

# The Underspecification of Functional Categories in Early Grammar

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## 1. Introduction

Let me begin by pointing out certain parallelisms between the behavior of the I and D systems in early syntax. First, verbs often surface in root contexts without finite morphology, as illustrated in (1) (Pierce 1989; Weverink 1989; Jordens 1990; Wexler 1994). The examples given are from French (1a, b), German (1c, d), Dutch (1e-g). Wexler refers to this phenomenon as the **OPTIONAL INFINITIVE STAGE** because such examples occur alongside finite sentences.

- (1) a. *pas mangerla poupée*  
not eat-INF the doll  
'The doll doesn't eat.'  
b. *Michel dormir* (Pierce 1989)  
Michel sleep-INF  
c. *zahne putzen*  
teeth brush-INF  
'(Someone) brushes (his) teeth.'  
d. *Thorstn das haben* (Wexler 1994)  
Thorstn that have-INF  
'Thorsten has that.'  
e. *pappa schoen wassen*  
daddy shoes wash-INF  
'Daddy washes (the) shoes.'  
f. *ik ook lezen*  
I also read-INF  
'I also read.'  
(Weverink 1989; Schaeffer 1994)

The sentences in (1) suggest that the finiteness of root clauses, an obligatory property of adult languages, is optional in the child's language.

Just as the clause in early language need not be marked for temporal specificity, that is, finiteness, so nominals may remain unmarked with respect to nominal specificity. Thus, parallel to the nonfinite sentences in (1) we have the sentences in (2), which lack determiners and are also characteristic of early language.

- (2) a. *open door*  
 b. *Wayne in garden*  
 c. *Hayley draw boat* (Radford 1990)  
 d. *Niekje ook boot maken*  
 Niekje also boat make-INF  
 'Niekje also makes [ ] boat.'  
 e. *Papa heft ook trein*  
 Daddy had also train  
 'Daddy also had [ ] train.'  
 f. *mag ik weer wan blokjes toren bouwen*  
 may I again of blocks tower make  
 'May I make [ ] tower of blocks again.'  
 (Dutch, Schaeffer 1994)

There is a further parallel between the verbal and nominal domains. Both finiteness and specificity trigger head movement. Finite verbs raise to I, as in French, or to C as in V2 languages such as Dutch and German. In the grammar of this stage nonfinite verbs remain *in situ*, as in (1a), where the verb appears to the right of negation, and in (1d-f), where the nonfinite verb is in sentence final position. Similarly, in languages such as Dutch, in which specific object NPs undergo obligatory movement, a process known as SCRAMBLING, children fail to scramble determinerless nominals (Hoekstra & Jordens 1994; Schaeffer 1994). This is illustrated in the examples in (3), in which the object appears to the right of the adverb or negation, when it should appear to the left.

- (3) a. *niet neus snuiten*  
 not nose blow-INF  
 'Don't blow [ ] nose/I don't want to blow my nose.'  
 b. *vind ook huis mooi*  
 find also house beautiful  
 'I like [ ] house too.'

- c. *ikke ook kietje aai*  
 I also knee stroke  
 'I want to stroke [ ] knee, too.'  
 d. *heb jij nog niet thee opedaan*  
 have you yet not tea up-done  
 'Haven't you written down 'tea' yet.'

On an intuitive level, we might say that what finite morphology and determiners have in common is that they are 'anchor' points, that is, points at which the sentence fixes itself with respect to discourse. Tense places the event or state denoted by the verb at a time relative to the time of discourse, while definite determiners pick out FAMILIAR entities (Heim 1982), that is, discourse referents. The parallel pragmatic function of these elements suggests the intriguing possibility that the optionality of these functional elements in early speech is an effect of the pragmatic principles in early language. This is the approach we will pursue in developing an account of the facts in (1) through (3). More generally, we will outline a possible solution to the problem of why children are inconsistent in their use of certain functional elements during what we will call the OPTIONAL SPECIFICITY STAGE. We will propose, in essence, that the early grammar contains the full set of functional categories, but that the functional heads may be UNDERSPECIFIED in a sense to be made precise. Moreover, we will suggest that the difference between the early grammar and the adult grammar with respect to the option for having underspecified functional heads is a result of differences between the pragmatic system of children and that of adults. This is in contrast to the position of Lebeaux (1988), Guilfoyle & Noonan (1988), Aldridge (1988), Radford (1990) and others, who have proposed that the early grammar lacks the functional projections, D(ET), I(NFL) and C(OMP), and that the difference between the early and adult grammar is structural, hence strictly syntactic.

The structure of the paper is as follows: First, we will discuss the null subject phenomenon. We will propose that null subjects in early English are directly related to the root infinitive phenomenon, illustrated in the examples in (1), and not an independently mis-set parameter, as originally proposed in Hyams (1983, 1986). On the analysis that we will outline, both English null subjects and root infinitives are derived from the underspecification of I. We will also discuss the behavior of D in the early grammar and suggest that the optionality of determiners and object scrambling in early Dutch follows from the underspecification of D. Finally, we will relate the underspecification of I and

D to the discourse role played by these functional heads. The analysis of the null subjects is based on Sano & Hyams (1994), and my discussion of Dutch determiners and scrambling is based on Schaeffer (1994, in prep.).

To set things in context, we will begin by briefly discussing the null-subject analysis proposed in Hyams (1983, 1986), which is an instance of a more general hypothesis which we may refer to as the PARAMETER MIS-SETTING HYPOTHESIS.

## 2. Parameter Mis-setting or Fast Setting

As is well known, children optionally produce null subjects even in languages such as English, in which null subjects are not typically licensed, as in (4) (CHILDES, MacWhinney & Snow 1989; Brown 1973).

- (4) a. *drop bean*  
 b. *fix Mommy shoe*  
 c. *go-on track*

There is a fairly wide consensus at this point that the null subject phenomenon relates to properties of the developing INFL system, but it has proved difficult to specify the precise nature of the relationship. In earlier work (Hyams 1983, 1986), I argued that AGR in child grammars is initially specified as pronominal (following ideas of Luigi Rizzi (cf. Rizzi 1982) for adult *pro*-drop languages), and thereby licenses a little-*pro* subject. On this view young children speak a language with the essential properties of an adult *pro*-drop language like Italian and the early grammar of English, for example, represents a MIS-SETTING along a specific parameter of UG. Unfortunately, this view has proved untenable for both empirical and conceptual reasons. It also runs into a particular logical problem. We consider these in turn.

On the empirical end, we now know that there are significant differences in the distribution of null subjects in early English and adult *pro*-drop languages. For example, Valian (1991) has noted that in early English null subjects do not occur in embedded contexts, and sentences like that in (5a) are unattested, while sentences such as (5b) do occur in early and adult Italian, as Rizzi (1992) has shown. (@ indicates that a sentence type is unattested in early language.)

- (5) a. @*I said that \_\_\_ went home.*  
 b. *Hò detto che \_\_\_ andava a casa.*  
 'I said that \_\_\_ went home.'

There are further distributional differences between early English and adult *pro*-drop languages that we will discuss shortly and these will be essential to the account of the early null subject phenomenon which we will present below. For now, however, we simply make the point that the available empirical evidence does not support the view that English speaking children speak an adult-like *pro*-drop language.

On the conceptual end, the notion that children have a MIS-SET parameter — which remains mis-set long enough to show overt effects — is also problematic. The most striking result that has emerged from the last few years of cross-linguistic investigation into early grammars is that language particular properties show up very early in development. Consider, for example, head direction; at no point do English-speaking children assume a head-last grammar, nor do Japanese-speaking children assume a head-initial grammar. Consider also the movement parameters. There is considerable evidence that French-speaking children have verb raising to I from the earliest stages (Déprez & Pierce 1992; Pierce 1992; Meisel & Müller 1992; and Verrips & Weissenborn 1992), as shown by the examples in (6), and the contingencies in Table 1 (Table 1 is adapted from Pierce 1992).

