Null Subject Versus Null Object: Some Evidence From the Acquisition of Chinese and English

Qi Wang and Diane Lillo-Martin
University of Connecticut and Haskins Laboratories

Catherine T. Best
Wesleyan University and Haskins Laboratories

Andrea Levitt
Wellesley College and Haskins Laboratories

Because young English-speaking children use null subjects systematically, it has been proposed that they begin with an initial parameter setting allowing null arguments (NAs) and must change this setting on the basis of linguistic evidence that adult English prohibits NAs. A recent proposal suggests that the licensing and identification of NAs used by English-speaking children is like that used in adult Chinese. This predicts that young Chinese- and English-speaking children should exhibit parallel performance in their use of NAs. This study investigated this prediction using an elicited production task with both Chinese- and English-speaking children. Although the hypothesis that early English allows null *subjects* was upheld, the evidence is against the claim that early English is a discourse-oriented language like Chinese: Whereas the Chinese children systematically used null objects, the American children did not. An alternative analysis of the use of null arguments is suggested.

1. INTRODUCTION

1.1 The Null Subject Phenomenon in Early Child Language

The null subject phenomenon, that is, the frequent absence of lexical subjects, is one of the most noticeable characteristics of early child language.

The following (nonimperative) English sentences (1a) and (2a), spoken by children aged from 1;8 to 2;5 (cited by Hyams (1983)), are examples of this phenomenon.

(1) a. Read bear book
       Ride truck
       Want look a man
    b. Kathryn read this
       Gia ride bike
       I want take this off

(2) a. Outside cold
       No morning
       Yes, is toys in there
    b. 'It's cold outside'
       'It's not morning'
       'Yes, there are toys in there'

In the examples in (1a), the subject, though not phonologically specified, has a definite reference that can be readily inferred from context. Because sentences with null subjects like those in (1a) co-occur with sentences like those in (1b), which do have lexical subjects, Hyams argued that it is not likely that the missing subjects in (1a) can be attributed to a performance constraint on sentence length. Although this conclusion has been questioned (e.g., Bloom (1990), Gerken (1990), Valian (1991)), we adopt it here, as our purpose is to compare possible grammatical explanations for this phenomenon.

A further characteristic of children's speech at this age is illustrated by the examples in (2a). In these examples, the unexpressed subject is an expletive, as shown by the "translations" of these sentences in (2b). However, according to Hyams, children at this age do not produce sentences such as (2b).

Additional studies of children's early utterances show that subjectless sentences are found both in languages that do allow null subjects, such as Italian (Hyams (1986)) and American Sign Language (Lillo-Martin (1986; 1991)), and those that do not, such as French (Pierce (1987), Weissenborn (1991)). Furthermore, studies of early German, which allows a restricted set of subjects to be null, show that children learning German use subjectless sentences beyond those allowed by the adult grammar (Clahsen (1990/91), Weissenborn (1991)). Thus, in all of these studies, it was found that at an early age children use subjectless sentences like the ones illustrated in English in (1a) and (2a).

The search for an explanation of children's early use of subjectless

sentences can be related to studies of adult languages that permit such sentences as grammatically acceptable, by comparison with those that do not. In the next section, we review some characteristics of the null subject phenomenon in adult languages (as we include null objects as well as null subjects, the term has been generalized to *null arguments*) and one proposal for the grammatical mechanisms underlying this phenomenon. We then turn to a proposal accounting for children's use of null subject sentences that appeals to this analysis of adult language.

1.2 The Null Argument Phenomenon in Adult Languages

The null argument phenomenon is a well-known characteristic of adult languages such as Spanish, Italian, and Chinese. Examples from these languages are given in (3). The English counterparts to these sentences require overt subjects.

(3) a. Mangia come una bestia.
'(He/she) eats like a beast.'
(Italian; Hyams (1983))
b. Come como una bestia.
'(He/she) eats like a beast.'
(Spanish; Hyams (1986))
c. [e] lái-le.
come-Asp[1]
'(He/she) came.'
(Chinese; Huang (1982))

In these so-called pro-drop languages, the expletive elements equivalent to English *it* and *there* are also phonologically null, as illustrated in (4, Italian) and (5, Chinese).[2]

(4) a. Sembra che Gianni sia matto.
'(It) seems that John is crazy.'
b. Piove oggi.
'(It) rains today.'
(Hyams (1983))

---

[1]The following abbreviations are used in the glosses: [e]: null argument; Asp: Aspect; De, Ne, Ma: Chinese particles that have no stress and no meaning of their own when used in a statement; Ba: a passivizing morpheme in Chinese.

[2]Chinese examples not otherwise credited are provided by Qi Wang.

(5) a. [e] Xiàyǔ-le.
        (It) rain-Asp
        '(It) is raining.'
    b. [e] Yào   xiàyǔ-le.
        (It) going to rain-Asp
        '(It) is going to rain.'
    c. [e] Kànshàngqù [e] yào   xiàyǔ-le.
        (It) seem   (it) going to rain-Asp
        '(It) seems that (it) is going to rain.'

In adult Chinese, the expletive element equivalent to English *it* can be phonologically null as in Spanish or Italian, as illustrated in (5a, b, c). Alternatively, a nonexpletive subject can be found in any of these sentence types, illustrated in (6a, b, c).

(6) a. Tiān xiàyǔ-le.
        sky   rain-Asp
        'The sky is raining.'
    b. Tiān yào   xiàyǔ-le.
        sky   going to rain-Asp
        'The sky is going to rain.'
    c. Tiān$_i$ kànshàngqù [e$_i$] yào xiàyǔ-le.
        sky   seem   going to rain-Asp
        'The sky seems to be going to rain.'

How can one account for the occurrence of null arguments in these languages, compared to languages that prohibit null arguments, such as English? Jaeggli and Safir (1989) proposed the following Null Subject Parameter, stated in (7), as a principle of Universal Grammar (UG) to make this distinction.

(7) *The Null Subject Parameter*
    Null subjects are permitted in all and only languages with mor-
    phologically uniform inflectional paradigms. (Jaeggli and Safir
    (1989, 29)).

According to Jaeggli and Safir, a morphological paradigm is uniform if all its forms are morphologically complex or none of them are. For example, the Italian inflectional paradigm consists entirely of morphologically complex forms, hence null subjects are allowed; in Chinese, no forms are morphologically complex, hence null subjects are allowed here, too. In the case of English, however, morphologically complex forms such as *walks, walked, walking,* coexist with morphologically simple forms, such as *walk.* Thus, English is a "mixed" system and null subjects are prohibited.

The Null Subject Parameter stated in (7) tells us when a null subject is possible. However, Jaeggli and Safir (following others, such as Rizzi (1986)) also proposed that a null subject can occur only when its referential value can be recovered. They proposed three mechanisms for the identification of null arguments: (a) local Ag(reement), including a tense feature; (b) a c-commanding nominal; or (c) a Topic. Failure to satisfy either of the two necessary and sufficient conditions, namely a morphologically uniform paradigm and a recoverable referential value for the thematic null subject, will result in the prohibition of null subjects in a language. Although the use of null arguments thus requires two conditions to be met, for ease of exposition we refer to a Null Subject (or Argument) parameter with settings [+/−pro-drop]. (This also enables us to be neutral with respect to other analyses of the null argument phenomenon.)

The use of local Ag to identify the reference of a null argument follows from numerous reports in the literature linking null arguments with "rich" agreement. Early reports were confined to languages with only subject–verb agreement (such as Italian, discussed in Rizzi (1982)); these languages allow null arguments identified by agreement only in subject position. Later studies (such as McCloskey and Hale's (1984) work on Irish) demonstrated that languages with other types of agreement often display null arguments in other positions. Jaeggli and Safir added the condition that a tense feature must be present in order to account for the lack of null arguments in German and other V2 (verb-second) languages. The null arguments identified by Ag are considered to be members of the empty category *pro,* [+pronominal, −anaphoric].

The use of a Topic to identify null subjects follows from Huang's (1984; 1989) proposal. Huang distinguished "discourse-oriented" languages from "sentence-oriented" languages. The former, such as Chinese, have a rule of "topic-chaining," by which the discourse topic is grammatically linked to a null sentence topic, which in turn identifies a null argument. This null argument is a variable left from the movement of the empty topic to sentence-topic position. According to Huang, a topic may bind a variable in either subject or object position. These two kinds of null arguments are illustrated in (8).

(8) a. Discourse Topic$_i$ [$_{s'}$ topic$_i$ [$_s$ [e$_i$] Infl   lái-le]]
                                                     come-Asp
      '(He) came.'
   b. Discourse Topic$_i$ [$_{s'}$ topic$_i$ [$_s$ Lisi Infl [hen xi huan [e$_i$]]]]
                                  Lisi   very like   (him$_i$)
      'Lisi likes (him) very much.'
      (Huang (1984))

In addition, there is a third method of identifying null arguments that results in a subject/object asymmetry. Because a c-commanding NP can

also be an identifier, in languages such as Chinese a null pronominal may be found in embedded subject position, as in (9a), but not in object position, as in (9b). This distinction is found because the empty embedded subject can be identified by the matrix subject; it functions grammatically like a pronominal rather than a variable. However, the empty object cannot be identified by the matrix subject, because identification has to be by the *closest* nominal element.[3] Thus, empty objects can only be identified by an empty topic, indicated by Op in (10).

