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NINA HYAMS

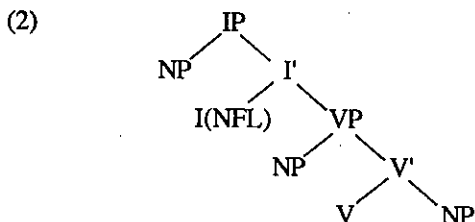# THE GENESIS OF CLAUSAL STRUCTURE

1. INTRODUCTION

Not too long ago the consensus in the field was that during the early stages of language development young children did not have grammatical categories or relations of any sort, but rather that their grammars had a semantic basis (cf. Bowerman, 1973; Schlesinger, 1971, for example). A notable problem for such analyses was to account for the transition to an adult-like, syntactically-based system. Current theories which propose that functional categories are lacking or underspecified in early grammars, face a similar challenge. The latter hypothesis, which I will henceforth refer to as the small clause hypothesis, following Radford (1986, 1990), may in fact have a harder task in that the kinds of semantic bootstrapping mechanisms which have been posited for the acquisition of lexical categories, such as Noun and Verb (cf. Wexler and Culicover, 1980; Grimshaw, 1981), do not readily extend to functional categories, such as INFL or COMP, which have no clear referential function.

The question of whether children have functional categories is a question not only about the correct description of early stages of language development, but also about the kinds of mechanisms available to the child in constructing a grammatical system. If functional categories are indeed missing from early language, as has been proposed by Radford (1986, 1990), Guilfoyle and Noonan (1988), Platzack (1990) and under somewhat different assumptions, Lebeaux (1988), what are the learning and/or maturational mechanisms responsible for the emergence of these categories? This is a central question which the small clause hypothesis must address if it is to provide an adequate account of grammatical development.

A second challenge to the small clause kind of analysis is an empirical one. With the exception of Platzack's work on Swedish, most of the support for this hypothesis comes from English child language (Radford, 1986, 1990; Guilfoyle and Noonan, 1988; Lebeaux, 1988). However, there is a broad range of empirical data from languages other than English which cannot be readily accounted for under the assumption that early grammars

lack functional heads. For example, in many languages, children have knowledge of various inflectional processes such as subject-verb agreement and Case assignment, as well as the syntactic process of verb movement. In this paper I will focus on these cross-linguistic data and I will discuss the empirical problems which they present for the small clause hypothesis. I should point out that for the most part the data that I will discuss are not new. However, these data have either been overlooked by proponents of the small clause hypothesis or, where they have been considered, they are often not given the weight they deserve.

2. EVIDENCE FOR THE I SYSTEM

2.1. Subject-verb agreement and Case assignment

One language in which children give clear evidence of an I(NFL) system is Italian. Hyams (1983, 1986a), Schaeffer (1990), Pizzuto and Caselli (1991) and others have noted that Italian children between the ages of 1;10 and 2;0 (and for some children as early as 1;8) have productive subject-verb agreement for at least the singular present tense paradigm (1,2,3 person singular). Examples are given in (1).[1]

(1)   a.   (1;11) Tu   leggi   il libro.
                  You [nom.]   read [2nd per. sing.]   the book
      b.   (1;11) Io   mangio   la pera.
                  I [nom.]   eat [1st per. sing.]   the pear
      c.   (2;1) Cosa fa   il tore?
                  What does [3rd per. sing.]   the tape recorder
                                                                   (do)?
      d.   (1;11) Chelo micino no   é   piccino.
                  That kitty   not is [3rd per. sing.] little

Note that the lack of productivity for plural agreement markers is not due to errors in agreement, but rather to the fact that children simply tend not to use many plural subjects at this age. Valian (1990) notes a similar phenomenon in English, where young children use only singular pronouns.[2]

Subject-verb agreement entails that there is some functional category, I or AGR (Pollock, 1989; Chomsky, 1989) between the subject and the VP, roughly as in (2)[3].

(2)

```
            IP
          /    \
       NP        I'
               /    \
          I(NFL)      VP
                     /   \
                   NP      V'
                          /   \
                        V       NP
```

The presence of I is further evidenced by the fact that subject pronouns in Italian are appropriately Case-marked in the nominative. Examples of nominative Case marking are given in (1a,b). These should be compared with the sentences in (3) which contain a direct object clitic, also correctly Case-marked in the accusative or dative. Thus we cannot maintain that nominative is simply a "default" Case.