(6) [+finite]		[-finite]	
a.	<i>elle a pas la bouche</i> she has not the mouth 'She doesn't have a mouth.'	d.	<i>pas la poupée dormir</i> not the doll sleep-INF 'The doll doesn't sleep.'
b.	<i>veux pas lolo</i> want not water '(I) don't want water.'	e.	<i>pas attrapper une fleur</i> not pick a flower '[ ] doesn't pick a flower.'
c.	<i>ça tourne pas</i> that turns not 'That doesn't turn.' (Pierce 1992)	f.	<i>pas tomber bébé</i> not fall baby 'The baby doesn't fall.'

Table 1. Finiteness vs. Position of negation in Early French\*

		[+finite]	[-finite]
neg	V	11	77
V	neg	185	2

\* p = 0001. From Pierce (1992).

The contingency table shows the position of the finite and nonfinite verbs with respect to negation. As we can see, in early French the finite verb raises across negation to I, as in the adult language and thus appears to the left of *pas*.

English-speaking children, in contrast, never assume verb raising to I for lexical verbs, and hence errors of the sort in (7a) are unattested. On the other hand, English-speaking children do raise auxiliaries to I at the point at which they begin to use auxiliaries, as is correct in English. So we also do not find errors of the sort in (7b-d). (cf. Stromswold 1990; Harris & Wexler, this volume).

- (7) a. @I dance not  
 b. @I not be/am bad  
 c. @the sun not is shining  
 d. @I not have gone

Thus, if we wish to think in terms of parameters, French- and English-speaking children fix the V-to-I parameter very quickly. Consider next German and Dutch children. Although there is some disagreement as to the position of the fronted verb in the V2 languages spoken by young children,<sup>1</sup> it is clear that children acquiring verb-second languages such as German, Dutch, and Swedish show V2 effects very early on, while English-speaking children and children acquiring the Romance languages do not. It is widely reported (cf. Meisel 1990; Clahsen & Penke 1992; Verrips & Weissenborn 1992; Meisel & Müller 1992; Poeppel & Wexler 1993) that German children place the finite verbs in second position, while leaving the nonfinite verb in sentence-final position. De Haan & Tuijnman (1988) and Jordens (1990) report similar findings for Dutch, and Platzack (1992) for Swedish.<sup>2</sup> Table 2 shows the finiteness/verb-position contingency for the one child studied by Poeppel & Wexler (1993). (Cf. also Clahsen & Penke 1992, who report quantitative data on another child, Simone.)

Table 2. Finiteness vs. Verb Position in Early German\*

	[+finite]	[-finite]
V2 position	70	1
final position	6	1

\* p = 0001. From Poeppel & Wexler (1993).

These cases illustrate that the effects of the environment are felt quite early in development and that in the general case, parameters are set very quickly. It

thus seems that a FAST SETTING MODEL is more appropriate, one in which parameters are set early and without error (Hyams 1993, 1994b). In this specific sense the instantaneous model (Chomsky 1965), as a model of the acquisition of core grammar, may be close to correct. This renders less plausible the view that English children go through a protracted period in which they have a mis-setting of the *pro*-drop parameter.<sup>3</sup>

There is also a logical problem with the parameter mis-setting hypothesis. Considerations of learnability require that parameters be set on the basis of unambiguous triggers (Sano 1992; Roeper & Weissenborn 1991). This means that the data which the child uses to fix a parameter at one of its values, say value *x*, must be consistent only with value *x*, and not compatible with value *y*. For example, in Hyams (1986) I proposed that English-speaking children fix the *pro*-drop parameter on the basis of lexical expletives, since these are incompatible with a *pro*-drop setting. Overt referential subjects would not be a good trigger because they are possible in both *pro*-drop and non-*pro*-drop languages alike. Similarly, SVO word order could not be a trigger for the V2-parameter, since SVO order is possible in SOV languages with V to C, but also in languages which have a base-generated SVO order. If parameters were set by ambiguous data, we could not explain how the child converges on the adult grammar, rather than swinging to and fro between two grammars in a kind of pendulum effect. It thus follows that there can be no *intermediate* stage of development characterized as a parameter mis-setting since this would have been set on the basis of data which are compatible with both the correct value and the incorrect value for the target language.<sup>4</sup>

### 2.1. An Alternative Analysis of the Null Subject Phenomenon

Sano & Hyams (1994) have developed an alternative analysis of the early English *pro*-drop phenomenon. We believe that the null-subject property of early English is directly related to the root-infinitive phenomenon discussed above and that both phenomena are effects of the underspecification of I. Similar analyses have been proposed independently by Roeper & Rohrbacher (1994), Kramer (1993), and, much earlier, and under somewhat different assumptions, by Guilfoyle (1984). Rizzi's (1992, 1994) truncation hypothesis also connects the null-subject and root-infinitive phenomena.<sup>5</sup>

Jordens (1990) and Weverink (1989) were the first to observe that Dutch children pass through a stage in which they freely allow infinitives in root clauses. Wexler (1994) notes that this generalization holds across a wide range

of child languages. Examples from French, German, Dutch were given in (1). Wexler extends this analysis to child English, arguing that uninflected verbs such as those in (8), that occur during the so-called TELEGRAPHIC STAGE, are actually infinitives, which in English happen to be indistinguishable from stems. This important hypothesis brings English nicely in line with the other languages discussed above, in which the infinitive is overtly marked.<sup>6</sup>

- (8) a. *Eve sit floor*  
 b. *where penny go?*  
 c. *that truck fall down*  
 d. *open door*  
 e. *Hayley draw boat*  
 f. *Daddy want golf ball*

(CHILDES; MacWhinney & Snow 1989; Radford 1990)

Although Wexler does not deal in any detail with the null subject issue, (cf. Wexler 1994, note 44) his optional-infinitive analysis of English bare forms suggests the hypothesis that null subjects are related to the root-infinitive option in early grammar, in contrast to the adult grammar. So let us explore this idea in more detail.

An important descriptive generalization of linguistic theory is that nonfinite clauses have a specific kind of subject — dubbed PRO — and that PRO may only occur as the subject of a nonfinite clause (or phrase). Within a government-based theory (Chomsky 1982), the distribution of PRO is derived from the PRO-theorem, i.e., the requirement that PRO be ungoverned. Within more recent minimalist terms (Chomsky 1992), the distribution of PRO follows from Case theory and from the assumption that PRO is a MINIMAL NP ARGUMENT. Chomsky & Lasnik (1992) propose that as a minimal NP, PRO is the only argument which bears NULL CASE.<sup>7</sup> Null Case, like nominative Case, is assigned or checked in Spec-IP. While nominative Case is a realization of Spec-Head agreement between a lexical subject (or *pro*) and a finite I, null Case is the realization of the same relation where I lacks tense and agreement features, that is, a nonfinite I. Thus, infinitival I (and the head *-ing* of gerunds) check null Case, and the distribution of PRO, schematized in (9), follows.<sup>8</sup>

- (9) a.  $[_{IP} \text{John}/*\text{PRO} [_I \langle +\text{finite} \rangle] [_{VP} \text{walks}]]$   
           [+nom Case]  
 b.  $[_{IP} * \text{John}/\text{PRO} [_I \langle -\text{finite} \rangle] [_{VP} \text{walk}]]$   
           [+null Case]

Returning now to the child's grammar, we can see exactly how the root infinitive phenomenon might relate to the null subject phenomenon. Sano & Hyams propose that in the early grammar, *I may be left underspecified*. For the present, let us say that an underspecified I contains no tense or agreement features. Thus, when I is underspecified, we have a licit context for PRO, that is, null Case is checked in Chomsky & Lasnik's terms, as in (9b). When I is specified, the finite verb checks nominative Case and PRO is excluded, as in (9a).