(9) a.   Zhāngsān$_i$, tā$_i$ shuō [e$_i$] méi kànjiàn Lǐsì
          Zhangsan   he   say   no   see   Lisi
          'Zhangsan$_i$, he$_i$ said that (he$_i$) didn't see Lisi.'

    b. *Zhāngsān$_i$, tā$_i$ shuō Lǐsì méi kànjiàn [e$_i$]
          Zhangsan   he   say   Lisi no   see
          'Zhangsan$_i$, he$_i$ said that Lisi didn't see (him$_i$).'

(10) [Op$_i$ [Zhāngsān$_j$ shuō [Lǐsì$_k$ kànjiàn [e$_i$] le]]]
              Zhangsan   say   Lisi   see   Asp
     'Zhangsan$_j$ said that Lisi$_k$ saw him$_{i/*j/*k}$.'
     (Huang (1984))

To summarize, Jaeggli and Safir proposed that the difference between the grammar of pro-drop languages such as Italian versus those such as Chinese is the method of identification of the null argument. This is illustrated in (11).

(11) a. [$_s$ pro$_i$ [$_{Infl}$ Ag$_i$/Tense] . . .]
          (identification by Ag, Italian)

    b. Discourse Topic$_i$ [topic$_i$ [$_s$ t$_i$ . . .]]
          (identification by a discourse topic, Chinese)

    c. Subject$_i$ verb [$_s$ pro$_i$ VP]
          (identification by a c-commanding NP, Chinese)

1.3 Null Subjects in Children's Grammars

From the examples presented earlier, it may be seen that "Early" English resembles a pro-drop language in three aspects. First, lexical subjects are optional; second, the subject has definite reference even when phonolog-

---

[3]In his (1989) paper, Huang amended this option in a way that also allows the matrix subject to be pro, by saying that an empty pronominal (pro) must be identified by the closest nominal element *if there is one*. We continue to adopt the (1984) analysis, by which only embedded subjects can be pro.

ically null (except in the case of null expletives); and third, lexical expletives are absent (Hyams (1983; 1989)).

How can one account for the development an English-learning child has to undergo in order to arrive ultimately at a steady state grammar so as to speak the right type of English? A recent analysis by Hyams ((1991); Jaeggli and Hyams (1988)), following the analysis of null subjects in adult languages conducted by Jaeggli and Safir (1989), proposed that the early grammar, like adult grammars, is constrained by the Null Subject Parameter. That is, the early grammar satisfies the requirement of morphological uniformity and the requirement that null arguments be properly identified.

Hyams (1991) argued that English-speaking children begin speaking a Chinese-like language, that is, a discourse-oriented language. Under the child's initial analysis, English is morphologically uniform with uniformly simple forms. Hyams took children's verb productions, which at this time are generally not inflected, as evidence for this position. She further proposed that young English-speaking children use null topics to identify the reference of their null subjects. The child will then need to learn that English is not a discourse-oriented language in order to properly exclude null subjects.

In the case of Italian-speaking children, Hyams proposed that their early empty subjects are identified by Ag, as is the case in adult Italian. She proposed this early correct null subject use because Italian-speaking children acquire the inflectional system fairly early. Thus, for these children, resetting of the null subject parameter is not required.

One potential problem for Hyams's analysis is that one would expect that a discourse-oriented child language should have both null subjects and null objects, because under topic identification the null subject and null object phenomena are grammatically equivalent. However, according to the data she reviewed, Hyams claimed that English-speaking children do not use null objects. In order to account for this, Hyams thus proposed, following Roeper, Rooth, Mallis, and Akiyama (1984),[4] that in the early grammar, the inventory of null elements includes pro but not variables. This hypothesis would predict a null subject/null object asymmetry. As null objects can only be variables, under this hypothesis null objects would not be allowed in the early grammar until some later point when variables mature. In order for this account to hold, Hyams had to depart from Huang's analyses of Chinese and suggest that matrix empty subjects as well as embedded empty

---

[4]Roeper et al. made this suggestion for a completely different reason. They discussed an experiment in which children appeared to violate strong crossover for a long period of time. They accounted for this finding with the hypothesis that children begin with pro but not variables as empty categories. However, there is new evidence that suggests that children do not actually violate strong crossover (see McDaniel and McKee (1992), Thornton (1990)) and that they do have variables.

subjects can be pro, although only embedded empty subjects can be identified by a c-commanding NP. Hyams said that matrix empty subject pros are identified by a discourse topic.

According to Hyams's hypothesis, Chinese-speaking children, who will ultimately acquire a real discourse-oriented language, should first exhibit the same null subject/null object asymmetry as English-speaking children, and they should not produce null object structures until the point when they develop variables. Hyams's hypothesis would also predict one of two null subject–object asymmetries for English-speaking children. On the one hand, if they have not yet reset the Null Subject Parameter by the time that they acquire variables, then they will produce only null subjects early on but will later include null objects as well once they have developed variables. On the other hand, if the English-speaking children have reset the null subject parameter *before* they develop variables, they will never use null objects. Thus, knowing when English- and Chinese-learning children use null subjects and objects compared to when they develop variables is important for evaluating Hyams's proposal.

The evidence regarding the timing of use of variables versus resetting the Null Subject Parameter is not wholly consistent with Hyams's approach. Roeper (1986) gave evidence that children have some uses of variables by age 3 to 4 years. All of his evidence for the use of pros rather than variables with *wh*-questions occurs with older children (ages 8 to 10) and long-distance questions. However, his proposal that children use pros instead of variables even at this later age can also be questioned, given new evidence regarding children's very early comprehension and production of *wh*-questions and strong crossover constructions (see McDaniel and McKee (1992), Thornton (1990)). We therefore used the production and comprehension of *wh*-questions in the study reported here as evidence for the existence of variables in children's grammars.

The timing of the use of null subjects is easier to determine. The acquisition data Hyams used to support her hypothesis indicate that the restructuring of the Null Subject Parameter takes place around 26 to 28 months. If Hyams's proposal that young children do not have variables is true, then we will not expect to see any null objects in the production of English-speaking children, as the restructuring takes place prior to the development of variables; and, of course, a clear decline in their use of null subjects should appear following the resetting of the Null Subject Parameter around 2½ years. However, if there is evidence that children do have variables while they still use null subjects (indicating that the resetting of the Null Subject Parameter has not yet taken place), then they will be expected to use null objects too, according to Hyams's account.

In order to more fully evaluate Jaeggli and Hyams's (1988; Hyams 1991) proposals, we collected data on the acquisition of English and Chinese. The

following experiment was designed to answer some relevant questions about Hyams's hypothesis through first-hand acquisition data. The questions we addressed include the following:

1. Is a null subject/null object asymmetry exhibited in child Chinese and child English? If so, is it equivalent for the two groups?
2. If child Chinese or child English does exhibit null objects, do we have evidence that variables coexist with null objects? The emergence of *wh*-questions is taken as evidence of acquisition of variables.
3. Can the presence of lexical expletives be taken by American children as evidence that English is not [+pro-drop]? The use of overt versus null expletives is examined to address this question.
4. What does the developmental pattern look like, as far as the null subject and null object phenomena are concerned, in terms of the parameterized theory of UG?
5. What is the influence of linguistic environment during development of early grammar between ages 2 and 4½ years?

2. METHOD

2.1 Subjects

2.1.1 Chinese and American children.   Nine Chinese children, four girls and five boys, ranging in age from 2;0 to 4;6, participated in the experiment. All of them were learning some variety of Mandarin Chinese as their first language. Their parents were graduate students from either mainland China or Taiwan, studying in the United States. Nine English-speaking children, five girls and four boys, ranging in age from 2;5 to 4;5, were also tested using the same procedure. Their parents were members of the university community. All the subjects had normal hearing. There were no recorded developmental delays of any sort. Subject characteristics are given in Appendix A.

2.1.2 Chinese adult controls.   Nine Chinese-speaking women participated in the experiment. They were all born in mainland China or Taiwan, speaking some variety of Mandarin Chinese. They were the mothers of the Chinese child subjects.

2.2 Procedure

2.2.1 Controlled production data collection.   This part of the experiment was carried out in the experimenter's home for the Chinese

children and in the observation room at a day care center for the English-speaking children. There were two storybooks used. One was a storybook designed by the experimenter (QW) about the daily life of a little boy named Baldy (who had no hair). A doll house with dolls and furniture corresponding to the settings and characters in the book was used to familiarize the subject with the main character. Another story used was a pop-up book, *The Three Little Pigs*. The testing was carried out after the experimenter played with the child subject a number of times and established rapport. The subject's task was to tell the experimenter the story. For the first story, the experimenter and the subject played with the doll house and dolls. Next, the subject was asked if he or she wanted to read a book about Baldy and then to tell a story about him. The answer was invariably positive. The entire procedure was audio recorded. All interaction with the Chinese-speaking children was conducted in Mandarin; that with the English-speaking children was in English.[5]

2.2.2   Eliciting expletive structures.   In this part of the experiment, a number of pictures were displayed to the child subject, and then he or she was asked to tell what happened in the pictures. This part of the experiment was designed to elicit expletive structures for the English-speaking children and to compare their productions to those produced by the Chinese-speaking children under the same situation.

2.2.3   Adult controls.   The Chinese adult subjects were asked to tell the stories and talk about the pictures, while pretending that they were talking to their own child. The testing was conducted in the subjects' home without their child or the experimenter present. The testing materials were identical to those prepared for the child subjects. The whole procedure was audio taped.

