonese?

In this connection one should note that Huang in fact has proposed two different analyses of empty categories in Chinese, in Huang (1984) and Huang (1989) respectively. The two accounts are the same in identifying the null object in Chinese as a variable, but differ with

respect to their conception of the null subject. The classic analysis of Huang (1984) treats the matrix null subject as exclusively a variable bound by a null topic. The embedded null subject, however, could be a pro identified by an overt c-commanding NP in the sentence, given the Generalized Control Rule (GCR) as in (18). It may also be discourse identified via the root null topic, as in German.

(18) Generalized Control Rule (GCR) (Huang 1984)

Coindex an empty pronominal with the closest nominal element.

(19) Generalized Control Rule (GCR) (Huang 1989)

An empty pronominal is controlled in its control domain (if it has one),
 α is a control domain for β iff it is the minimal category that satisfies both (a) and (b):
 (a) α is the lowest S or NP that contains (i) β , or (ii) the minimal maximal category containing β ;
 (b) α contains a subject accessible to β .

In contrast, the revised approach of Huang (1989) assimilates the properties of subject pro to PRO. According to the GCR of Huang (1989), given in (19), the matrix subject will not have any control domain, and does not need to be controlled because of the qualification 'if it has one' in the GCR.¹⁵ It is therefore not identified with any null topic, but rather can have arbitrary reference in the same way PRO can. In a similar vein, the empty subject of clausal complements to verbs like 'say' will not have a control domain.¹⁶ It, too, will function like PRO in being able to pick up its reference either sentence internally or from discourse. The second analysis of Huang (1989) seems to provide an intuitively appealing account of pro-drop that reflects the characteristics of Chinese, as embedded subjects in Chinese seem to have the ability to pick up reference directly from discourse without having to be first chained to the matrix null topic. It is interesting to note that acquisition researchers (e.g. Lillo-Martin 1991) have by and large adopted the analysis of Huang (1984), which facilitates comparison between null topics in Chinese and topic-drop in languages like Dutch and German. But it should also be emphasized that null arguments in German are distinct from those in Chinese in a fundamental way: they cannot occur in embedded finite contexts, despite the fact that the language has topic drop, a fact that was not given any explanation in Huang (1984).

The difference between German and Chinese can also be seen from the status of their null objects. Null objects in German are limited to third person reference, whereas those in Chinese are not, a point overlooked in the early analysis of Huang. While the null object in languages like Chinese and Japanese often behaves like a variable, it does not always do so, as have been observed by various scholars (Xu 1986, and Huang 1991). The null object is argued to be a variable because it exhibits crossover effects: an embedded null object cannot be coreferential with the matrix subject, a phenomenon that receives ready explanation if the null object is a variable bound by a topic. The variable status of the null object is also evidenced by the fact that a pronoun in an embedded clause can be understood as a bound variable in object position but not in subject position, as argued in Huang (1991).¹⁷

On the other hand, as critics have pointed out (cf. Xu 1986), there are instances of null objects that can be coreferential with antecedents in argument positions.¹⁸ Further, as Huang (1991)

himself has observed, the null object in Chinese could be a reflex of VP ellipsis in certain constructions. It is suggested that for a sentence such as (20), the repeated verb in the second conjunct can be seen as a dummy, and the null object analyzed as a pro-VP (cf Han 1997 for a similar view).

(20) Lisi da lanqiu, wo ye da e
Lisi play basketball, I also play “Lisi plays basketball, and I do too”

In the speech of the Cantonese child MHZ after 2;0, there were 15 instances of null objects playing this role, illustrated in (21). One can think of the single verb reply to the question "Would you like to eat icecream?" as on a par with "I do [like to eat icecream]", with the bracketed VP ellipted. The same analysis extends to the response to "Does MHZ (=the child) know how to ride a bike?".

(21a) (MHZ 2;1;01)

Adult: nei zung m zungji sik syutgou aa3?
you like not like eat icecream sfp “Would you like to eat icecream?”
MHZ: zungji
like “(yes, I would) like (it)”

(21b) (MHZ 2;1;15)

Adult: Houzeon sik m sik jaai daance aa3?
MHZ know not know ride bike sfp “Does MHZ know how to ride a bike?”
MHZ: sik
know “(yes, I) know (how to ride a bike)”

These null objects that replace VPs or clausal complements pattern in the same way as empty objects that replace NPs. Whether these should be analyzed as topic bound variables or pro-VPs deserves further research. But considerations of data such as these point to further divergences between German and Chinese. Thus, assimilating Chinese discourse identification under the ECP (identification) would not seem to be an empirically adequate approach.

In this paper, we have discussed two proposals that have some degree of explanatory power in their uniting a number of distributional regularities of pro-drop in child and adult languages. We have drawn out the implications of these theories for adult and child Chinese and evaluated their empirical adequacy using the acquisition data of young Cantonese-speaking children. Our early child language data fail to provide support to these principles as possible universal constraints that govern the initial stages of language development. They also shed light on fundamental differences between null-topic languages like German and Chinese. Indirectly, the data urge us to critically rethink the analyses of pro-drop for adult Chinese, in particular the theories of Huang (1984, 1989).