On this view, then, the English child's null subjects are not the result of a mis-setting of a null-subject parameter, as I originally argued, but rather they are the effect of an independent aspect of child grammars, the optional underspecification of I, the same property that gives rise to root infinitives. Moreover, we assume (in contrast to my earlier view), and following proposals by Guilfoyle (1984), Guilfoyle & Noonan (1989) and Radford (1990), that the null subject of early English is PRO, in contrast to the null subject of Italian, which is *pro*.<sup>9</sup>

Below we will provide a more precise characterization of underspecification, and we will also address the explanatory problem of why underspecification is possible in the early grammar, but not in the adult's. For now let us simply assume that underspecification means that tense and agreement features are absent. Let us now turn to some empirical evidence for the underspecification hypothesis.

### 3. Empirical Considerations

#### 3.1. Null Subjects and Inflected *be*

There are a number of clear predictions which follow from the underspecification analysis. The most obvious is that null subjects in early English will not occur with finite verbs inflected for agreement since this would entail a specification of I-features and hence the null Case of PRO would not be checked. In English, the verb *be* provides the only unambiguous case of agreement morphology and so this is the place to test the prediction. We expect that null subjects will not occur with inflected forms of the verb *be*. In Table 3, we show the number of null subjects occurring in sentences with uncontracted *am*, *are*, *is* in the corpora of Eve, Adam and Nina (CHILDES; MacWhinney & Snow 1989; Brown 1973; Suppes 1973).<sup>10</sup>

Table 3. The Proportion of Null Subjects in Sentences Containing Uncontracted *am*, *are*, *is* (Sano & Hyams 1994)

file	age	<i>am</i>	<i>are</i>	<i>is</i>
Eve 01-20	1;6-2;3	0/4	0/36	0/109
Adam 01-20	2;3.4-3;0.11	0/1	0/71	13/114 (=11.4%)
Nina* 01-21	1;11.16-2;4.12	0/0	0/19	2/50 (=4%)

\* Nina 08 is not available, hence Nina 01-21 consists of 20 files.

As can be seen in Table 3, children use null subjects very infrequently with *am/are/is*. A comparison with these children's overall null subject use highlights this result. Table 4 lists the proportion of null-subject sentences out of sentences containing lexical verbs (i.e., non-copulas, non-auxiliaries) for Eve and Adam (from Hyams & Wexler 1993) and the proportion of null-subject sentences out of all utterances for Nina files 01 and 13 (from Pierce 1992).

Table 4. The Overall Proportion of Sentences with Null Subjects

child	age	proportion
Eve	1;6-2;1	26%
Adam	2;5-3;0	41%
Nina	1;11.16	44%
	2;2.6	11%

Although the data in Table 4 do not cover the whole period covered in Table 3, it is obvious that the children produce null subjects with uncontracted *am/are/is* far less frequently than with lexical verbs.

A second point to note regarding *be* concerns its optionality. As is well known, *be* is often omitted in obligatory contexts (Brown 1973), as in the participle cases in (10), and in predicative constructions, as in (11) (CHILDES; MacWhinney & Snow 1989; Radford 1990).

- (10) a. *Adam laughing*  
 b. *I brushing*  
 c. *Becca making a table*
- (11) a. *Geraint naughty*  
 b. *Mommy busy*  
 c. *hand cold*  
 d. *potty dirty*

Hyams & Jaeggli (1987) propose that omission of *be* is directly related to the specification of I-features. We suggested that *be* is an expletive verb inserted into the derivation to carry tense and agreement features (see also Scholten 1987; Moro 1993) or in current terms to 'check' those features, but which does not contribute to the semantic structure of the sentence. It follows that if I is underspecified, *be* will be omitted.<sup>11</sup>

### 3.2. Null Subjects and Modals

Another prediction of our analysis is that the null subject of child English should not co-occur with modals, which are inherently finite in English and hence exclude PRO. The data in Valian (1991) show that this is the case for the corpora of 21 children that she examined. While modals do occur during the stage at which children produce null subjects, they occur almost exclusively with overt subjects, as shown in Table 5.

Table 5. The Proportion of Overt Subjects in Sentences Containing Modals (Valian 1991)

	group I	group II	group III	group IV
mean age/MLU	2;0/1.77	2;5/2.49	2;5/3.39	2;7/4.22
%	94	95	98	99

### 3.3. Null Subjects and *-ed*, *-s*

Let's turn now to tense and agreement on lexical verbs, marked by *-ed* and *-s*. Our analysis predicts that null subjects will occur only with nonfinite forms and not with verbs inflected with past-tense and number/person morphology. However, if we look at Table 6, we see that the predicted incompatibility between null subjects and finiteness does not appear to hold for the past-tense morpheme *-ed*. Table 6 shows the proportions of null subjects with verbs inflected with *-ed*.<sup>12</sup>

A comparison with the corresponding data in Tables 3 and 4 for each child indicates that null subjects occur substantially more with the morpheme *-ed* than with *am/are/is* (cf. Table 3), and that the proportion is close to the overall proportion of null subjects in Table 4.<sup>13</sup> Clearly, null subjects co-occur with *-ed*. The examples in (12) are from Adam, Eve and Nina (CHILDES; MacWhinney & Snow 1989).

Table 6. The Proportion of Null Subjects with Verbs Inflected with -ed

file	age	proportion	%
Eve 01-20	1;6-2;3	9/40	22.5
Adam 01-20	2;3-3;0	13/23	56.5
Nina 13-21	2;2-2;4	3/16	18.8

- (12) a. *goed on that way* (subject = cow)  
 b. *dropped a rubber band* (subject = I)  
 c. *slapped Becca and Rachel* (subject = I)

Turning to -s, we find that it appears with null subjects at the frequencies given in Table 7. As we can see, null subjects occur less frequently with -s than with -ed (cf. Table 4), but not as infrequently as with *am/are/is* (cf. Table 3).

Table 7. The Proportion of Null Subjects in Sentences Containing -s

file	age	proportion	%
Eve 01-20	1;6-2;3	5/50	10
Adam 01-20	2;3-3;0	16/62	25.8

On the face of it, these data appear to show that children do use null subjects in finite clauses, contrary to our hypothesis. Sano & Hyams propose that at this stage verbs in -ed and -s are ambiguous between a finite and participial form. When finite, V-ed and V-s check nominative Case in the standard way and hence require lexical subjects. As participles, they are like the gerundive -ing head discussed above, in that they check null Case. By hypothesis, it is this latter option that is realized in the null-subject sentences under discussion. The structure that we assume for the aspectual use of -s and -ed is roughly as in (13) (irrelevant details omitted). The verb is inside a low Aspect Phrase of the sort proposed by Belletti (1990) for (Italian) past participles.

- (13) [<sub>IP</sub> PRO [<sub>I</sub> 0] ... [<sub>ASPP</sub> V-ed/V-s<sub>i</sub> ... [<sub>VP</sub>...t<sub>i</sub>... ]]]

We may assume that -ed marks perfective aspect, while -s marks participial number agreement. This latter suggestion follows in the spirit of Kayne's (1989) proposal that English -s marks singular number and not person, as is standardly assumed. It is also consistent with the observation that participles typically mark number and gender, but not person. The structure in (13) is independently

motivated by the early progressive sentences given in (10), and also past-participle sentences, such as the Italian ones given in (14) (from Antelmi 1992).

- (14) a. *visto mao*  
 seen kitty  
 b. *rotta a pallina*  
 broken the ball  
 c. *porta chiusa*  
 door closed  
 d. *cotta a pappa*  
 cooked the food  
 e. *vista etta*  
 seen this

Thus, the sentences in (12) would be analyzed as *I [have] goed on that way*, *I [have] dropped a rubber band*, etc. with an empty I. This proposal is reminiscent of a traditional view which holds that children acquire aspect before tense (Bronckart & Sinclair 1973; Antinucci & Miller 1976; Bloom *et al.* 1980; under a different set of assumptions, Tsimpli 1992).<sup>14</sup> The claim we make is a weaker one, but which is nevertheless strong enough to capture the relevant facts, which is that finite morphology is ambiguously aspectual in the early stage, and when it is aspectual it provides a licit context for PRO and when it marks tense, it does not. Thus, in contrast to the STRICT ASPECT-BEFORE-TENSE hypothesis noted above, we maintain that the early grammar expresses tense as well as aspect. In Section 4 we address the issue of how temporal interpretations are assigned in the early grammar, and also the question of how children recover from the aspectual analysis of -ed and -s.