(3) a. Ti   do   questo.
         (I) to you (dat.) give this
         'I give you this.'
     b. Meo   dai?
         (You) to me (dat.) it (acc.) give
         'You give it to me ?'
     c. Io la   mangio.
         I   it (acc.) eat
         'I eat it.'

Under standard assumptions nominative Case is assigned to the subject by a c-commanding functional head. In Italian, there are no Case-marking errors of the sort which we find in English, for example, 'me like it', in which children use an accusative pronoun in subject position (cf. Hyams, 1983 for discussion). According to Valian (1990) such errors are rare even in English, and hence the evidence that early English lacks a Case component as claimed by Radford (1986, 1990) and Lebeaux (1988) is weak.[4]

The Italian data concerning Case are not unique. Weist and Witkowska-Stadnik (1985) report that Polish speaking children have productive control of the Case system (7 cases including nominative) and subject-verb agreement for person, number and gender by age 1;9. Slobin (1982) observes that Turkish children use much of the verb morphology productively before age 2, as well as the Case morphemes for 7 Cases, including nominative. Similar facts are reported for Hungarian (MacWhinney, 1974), Tamil (Raghavendra and Leonard, 1989) and many other languages. It is difficult to see how such languages could be generated by a grammar which lacks an I system.

2.2. Clitic Placement in Italian

Another source of evidence from Italian child language for an I projection is clitic use. Children have productive and correct placement (preceding the tensed verbal element) of clitics by roughly age 1;10 (Hyams, 1983; Bates, 1976).[5] The sentences in (3) are illustrative. Kayne (1989) has argued that clitic placement involves head movement to I[6]. One might argue that this is the case only for adults and that for children clitics only adjoin to V without raising to I. If this were the case, children's use of clitics would not entail the presence of a functional head. There is good evidence, however, that children do attach the clitic to I. The evidence comes from sentences with auxiliary verbs.

In Italian, the accusative clitic must appear immediately preceding the tense bearing element, as in (4). Thus in participial constructions containing auxiliary verbs, the clitic is attached to the auxiliary and not the main verb, as in (4b,c,d). This follows on the assumption that the auxiliary and the clitic raise to I.

(4) a. Questo libro, lo leggo   volentieri.
         This book,   (I) it-read willingly
     b. Maria ti ha   visto   andare a cavallo   ieri.
         Maria you-has seen   go horseback riding   yesterday
     c. Questi articoli, Gianni li ha   letti   due volte.
         These articles, John   them-has read   twice
     d. Questa rivista, l'ho   letta   in fretta.
         This magazine, (I) it-have   read   in a hurry

e. * La pasta,   ho   la mangiata.
    The pasta,   (I) have it-eaten

Note, also, that in Italian participial constructions the past participle agrees in number and gender with an accusative clitic. Thus, in (4c) the masculine, plural clitic *li* triggers agreement on the participle, which is spelled out as *letti*, whereas in (4d) the participle agrees with the feminine singular clitic *la* (which is contracted onto the auxiliary).

Returning to the acquisition facts, if children do not have clitic raising to I, but instead are simply adjoining the clitic to V, then we would predict that there would be errors in which the clitic is incorrectly placed between the auxiliary and the participle, as in (4e), for example. Such errors are completely unattested in the child language data. Instead, we find the clitic placed correctly from the first participle constructions, as in (5).

(5) a. (2;1) L'ha   buttata via   a Lila.
                it-has   thrown away   the Lila
                'Lila threw it away.'
     b. (2;3) Si,   li ho   visti   io.
                Yes,   them-have   seen   I
                'I have seen them'
     c. (2;4) L'ha   portata   la tata.
                it-has   brought   the nanny
                'The nanny has brought it.'

Another fact worth noting about the data in (5) is that the participle is correctly inflected to agree with the clitic, as discussed earlier (cf. 4c,d). This observation brings us to our second argument in support of the claim that children raise clitics to I. In adult Italian, past participles agree in number and gender with clitic pronouns, as noted above. However, they do not agree with full NP objects in post-verbal position. Thus, we have the contrast in (6).