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¹ The analysis presented in Sano and Hyams (1994) departs from the classic account of the pro-drop parameter given in the early work of Hyams (1986), which argues that the null arguments in early language are *pro* rather than PRO, or other works such as Jaeggli and Safir (1989) and Hyams (1992). Sano and Hyams themselves noted that the classic analysis has been shown to be empirically inadequate.

² Sano and Hyams acknowledged the existence of null subjects in sentences with past tense verbs. However, they argue that these constitute counter-examples, as past tense forms in early language could be aspectual markers. They also discussed the existence of null objects in child English. They observed that these empty categories were invariably third person. These null elements are therefore not PRO (as predicted by their theory) and should be treated as variables bound by discourse identified null topics.

³ Indeed, this view is akin to the analysis of Huang (1989) which tries to give a uniform analysis of *pro* and PRO in Chinese (cf. later discussion in Section 5).

⁴ The sentences in (4), (5) and (7) are taken from Rizzi (1994).

⁵ Rizzi observes that since the verb moves into C position in V2 languages at S-structure, if the local subject is moved into the Spec of CP, the Spec-AGR configuration is reconstituted at the CP level. Thus the Spec of CP can be seen as an A-position.

⁶ If the empty element in Spec of IP is a null constant, it needs to be bound by a non-quantificational null operator, which is not available; if it is an NP trace, it needs to be bound by an antecedent in A position, which is again not available; if it is a null variable, identification with the fronted wh phrase will cause a bijection violation. Thus an empty subject in this position cannot be identified.

⁷ As will be discussed below, it is assumed that the wh-phrase in a Chinese sentence moves to the SPEC of CP position at Logical Form. It is also assumed that question particles occupy this position at surface structure.

⁸ A reviewer pointed out that the two question particles *aa4* and *me1* have very different presuppositional properties, which may be the real reason for the ungrammaticality of (13c). It should be pointed out that the incompatibility of two co-occurring question particles is also evidenced by the sentences below, which involve the yes-no question particle *maa3* and the question particle *ge2* meaning "how come":

- (a) *keoi5 lei4 maa3*
s/he come q-sfp "Is s/he coming?"
- (b) *keoi5 lei4 ge2*
s/he come q-sfp "How come she is coming?"
- (c) **keoi5 lei4 aa4 maa3*
s/he come q-sfp q-sfp
- (d) **keoi5 lei4 aa4 ge2*
s/he come q-sfp q-sfp

⁹ The study of incomplete sentences and the ways in which they can be made complete has been undertaken in recent studies of Mandarin, as in the insightful work of Kong (1994).

¹⁰ As we can see, there was a slight decline in the percentage of null subjects and objects over the period observed for all three Cantonese-speaking children. Man (1993) and Sze (1997) have observed a processing constraint effect in the earliest stage of observation but not in the later stages.

¹¹ The figures on null arguments for CGK and WBH are taken from Man (1993) while those for MHZ are drawn from Sze (1997). The counts were based on simple clauses containing transitive verbs that take single nominal objects. In other words, transitive verbs that take clausal complements and ditransitive clauses were excluded from these counts.

¹² Since ditransitive clauses were excluded from the null object count, the actual number and percentage of null objects should be higher than the figures indicated.

¹³ The small number of possible null subjects in embedded clauses is due to the fact that only positions in which an empty category can potentially alternate with a lexical NP in a finite embedded clause were counted.

¹⁴ The verb *waan2* 'play' can take a clausal complement as in *waan2 [daai3 mou2]* "(I) play-a-game-of wearing hats". The subject positions of embedded clauses in these control structures do not allow lexical NPs and will therefore be excluded from the null subject count.

¹⁵ The analysis of Huang (1989) depends crucially on the notion of 'control domain'. The matrix null subject in Chinese will not have a control domain, because if it had a control domain, it should be the root clause. However, this domain does not have an accessible subject, since Chinese does not have AGR. Therefore the subject does not have a control domain and is exempt from the coindexing requirement.

¹⁶ Huang (1989) argues that the subject of an embedded finite clause in Chinese will not have a control domain because the matrix verb in this case subcategorizes for a NP which expands into a clause. If the embedded subject had a control domain, it should be the NP or the embedded clause. However, lack of AGR in Chinese results in the lack of an accessible subject. Thus the embedded subject does not have a control domain, and is therefore exempt from the coindexing requirement. On the other hand, if the embedded clause is infinitival, the control domain of the embedded subject will

be the matrix clause, and obligatory control will apply by the GCR.

¹⁷ The contrast can be illustrated by the pair of sentences below (cf. Aoun and Li 1993):

(a) *Meigeiren_i dou shuo [ta_i xihuan Zhangsan]

everyone all say s/he like Zhangsan

(b) Meigeren_i dou shuo [Zhangsan xihuan ta_i]

everyone all say Zhangsan like him/her

Huang (1991) adopts the Overt Pronoun Constraint of Montalbetti (1984), which says that "overt pronouns cannot link to formal variables if and only if the alternation over/empty obtains". Since a bound variable can occur in the object position, empty pronouns are clearly ruled out from that position by this constraint.

¹⁸ The cross-over effects are said to be absent in some languages that allow null objects, such as Japanese (Nakayama 1996).