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THE PRO-DROP PARAMETER IN CHILD GRAMMARS

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0. Sentences like those in (1) are characteristic of the speech of young children acquiring English.

- | | | |
|-----------------------|---------------------------------|------------------------------------------|
| (1) a. Read bear book | b. Kathryn read this | (K II) |
| Want go get it | I want take this off | (K III) |
| Ride truck | Gia ride bike | (G III) |
| Bring Jeffrey book | You read this book | (G V) |
| Want look a man | I want kiss it | (E V) |
| See under there | My finger got stuck
in there | (E V) ¹ |
| | | |
| c. Outside cold | (K I) | ('It's cold outside') |
| No morning | (G III) | ('It's not morning') |
| No more cookies | (G V) | ('There are no more cookies') |
| Is toys in there | (G V) | ('There are toys in there') ² |

In the examples in (1a) the subject, though phonologically unspecified, has a definite reference which can be readily inferred from context. One such situation is given in (2).

- (2) (Eric has just eaten an apple)
Mother: You ate the apple all up
(Eric starts to cry and hits the toys)
Eric: Want more apple

The sentences in (1a) co-occur with those in (1b), which contain a lexical subject, and thus the missing subjects in (1a) cannot be attributed to a performance constraint on sentence length. During the same period of development, which may last up to five or six months, expletive elements like *it* and *there* are absent. This is exemplified in (1c). Finally, this same period is characterized by a notable lack of verbal auxiliaries, in particular, the modals.

In analyzing this acquisition data, I adopt the developmental model schematized in (3), where G_0 is Universal Grammar; G_1 through G_n are the intermediate grammars; and G_s is the endpoint of acquisition - the adult grammar.

- (3) $G_0, G_1, \dots, G_n, G_s$

As implied by the diagram in (3), I assume that child grammars, ie. the intermediate grammars, are constrained by the same principles which constrain all human grammars - principles of UG. I further assume, following Chomsky (1981) and references cited therein, that UG is a parameterized system; that is, it contains a set of universal principles, each of which has associated with it a set of values which express the narrow range within which languages may vary with respect to each principle. Parameter Theory thus makes a prediction about the developing grammars represented in (3), namely, that during the course of development the intermediate grammars, of English, for example, may differ from the adult grammar with respect to the value chosen by a particular parameter provided that each chosen value is within the permitted range. In this paper I will explore one such instance of "dissonance" (Klein, 1982) between an early grammar of English and the adult grammar.

The acquisition data presented earlier bring to mind three questions. First, why do these properties - the optionality of lexical subjects, the absence of modals, and the absence of expletive elements - cluster together during the same period of development. Second, how is the grammar of this period, let us call it G_1 , different from the adult grammar of English; and third, what accounts for the restructuring from G_1 to the adult grammar of English. The goal of this paper is to provide an answer to these three questions.

1.0 The Pro-Drop Phenomenon

As a point of departure, we should note that some of the properties exhibited in the acquisition data also show up in adult languages, specifically, in pro-drop languages like Spanish and Italian. These languages allow phonologically null subjects as in (4).

- | | |
|-------------------------------|-----------|
| (4) a. Mangia come una bestia | (Italian) |
| b. Come como una bestia | (Spanish) |
| 'Eats like a beast' | |

The null subject of the sentences in (4) has a definite pronominal interpretation, and thus the sentence in (4a), for example, is grammatically equivalent to the sentence in (5).

- (5) Lui mangia come una bestia
'He eats like a beast'

Similarly, in Spanish and Italian the expletive element equivalent to English it is phonologically null, as in (6).

- (6) a. Sembra che Gianni sia matto
'Seems that John is crazy'
b. Piove oggi
'Rains today'

"Early" English thus resembles a pro-drop language in three respects. First, lexical subjects are optional; second, the subject has definite reference even when phonologically null, and third, lexical expletives are absent.

With regard to the auxiliaries and modals, the situation is more complex. Early English lacks modals and auxiliaries. Italian has these elements, but they do not freely appear under AUX. There is considerable evidence that the Italian aspectual auxiliaries, avere (have) and essere (be), are generated in the VP³ with the verbal participle. The modals dovere (must) and potere (can), in contrast, exhibit the morphological and syntactic properties of main verbs. Rizzi (1977) and Burzio (1981) analyze potere and dovere as raising verbs. On their analyses sentences containing modals have the structure in (7).