(6) a. I fiori,   *li* ho   vist*i*   io.
         The flowers,   them-have   seen   I
     b. Ho   visto i fiori.
         (I) have   seen   the flowers
     c. * Ho visti *i fiori.*

In (6a) the participle is correctly inflected to agree with the clitic. In (6b) the participle is in the neutral masculine singular form. In (6c) it is incorrectly inflected in agreement with the lexical object, *i fiori*. Antinucci and Miller (1976) note that Italian children appear to make the error in (6c); that is, they apparently inflect the past participle in agreement with a lexical direct object in post-verbal position. The examples in (7) are from Antinucci and Miller (1976).

(7) a.   (2;0) Fatt*i*   la nonna   (i pantaloni).
            Made   grandmother (the pants)
     b.   (1;8) Pres*e*   io (calze).
            Taken   I (shoes)
     c.   (1;10) La Signora   ha   chius*a* *a porta.*
            The woman   has   closed   the door
     d.   (2;4) Ho   sbagliat*a strada.*
            I have   taken the wrong street

This phenomenon is of some theoretical interest precisely because the child's language seems to differ in a systematic and interesting way from the adult language. Such cases potentially provide a window onto the developmental principles which the child uses in grammar construction. Borer and Wexler (1988) propose one such principle - the Unique External Argument Principle (UEAP) - according to which every verbal element has a unique external argument; thus children (though not adults) take the direct object to be the external argument of the participle and this triggers agreement. (This is an overly simplified presentation of their analysis, but sufficient for our purposes.)

There is, however, an alternative explanation for the agreement pattern illustrated in (7), and one which does not require us to invoke a principle such as UEAP. McKee and Emiliani (1990) propose that in such cases there is a null clitic which is triggering agreement. McKee and Emiliani present rather compelling experimental evidence in support of this hypothesis. In a production task with 9 Italian children between the ages of 2;2 and 2;11, McKee and Emiliani elicited participial constructions with clitic and non-clitic (full NP) objects. In sentences where only a clitic and not a full NP object would be felicitous the children correctly inflect the participle. Importantly, this is true whether or not the clitic was actually expressed. Thus, there were cases in which there was an inflected participle but no

overt clitic (and also no lexical object). Conversely, in elicited sentences with full direct objects (where agreement would be ungrammatical), the children inflected the participle only once in 25 responses. Thus, there is little support for the notion that children make the error of agreeing the participle with a full lexical object. It is more likely that in the Antinucci and Miller examples, such as (7), (in which context of the utterances is not given), children are *correctly* inflecting the participle to agree with an unexpressed clitic.

The McKee and Emiliani results are relevant to the question of whether children raise clitics to I. If children are not raising clitics to I, then we should find cases in which the clitic occurs in the absence of an auxiliary, i.e., cases in which the clitic is attached directly to the past participle. However, the data in McKee and Emiliani and Antinucci and Miller show that while children may omit a clitic and they may also omit the auxiliary when there is no clitic, it is never the case that the clitic occurs in the absence of a phonological auxiliary. Thus, we find structures of the sort in (8a,b), but not those in (8c). (Part = inflected past participle)

(8)	a.	CL/Ø	AUX	part
	b.	Ø	$[_{AUX} Ø]$	part
	c.	*CL	$[_{AUX} Ø]$	part

The total lack of sentences conforming to the structure in (8c) in both spontaneous and elicited production follows under the assumption that for the child (as for the adult) the clitic must have a lexical I to adjoin to. This supports our hypothesis that in Italian child language clitics raise to I, and a fortiori the hypothesis that the early grammar contains an I projection.

2.3. The Position of Negation

In general, the most compelling evidence for a small clause analysis has come from English speaking children (cf. Radford, 1986, 1990), in particular, the fact that there are few if any verb inflections or auxiliaries in early English, giving it the "telegraphic look" first discussed in Brown (1973). However, in light of the strong evidence for an I system in other languages, such as the ones previously discussed, it seems reasonable to look more closely at English and see whether English speaking children show any evidence of functional categories. To address this question, I

would like to consider the development of negation in English child language. Although the arguments I will present are indirect, the developmental data do point to the presence of an I system.