### 3.4. Null Subject and Finite Subordinate Clauses

A further empirical point concerns Valian's (1991) observation that English speaking children do not use null subjects in embedded finite contexts, in contrast to Italian children (cf. Rizzi 1992). Valian reports that in 21 children ranging in age from 1;10 to 2;8, there were *no occurrences* of null subjects in 123 finite subordinate clauses. Roeper & Weissenborn (1990) confirm this for French and German, though they do not provide quantitative data (but see note 3). This follows on the analysis we are proposing since the embedded finite I excludes PRO.

### 3.5. *Underspecified Categories or No Categories?*

To sum up thus far, we have proposed that null subjects in child English are not an independent property, but rather are related to the early optionality of root infinitives. Both phenomena are derived from the underspecification of I. This proposal is empirically supported by the fact that null subjects do not appear in unambiguously finite contexts, for example, in constructions involving *am/are/is* and embedded finite clauses. We have proposed that apparent cases of past tense and agreement morphology in null-subject sentences are aspect markers, hence *minimal* in the sense required to check the null Case of PRO.

An important respect in which the underspecification analysis proposed here differs from Radford's and other 'small clause' (Lebeaux 1988; Guilfoyle & Noonan 1988) and truncation (Rizzi 1994) approaches to root infinitives, is that we assume that children have an obligatory I projection from the earliest stage. On our analysis children's early infinitives do not differ structurally (or morphologically) from adult infinitives. A nonfinite I is necessary for the assignment of null Case in both the early and adult grammar. Thus, it is precisely the presence of I in the early grammar which provides a licensing context for PRO and hence explains the distribution of null subjects in early English. Within a system that posits no I projection in root infinitives, we are forced to assume a new kind of empty category with distinct properties from those that exist in similar structures in the adult language (cf. for example, Rizzi 1994), since neither *pro* nor PRO is licensed as subject of a small clause or truncated tree. The small-clause/truncation analyses also fail to explain the morphological characteristics of root infinitives, which is that they have infinitival morphology in those languages where this is a distinctive form (cf. the examples in (1)). By hypothesis, this inflection is picked up/checked somewhere; the obvious candidate is I. The child's system does differ from the adult's in that infinitives are used in contexts which are infelicitous in the adult language, namely in root declarative contexts. This suggests that the locus of difference between the early and adult grammar is in the pragmatic system. We develop this proposal further below.

## 4. A Theory of Underspecification

Let us now examine more carefully the idea of underspecification. There are two issues:

- (i) Can we make the notion more precise; that is, exactly what do we mean when we say that a functional node is underspecified?
- (ii) Why is it the case that categories can be underspecified in the child's grammar but not in the adult's?

There is much evidence to suggest that the internal structure of nominal phrases is strongly parallel to that of clauses (Szabolsci 1983, 1994; Abney 1987). For example, the head of DP, a determiner such as *the*, is parallel to a complementizer which heads CP, like *that*, and there are functional projections which intervene between the head and its complement (Valois 1991; Ritter 1989). Various syntactic operations at the clausal level have DP-analogues; for example, it is suggested that N raising to D parallels V-to-C (Hoekstra, p.c.). Clauses and DPs are also parallel with respect to their interpretive properties. Thus, as noted earlier, I marks finiteness, which is TEMPORAL SPECIFICITY, just as D marks NOMINAL SPECIFICITY. A finite I situates the event described by the verb at a specific interval of time, either past or present (relative to Speech or Reference Time).<sup>15</sup> And specific NPs refer to NPs in the discourse domain.

Traditionally, the temporal specification of the clause has been thought of as anaphoric, which is to say dependent for its interpretation on an antecedent. For example, Partee (1973) notes a number of parallels between temporal and nominal anaphora. In particular, she observes that a past tense can be used to refer to a particular time not introduced by previous linguistic context, just as a pronoun may be without a linguistically specified antecedent when its referent is understood to be salient to the hearer. Thus, (15a) (Partee's example) may be uttered while driving down the freeway, just as (15b) may be uttered as the first sentence of a conversation. Partee's point is that in (15a) the temporal reference is not specified while in (15b) the nominal reference is not specified; the reference is implicit in both cases.

- (15) a. *I didn't turn off the stove.*
- b. *She left me.*

Extending the nominal/temporal parallelism, Partee likens the past tense to a third person pronoun in that the antecedent may be either implicit as in (15a, b) or explicit as in (16a, b).

- (16) a. *Yesterday, John washed the car.*
- b. *John said he would wash the car.*
- c. *John knows the answer.*



The antecedent to a past tense is explicitly represented in (16a) by the temporal adverb *yesterday*. Similarly, the pronoun *he* in (16b) may take *John* as its linguistically specified antecedent. On the other hand, a genuinely temporal present tense in a simple sentence, such as (16c), is like a first person pronoun in that it is indexical; both are evaluated relative to discourse context. A genuinely temporal present tense refers to Speech Time, just as first person refers to the speaker.

Following in the spirit of Partee's notion of temporal anaphora (and also Enç's 1987 binding-theoretic account of tense), Guéron & Hoekstra (1989, 1994) propose a binding analysis according to which I may be either anaphoric or pronominal.<sup>16</sup> When I is anaphoric, it is bound (co-indexed) with a temporal operator (TO) (in Spec-CP), whose default value is the *here and now*, or *speech time*, and I has the value of *present* tense, as in (17a). When I is pronominal, it is free from the TO (contra-indexed), and has the value *past*, as in (17b).<sup>17</sup>

- (17) a. (TO<sub>i</sub>) *John* [I<sub>i</sub>] *knows the answer.* present  
 b. (TO<sub>i</sub>) *John* [I<sub>j</sub>] *drove his car.* past

Following Guéron & Hoekstra, we refer to the relation between the TO and I as an I-CHAIN (their TENSE CHAIN). The function of the I-chain is to make the predicate referential by hooking the V + I-complex up to temporal operator and hence the discourse world.

This is a very sketchy presentation of the Guéron & Hoekstra analysis, but it suffices for our purposes. Given this framework, suppose we now understand the specification of I as its TEMPORAL INDEX (either co-indexed or contra-indexed to the temporal operator). The index on I provides the verb with its temporal interpretation, either simultaneous with or prior to Speech Time. This temporal index, and the I-chain it creates, may have a morphological reflex, for example, English *-ed, -s*.

We have said about young children that I can be underspecified, giving rise to the root infinitive phenomenon. We are now in a position to understand what this means. In terms of our present discussion, underspecification means UNINDEXED or not part of an I-chain. Thus, our claim is that in the early grammar, I may be co-indexed or contra-indexed with the operator, as in the adult grammar, or it may fail to bear an index altogether, as in (18):

- (18) (TO<sub>i</sub>) *Baby doll* [I<sub>0</sub>] *cry.*

When I is unindexed, there will be no morphological features realized on the verb and the infinitive surfaces, as in (18). If we were to say nothing else at this point, this would mean that the verb in the child's utterance in (18) had no

temporal interpretation. In fact, it has been suggested (Meisel 1990; Boser *et al.* 1991; Kramer 1993; Hoekstra & Jordens 1994) that root infinitives have a modal interpretation (but cf. Clahsen & Penke 1992; Clahsen *et al.*, this volume, for arguments that German root infinitives may also have a declarative interpretation). Thus, Meisel reports that the German child's sentence in (19) means something like *The bear must/should/ought to sleep.*

- (19) *bar schlafen*  
 bear sleep  
 'The bear should/must/ought to sleep.'