2.3 Data Reduction

The mean percentage of sentences with null subjects for each speaker was calculated based on the ratios of the sentences with null subjects to the total number of sentences produced when telling the two stories. These ratios were averaged over the total number of subjects in each language group, over each age level (2-, 3-, and 4-year-olds), and over each MLU level (3.5, 4.5, 5.25) separately. The standard error of the means (*s.e.*) was also calculated.

The mean percentage of sentences with null objects was calculated using a similar method. The ratio was the total number of sentences with an underlying structure of SVO to the total number of sentences produced with

---

[5]The experimenter, QW, is a native speaker of Mandarin from the People's Republic of China. She is also fluent in English.

a null object. For the Chinese data, in addition to this criterion, any two-morpheme compounds that had been identified as a *word* by the authoritative dictionary—*Xiàndài Hànyŭ Cídiăn* 'Modern Chinese Dictionary' (Institute of Linguistics, (1973))—were not included, even if they had the V + O formation. For example, (12a) was identified as a single word, so it was excluded; but (12b) was counted because it was not identified as a single word. The reason for this constraint is that it is generally agreed among Chinese linguists that a verb + complement compound is not equal to the structure of V + O. Unlike the latter, the former is already in its minimal construction and is not divisible; therefore, these two types of words are analyzed differently.

(12) a. xĭ   zăo
        wash bath
        'take a bath'
     b. xĭ   shŏu
        wash hands
        'wash hands'

The MLU for child subjects in both languages was calculated, using the productions made for the stories, according to the method in Brown (1973).

A second measure of the mean percentage of sentences with null subjects for English-speaking children was also calculated in the same way, excluding the sentences with null subjects using a gerund or *to*-infinitive. The reason for this exclusion is that given the discourse, these kinds of sentences are also allowed in the adult grammar of English. This second measure is labeled *adjusted* in the figures.

The data gathered from testing the expletive structures was excluded from the calculation of the mean percentages. This part of the data was only evaluated for structural differences among the three testing populations. No quantitative analysis was involved.

The children's comprehension and spontaneous productions of *wh*-questions during the course of the study were evaluated, for the purpose of determining their use of variables.

3. RESULTS

3.1 An Overall View of the Results
     (For details see Appendices B and C)

3.1.1 Null subjects.   From Figure 1, it may be seen that there is a noticeable difference between the mean percentages of sentences with null subjects produced by Chinese child subjects and those by American child
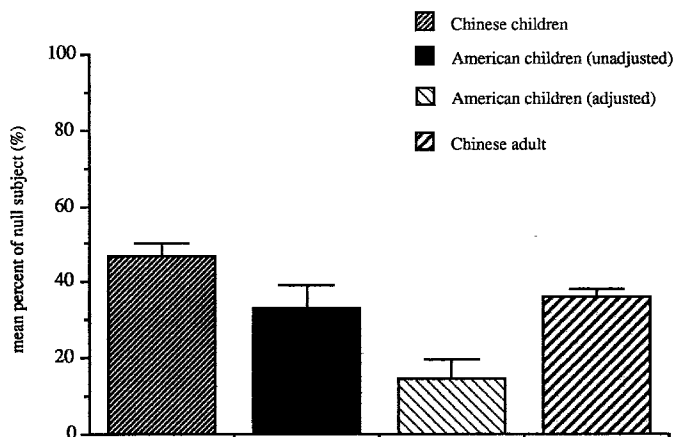
FIGURE 1   Mean percentage of sentences with null subjects produced by Chinese and American children and Chinese adults.

subjects at 2 to 4½ years. Examples for such sentences are (13a, b) for the Chinese child subjects and (14a, b, c) for American child subjects.

(13) a. Zhè húang wáwá tiàotiào. [e] shūai. [e] shūai dǎo   le.
       this yellow baby jump   fall   fall   down Asp
       'This yellow baby jumped. (He) fell. (He) fell down.'
       (ZY, 2;0)

   b. [e] wán shāshā ne. [e] zāng. [e] xǐ   zǎozǎo ne.
          play sand Ne   dirty   take bath   Ne
       '(He) is playing with sand. (He) is dirty. (He) is taking a bath.'
       (AN, 2;3)

(14) a. [e] brush her hair. [e] brush hair.
       '(She's) brushing her hair. (She's) brushing (her) hair.'

       [e] fighting like that, bang!
       '(They're) fighting like that, bang!'

       [e] playing. They all bent. [e] are playing.
       '(They are) playing. They (are) all bent. (They) are playing.'
       (AR, 2;5)

   b. He got in there. [e] fell down.
       'He got in there. (He) fell down.'
       (DS, 2;10)

   c. [e] jumping. [e] fell. They fell down. [e] sleeping.
       '(They're) jumping. (They) fell. They fell down.
       (They're) sleeping.'
       (SP, 4;2)

The mean percentage of sentences with null subjects produced by Chinese children is 46.54 (*s.e.* = 3.78); whereas for the American children, it is 33.11 (*s.e.* = 6.12). The Chinese adults produced sentences with null subjects 36.13% of the time. Given that Chinese is a pro-drop language, all the sentences with null subjects produced by the Chinese children are considered grammatical, with the reference of the null subject determined by the discourse topic. Although English is not a pro-drop language, some of the sentences with null subjects produced by American children, that is, sentences with null subjects but using infinitives or gerunds rather than a full verb, can be judged as pragmatically acceptable in the given context in which they were produced. If we exclude these sentences from our count of sentences with null subjects produced by American children, the mean percentage drops to 14.58 (*s.e.* = 5.03). Comparing this adjusted mean percentage, 14.58, with the mean percentage of Chinese children, 46.54, and that of Chinese adults, 36.13, one way analysis of variance (ANOVA) omnibus $F(2, 24) = 17.80$, $p = .0001$, it is clear that Chinese children are dropping their subjects at a much higher rate than American children and even at a bit higher rate than that of the Chinese adults. The differences between the American children and the Chinese children, and between the American children and the Chinese adults, are both significant by Scheffé's tests, $F(1, 24) = 31.96$, $p = .0001$, and $F(1, 24) = 21.55$, $p = .0025$, respectively; the difference between the Chinese children and the Chinese adults is not significant. Even still, it is clear that American children do drop subjects a relevant amount of the time.

For both groups of children, the null subject was sometimes clearly related to an antecedent from the discourse as shown in examples (15, Chinese) and (16, English). In other cases, the referent of the null subject was not previously mentioned in the discourse, although it was usually understandable from the context; often, it was part of the pictures the children were describing. Some examples of this type are given in (17, Chinese) and (18, English).

(15) a. Xiǎo zhūzhū zhǔ tāngtāng.
      little piggy boil soup
      'Little pig makes soup.'

      [e]   zhǔ tāngtāng.
      (He) boil soup
      'He makes soup.'
      (WW, 2;5)

  b. Dà yě láng$_i$ zài zhèlǐ tōu   kàn.
      Big wild wolf$_i$ Asp here secretly look
      'The big wild wolf is here peeping secretly.'

[e$_i$] zài kàn xiǎo zhū.
(It$_i$) Asp look little pig
'It is looking at the little pig.'
(HE, 3;1)

(16) a. Look at this bad wolf. He got in there. [e] fell down.
        'Look at this bad wolf. He got in there. (He) fell down.'
        (DS, 2;10)
     b. The big bad wolf coming again and bang the door. [e] want to
        blow the house and the house is down.
        'The big bad wolf (is) coming again and bang the door. (He)
        wants to blow the house and the house is down.'
        (SR, 2;8)

(17) [e] kàn jìngjìng. [e] méi chūan xiéxié.
     (He) look mirror   (He) not wear   shoe
     'He is looking in a mirror. He didn't wear shoes.'

     [e] méi chūan wàwà.
     (He) not wear   sock
     'He didn't wear socks.'
     (ZY, 2;0)

(18) [e] jump up. [e] jump in bed. [e] fall down.
     '(He) jumped up. (He) jumped in bed. (He) fell down.'
     (AR, 2;5)

Although both Chinese- and English-speaking children thus produced null
subjects in a somewhat similar fashion, we believe this does not necessarily
show that they use the same mechanism in identifying and licensing the null
subjects. We return later for further discussion of this point.