- (7) Gianni_i deve [_S [_{NP} (e_i) partire]]
'Gianni must leave'

That the auxiliaries and modals in Italian may not, in general, appear under AUX is demonstrated by the fact that these elements may not undergo Subject-AUX inversion in tensed sentences.

- (8) a. *Ha Gianni mangiato
'Has John eaten'
b. *Deve Gianni partire
'Must John leave'

In the analysis that follows I will argue that the impossibility of having tensed auxiliary elements in AUX is closely related to the pro-drop phenomenon illustrated in (4). The parameter which I propose, the AG/PRO parameter, will provide the framework within which to analyze the acquisition data presented

earlier.

2.0 The AG/PRO Parameter

The following analysis falls largely within the framework of the Government Binding Theory (Chomsky, 1981 and references cited therein). In particular, I assume the Extended Projection Principle, which requires (among other things) that all clauses have subjects. Thus the expansion of S is as in (9).

- (9) S → NP INFL VP

I further assume that INFL has the structure in (10).

- (10)
$$\begin{array}{c} \text{INFL} \\ \swarrow \quad \searrow \\ \text{(AG)} \quad \text{AUX} \end{array}$$

AG is a collection of features for person, number and gender associated with the subject. As proposed in the Standard Theory (Chomsky, 1965), I assume that the Tense features are generated in AUX. Where INFL is [+tense], we also have AG. The AG features and the tense features may or may not be morphologically realized on the verb, depending on essentially idiosyncratic properties of particular languages. I further assume, again within the spirit of the Standard Theory, that the modals in English are base-generated in AUX. Have and be may be raised into AUX from their base position in the VP (Emonds, 1976). This 'verb raising' is optional. Where AUX contains lexical material, INFL may undergo inversion to yield sentences like those in (11).

- (11) a. Can you give me a hand
b. Are you happy

Following Safir & Pesetsky (1981), I take this inversion to be an instance of 'Move α ' which adjoins INFL to sentence initial position. Where AUX is not lexically specified, that is, where INFL contains only tense and/or AG features 'Move INFL' is blocked. In the latter case the featural affixes would not be adjacent to verbal material onto which they may hop. Thus the PF filter in (12) will rule out the structure in (13).

- (12) * X + Af + Y where X = Y = \emptyset

- (13) * $\left\{ \begin{array}{l} \text{[AG] [+tense]} \\ \text{INFL} \end{array} \right\} \left[\begin{array}{l} \text{John [e] eat} \\ \text{S} \end{array} \right]$

Recall that the two properties of pro-drop languages which are of concern here are the possibility of phonologically null subjects, illustrated in (4), and the impossibility of auxiliary elements in AUX, exemplified by the ungrammaticality of the inverted structures in (8).

Regarding the pro-drop phenomenon, Rizzi (1982) argues that the variation with respect to whether the subject must be phonologically realized can be explained by assuming that INFL in pro-drop languages is pronominal. Following in the spirit of Rizzi's proposal, I will argue that AG in pro-drop languages is PRO, the element typically found in subject position of embedded infinitivals, as in (14).

- (14) a. I tried [PRO to go]
 b. I persuaded Bill [PRO to leave]
 c. It is unclear who [PRO to visit]

Where AG = PRO, it licenses an empty category in subject position of tensed clauses and allows for the definite pronominal reading associated with that position, as in Italian. Where AG \neq PRO, as in English, null subjects are impossible. These two situations are schematically represented in (15).

- (15) a. [ec] [AG/PRO] VP⁴ (Italian)
 b. *[ec] [AG] VP (English)

If AG is identified as PRO (in pro-drop languages) we expect it to exhibit the essential properties of PRO. The relevant properties are given in (16).

- (16) (From Chomsky, 1981)
 a. PRO may be controlled (as in (14a,b))
 b. PRO may be arbitrary in reference (as in (14c))
 c. PRO must be ungoverned

In Hyams (in preparation) I show that AG in pro-drop languages exhibits each of the properties of PRO listed in (16). In this paper I limit my attention to (16c) since this is most directly relevant to the acquisition analysis. The definition of

government which I assume (adopted from Aoun & Sportiche, 1981) is given in (17).

- (17) A head governs within its maximal projection

I will further assume that where AUX is lexically specified, ie. contains a modal or auxiliary, it heads INFL and thus counts as a governor.