Though there is a modal interpretation for some root infinitives, it is not the only one in English child language (cf. also Kramer 1993 for Dutch root infinitives.) Root infinitives generally denote ongoing events or states. We thus assume that when I is without an index, it somehow receives a declarative — usually present tense interpretation. This does not involve syntactic binding as in the case where I is co-indexed with the operator, as in (17a). Rather, we propose that in this case there is a pragmatic assignment of a temporal value, from discourse or non-linguistic context. We can think of this assignment as TEMPORAL COREFERENCE, as distinct from binding. Following in the spirit of Partee's proposal that the use of tense parallels that of pronouns, we are suggesting that a present tense I can be either anaphoric, as described by Guéron & Hoekstra, and illustrated in (17a), or it can enter into coreference, in which case the event described by the verb just happens to take place in the present, though there is no binding relation between the operator and I. We thus have temporal anaphora and temporal coreference, analogous to nominal anaphora and nominal coreference, as described in Reinhart (1983). Root infinitives involve temporal coreference.<sup>18</sup>

So now the obvious question is why is the coreference, i.e., root infinitive, option blocked in the adult grammar? Again, we suggest a parallel with the nominal system. In the adult language coreference between two NPs is ruled out just in case the resulting interpretation would be indistinguishable from that of bound anaphora. This is the essence of the pragmatic principle first formulated by Reinhart (1983), and later modified by Grodzinsky & Reinhart (1992), and under a different set of assumptions by Chien & Wexler (1990). The Grodzinsky & Reinhart formulation is given as Rule I in (20).

- (20) Rule I  
 NP A cannot corefer with NP B if replacing A with C, C a variable bound by B, yields an indistinguishable interpretation.

In other words, if you can use bound anaphora, use it, and if you do not use it, the hearer will infer that you mean something different.

To illustrate, Rule I rules out the sentence in (21a) with a coreference interpretation (indicated by underlining the coreferent NPs), since there is a well-formed instance of bound anaphora which means the same thing, that is, the sentence in (21b). Recall that Rule I governs coreference possibilities and not syntactic binding. The local binding relation in (21c) (indicated by co-indexing) is ruled out by Condition B of the binding theory (Chomsky 1981).

- (21) a. \*John likes him.  
 b. John<sub>i</sub> likes himself<sub>i</sub>.  
 c. \*John<sub>i</sub> like him<sub>i</sub>.

Over a wide range of cases, Rule I and the Binding Theory converge, ruling out both local binding and local coreference. There are, however, sentences which are thrown out by the Binding Theory, but which satisfy Rule I. Consider the sentences in (22).

- (22) a. *I dreamed I was Mel Gibson and then I kissed me.*  
 b. *I dreamed I was Mel Gibson and then I kissed myself.*  
 (a ≠ b)

(22a) is good under a coreference interpretation precisely because it means something different from (22b). The binding theory rules out binding between *I* and *me* in the second conjunct of (22a), yet Rule I allows coreference, precisely because (22a) does not describe a self-kissing event as does (22b).

Suppose we extend Reinhart's principle or something close to it, to temporal coreference, as in (23), which we henceforth refer to as Rule T.

- (23) Rule T  
 I(nfl) A cannot corefer with I(nfl) B if replacing A with C, C a variable bound by B, yields an indistinguishable interpretation.

The principle in (23) would then rule out temporal coreference whenever the resulting interpretation is indistinguishable from temporal anaphora. This would get us exactly the desired result; in the adult grammar a root infinitive, i.e., coreference, is ruled out by Rule T when its interpretation is indistinguishable from the anaphoric present tense, such as that represented in (17a).

Continuing the parallel with the nominal system, we now expect that root infinitives should be possible in the adult language under other interpretations. In this regard, consider the sentences in (24).

- (24) a. *John dance. Never in a million years!*  
 b. *My brother marry Mary. Over my dead body!*  
 c. *Herman eat bean sprouts. Why?*

The adult sentences in (24) contain root infinitives, but they are perfectly well-formed in the context provided. Notice, however, that these root infinitives are possible because they have a modal-like interpretation; that is, they are distinguishable from a declarative tense interpretation. So, the root infinitives in (24) are felicitous according to Rule T.

One final question remains, why can children produce root infinitives with an indistinguishable temporal interpretation, while this is ruled out in the adult grammar? Or in other words, in what way does the child's system differ from the adult's? We propose that the difference is due to the same factor or a similar one to that which is responsible for children's apparent Condition B violations. As is well known, young children accept sentences such as that in (21a). According to Chien & Wexler (1990) and Grodzinsky & Reinhart, this is because children either have not yet developed (Chien & Wexler) or cannot implement (Grodzinsky & Reinhart) Rule I (in (20)), the principle which blocks coreference where bound anaphora is possible. Our proposal is that Rule T is similarly unavailable in the early grammar and as a result temporal coreference is possible with a declarative tense (non-modal) interpretation, even where temporal anaphora is available. Thus, root infinitives are possible in both the adult and child language, but they are felicitous in a broader set of pragmatic circumstances in the child's grammar than in the adult's due to the absence or inaccessibility of Rule T.<sup>19</sup>

To sum up the discussion thus far, we are claiming that the optional specificity stage (and the derivative null-subject phenomenon) has its roots in the child's developing semantics and pragmatics. The child's tense semantics, that is, her assignment of temporal specificity, is like the adult's when I is specified. Thus, we are rejecting the notion that children have aspect but not tense in the early stages (see also Weist 1984; Fantuzzi 1994; Hoekstra & Hyams 1995a, b; Sano & Hyams 1994; Sano 1995). However, because of the inaccessibility of the pragmatic principle Rule T, children have a further interpretive option, unavailable to the adult, which is for I to be underspecified, hence nonfinite or nonspecific. When this happens, it receives a deictic interpretation, generally referring to Speech Time since this is the default value of the temporal operator. (But see note 18.)

Although there are obviously many technical details to be worked out, the analysis just outlined accords well with our intuition that children are somehow

more bound to the here and now than adults, an intuition which people have tried to capture in various ways, for example, the aspect-before-tense hypothesis referred to earlier or the idea proposed in Smith (1980) (and adopted by Tsimpli 1992) that for children Event Time and Reference Time are frozen at Speech Time. We capture this intuition by allowing children's underspecified I to receive the deictic here-and-now value which corresponds to the default value of the temporal operator. This is one of three values assigned to I, which may also be anaphoric, hence present, or pronominal, hence past, as in the adult grammar.

The option of having both coreference and anaphoric binding of T further assimilates the semantics of temporal anaphora to that of nominal anaphora in the spirit of Partee's original insights. It also allows us to maintain a very strong form of SYNTACTIC CONTINUITY. There is nothing in the child's *grammar* which must change in order for root infinitives to be pushed out. It places the problem in the domain of pragmatics where we have independent evidence of developmental delays (e.g., Chien & Wexler 1990; and see also Wales 1986; Weist 1986 for an overview of children's use of deixis and tense). Once Rule I appears (either through maturation of the rule itself (Chien & Wexler 1990), or of the mechanisms involved in the implementation of the rule (Grodzinsky & Reinhart 1993)), the deictic assignment of temporal reference is blocked and I must be finitely specified; that is, indexed to the temporal operator. Root infinitives are now impossible, except in cases such as those in (24). At this point children will give up the aspectual analysis of *-ed* and *-s* in favor of the tense analysis of these morphemes since a representation such as that in (13) also contains an underspecified I.

### 5. Extensions to the D-system

Let's turn now to another aspect of the early grammar, the underspecification of D, which we will propose follows from principles similar to those just outlined for temporal interpretation of I. The analysis of determiners is more sketchy than the analysis of I, but we hope to at least point in the direction of a possible explanation for the behavior of the D system in early language.

As noted earlier, D and I have an important property in common, which is that they are both points at which the sentence is anchored into a discourse representation. As discussed above, a finite I situates the event described by the verb at a specific interval of time, either past or present (relative to Speech or

Reference Time). In a similar way, D specifies the relation of its NP-complement to the DPs in the discourse representation. Thus, a definite/specific DP such as *the boy* or *he*, refer to a FAMILIAR NP, one which has already been implicitly or explicitly introduced into discourse, while an indefinite/non-specific DP, for example *a boy*, can introduce a NOVEL NP (Heim 1982).<sup>20</sup>

There are well-known syntactic effects of definiteness and specificity. For example, there is a definiteness restriction on the postverbal subject of an existential construction, as illustrated in (25a,b); specific animate objects in Spanish require *a*-insertion, while nonspecific objects do not, as in (25c, d) (from Zubizarreta 1992); and postverbal subjects in Italian show weak definiteness effects, as in (25e, f).