3.1.2 Null objects.   From Figure 2, we see that there is a considerable
difference between the mean percentages of sentences with null objects
produced either by Chinese child subjects, which is 22.53 (*s.e.* = 1.76) or by
Chinese adults, 10.3 (*s.e.* = 1.58), and that by American child subjects,
which is 3.75 (*s.e.* = 1.31), one way ANOVA omnibus $F(2, 24) = 37.21$, p
= .0001. Here, the differences between the American children and the
Chinese children, the American children and the Chinese adults, and the
Chinese children and the Chinese adults are all significant by Scheffé's tests,
$F(1, 24) = 18.781$, $p = .0001$; $F(1, 24) = 6.549$, $p = .0237$; and $F(1, 24)$
= 12.232, $p = .0001$, respectively. With the Chinese children, only 27.59%
of the total sentences with null objects are ungrammatical. The grammat-
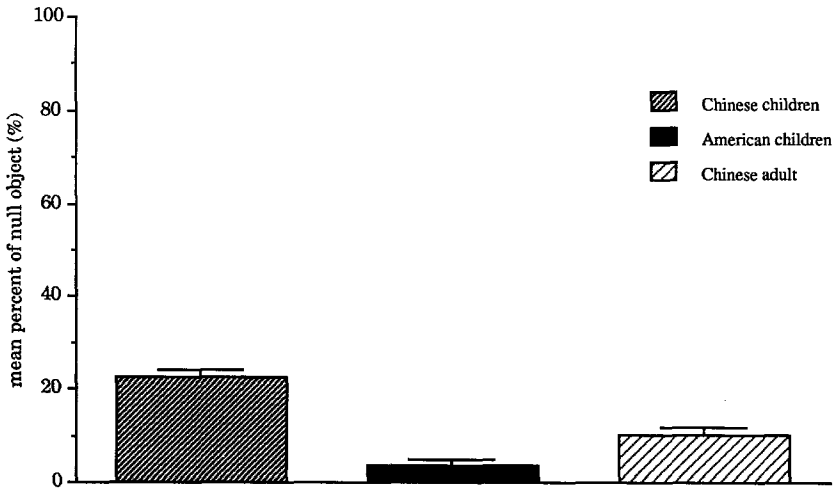icality of the Chinese object-drop sentences (i.e., whether the null object

FIGURE 2   Mean percentage of sentences with null objects produced by Chinese and American children and Chinese adults.

was used properly) was judged with respect to the context in which the sentence in question was actually produced. For the American children, 100% of the sentences with null objects were ungrammatical. Examples are given in (19) for Chinese child subjects and (20) for American child subjects.

(19) a. *Ou, láng lái   chī [e].   (ungrammatical)
         oh, wolf come eat (it = pig)
         'Oh, the wolf came to eat (the pig).'
         (ZY, 2;0)

     b. *Tāmén yào   qiù gài   [e].   (ungrammatical)
         they   going to   build (it = house)
         'They are going to build (a house).'
         (WW, 2;5)

     c. [e]   Zài   kànkàn   [e].   (grammatical)
        (He = wolf) again look look (it = pig)
        '(He) had another look at (the pig).'
        (ZY, 2;0)

     d. [e$_i$]   chīwán   [e$_j$],   (grammatical)
        (He = wolf) eat finish (it = pig)
        'After (he) finished eating (the pig),'

        lǎoláng dùzǐ jiòu biàn   dà le.
        old wolf belly then become big Asp
        'the old wolf's belly became big.'
        (LX, 3;4)

(20) a. *Look at [e$_i$].   [e$_i$] go a little higher.   (ungrammatical)
    'Look at (him). (He) goes up a little higher.'
    (DS, 2;10)

 b. *The other little pigs worry about [e].   (ungrammatical)
    'The other little pigs worry about (him).'
    (ER, 3;8)

3.1.3 Null subject/null object asymmetry. Comparing Figure 1 with Figure 2, it can be seen that the null subject/null object asymmetry is not unique to the Chinese children. The ratio of the mean percentage of sentences with null objects to those with null subjects is 0.48, 0.23, and 0.24 for Chinese children, Chinese adults, and American children, respectively. If we recalculate the ratio for the Chinese children, excluding the ungrammatical sentences as in example (19a, b), (which may be considered as errors), the ratio decreases from 0.48 to 0.29. If we do the same thing for the English children, considering their small percentage of object dropping (3.57), which was ungrammatical, as errors, the ratio, of course, becomes zero.

The amount of null object use by the Chinese adults is surprisingly low. However, note that we believe the ratio for Chinese adults would be higher than the rate we obtained if the data had been collected in an adult-to-adult conversational situation, where most object dropping takes place, rather than in children's story-telling. Because of this discrepancy, we conducted a follow-up study with Chinese adults.

In the follow-up study, five Chinese-speaking adults were interviewed by the experimenter in an adult-to-adult conversational setting. These adults were all women who had recently given birth to their first child. The interviews took place in the subjects' home and consisted of several parts. First, the subjects were asked to tell their child two stories as a warming up. Then, they engaged in conversation with the experimenter. The conversations all included the same three topics of discussion: the woman's pregnancy and childbirth, her own lifestyle, and the growth and behavior of her child. The interviews were tape-recorded. Only the conversations were transcribed and scored according to the same procedures discussed previously for the initial study. The percentages of null subject and null object used by each speaker in this study are illustrated in Figure 3, and more detailed information is given in Appendix D.

As Figure 3 clearly shows, a subject–object asymmetry remains for the adult subjects, but the overall percentage of null object use increases greatly. Both of these facts are important for comparison with the children's utterances. In the follow-up study, the average drop is 40.1% (*s.e.* = 1.77), whereas the average subject drop is 45.6% (*s.e.* = 2.42). Although the amount of object drop is much higher than in the initial study (10.30%), the difference between the subject drop and the object drop is significant by a
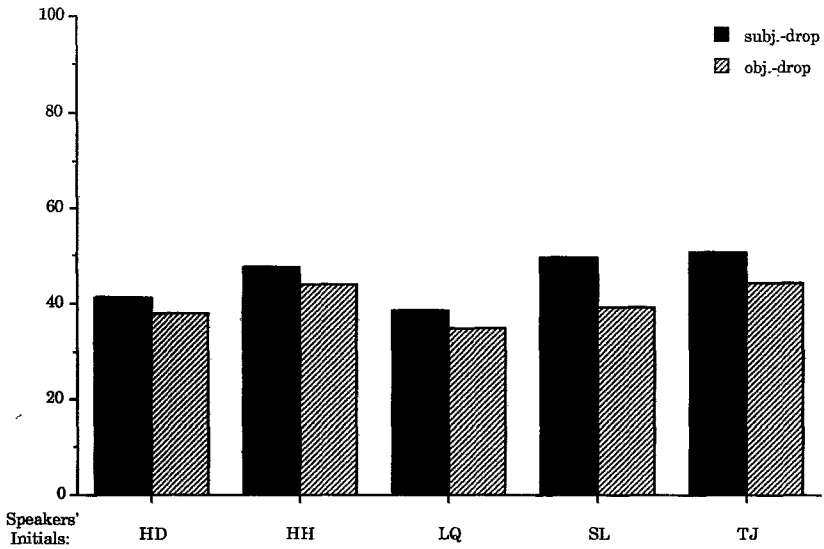
FIGURE 3 Percentage of sentences with null arguments produced by Chinese adults in the follow-up study.

two-tailed paired t test, $t(4) = 4.073, p < .02$. Some examples of the adults' utterances with subject and/or object drop are given in (21) and (22).

(21) Tā$_i$ jiòu hē   diǎn niúnǎi$_j$ ma. [e$_i$]   yě he   [e$_j$] bù duō.
He$_i$ only drink little milk.   Ma (He$_i$) yet drink (it$_j$) not much.
'He only drinks a little milk. (He) does not drink (it) much.'

[e$_i$] zài hē   diǎn   guǒzhī. [e$_i$]   chī diǎn   shuǐguǒ.
(He$_i$) also drink a little bit juice.   (He$_i$) eat a little bit fruit
'(He) also drinks a little bit of juice. (He) eats a little bit of fruit.'
(LQ)

(22) Tā$_i$ yiòu   ài kàn diànshì$_j$.
She$_i$ especially like watch TV$_j$
'She especially likes to watch TV.'

Wǒ$_k$ jiòu pà   ta$_i$ bǎ yǎnjīng kàn   huài-le.
I$_k$ so afraid she$_i$ Ba eye   watch bad-Asp.
'I was so afraid that she might damage her eyesight.'

[e$_k$] yī tiān bú ràng ta$_i$ kàn   nàmo jiǒu [e$_j$].
(I$_k$) a day not let   her watch that   long (it$_j$).
'I do not let her watch (it) for long in a day.'
(TJ)

3.2 Results Broken Down by Age and by MLU

In order to determine whether there is any relationship between the null subject/null object phenomena and the child's linguistic maturation, the results were recalculated according to the child's chronological age and the child's MLU level.

For the American children, the adjusted mean percentages of sentences with null subjects are 25.89, 4.48, and 13.39 for age group 2, 3, and 4, respectively. For the Chinese children, the mean percentages of sentences with null subjects are 55.73, 45.65, and 38.25 for these three age groups. Thus, in both languages, the proportion of subjectless sentences decreases over time. However, the American children seemed to make a surprising jump up in the use of null subjects by 4-year-olds.

To investigate this further, the percentage of null subject sentences was recalculated on the basis of MLU. It was found that for the Chinese child subjects, MLU levels were in accordance with their chronological age groups. However, for the American child subjects, the 2- and 3-year-old groups had MLU levels corresponding to their 2- and 3-year-old Chinese counterparts, but the 4-year-olds had an MLU level corresponding to the Chinese 3-year-olds. Thus, the American 3- and 4-year-olds were grouped together in one MLU group for the comparison of null subjects across MLU.