Radford (1986, 1990) argues that sentences such as (9), which contain a bare negative marker unsupported by any inflectional element, are consistent with his small clause analysis of child language in that you find similar kind of adverbial negation inside adult small clauses, as in (10).
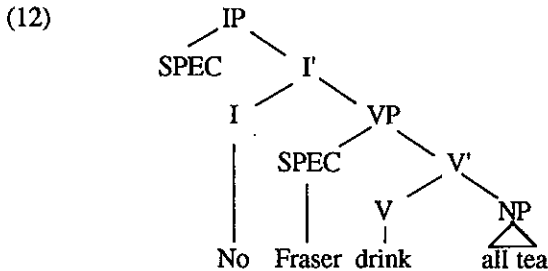
(9)   I not get it dirty.
           I not bending them.
           That no blast off.

(10)   I consider John not particularly nice.

However, the data in (9), taken from Bellugi (1967), represent the *second* stage in the development of negation. Prior to this point, there is a well-known stage during which children have sentence external negation, as in (11). (Sentences also from Bellugi, 1967).

(11)   Not the sun shining.
           No Fraser drink all tea.
           No I see truck.

There does not seem to be any easy way of accommodating external negation into the small clause analysis, nor of explaining the transition from external (e.g. (11)) to internal (e.g. (10)) negation. Suppose, however, that we adopt the analysis proposed in Pierce (1989), which is as follows. Children do have a clausal structure which includes I projections and negation is generated in either INFL or NegP, following Pollock's (1989) analysis of the adult language. Suppose, moreover, that children have VP-internal subjects, along the lines proposed by Kitagawa (1986), Koopman and Sportiche (1988) and others, but that they do not initially raise subjects to SPEC IP. During Bellugi's Stage A, that is, the period of external negation, children have structures roughly of the sort in (12)[7].

(12)

```
              IP
          /        \
      SPEC          I'
              /          \
          I                 VP
          |            /         \
          |        SPEC            V'
          |          |        /        \
          |          |       V          NP
          |          |       |          △
         No       Fraser   drink      all tea
```

Following the development of subject raising - Bellugi's Stage B - we have roughly the structure in (13). Thus, the apparent movement of the negative marker from external to internal position actually reflects the movement of the subject from a position internal to the Verb projection to the SPEC of IP.

(13)

```
              IP
          /       \
      SPEC         I'
        |      /       \
        |     I          VP
        |     |      /       \
        |     |   SPEC        V'
        |     |     |          △
     That_i  no    t_i      blast off
```
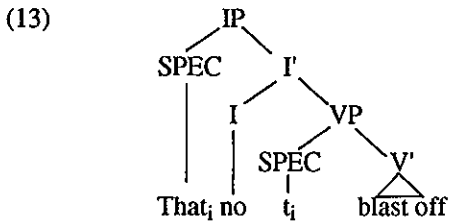
The VP-internal subject analysis provides a rather natural account of early placement of negation, as well as the transition to sentence internal negation and crucially, it presupposes that there is a SPEC IP position. So while young English speaking children appear not to have productive control of verbal inflection at this age, the negation facts provide a different form of evidence for the presence of some I projection in early language.[8]

Let's turn now to the phenomenon of Verb Movement.

2.4. Verb Movement

Pollock (1989), and Chomsky (1989), following Emonds (1978) propose that languages vary with respect to how inflectional morphology affixes onto the verb. In many languages, for example, French, the tensed verb raises into one or more I projections, while in English the affixes are

presumed to lower onto the verb in VP (the affix hopping rule of Chomsky, 1957; but see Johnson, 1990 and Jaeggli and Hyams, 1990 for a verb raising analysis of English), or are picked up by a pleonastic do. Whether the verb has moved or not can be deduced from its position relative to negation and adverbs, for example. Thus, in English, the verb follows negation and adverbs, as in (14a), while in French the tensed verb precedes, as in (14b).

(14)   a.   John *doesn't* kiss Mary / John *often* kisses Mary
       b.   Jean n'embrasse *pas* Marie /   Jean embrasse *souvent* Marie

The relevant structures are roughly as in (15).

(15)   a.

Jean n'embrassse$_i$ pas (souvent) t$_i$ Marie

       b.