The AG/PRO analysis may now account straightforwardly for the impossibility of auxiliary elements in AUX in pro-drop languages. Given the structure of INFL, presented in (10), if a modal or auxiliary is inserted or raised into AUX, AG/PRO will be governed in violation of (16c). Moreover, because lexical material cannot appear in AUX, 'Move INFL' is blocked; hence the ungrammaticality of the inverted Italian sentences in (8). The AG/PRO hypothesis makes a precise prediction, namely, that where INFL does not contain AG, as in tenseless clauses, we should find auxiliaries in AUX and hence inversion. This is precisely the situation in Italian. In the sentences in (18), taken from Rizzi (1982), an INFL containing a gerundive or infinitival auxiliary has been inverted.⁵

- (18) a. Avendo Maria accettato di aiutarci, potremo risolvere il problema
 'Having Maria accepted to help us, we can resolve the problem'
 b. Gianni sostiene non essere lui in grado di aiutarci
 'Gianni maintains not to be him able to help us'
 c. Dovendo tuo fratello tornare a casa, non possiamo allontanarci molto
 'Having (=musting) your brother to return home, we can't go very far'

Thus Italian tenseless clauses pattern like English tensed clauses precisely because AG/PRO is absent in both instances. Note that the above analysis allows us to maintain a system in which 'Move INFL' applies freely in both languages just in case AUX is lexically specified and thereby able to escape the PF filter given in (12). Finally, the inversion patterns support the hypothesis that AG is PRO in pro-drop languages.

3.0 G₁

Returning now to the acquisition data presented in (1), recall that lexical subjects are optional, and the subject, where null, has definite reference. Both of these properties follow immediately if the grammar of this period of development is a grammar in which AG = PRO. Given that these null subject sentences occur very early in the acquisition process, we may assume that AG/PRO is the initial (ie. unmarked) value⁶ for this parameter, which must be later altered on the basis of 'positive' linguistic evidence. I return to this shortly.

The AG/PRO hypothesis makes the further prediction that the modals and auxiliaries will appear in AUX (where they may undergo inversion) only after the grammar has shifted such that AG no longer equals PRO, as in the adult grammar of English. Where AG ≠ PRO, null subjects are impossible and modals may be freely inserted into AUX. Close inspection of the acquisition data reveals, in fact, that the modals (and be) first appear⁷ (in declaratives, negatives, and interrogatives) a short time after the point at which the child consistently uses lexical subjects, ie. the point of grammar shift. In (19) I have indicated the point of shift for the children whose utterances are given in (1).

(19) AG ≠ PRO

Eric VI (26 mos.)

Gia VI (26 mos.)

Kathryn IV (24 mos.)⁸

The emergence of modals in AUX (evidenced by Subject AUX inversion) alongside a regular and productive use of lexical subjects is predicted by the AG/PRO hypothesis. The question which remains, however, is why are the modals entirely absent prior to the shift away from G₁, ie. away from a grammar in which AG = PRO. We can approach this question by considering the options available to the child in assigning a structural description to a sentence like 'John must leave'. By hypothesis, he may not analyze the modal as appearing in AUX or AG/PRO would be governed. The AG/PRO parameter, however, does not preclude an analysis in which the modal is a main verb. A main verb analysis of modals is clearly an option made available by UG, as evidenced by the grammar of Italian. Nothing we have said so far would prevent the child from assigning the sentence 'John must leave' the structure given in (7).

In order to do this, however, the child must be able to identify the modals as verbs.

In English, one of the crucial differences between verbs and modals is the lack of morphological marking on the latter. The modals are not inflected for either tense or aspect. Thus if the child is sensitive to the relationship that exists between particular inflectional forms and grammatical classes, it is unlikely that he will assign the modals to the category Verb. There is evidence from both naturalistic and experimental studies that children do in fact have knowledge of form-class relationships at a very early age. Brown (1973) notes that the inflectional morphemes begin to emerge during "Stage II" speech. During the early stages 'errors of omission' are frequent, that is, the child neglects to use the inflectional morphemes where obligatory. as in (20).