Grouped by MLU, the American children produced subjectless sentences 25.89% of the time and 8.93% of the time for MLU levels 3.51 (2-year-olds) and 4.48 (3- and 4-year-olds), respectively (see Figures 4 and 5). The
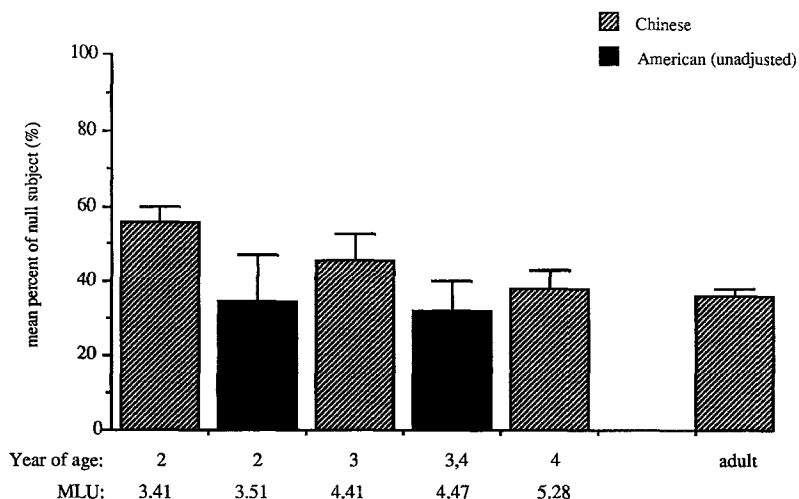

FIGURE 4   Mean percentage of sentences with null subjects produced by Chinese and American children (by MLU, unadjusted) and Chinsese adults.
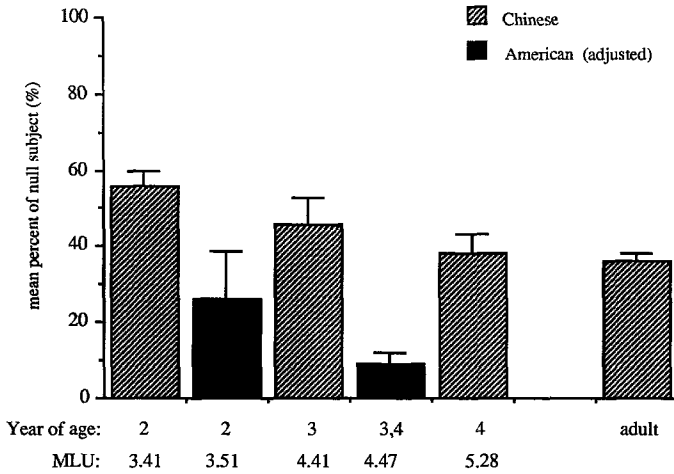
FIGURE 5   Mean percentage of sentences with null subjects produced by Chinese and American children (by MLU, adjusted) and Chinese adults.

difference between the Chinese and American first MLU groups (2-year-olds) is not statistically significant, $t(2) = 2.209$, $p = .09$, however, as can be seen in Appendix A, this is essentially due to the youngest American subject (AR), who had a rate of subject drop comparable to that of his Chinese peers. The difference between the second MLU groups (Chinese 3-year-olds and American 3- and 4-year-olds) is significant by unpaired two-tail t test, $t(7) = 2.21$, $p = .0007$. Clearly, the American children experience a sharp drop in their use of null subject sentences. The Chinese children, on the other hand, continue to use null subjects across the MLU groups (for the Chinese children, MLU groups are equivalent to age groups).

   The pattern of use of missing objects is quite different (see Figures 6 and 7). Whether divided by age or by MLU group, the American children used missing objects much less frequently than missing subjects. The 2-year-olds (MLU 3.51) used missing objects only 8.3% of the time, whereas the older children used essentially none. In contrast again, the Chinese children used null objects much more frequently than the American children. They averaged 20.2% to 26.0% null objects, with the figures increasing slightly over the age/MLU ranges.[6] Although the adults in the initial study produced far fewer null objects than the Chinese children, from the follow-up study we can see that the overall production of null objects by the children is approaching the level of use by adults in conversational settings.

---

[6]Statistical comparison between the use of null objects by the American children and the Chinese children was unnecessary given the large differences between the ranges of the percentages.
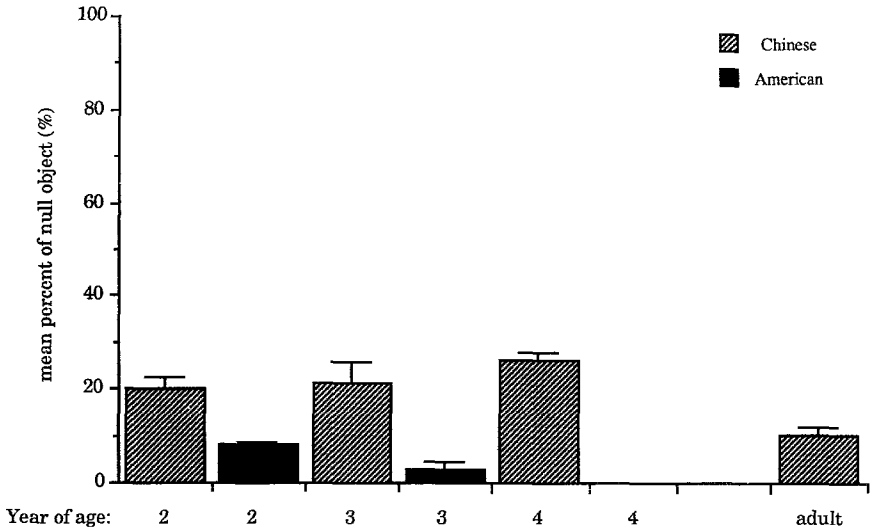
FIGURE 6   Mean percentage of sentences with null objects produced by Chinese and American children (by age) and Chinese adults.

The Chinese- and English-speaking children do not differ significantly in their use of null subjects at the earlier MLU stage tested (MLU level 3.5), but they do at the latter MLU stage (MLU level 4.5). These results provide strong evidence for pro-drop in younger English-speaking children (MLU level 3.5). For the use of null objects, however, the two language groups differ significantly across all MLU levels. The differences in the use of null subjects and null objects by Chinese and American children indicate that the factors controlling the use of the two types of null arguments in the two groups are distinct. This is counter to the proposal by Jaeggli and Hyams (1988), which suggests that the two groups use null subjects for essentially the same reason.

3.3 Results of Eliciting Expletive Structures

In order to determine how the course of the development of expletive subjects interacts with the development of null versus overt subjects, children's productions of sentences calling for expletive subjects were examined. For the Chinese-speaking children, we examined whether they used a null subject, as in (5), or a nonexpletive lexical subject, as in (6). For the English-speaking children, we examined whether they produced any lexical expletives and, further, whether there was any evidence that lexical and null expletives coexisted.

    In general, there was no evidence of the Chinese children producing structures with overt nonexpletive subjects, such as those in (6a, b, c), even
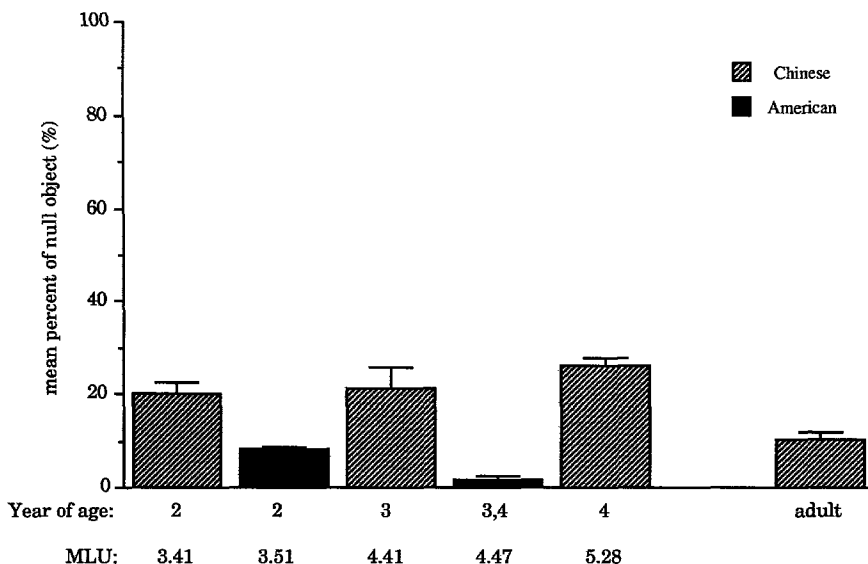
FIGURE 7   Mean percentage of sentences with null objects produced by Chinese and American children (by MLU) and Chinese adults.

among the 4-year-olds. The only structures they used in the weather conditions were those with null subjects, as in (5a, b). They did not use the structure in (5c) either. The only exception occurred when they talked about a windy condition. In that case, they either used a structure with a null subject, as in (23), or they used *fēng* ('wind') as an overt subject, as in (24). The Chinese adults used all the structures in (5) and (6). They also used fēng in the same way as the Chinese children. The observed difference here between the Chinese children and the Chinese adults in their use of null subjects (as in 5a, b) and nonexpletive lexical subjects (as in 6a, b), we believe, is due to a stylistic reason rather than a grammatical one. In fact, sentences in (5a, b) are more colloquial than those in (6a, b). However, it seems that the absence of the structure like that in (6c) from the data of the Chinese children could be due to a grammatical reason. The structure in (6c) requires the ability to raise the subject from the embedded clause to the matrix clause.[7]

---

[7]None of the Chinese children in MLU group 3.5 (2-year-olds) and 4.5 (3-year-olds) produced any sentences with embedded clauses. Only one of the 4-year-olds (YD) produced a few sentences with embedded clauses. However, all three of his sentences with embedded clauses were produced with an overt subject, for example:

(i) Tā xiǎng,   *Lǎo láng* chūi bù dǎo   zhè mùtóu fángzi de.
    he thought old wolf blow not down this wood house De
    'He thought that *the old wolf* could not blow down the wood house.'