John does not(often) kiss   Mary
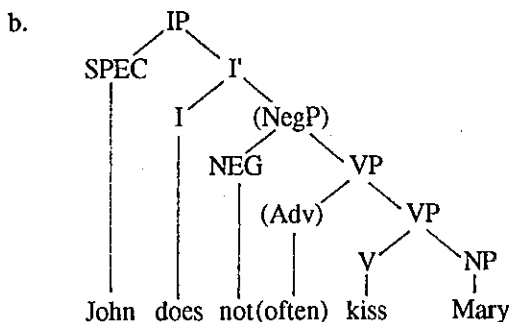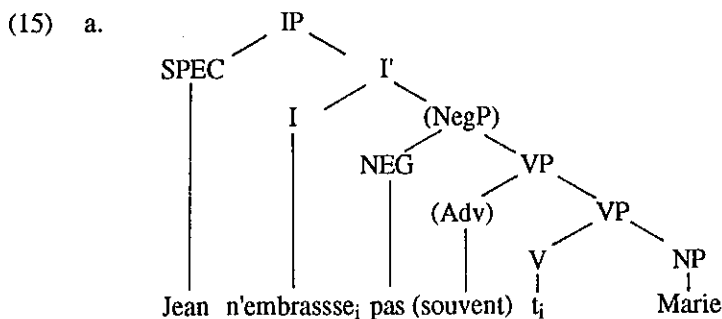
In looking at children acquiring languages which have verb movement, we can use the position of negation relative to the verb as a diagnostic for determining whether there are functional heads. The data from French

speaking children are clear on this point. Weissenborn, Verrips and Berman (1989), Meisel (1990), and Pierce (1989) all note that French children correctly place tensed verbs in the pre-negation position, as in (16b), and that, crucially, infinitival forms follow negation, as in (16a). Pierce argues that by age 2 the children have mastered verb raising to INFL. The examples in (16) are from Pierce (1989).

(16) a.   Pas   manger   la poupée.
          Not   eat   the doll
          Pas   tomber   bébé.
          Not   fall   baby
      b.   Patsy est   pas là bas.
          Patsy is   not down there
          Veux   pas lolo.
          Want   not water

2.5. Summary

There is considerable evidence from a variety of typologically distinct languages that young children have a more articulated phrase structure than the small clause analysis would propose. Minimally, they have one level of functional structure above VP (in addition to NegP). This "functional shell" might correspond to AgrP or TP or simply IP. It is difficult to decide the issue on the basis of the evidence presented thus far. So for the time being, let us simply refer to this projection as IP, as in (17).

(17)

```
              IP
           /     \
      SPEC        I'
              /      \
          I          VP
                  /      \
              SPEC        V'
                      /      \
                  V            ...
```
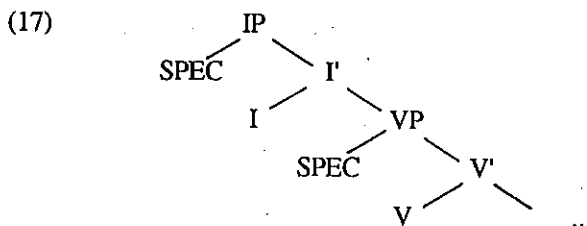
Our next question is, is there evidence of an even higher functional projection, which for ease of exposition, we will refer to as CP, though we will return to the question of the categorial status of this projection later.

3. EVIDENCE FOR A
HIGHER FUNCTIONAL PROJECTION

3.1. Verb Second

The verb second phenomenon, which exists in all the Germanic languages except English, provides yet another avenue for exploring the question of whether young children have functional categories. The standard analysis of V2 within current theory, based on the original insights of Koster (1975) and den Besten (1983), involves movement of a finite verb to the head of COMP; subsequent movement of an XP to the SPEC of COMP results in the verb appearing in second position.[9] V2 is restricted to main clauses, except in Icelandic and Yiddish, where it also holds in tensed subordinate clauses. The German sentences in (18) illustrate standard V2 effects.

(18) a.   Ich   kenne   den Mann.
           I   know   the man'
      b.   Hans sagt, daß er den Mann kennt.
           Hans says that he the man   knows
      c.   Hans behauptet den Mann zu kennen.
           Hans claims   the man   to know

The question for us is do children show knowledge of the V2 requirement? If they do, then we have good reason to believe that they have the functional categories involved in the V2 effect. This follows from the Head Movement Constraint (Travis, 1984; Chomsky, 1986) according to which, a head, in this case the verb, may only move to the closest governing head position.