(20) man sit down

However, 'errors of commission' are strikingly rare even in very early speech (Maratsos, 1982). Children do not attach verbal inflection to members of other categories; nor do they treat verbs as nouns, for example. We can illustrate the point with the following example. During "Stage I" speech the progressive morpheme -ing is productive (Brown, 1973). During this stage children typically use terms like away, off, bye-bye, out to denote actions in expressions like Gia away and car bye-bye. Maratsos (1982) notes, however, that they do not produce errors like Gia awaying or car outing. Similar errors involving present or past tense inflection are virtually non-existent. The absence of form-class errors strongly suggests that children recognize which inflections belong to which grammatical classes. There is also experimental evidence (Slobin, 1982) that children make use of inflectional morphology in uncovering underlying grammatical relations.

In acquiring the lexicon of his language the child must learn, among other things, the grammatical category to which each word belongs. If morphological markings are criterial in determining grammatical category, as seems natural, the modals will not be analyzed as verbs. Thus both of the analyses which are in principle available to the child in analyzing the modals are in fact excluded. The modal may not appear in AUX because AG = PRO in G₁. Similarly, the morphological properties of modals (or lack thereof) prevent them from being analyzed as main verbs. The modals may only emerge when they may be generated in AUX, ie. following the shift away from G₁. Prior to

this point they are, in effect, "filtered out" by the early grammar. This suggests that at least one of the factors responsible for the child's "selective attention" to data (Newport, Gleitman & Gleitman, 1977) is purely grammatical. The child ignores those data which are unanalyzable by the current grammar.

4.0 The "Filtering Effect" of Child Grammars

The hypothesis that the early grammar "filters out" unanalyzable material implies that it will attempt to analyze as much of the input data as possible. To the extent that the early grammar is different from the adult grammar, however, various material may be analyzed differently by the two systems. The child's "misanalysis" represents the only possible analysis given the shape of his grammar, and thus offers unique insight into the properties of the early system.

It is well-known that prior to the emergence of the modals (in declaratives, interrogatives, and uncontracted negatives, eg. cannot) we find the negative elements can't and don't (Bellugi, 1967). During this same period (Bellugi's Stage B) we also find the semi-auxiliaries have to and going to (hafta, gonna). With regard to can't and don't, Bellugi argues that they are not at this point members of AUX. Rather, they are lexical variants of the category NEG, and therefore have a shared distribution with two other negative elements no and not. Following are some examples of negative sentences which occur during Bellugi's Stage B (prior to the appearance of modals).

(21) That no blast off

He not bite you

I can't wear it

Can't reach it⁹

He don't want some money

Don't break it (non-imperative)

Bellugi argues that the negative elements are generated in preverbal position by a PS rule of the following form.

(22) S \longrightarrow NP NEG VP¹⁰

Although Bellugi's account provides an adequate description of the rather limited distribution of can't and don't, and the fact that they only occur in a contracted form, we have no explanation for the "precocious" appearance of these two elements. On

the analysis proposed in this paper the emergence of can't and don't prior to the full range of auxiliaries is entirely predicted. The early grammar attempts to analyze as much of the input data as possible. It will not allow for lexical material in AUX; hence, the absence of the non-negative counterparts of can't and don't, and the non-contracted forms, eg. do, do not. Can't and don't however, which are marked as negatives (n't) and are presumably understood as having negative intent, can be analyzed as simple negative elements, as Bellugi argues. In other words, there is an analysis of can't and don't which does not involve assigning them to the category AUX - a possibility which is excluded by AG/PRO.

A similar situation arises in connection with the semi-auxiliaries, which, as we have noted, emerge significantly earlier than the (semantically equivalent) modals. Unlike the modals, the semi-auxiliaries have to and going to do have verbal inflection. The verb have receives tense inflection, while going is marked for progressive aspect. There is therefore nothing to prevent the grammar from analyzing these elements as main verbs. We thus expect that they will emerge prior to the shift away from the grammar in which AG = PRO. In short, can't and don't, and the semi-auxiliaries are not filtered out by the grammar because there is an analysis of these elements which is not inconsistent with G₁.

5.0 The Restructuring of G₁

I have argued that the early grammar of English is distinct from the adult grammar with respect to the value it chooses for a particular parameter. The final point I wish to address concerns the data which will induce a restructuring from G₁ to the adult grammar.