- (25) a. *There is a boy in the garden.*  
 b. \**There is the boy in the garden.*  
 c. *Juan vio a Maria.*  
    'Juan saw (a) Maria.'  
 d. *Juan busca una muchacha que sepa hablar ingles.*  
    'Juan is looking for a girl that knows English.'  
 e. ?*Ha scritto la lettera Gianni.*  
    has written the letter Gianni  
    'John has written the letter.'  
 f. *Ha scritto la lettera una studentessa.*  
    has written the letter a student  
    'A student has written a letter.'

Specificity effects also show up in scrambling constructions in German, Dutch and other languages. We focus on Dutch. In Dutch specific DPs (including proper names and pronouns) move to the left of negation and adverbs in a process known as SCRAMBLING, as illustrated in (26a, b). Non-specific DPs do not scramble in the general case, as in (26c).

- (26) a. ... *dat Jan het boek, niet/stilletjes t<sub>i</sub> leest* [definite DP]  
    '... that Jan the book not (quietly) reads.'  
 b. ... *dat Jan het<sub>i</sub>, niet/stilletjes t<sub>i</sub> leest.* [pronoun]  
    '... that Jan it not/quietly reads.'  
 c. ... *dat Jan niet/stilletjes ein boek leest.* [indefinite DP]  
    '... that Jan not/quietly a book reads.'

Within recent theory (Wyngaerd 1989; Mahajan 1990; Koopman & Sportiche 1991), scrambling is analyzed as a movement of the object NP out of the VP to the Spec of a higher functional position, symbolized as (FP), roughly as

illustrated in the embedded clause in (27). (Irrelevant details and projections omitted).<sup>21</sup>

(27) ... [<sub>IP</sub> Jan [<sub>PP</sub> het boek<sub>i</sub> stilletjes/niet [<sub>VP</sub> t<sub>i</sub> t<sub>j</sub>] [<sub>I</sub> leest<sub>j</sub>]]

Let us return to the child's grammar. As is well known, determiners are often unexpressed in the early grammar. Some examples were given in (2), and these are repeated below.<sup>22</sup>

- (2) a. *open door*  
 b. *Wayne in garden*  
 c. *Hayley draw boat* (Radford 1990)  
 d. *Niekje ook boot maken*  
 Niekje also boat make-INF  
 'Niekje also makes (the) boat.'  
 e. *Papa heft ook trein*  
 Daddy had also train  
 'Daddy also had [ ] train.'  
 f. *mag ik weer wan blokjes toren bouwen*  
 may I again of blocks tower make  
 'May I make [ ] tower of blocks again.'

(Dutch, Schaeffer 1994)

Hoekstra & Jordens (1993) and Schaeffer (1994) note that there are many determinerless nominals in Dutch child language. (See also Clahsen *et al.* 1994 and Eisenbeiss 1994 for German). Schaeffer reports the percentages of determiners for the two children she studied, as in Table 8.<sup>23</sup>

Table 8. Percentage of NPs with and without Determiners during Niek and Laura, Stage 1. (Adapted from Schaeffer 1994)

		with determiner	without determiner
Niek	(2;7-3;5)	4 (7%)	61 (93%)
Laura	(1;9-3;4)	8 (31%)	23 (69%)

Schaeffer proposes that in the early grammar D can be underspecified with respect to (nominal) specificity, just as I can be underspecified with respect to temporal specificity, i.e., finiteness. This has two consequences: First, it accounts for the optionality of determiners since determiners on her account are simply a morphological realization or spell-out of the specificity feature. This is reminis-

cent of our earlier discussion of *be*, where we said that since *be* is a spelling out of I features, it would not be realized in the case of an underspecified I-node. Second, the underspecification of D in Dutch has a syntactic consequence, which is that nominals which are underspecified with respect to specificity should not scramble. As we see in Table 9, this prediction is by and large confirmed. 82% of Niek's and 100% of Laura's determinerless nominals occur in unscrambled position (see also Hoekstra & Jordens 1994).

Table 9. Proportion of Non-Scrambled Determinerless Nominals for Niek and Laura, Stage 1. (From Schaeffer 1994)

		scrambled	non-scrambled
Niek	(2;7-3;5)	11 (18%)	50 (82%)
Laura	(1;9-3;4)	0	18 (100%)

Some examples of non-scrambled determinerless nominals were given in (3) and are repeated below.

- (3) a. *niet neus snuiten*  
 not nose blow-INF  
 'Don't blow [ ] nose/I don't want to blow my nose.'  
 b. *vind ook huis mooi*  
 find also house beautiful  
 'I like [ ] house too.'  
 c. *ikke ook kietje aai*  
 I also knee stroke  
 'I want to stroke [ ] knee, too.'  
 d. *heb jij nog niet thee opedaan*  
 have you yet not tea up-done  
 'Haven't you written down [ ] 'tea' yet.'

Interestingly, Schaeffer shows that the results in Table 9 are completely reversed for pronouns. As shown in Table 10, pronouns — which we take to be inherently specific — are most often correctly scrambled.<sup>24</sup>

The results in Table 10 show that Dutch children do not have a problem with the movement involved in scrambling per se, but rather with the specificity element that triggers scrambling. Since pronouns are inherently marked, they scramble, while in NPs the specificity feature must be marked by a D.<sup>25</sup>

Table 10. Proportion of Scrambled and Non-Scrambled Pronouns for Niek and Laura, Stage 1. (From Schaeffer 1994)

		scrambled	non-scrambled
Niek	(2;7-3;5)	15 (71%)	6 (29%)
Laura	(1;9-3;4)	7 (70%)	3 (30%)

Schaeffer notes that one of the questions left unanswered by this account is how underspecified DPs are semantically interpreted in the early grammar. To begin to answer this question, we might try to assimilate Schaeffer's analysis into framework outlined earlier for I. Suppose we assume, essentially following Heim (1982), that DPs introduce into the sentence variables that must be bound. Nonspecific/indefinite DPs introduce novel variables. (We will have little to say here about these.) The interesting case for our purposes are the specific/definite DPs, which in Heim's framework, introduce familiar variables. Familiar variables must find an antecedent in the discourse, or else have a contextually salient referent. So, following Guéron & Hoekstra (1994), let us further assume that parallel to the T-operator, there is a D-operator which has as its default range the contextually salient and presupposed DPs, i.e., the discourse domain. We might think of the D-operator as analogous to the signing space in signed languages such as ASL. It contains the speaker, the hearer and a set of discourse referents, each of whom is indexed, just as the referents in ASL are assigned points in space (T. Hoekstra, p.c.).

In the adult system the head of DP, D, may be specific, by which we now mean that it bears the index of the D-operator, hence picks out a familiar NP, or it is nonspecific, that is, contra-indexed, and thus introduces a novel NP. Turning to the child's system, let us assume, as we did for I, that the child has the co-indexing and contra-indexing possibilities plus a third option, which is for D to be unindexed. Although D may be underspecified, the NPs must nevertheless be semantically interpreted. As in the case of root infinitives, which receive a default here and now interpretation, we propose that unindexed DPs are assigned a default, FAMILIAR interpretation. This assignment is done pragmatically or deictically. There are thus two ways to arrive at a familiar interpretation in the child's grammar — grammatically, by co-indexing, or via a pragmatic or deictic assignment.<sup>26</sup> The latter would not represent a case of binding, however, but rather of coreference. The coreference interpretation assigned to a determinerless DP is not an option available in the adult grammar for the reasons

outlined earlier; it would yield an interpretation which is indistinguishable from the bound variable interpretation and is thus ruled out by some appropriate version of rule I/T, given in (28)/(31), a rule which is unavailable to the child. In this way, the analysis of I in the early grammar is extended in full to D allowing us to capture the parallel properties of these two heads, outlined in (28).