(23) [e]   yào bǎ zhège guā diào,
     (it = wind) want Ba this   blow down
     [e]   hái yào bǎ zhège jě guā diào.
     (it = wind) also want Ba this   too blow down

     '(Wind) wants to blow this down.
     (it) also wants to blow this down too.'
     (ML, 4;3)

(24) Xiànzài guā fēng-le.   Fēng dōu tài dà-le,
     now   blow wind-Asp   wind also too big-Asp
     fángzi dōu chūi dǎo-le.
     house also blow down-Asp

     'The wind began blowing now. The wind was so big
     that the house was blown down.'
     (SK, 4;1)

The American children had a different pattern. Except for the youngest
one (AR, 2;5), all the children showed some kind of evidence for the
existence of expletive *it,* as in (25). At the same time, however, they also
used some null expletives as well, as shown in (25) and (26).

(25) It is raining.   (SR, 2;8)
     It's very windy so the clothes are going up.   (SR, 2;8)
     It's rain. Rain. They can't come out.   (DS, 2;10)

(26) Snow. Raining   (DS, 2;10)
     No snow.   (SR, 2;8)
     Windy now.   (EL, 3;6)
     Raining.   (AR, 2;5)

Hyams (1986) suggested that one piece of evidence that English-speaking
children use to reset the null subject parameter to [−pro-drop] is the
presence of overt expletives. Hyams argued that as *it* and *there* are not being
used for pragmatic purposes (because they do not contribute to the meaning
of the sentence), they must therefore be present for strictly grammatical
reasons. Hence, lexical expletives could be used to trigger parameter
resetting. Furthermore, as noted earlier, Hyams found that children use null
expletives at the time they use null subjects. So, the emergence of lexical
expletives coincident with restructuring to [−pro-drop] is predicted.

Our data show that the youngest child, who used missing subjects the most frequently, also did not use overt expletives. However, some children do use both overt and null expletives at the time when they are using some null subjects. Hence, it might look like the presence of overt expletives in the input is not a type of triggering data for resetting the null subject parameter. But why do the children use overt·expletives when they sanction null subjects? Lillo-Martin (1987) gave a possible solution for this puzzle. She suggested that children have misanalyzed the expletives and instead interpret *it* as (quasi-)referential, even in sentences such as "It's raining." Because they have the wrong analysis of *it,* they do not have the overt expletive evidence that English is not [+pro-drop]. So at this point, one cannot assume that the time at which a child starts using overt expletives will be coincident with the correct setting for the Null Subject Parameter.

3.4 Results of the Use of Structures Exhibiting Variables

In our data, both child language populations have shown some evidence for the existence of variables though the production of *wh*-movement (English) or the comprehension and production of *wh*-questions (Chinese). This can be seen in (27) and (28). These questions were produced and comprehended during the course of the experiment described earlier, at the same time as these children showed evidence of using null arguments.

(27) a. What's that?
       (AR, 2;5)
    b. Who's that? Baldy? Baldy is playing with mud.
       (SR, 2;8)
    c. That's what I think he did.
       (DR, 3;9)

(28) a. Experimenter: Shúi lái-le?
                        Who came-Asp
                        'Who came?'

         Child Subject: Láng, Láng lái-le.
                          wolf, wolf came-Asp
                          'The wolf came.'
                          (ZY, 2;0)
    b. E: Dà hūi láng gàn shénmo lái-le?
          big grey wolf do   what   come-Asp
          'Why did the big grey wolf come?'

        C: [e]   Ná   xiǎo zhū Ah.
           (He) take little pig Ah
           '(He) came to take the little pig away, of course.'
           (AN, 2;3)
     c. Nà   shì shémo? Nà   shì shúi nòng de?
        that is what   that is who did
        'What is that?' 'Who did that?'
        (WW, 2;5)

One might claim, following Roeper et al. (1984), that the empty categories used in these constructions are pros, not variables. However, work by Thornton (1990) and Sarma (1991) suggests that children at least at 3 years do use variables rather than pros in these constructions, because they correctly produce long-distance questions and obey the strong cross-over constraint. Therefore, we assume that the empty categories used in the *wh*-questions shown earlier are variables rather than pros. In any case, it is the difference between Chinese- and English-speaking children with respect to null objects, without a corresponding difference with respect to evidence for variables in the form of *wh*-questions, that is relevant to our discussion.

4. DISCUSSION: THE PARAMETERIZED THEORY OF UG AND LINGUISTIC EVIDENCE

A review of Figures 4 through 7 indicates the following:

1. At the earliest age tested, 2 years old or an average MLU of 3.5, both Chinese and American children are using null subjects. The Chinese children are also using null objects. Although the American children do have a few sentences with null objects, the mean percentage of their sentences with null objects is only 3.57, so we count these as errors, that is, outside of the children's grammars.
2. For the Chinese children, as their MLU increases, the mean percentage of sentences with null subjects decreases, and the mean percentage of sentences with null objects increases. By the MLU level of 5.28, their subject-dropping rate is very close to that of Chinese adults, and their object-dropping rate is approaching that of the adults in the follow-up study.
3. For the American children, as their MLU increases, the mean percentage of sentences with null subjects (as well as sentences with null objects, which we are not counting as part of the children's grammar)

decreases drastically, thus also coming in line with the corresponding adult grammar.

4. At each MLU level, both mean percentages are much higher for the Chinese children than their American counterparts, although for the first MLU group (MLU level 3.5) the difference between the Chinese- and English-speaking children in their use of null subjects is not statistically significant.

How can we explain the observation that as early as 2 years old both Chinese and American children are using null arguments? It might be understandable that Chinese children do so because adult Chinese is a pro-drop language. But then why would the American children also do so, given that null arguments are not allowed in adult English? On the other hand, how can the observed differences between Chinese and American children in the null argument phenomena be explained along developmental lines?

If we adopt the idea that part of the formulation of UG is a system of parameters and that the initial setting for a particular parameter is the same for all children constrained by certain principles, then the observed phenomena can be explained. As discussed earlier in detail, the principles of UG may tell us when a null subject can occur and how it can be identified. The data we obtained support the hypothesis that English- and Chinese-speaking children at a very early age have a grammar that allows null subjects.

However, we are left with three important questions for discussion. First, how strong is the asymmetry we found comparing subject and object dropping in English compared to Chinese, and how can it be accounted for by parameter theory? Second, how does the child who begins with an incorrect parameter setting make the change to the adult grammar? Third, how does the linguistic environment make an impact on this parameter resetting?

4.1 On the Subject/Object Asymmetry

Our data did not confirm Jaeggli and Hyams's (1988; Hyams 1991) hypothesis with respect to null objects. Instead, our data indicate that whereas the Chinese-speaking children used null objects from as early as 2 years old (the youngest age tested), the English-speaking children by and large did not use null objects. This returns us to the potential problem with Jaeggli and Hyams's account discussed previously. If English-speaking children have a Chinese-type language as their initial parameter setting, then we would expect children learning both languages to progress similarly in terms of the use of null objects. However, this was not the case.

We do not think that the null subject/null object asymmetry we found in Chinese- and English-speaking children's use of null objects can be accounted for by the nonexistence of variables in early grammar. Both the Chinese- and the English-speaking children provided evidence for the emergence of variables. According to Jaeggli and Hyams's (1988; Hyams 1991) hypothesis, the English-speaking children in this situation should use null objects at least as productively as the Chinese-speaking children do, but our data show that they do not. The small percentage (3.57) is really within the error range. If the English-speaking children have reset their Null Argument Parameter at this point, they should have stopped using both null subjects and objects. Our data show that this is not the case: They continued to use null subjects but essentially no null objects even though they had acquired variables. At the same time, the Chinese-speaking children (who showed the same kind of evidence of variables) did use null objects productively.

As an alternative to Jaeggli and Hyams's hypothesis, we propose that there is more than a single parameter controlling the use of null arguments (following Lillo-Martin (1986; 1991)). One parameter, which can be called the Discourse-Oriented Parameter (DOP) (following Huang (1984)), permits languages with discourse-oriented properties to have both null subjects and null objects. These null arguments can be one of two types. Most are variables identified by a Discourse Topic. In embedded subject position, there is also the option of pro, identified by a c-commanding NP. These null arguments correspond straightforwardly to two of the identification options proposed by Jaeggli and Safir (1989), given in (11b, c). For learnability reasons, assuming parameter setting takes place on the basis of positive evidence, we might expect that the initial setting of the DOP is [−DO]. If so, the performance of the Chinese-speaking children in our study indicates that resetting of the DOP to [+Discourse Oriented] can take place early. As other characteristics of discourse-oriented languages, such as topic-comment structures and discourse-bound anaphors, can serve as evidence for determining this parameter setting, it is reasonable to assume that the Chinese-speaking children have made this setting and produce null subjects and null objects in accordance with this grammatical option.

The second part of our proposal is that null arguments in adult languages such as Italian are due to a separate parameter, which we call the Null Pronoun Parameter. This parameter permits null arguments when licensed by certain Case-assigning maximal categories, following Rizzi (1986). These null arguments are empty categories of the type pro, identified by the person, number, and/or gender features of the licensing category. Although subject–verb agreement is insufficient to license or identify null subjects in adult English, we take it that English-speaking children who use null subjects are doing so because of this parameter, rather than the DOP. The

subject–object asymmetry is related to the cross-linguistic observation that object agreement is much less common than subject agreement; hence, pro null objects are found in far fewer languages than pro null subjects. Children will universally posit an Infl category with the potential of being a licenser for empty subjects but not for empty objects. Hence, universally children will begin with a null subject hypothesis. Changing the parameter setting to disallow null subjects will thus only take place after morphological agreement has been analyzed.