There are a number of interesting studies which have looked at the V2 phenomenon in child language, for example Clahsen (1986, 1990) Clahsen and Penke (this volume) and Meisel and Müller (this volume) for German, Platzack (1990) for Swedish, de Haan (1986), Weverink (1989) for Dutch, and Sigurjónsdóttir (1987) for Icelandic, among others. With the exception of Sigurjónsdóttir, these authors have concluded that children do not have adult-like knowledge of the V2 requirement at the initial stages of acquisition. I believe, however, that the empirical data do not support this conclusion.

In what follows I review the main points of these studies. In the interest of conciseness, I will ignore many interesting and important details of these analyses.

3.2. German

Clahsen (1986, 1990) observes that German children initially position the verb in either 2nd or last position and that the verb-final construction predominates. It is not until Clahsen's Phase IV, i.e., when the children are over 3 years old, that they place the finite verb in second position at least 90% of the time. Clahsen argues that prior to this point German children do not distinguish finite from non-finite verbs, and hence they do not have adult-like verb movement. However, there are two important aspects of Clahsen's data which argue against his analysis. First, Clahsen (1990) notes that even in the earlier Phases II and III, the different verb forms are not randomly distributed between second and final position. Only the modals and verbs with a -*t* affix appear in 2nd position, while infinitives (-*n* affix) and unmarked verbs (Ø affix) only occur in final position. This distribution strongly suggests that German children, like the French children discussed earlier, do distinguish finite from non-finite forms. They appear to mark finite verbs with the -*t* affix, while nonfinite forms are marked with -*n* or Ø, and only the former undergo verb movement, at least optionally.[10]

There is a second aspect of the German data which supports this hypothesis. Clahsen notes that there is an important asymmetry between preverbal and postverbal negation in German child language; postverbal negation typically occurs with verbs inflected with the -*t* affix, while preverbal negation is used with the infinitive form and the unmarked verb form (Ø affix). This distribution follows straightforwardly if we assume that the finite verb form undergoes movement to a functional position preceding NegP, arguably to COMP.[11]

3.3. Dutch

De Haan (1986) and Weverink (1989) also note that the distribution of verbal forms in the language of Dutch children is severely restricted. At age 2, the child uses finite verb forms in first and second position (first position when the subject is dropped), and non-finite verb forms in final position. However, de Haan and Weverink argue against a verb movement analysis of this phenomenon. Despite the prima facie evidence, de Haan claims that

children do not distinguish finite from non-finite verbs at this point, and he offers as evidence the fact that they do not have productive subject-verb agreement. (Clahsen, 1986 and Weverink, 1989 use the same argument.)

However, we need to ask why a ±finite distinction should entail person and number agreement. After all, there are languages, such as Swedish, which distinguish finite from non- finite verbs, but which do not have subject-verb agreement. It is certainly logically possible that the child encodes ±finite before the number/person features (and in fact cross-linguistically this seems to be the case). For our present purposes, suffice it to note that V2 is sensitive to finiteness and not number and person agreement, and hence we should take de Haan's acquisition data at face value. What they show is that children do distinguish finite from non-finite forms and that the former undergo verb movement.[12]

3.4. Swedish

Platzack (1990) argues for a small clause analysis of child language based on acquisition evidence from Swedish. The children whose language he examines are roughly between the ages of 20 and 26 months. Platzack's main argument centers around the claim that there is initially no verb movement. Since Swedish is underlyingly SVO, evidence for movement is somewhat more obscure. Thus, what Platzack does is to calculate the number of utterances which can be accounted for under the assumption that there are no functional categories, and the number of child utterances which cannot be accounted for under this assumption. For example, a sentence with an XP-Verb-Subject-YP sequence, such as (19a), would presuppose functional categories, since both the (non- subject) XP and the verb appear to have undergone movement of the type that you find in the adult grammar. Similarly, a question with inversion would presuppose a functional category.