Recall that in Italian and Spanish, the expletive element, the counterpart to English it, is null. This is illustrated in the sentences in (6). The null expletive in these languages is licensed by AG/PRO. Additionally, in Spanish and Italian lexical pronouns are typically used to signal emphasis, contrast, new information, etc. In short, the appearance of a pronominal subject in a token utterance is governed by functional considerations. In particular, pronouns are subject to the 'Avoid Pronoun Principle' (Chomsky, 1981) which states 'Avoid a lexical pronoun where possible.' 'Where possible' means where the lexical pronoun is neither required for grammatical or pragmatic reasons. Expletive elements, which are by definition void of semantic content, cannot be used for any of the functions

reasons listed above. Thus, in a grammar in which AG = PRO, lexical expletives will always be avoided. In English, of course, this is impossible. Expletive it is required irrespective of functional considerations. It is therefore possible for lexical expletives to act as a "trigger" for the restructuring of G₁.

Let us assume that the child is operating under the Avoid Pronoun Principle. In other words, we are assuming that this pragmatic principle is universal. When the child acquiring English becomes aware of expletive it, he knows that it is not being used for pragmatic purposes. The alternative is that it is present for strictly grammatical reasons, namely, that an empty category is impossible in subject position, and hence, that AG ≠ PRO. If expletives do trigger the restructuring from G₁ to the adult grammar, we expect that at the point at which the child begins using these elements (this is evidence that he is aware of them) he will no longer produce null subject sentences like those in (1a). This is, in fact, the case; the first occurrences of expletives occur at the point of grammar shift noted in (19). The relevant sentences are presented in (23) and should be compared to those in (1c).

- (23) No, it's not raining (G VI)
 It's not cold out
 There's no more
 There's no money

The sentences in (23) provide empirical support for the hypothesis that lexical expletives may act as a "trigger" for the restructuring of G₁.

6.0 Conclusion

The analysis proposed in this paper provides a unified account of otherwise unrelated aspects of child language. It also contributes to an explanatory theory of syntactic development insofar as the descriptive devices employed are independently motivated by the properties of adult English and Italian. Finally, the analysis strongly supports a "continuous" model (Keil, 1981) of grammatical development schematized in (3); that is, a model in which each of the intermediate grammars is constrained by principles of UG and, hence, not qualitatively different from adult grammatical systems.

FOOTNOTES

* This is a slightly revised version of the paper presented at the conference. I would like to thank Hagit Borer, Sue Foster, Osvaldo Jaeggli, Sharon Klein, David Pesetsky, and Tim Stowell for their comments.

¹ These data are from Bloom (1970) and Bloom, Lightbown & Hood (1975). The letter and number refer to the child's name and number of taping session, eg. K II is Kathryn at the second session.

² The glosses (in parentheses) are the child's intended meaning inferred, on the basis of the context in which the sentence was uttered.

³ See Hyams (in preparation) for discussion.

⁴ Although it is irrelevant for the purposes of the present discussion, I assume that the empty category in [NP, S] is pro (a pure pronominal minus a phonetic matrix (Chomsky, 1982)).

⁵ Rizzi notes that these inverted sentences are of a rather formal style, the gerunds being less informal than the infinitives. The inversion rule also applies in nominal infinitive constructions, certain adverbial infinitives, and in subjunctive clauses. The analysis proposed in the text will also account for the inversion in the two infinitival constructions; it does not, however, extend to the subjunctives.

⁶ I am assuming that the unmarked value of a parameter is, by definition, the initial value, that is, the value assumed in advance of linguistic experience (Williams, 1981).

⁷ In this paper I limit my attention to the modals. For discussion of the emergence of be, see Hyams (in preparation).

⁸ Samples of Kathryn's language beyond Time III are not reported in Bloom et al. Thus the point of shift for this child is a projection based on the fact that at Time III, her language contained many of the elements which typically precede the shift, for example, can't and don't and the semi-auxiliaries. See Section 4.0.

⁹ Note that some of these sentences (taken from Bellugi (1967) and Bloom (1970) contain null subjects, and thus, by our hypothesis, the grammar is still G₁.

¹⁰ Given that the expansion in (1) is universal, we assume that the base rule at this stage is roughly as in (i). The precise position of NEG (ie. off of S or in VP) is not of crucial importance here.

(i) S → NP INFL NEG VP

¹¹ It is important to note that given the (rough) semantic equivalence of the modals and semi-auxiliaries, the late appearance of the modals cannot be due to semantic or conceptual difficulties.

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