Other proposals have been made arguing that the null subject phenomenon in early English is due to performance factors rather than a grammatical parameter setting (e.g., Bloom (1990), Gerken (1990), Mazuka, Lust, Wakayama, and Snyder (1986), Valian (1991)). These suggestions are worth considering, as processing limitations are quite likely to play a role in early language development and may well contribute to the prevalence of sentences with missing subjects in early grammars. However, there is considerable cross-linguistic evidence to take the early null subject phenomenon as representing a grammatical stage. Performance accounts of the early null subject phenomenon do not make the same cross-linguistic predictions that grammatical accounts do. Specifically, the grammatical account makes the prediction that cross-linguistically, it will be subjects that children's early sentences are missing. The performance accounts lack a motivation for the special status of subjects in languages with different typologies. More cross-linguistic work can contribute to the resolution of this debate, but the data currently available support the grammatical account. For reviews of performance versus grammatical accounts, see Hyams and Wexler (1991) and Lillo-Martin (1991).

4.2 Parameter Resetting

The evidence is quite strong that both Chinese- and English-speaking children have a grammar that allows null subjects at an early age, because they were both using null subjects even at the age of 2 (examples 12a, b and 13a, b). For the Chinese children, because the adult language allows null arguments, no change will have to be made in their parameter setting. However, for the English-speaking children, a parameter will have to be reset on the basis of evidence for [−pro-drop] from the linguistic environment. Our data show that roughly between the ages of 2 and 3, or MLU 3.5 to MLU 4.5, a drastic change has taken place in the English-speaking child's grammatical development. That is, during this transition the English-speaking children showed a dramatic decline in the production of null subjects. It seems to be at this point that the parameter resetting has taken place.

How does this resetting occur? It is possible that the presence of overt

expletives can be used as evidence that English is [−pro-drop], as discussed earlier. However, there are now some cross-linguistic data that indicate that the perfect correlation between overt expletives and [−pro-drop] needed for this kind of evidence does not exist (see Jaeggli and Hyams (1988), Hyams (1991)). Even if this positive evidence is unavailable, however, it is possible that indirect negative evidence can be used, as suggested, for example, by Lasnik (1989). For the English-speaking children, because the initial setting is also [+pro-drop], they would, like the Chinese children, expect to hear sentences with null subjects. When they fail to hear sentences with null subjects in English, this will then be taken as indirect negative evidence that such sentences are not allowed in the language and are, hence, ungrammatical. The incorrect positive parameter will then be replaced by the correct negative setting [−pro-drop].

Note that our data do agree with some empirical data existing in the literature, which together may be taken as evidence for certain a priori, language-independent properties of early grammar hard-wired by parameters of UG. For instance, with our Chinese child subjects at MLU level 3.5, 20% of the transitive verb constructions were produced with null objects, which is very close to the 17% of the similar constructions obtained in Japanese children (Mazuka et al. (1986)). Further, the dramatic decrease in the mean percentage of sentences with null subjects observed in our American children between age 2 and 3 is consistent with Hyams's (1991) proposal of an inverse relationship between null subjects and the use of inflectional morphology. These studies all point to an initial [+pro-drop] setting, with resetting to [−pro-drop] for English-speaking children during the third year.

It is important to note, however, that Valian (1991) reported findings that appear not to be in agreement with ours. She found a lower percentage of null subject use overall than we did, in a study with 2-year-old English-speaking children. Her youngest, lowest MLU group (her Group I) produced sentences with verbs but without subjects an average of 31% of the time; however, her older 2-year-olds dropped subjects only 5-11% of the time. Although the results from Valian's Group I are comparable to our 25% average subject drop in the 2-year-old group, our subjects fit in age and MLU with Valian's older subjects. Valian's data summarized here, and additional findings including data showing differences between English- and Italian-speaking children, led her to conclude that young English-speaking children do not have grammars that sanction pro, but rather that subjects are missing for performance reasons.

We would like to point out a difference between Valian's study and ours that may contribute to the different results. There is a major distinction between the studies in methodology: Valian used spontaneous production data, whereas we elicited connected discourse. Connected discourse is more conducive to null subject use in general, because the referent of a null or

pronominal subject can be more easily determined from the context. Hence, it is possible that the 2-year-olds in our study, although older and at more advanced MLUs than Valian's Group I, used null subjects more frequently than her subjects did because of the situations in which the language samples were collected.

We would also like to point out briefly some theoretical differences between our study and the pro hypothesis that Valian argues against. Some of the data that supported Valian's position are related to an earlier theoretical analysis of the null subject phenomenon than the analysis we are considering (i.e., Hyams's (1986) analysis differs considerably from her (1991) analysis). Under the new hypothesis, children's use of modals, for example, do not bear on the null subject hypothesis. Finally, we take the differences that Valian found between English- and Italian-speaking children as not necessarily reflecting grammatical differences, but perhaps pragmatic ones. We consider it necessary to establish null arguments on the basis of a minimum percent usage, but differences in frequency of use beyond that minimum should reflect extrasyntactic devices.

In sum, we find Valian's study interesting and informative for its careful presentation of a range of data potentially relevant to the hypothesis that young children have grammars that sanction pro, and her arguments should be considered seriously. However, we are not convinced that the pro hypothesis is undermined, and we are ourselves unconvinced by the performance account to which Valian appeals.

4.3 Effects of Linguistic Environment

What role does the linguistic environment play in this parameter-setting account of language development? Clearly, only data from the linguistic environment can trigger the resetting of a parameter, such as is needed for English-speaking children. However, the interaction between the child's initial setting of this Null Subject Parameter and the input of the child's linguistic environment seems to make itself felt even earlier and in more subtle ways than parameter resetting. Even the 2-year-olds we tested displayed a noticeable difference in the null subject/null object phenomena between the two testing populations. First of all, only the Chinese-speaking children used null objects to any extent. This, as we suggested, can be due to a different parameter than the one used for null subjects by English-speaking children, one that could possibly be set on the basis of entirely independent data.

A more extensive consideration of the role of the linguistic environment is called for if we take into account the proportions of null arguments used across the different age ranges in Chinese and English. Although the English-speaking children used null subjects frequently, they still used them

less frequently than the Chinese children. In the case of null objects, we have suggested that the difference between English- and Chinese-speaking children is a difference related to their grammars: The Chinese-speaking children's grammars allow null objects, whereas the English-speaking children's grammars do not. However, we do not make the claim that the difference in the use of null subjects is a grammatical difference. This seems to be a prime example of an area where the force of the linguistic environment is felt. Furthermore, as they develop, the use of null arguments by the Chinese-speaking children approaches that of the adult subjects. For example, the Chinese adults produced sentences in which the null argument is interpreted by virtue of a discourse topic established several sentences earlier, as in (22). The youngest children did not exhibit this kind of long-distance topic chaining. The factors that control the pragmatically acceptable use of null arguments (as opposed to their general grammaticality) will need to be learned by Chinese-speaking children, independent from the setting of grammatical parameters. This will be directly related to the linguistic environment.[8]

5.   CONCLUSION

In general, this study has shown some support for the hypothesis that English-speaking children begin speaking a [+pro-drop] language. The specific hypothesis of Jaeggli and Hyams (1988), that early English is a Chinese-type language, received mixed support. Support in favor of Jaeggli and Hyams's proposal may be seen through the following points:

1. As early as 2 years old, which was the earliest age tested, the English-speaking children produced sentences with null subjects at 25.89% (adjusted).
2. The English-speaking children did display an asymmetry in the use of null subjects, compared to their very low incidence of null objects.

However, these data also throw Jaeggli and Hyams's (1988) theory into a dilemma. They used Roeper's (1986) proposal for the later development of variables in order to account for the proposed null subject/null object asymmetry. Our result shows that apart from the low level of null object

---

[8]An interesting comparison can be made with the acquisition of German. Weissenborn (1991) claimed that adult German is like Chinese in allowing null arguments identified by discourse topics, but he said that the occurrence of null arguments in German is more restricted than in Chinese, according to pragmatic factors. As he pointed out, German-speaking children will then need to learn those pragmatic factors that allow for null arguments in German on the basis of more linguistic experience than that that allows the Discourse-Oriented Parameter to be set. Weissenborn indicated that the development of the correct use of null arguments in German takes some time.

errors, the English-speaking children did not show evidence of a grammar that allows null objects, consistent with Jaeggli and Hyams's analysis. However, we found this even after the children had developed variables (as indicated by production of *wh*-questions). According to Jaeggli and Hyams, the English-speaking children should have displayed null objects when they developed variables, or else they should have changed the setting on the Null Argument Parameter by this time and displayed no null subjects. But our data show that they did use null subjects at this stage. Furthermore, the English-speaking children were different from the Chinese-speaking children, in that the latter used both null subjects and null objects during the time we tested them. These observations provide counterevidence to the Jaeggli and Hyams proposal.

This study also shows that although it is important to have theory guide research in the field of language acquisition, it is likely that the data will show where the predictions of the theory are in error or where the theory needs refinement. Even if the parameter theory generally holds, it still could be true that the process of resetting might be slower for some parameters than others; in other words, in some aspects of the use of null subjects, the restructuring can be gradual and take a longer time than was previously thought. The results of this study also suggest that the linguistic environment or linguistic input shapes the child's grammar from a very early stage, for example, as seen in the early cross-language differences in use of both null subjects and null objects.