- (28) a. Underspecification of I →
- i. root infinitives
  - ii. null Case (→ null subjects)
  - iii. deictic *here and now* interpretation
- b. underspecification of D →
- i. determinerless DPs
  - ii. no scrambling
  - iii. deictic *familiar* interpretation

## 6. Conclusion

We have proposed that the various properties which characterize the early grammar, specifically root infinitives, null subjects, determinerless DPs, and the optionality of scrambling, can be handled in a unified way as the effects of underspecified functional heads. We understand an underspecified head as one which is not indexed with a linguistic antecedent and hence whose interpretation must be deictically assigned. Underspecification has morphosyntactic reflexes in the form of absence of finite morphology, determiners, the presence of null subjects in non-*pro*-drop languages such as English. The possibility of underspecification (which is only marginally available in the adult language, cf. (24)) reduces ultimately to the availability of an interpretive rule which links underspecified Ds and Is directly to the discourse domain. The deictic interpretation is unavailable in the adult grammar because of the bleeding relationship between grammar and pragmatics, which requires that variables — whether temporal or nominal — be grammatically interpreted where possible (Reinhart 1993). On this view, then, the shift to the adult grammar, and hence away from root infinitives, null subjects, and determinerless nominals, involves a restructuring (or several restructurings) not of the syntax proper, but rather of the mapping between grammar and pragmatics. We see in the child's development of nominal and temporal specificity, as with other developmental phenomena, an interaction of

distinct modules — pragmatics, semantics, syntax, morphology and this interaction is characterized by a staggered or uneven development in different domains, with the syntax and semantics outpacing the pragmatic component.

By way of conclusion we might consider whether grammatical underspecification, as it is described here, relates in an interesting way to phonological underspecification (cf. Steriade 1994). One difference between the two is that underspecified phonological segments get filled in, while underspecified functional heads do not. Given economy considerations and current minimalist assumptions (Chomsky 1992), conditions on grammatical representation are motivated purely by properties of the two interface levels LF and PF. The auditory/perceptual requirements of PF will force the specification of phonological features since underspecified segments are unpronounceable. Grammatical categories must be specified only as required, by the interpretive/conceptual system. We have proposed that in the early grammar there is a deictic option for the assignment of temporal and nominal reference, thereby satisfying interpretive requirements. Hence, grammatical specification is preempted. The differences between the two kinds of underspecification thus follow from independent properties of the interface levels.<sup>27</sup>

#### Acknowledgements

I would like to thank Tetsuya Sano and Jeannette Schaeffer, whose ideas I have liberally borrowed, Harald Clahsen, and Peter Coopmans, Anne Roussou, Jürgen Meisel, Filippo Beghelli and 3 anonymous reviewers for their many helpful comments and suggestions. Finally, my appreciation to Teun Hoekstra for his invaluable help and encouragement. An earlier version of this paper was presented at the Great Britain Child Language Seminar in Bangor, Wales, in March 1994. This research is partially supported by a UCLA Academic Senate, Faculty Research Grant, 1993–1994.

#### Notes

1. Weissenborn (1990), Poeppel & Wexler (1993), Hyams (1992, 1994a) argue that V raises to C as in the adult grammar. Meisel & Müller (1992) argue that I raises to C from a VP-internal position, and Clahsen *et al.* (this volume) to an unspecified FP; in the latter two proposals the early grammar, though different from the adult grammar, mimicks the V2-effect.

2. Platzack (1992) and de Haan & Tuijnman (1988) actually argue that young children do not have V2. Their data clearly show, however, that children place finite verbs in second position and nonfinite verbs in final position. See Hyams (1992) and Wexler (1994) for discussion.
3. Potentially problematic for the Fast Setting Model are the so-called LATE NULL SUBJECTS discussed in Hamann (1992, 1994) and Duffield (1993) (his rogue nulls). Hamann and Duffield independently isolate a late stage in German during which children have postverbal null subjects (hence not null topics, which are permissible in German and frequently observed in early language, cf. Weissenborn 1991; de Haan & Tuijnman 1988; Jaeggli & Hyams 1987), as in (i).

- (i) *das will hier haben.*  
that want here have  
'(I) want that here.'

Duffield and Hamann both suggest that the German children have Italian-like null subjects during this stage. If so, this would provide a counterexample to the hypothesis that parameters are set quickly and without error. There is, however, reason to doubt the Italian analysis of late null subjects. First, the frequency of these null subjects is quite low as compared to null subjects in Italian (children and adults); 12–18% in early German vs. 70% in Italian. (cf. Valian 1991 who argues against my original *pro*-drop analysis of English on the basis of frequency difference between Italian and English null subjects.) Second, and more revealing, is the fact that if these are Italian null subjects, their appearance should correlate with the acquisition of 'rich' agreement. In fact, Hamann notes that agreement is fully productive in Elena prior to the late null subject stage, and Duffield observes that Simone acquires the second person *-st*, the point of acquisition of AGR according to Clahsen & Penke (1994), significantly earlier than his rogue nulls appear. Third, late nulls, if Italian-like, should appear in embedded contexts (cf. (5)). Examples such as those in (ii) do occur, but they are extremely rare (under 1% of all embedded clauses for the children studied by Duffield).

- (ii) ... *nein, weil \_\_\_ zu gross ist.*  
no because too big is  
'... no, because [ ] is too big.'

According to Hamann, the late null subject stage ends with the acquisition of the expletive *es*. It thus seems likely, as she proposes, that the occurrence of late null subjects (particularly those in embedded contexts) in German, but not in English, for example, is related to the fact that German allows null expletives in postverbal position, and in embedded contexts, as in (iii, iv).

- (iii) *Mir wurde pro geholfen.*  
me(DAT) was helped  
'I was helped.'

- (iv) ... *daß pro getanzt wurde.*  
that danced was  
'... that there was dancing.'

According to Hamann, who follows Tomaselli (1990), German null expletives are licensed under government by the verb in C, hence directly related to the V2-property. If this is so, then German speaking children are not speaking Italian, which is not a V2-language and which licenses null subjects through Spec-Head agreement with AGR(S) (Rizzi 1986).

4. This logical argument does not preclude a situation such as the one described in Hyams (1993, 1996), in which a parameter (e.g., the *pro*-drop parameter) comes fixed at an initial parameter setting which may be altered on the basis of positive evidence. But it does preclude an intermediate parameter mis-setting, fixed on the basis of some datum. However, the view that parameters come fixed at an initial setting raises the well-known TRIGGERING PROBLEM, that is, the question of why the parameter remains mis-set for as long as it does despite the availability of triggering data. This problem, which was apparent as soon as the *pro*-drop story was proposed (cf. Hyams 1986; Borer & Wexler 1987), provides one of the main motivations for the maturational theory proposed in Borer & Wexler.
5. The term 'root infinitive' is from Rizzi (1994). Rizzi proposes that root infinitives are truncated structures, i.e., VPs, and that child grammars, in contrast to adult grammars, need not project to a CP-root. We discuss some problematic aspects of the truncation hypothesis below, but see Hoekstra & Hyams (1995a, b) for further discussion of this approach.  
Roepers & Rohrbacher (1994) also adopt a truncation-type analysis, though under somewhat different assumptions from Rizzi.
6. It is important to note that the root infinitive phenomenon is not a universal property of child language. In particular, we do not find root infinitives in Romance *pro*-drop languages such as Italian, Spanish and Catalan (cf. Grinstead 1994; Guasti 1992). Nor does it occur in Japanese (Sano 1995). We do not address the issue of cross-linguistic variation here, but see Hoekstra & Hyams (1995a, b) for an account of these facts.
7. Chomsky & Lasnik observe that PRO behaves like other arguments in that it moves from non-Case positions and is barred from moving from Case positions. If PRO, like other NPs, contains Case features, then this behavior is explained. Space limitations prevent a more thorough presentation of their arguments, but see Chomsky & Lasnik (1992, Section 4.3) for discussion.
8. For ease of exposition, here and throughout we do not split INFL into its different heads, TENSE, AGR and so on (Pollock 1989). However, the analysis proposed here can readily be translated into a split-INFL system. See Hoekstra & Hyams (1995a, b) for a specific proposal.
9. Kramer (1993) independently arrives at a similar analysis based on acquisition data from one German-speaking child and two Dutch children. She observes a high correlation between lexical subjects and finite verbs on the one hand, and between null subjects and root infinitives on the other. On the basis of these data, Kramer argues

two points; first, that the Case Filter is operative in early child grammar and hence lexical subjects must occur with finite verbs (or with a null modal + infinitive), and second, that the (predominant) null subject in these early (non-*pro*-drop) languages is PRO.

It should be noted that early English poses an apparent problem with respect to Case since we find a very high proportion of lexical subjects with root infinitives which cannot plausibly be argued to involve a null modal or modal interpretation. See Section 3 for discussion. Hoekstra & Hyams (1995b) present a number of arguments that the lexical subject of root infinitives is a dislocated constituent.

10. We do not consider contracted forms of *be*, e.g., *I'm*, *he's*, etc. since the copula is a clitic in these cases, and the subject is required for independent phonological reasons.
11. Wexler (p.c.) further observes that this may account for the interesting and previously unexplained fact that children do not use the nonfinite form of *be* during the optional infinitive stage, in contrast to their behavior with lexical verbs. Thus, '*I be good*' occurs rarely, if at all. As Wexler notes, this also follows on the assumption that *be* is expletive and hence needed only for feature checking.  
Anecdotal evidence also suggests that when *be* is used as a root infinitive, it has a lexical meaning, roughly equivalent to *I am behaving/acting good (like a good boy)* (M. Jaeggli, p.c.). This would follow as well.
12. We excluded from the count subject *wh*-questions such as *What happened?* because such sentences do not allow null subjects for obvious reasons.
13. Note that because Nina began to produce the morpheme *-ed* only after the age of 2;2, her 18.8% in Table 6 should be compared to the 11% in Table 4 which is at the comparable age.
14. Tsimpli (1992) follows Radford in assuming that children do not project functional categories during this early stage. On her analysis aspect is a lexical property, which unlike tense and agreement, requires no association with a functional head position, and is thus available in a 'prefunctional' grammar of the sort she assumes, and prior to tense.
15. It is difficult to give a crosslinguistically valid morphological characterization of finiteness since languages differ with respect to which particular heads spell out the finiteness, e.g., person, tense, number, gender, etc., and there is even variation within a particular language, e.g., in the past tense English marks finiteness with a tense morpheme *-ed*; in the present with an agreement morpheme, *-s*. For the matters which we wish to emphasize in this paper we will simply represent finiteness as a property of I. For a discussion of crosslinguistic morphological variation and how this relates to development, see Hoekstra & Hyams (1995a, b).
16. Guéron & Hoekstra identify T as anaphoric/pronominal. However, we will recast their ideas in terms of I for the reasons noted in note 15.
17. More precisely, on Guéron & Hoekstra's account, the T-operator determines the value of C, which contains the Reference Time (in Reichenbach's 1948 sense) of the sentence. Their tense chain is a complex object containing tense features and an e-(ventuality) role provided by a lexical verb or other predicate, and is headed by the tense operator.

Parallel to the tense chain is the D(et)-chain which we refer to in our discussion of the determiner system below.

18. The analysis proposed in the text is for root infinitives with a present-tense declarative interpretation. For root infinitives with a modal reading, such as that in (19), we assume that there is a null modal in I bound by a modal operator. Much less frequently a root infinitive will have a past-tense interpretation. In these cases we assume the  $T^0$  takes a marked past value and underspecified T refers directly to this interval.
19. The fact that there is a considerable lag between the time the child sorts out the pragmatics of the temporal system and that of the anaphor system suggest that Reinhart's Rule I and Rule T are not one and the same, but are rather specific instances of a more general bleeding relationship between grammar and pragmatics such that if an interpretation can be assigned grammatically, then this precludes a (non-distinct) pragmatic assignment. Thus, children give up declarative root infinitives by roughly age 3, while the principle blocking local coreference between a pronoun and NP-antecedent is not apparent for several years; at age 6 children still accept sentences such as that in (21c) (Chien & Wexler 1990).
20. The relation between definiteness and specificity is a complicated one. Since the details are not really crucial to what follows, we will make some simplifying assumptions: definite DPs are specific (except where generic as in *The dolphin is a beautiful animal*, in which case the determiner is expletive (Vergnaud & Zubizarreta 1992); indefinite DPs may be specific or non-specific. Thus, *John wants to marry a girl with blue eyes* may mean that a prerequisite for John marrying is that the girl, whoever she is, have blue eyes, or John wants to marry a specific girl, say Mary, who has blue eyes. In what follows we are primarily concerned with specific DPs. (For detailed discussion of these issues see Heim 1982; Diesing 1992, and papers in Reuland & ter Meulen 1987.)
21. For ease of exposition we assume that adverbs and the negative marker *niet* occur in the same position. There is a great deal of debate over the exact position of negation and the various adverbials, which has rather important implications for acquisition. For discussion, see Schaeffer (in prep.).
22. Examples such as that in (i) show that determiners (at least in object position) can appear in nonfinite clauses, and they can also be omitted in finite clauses, as in (ii, iii).
- (i) *pas attrapper une fleur*  
[ ] not pick a flower
- (ii) *veux pas lolo*  
(I) want not water
- (iii) *Papà heft ook trein*  
Daddy has also train

It is unclear at this point whether there is a correlation in early English (or French or Dutch) between root infinitives and determinerless nominals in either subject or object position. Clahsen *et al.* (this volume) report a correlation in German between root infinitives and underspecified subjects, where the latter include both determinerless DPs and null subjects (mainly null subjects). Their RI/null subject correlation seems to

parallel the English results reported in Sano & Hyams, Roeper & Rohrbacher, and Kramer's Dutch results, discussed in the text. In order to determine whether there is, in addition, a correlation between root infinitives and determinerless DPs in these languages, quantitative analyses must be done. This issue is taken up in Hoekstra & Hyams (1995b).

23. We would like to thank Jacqueline van Kampen for making Laura's data available to us.
24. We should note that most of the nonscrambled pronouns are demonstratives, which can be left unscrambled when they are focused.
25. We have not included proportions for scrambled vs. non-scrambled full DPs because scrambling in these cases (unlike the pronoun case) is dependent on a variety of factors including focus. For example, in a neutral context a definite DP-object must scramble, as in (i), but if the object has contrastive focus then it may not scramble even if definite/specific, as in (ii) (T. Hoekstra, J. Schaeffer, p.c.).
- (i) *Roll de bal maar.*  
roll the ball go-ahead  
'Go ahead roll the ball.'
- (ii) *Roll maar de ball.*  
roll go-ahead the ball (not the marble)  
'Go ahead roll the ball, (not the marble).'
- From transcripts it is difficult to establish obligatory contexts for scrambling of definite DPs in a way that would make a proportion meaningful.
26. Hamann (1992) presents some interesting evidence supporting the idea that the default or unmarked interpretation of D is deictic. She observes that in early German there is a preference for tonic subject pronouns (85% of all cases) over atonic pronouns at the same time that children 'overextend' topic drop, that is, they drop topics in contexts in which it would be infelicitous to do so in the adult language, where the referent is not clearly given. Hamann suggests that these two phenomena follow from the child's early preference for deictic or direct discourse anchoring of anaphoric expressions. She points out that the tonic pronouns, like first and second person pronouns, are deictic, that is, they can be directly interpreted in discourse, while the atonic pronouns are anaphoric and must be bound by a linguistically specified antecedent, and hence they are a later development. Similarly, children's null topics are directly anchored in discourse and are not anaphorically related to a linguistic antecedent, as would be required in the adult language.
27. My thanks to Alec Marantz and David Pesetsky for bringing the issue of phonological vs. grammatical underspecification to my attention.

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