ACKNOWLEDGMENTS

REFERENCES

Institute of Linguistics, Chinese Academy of Sciences (1973) *Modern Chinese Dictionary*, The Commercial Publishing House, Beijing, People's Republic of China.

Bloom, P. (1990) "Subjectless Sentences in Child Language," *Linguistic Inquiry* 21, 419–504.

Brown, R. (1973) *A First Language: The Early Stages,* Harvard University Press, Cambridge, Massachusetts.

Clahsen, H. (1990/91) "Constraints on Parameter Setting: A Grammatical Analysis of Some Acquisition Stages in German Child Language," *Language Acquisition* 1, 361–391.

Gerken, L. (1990) "A Metrical Account of Children's Subjectless Sentences," in J. Carter, R. Dechaine, B. Philip, and T. Sherer, eds., *Proceedings of NELS 20, Volume 1,* Graduate Linguistic Student Association, Amherst, Massachusetts.

Huang, C. T. J. (1982) *Logical Relations in Chinese and the Theory of Grammar,* Doctoral dissertation, Massachusetts Institute of Technology, Cambridge.

Huang, C. T. J. (1984) "On the Distribution and Reference of Empty Pronouns," *Linguistic Inquiry* 15, 531–574.

Huang, C. T. J. (1989) "Pro-drop in Chinese: A Generalized Control Theory," in O. Jaeggli and K. Safir, eds., *The Null Subject Parameter,* Kluwer, Dordrecht.

Hyams, N. (1983) "The Pro-drop Parameter in Child Grammars," in *Proceedings of the West Coast Conference on Formal Linguistics* 2, 126–139.

Hyams, N. (1986) *Language Acquisition and the Theory of Parameters,* Kluwer, Dordrecht.

Hyams, N. (1989) "The Null Subject Parameter in Language Acquisition," in O. Jaeggli and K. Safir, eds., *The Null Subject Parameter,* Kluwer, Dordrecht.

Hyams, N. (1991) "A Reanalysis of Null Subjects in Child Language," in J. Weissenborn, H. Goodluck, and T. Roeper, eds., *Theoretical Issues in Language Acquisition,* Lawrence Erlbaum Associates, Inc., Hillsdale, New Jersey.

Hyams, N. and K. Wexler (1991) "On the Grammatical Basis of Null Subjects in Child Language," ms., University of California, Los Angeles, and Massachusetts Institute of Technology, Cambridge.

Jaeggli, O. and N. Hyams (1988) "Morphological Uniformity and the Setting of the Null Subject Parameter," in J. Blevins and J. Carter, eds., *Proceedings of NELS 18, Volume 1,* Graduate Linguistic Student Association, Amherst, Massachusetts.

Jaeggli, O. and K. Safir (1989) "The Null Subject Parameter and Parametric Theory," in O. Jaeggli and K. Safir, eds., *The Null Subject Parameter,* Kluwer, Dordrecht.

Lasnik, H. (1989) "On Certain Substitutes for Negative Data," in R. Matthews and W. Demopoulos, eds., *Learnability and Linguistic Theory,* Kluwer, Dordrecht.

Lillo-Martin, D. (1986) *Parameter Setting: Evidence from Use, Acquisition, and Breakdown in American Sign Language,* Doctoral dissertation, University of California, San Diego.

Lillo-Martin, D. (1987) "Parameter Setting in the Acquisition of American Sign Language," paper presented at the Boston University Conference on Language Development, Boston.

Lillo-Martin, D. (1991) *Universal Grammar and American Sign Language: Setting the Null Argument Parameters,* Kluwer, Dordrecht.

Mazuka, R., B. Lust, T. Wakayama, and W. Snyder (1986) "Distinguishing Effects of Parameters in Early Syntax Acquisition: A Cross-linguistic Study of Japanese and English," *Papers and Reports on Child Language Development* 25, 73–82.

McCloskey, J. and K. Hale (1984) "The Syntax of Person–Number Inflection in Modern Irish," *Natural Language and Linguistic Theory* 1, 487–533.

McDaniel, D. and C. McKee (1992) "Which Children Did They Show Obey Strong Cross-over?" in H. Goodluck and M. Rochemont, eds., *Island Constraints,* Kluwer, Dordrecht.

Pierce, A. (1987) "Null Subjects in the Acquisition of French," paper presented at the Boston University Conference on Language Development, Boston.

Rizzi, L. (1982) *Issues in Italian Syntax,* Foris, Dordrecht.

Rizzi, L. (1986) "Null Objects in Italian and the Theory of *pro*," *Linguistic Inquiry* 17, 501–557.

Roeper, T. W. (1986) "How Children Acquire Bound Variables," in B. Lust, ed., *Studies in the Acquisition of Anaphora: Vol. I,* Kluwer, Dordrecht.

Roeper, T., M. Rooth, L. Mallis, and S. Akiyama (1984) "The Problem of Empty Categories

and Bound Variables in Language Acquisition," ms., University of Massachusetts, Amherst.

Sarma, J. (1991) *The Acquisition of* Wh-*Questions in English,* Doctoral dissertation, University of Connecticut, Storrs.

Thornton, R. (1990) *Adventures in Long-Distance Moving,* Doctoral dissertation, University of Connecticut, Storrs.

Valian, V. (1991) "Syntactic Subjects in the Early Speech of American and Italian Children," *Cognition* 40, 21–81.

Weissenborn, J. (1991) "Null Subjects in Early Grammars: Implications for Parameter Setting Theory," in J. Weissenborn, H. Goodluck, and T. Roeper, eds., *Theoretical Issues in Language Acquisition,* Lawrence Erlbaum Associates, Inc., Hillsdale, New Jersey.

APPENDIX A
Child Subjects

Subject	Language	Age	Sex	MLU	Subject Drop	Object Drop	Adjusted Subject Drop
ZY	Chinese	2;0	F	2.41	48.103	15.952	
AN	Chinese	2;3	M	3.60	62.144	21.335	
WW	Chinese	2;5	F	4.23	56.937	23.077	
HE	Chinese	3;1	F	4.44	58.669	24.159	
LX	Chinese	3;4	M	4.27	44.532	12.827	
ZZ	Chinese	3;5	F	4.52	33.750	27.143	
SK	Chinese	4;1	M	5.04	45.439	22.479	
ML	Chinese	4;3	M	4.83	40.756	29.365	
YD	Chinese	4;4	M	5.98	28.572	26.250	
AR	English	2;5	M	2.69	58.636	8.333	51.177
SR	English	2;8	F	4.10	27.922	9.091	17.388
DS	English	2;10	F	3.74	17.156	7.500	9.091
EL	English	3;6	F	4.58	11.395	3.125	3.949
ER	English	3;8	M	4.80	25.981	5.179	5.390
DR	English	3;9	F	4.65	14.063	0.000	4.087
SP	English	4;2	F	4.49	59.524	0.000	18.831
SM	English	4;4	M	3.84	45.834	0.000	4.167
PT	English	4;5	M	4.51	37.436	0.000	17.179

APPENDIX B
Results From Adult Subjects

Subject	Subject Drop	Object Drop
BM	33.670	6.719
BX	39.136	22.028
ET	43.363	10.417
LM	32.834	10.976
LP	25.322	8.495
QG	26.423	7.143
QQ	40.94	11.334
WC	40.298	8.929
YL	43.177	6.667

APPENDIX C
Results From Child Subjects

Mean Percentages of Sentences With Null Subjects and With Null Objects

Subject	Subject Drop	(s.e.)	Object Drop	(s.e.)
CC	46.543	3.776	22.533	1.761
AC	33.105	6.120	3.572	1.313
AAC	14.584	5.025		
CA	36.129	2.296	8.387	2.123

Note. CC = Chinese Children; AC = American Children; AAC = Adjusted American Children; CA = Chinese Adults.

Testing Results Arranged According to Chronological Age

Subject	Age	MLU	Subject Drop (s.e.)		Adjusted SD (s.e.)		Object Drop (s.e.)	
CC	2	3.41	55.728	4.098			20.192	2.165
CC	3	4.41	45.650	7.215			21.376	4.361
CC	4	5.28	38.252	5.026			26.031	1.991
AC	2	3.51	34.571	12.427	25.885	12.871	8.308	0.459
AC	3	4.65	17.146	4.484	4.475	0.459	2.948	1.653
AC	4	4.28	47.597	6.437	13.392	4.637	0	0

Note. CC = Chinese Children; AC = American Children.

Testing Results Arranged According to MLU

Subject	Age	MLU	Subject Drop (s.e.)		Adjusted SD (s.e.)		Object Drop (s.e.)	
CC	2	3.41	55.728	4.098			20.192	2.165
CC	3	4.41	45.650	7.521			21.376	4.361
CC	4	5.28	38.252	5.026			26.031	1.991
AC	2	3.51	34.571	12.427	25.885	12.871	8.308	0.459
AC	3,4	4.48	32.372	7.660	8.933	2.884	1.474	0.991

Note. CC = Chinese Children; AC = American Children.

APPENDIX D

The Follow-Up Study with Chinese Adults

Subject	Total No. of Sentences	No. of Sentences With Transitive Verbs	% Subject Drop	% Object Drop
HD	295	176	41.36	38.07
HH	264	132	47.73	43.94
LQ	288	97	38.54	35.05
SL	316	122	49.68	39.34
TJ	344	167	50.87	44.31