(19) a.   Namn har den. (XP-Verb-Subject)
            Name has it
            'It has a name.'
      b.   * Inte mamma hjälpa   Embla. (XP-Subject-Verb-YP)
            Not   mommy help (inf.) Embla

In contrast, a sentence such as (19b), in which the verb is in third position, in violation of the V2 requirement, is taken as evidence that children do not have functional projections, but are rather adjoining elements to a VP small clause.

Platzack looks both at sentences with infinitival forms and at sentences with finite verbs. For the moment I will restrict my attention to the discussion of the finite forms since the verb movement analysis only is relevant in this case. I return to the infinitival sentences. Platzack found that of the utterances containing finite verbs there were 169 utterances which could be accounted for without assuming functional categories and 61 which could not be accounted for without assuming functional categories. Comparing these figures we might conclude that the evidence for movement/functional categories is slim, which is Platzack's conclusion. However, it is important to note that of the original 169 utterances which are used as evidence against the presence of functional categories, 154 are Subject-Verb-(XP) utterances, as in (20).

(20)[13]   Hon   tog   dockan.
            She   took   the doll
            Bilen   kommer.
            The car comes

Notice, however, that sentences such as those in (20) are perfectly grammatical in the adult language where they *are* generated via verb movement. Thus, these utterances are compatible with both a movement and non-movement analysis and must therefore be considered neutral with respect to the hypothesis being tested. If we eliminate them from the count, we are left with a total of 11 utterances which are ungrammatical in the adult language and which could be considered inconsistent with a movement/functional category analysis.[14] If we compare this to the 61 utterances which cannot be accounted for without functional categories, the weight of evidence is clearly against a small clause analysis.[15]

There is a second crucial comparison to be made in the Swedish data - the rate of verb movement in finite vs. non-finite sentences. We have already seen that in Dutch and German, children appropriately restrict movement to finite verbs at a very early age. Excluding the ambiguous Subject-Verb-XP sequences mentioned earlier, Platzack's data show that there are 61 cases of clear verb movement in finite utterances and Ø in the

non-finite case. Thus, the pattern that we observed in the other Germanic languages is repeated in Swedish. The movement of finite verbs entails not only a C projection to which the verb moves, but also some functional head (e.g. IP or TP) which determines finiteness.

3.5. Icelandic

Icelandic is another V2 language with SVO word order. As in the case of Swedish, evidence for verb movement is harder to come by. However, the inversion is apparent in interrogatives, in which the verb appears in first position (presumably following an empty Q morpheme), and after preposed constituents. These two cases are illustrated in (21).

(21) a.   Fóru þeir heim   um kvöldið?
             Went they home   that night
      b.   Bókina   keypti einhver   í gær.
             The book   bought somebody   yesterday

Sigurjónsdóttir (1986) examined the acquisition of inversion in Icelandic children. As is the case with Swedish children, the majority of the Icelandic children's utterances are main clauses with SVO order. Sigurjónsdóttir notes, however, that soon after the children start producing two-word utterances (age 2;0), they correctly apply verb movement in interrogatives and with preposed constituents more than 90% of the time. Sentences with inversion constitute about 30%-40% of their utterances. Thus, Icelandic children also exhibit knowledge of verb movement at a very early age, an age at which the proponents of the small clause type of analysis propose that children do not have functional heads.[16]

3.6. The position of fronted verbs in child language

Thus far we have assumed that the V2 effect in child language involves movement of the verb to C (with the possible exception of Icelandic, see note 16). Meisel and Müller (this volume) propose, however, that this is not the case, and that the early grammar lacks a C projection. On their account, rather than raising to COMP, the verb in V2 languages raises to a second I position. Adopting Pollock's "split INFL hypothesis," Meisel and Müller suggest that at the earliest stage, the verb raises only as far as T. The relevant structure (for German) is given in (22).

(22)

```
            TP
          /    \
       SPEC     T'
              /    \
            T'      AgrP
                   /    \
                SPEC     AGR'
                        /    \
                      VP      AGR
```
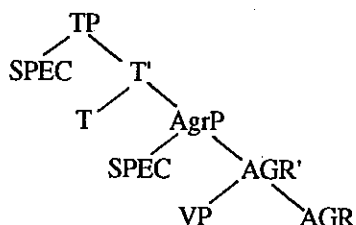
The subject (or other XP) raises from the VP-internal position to SPEC TP giving rise to the V2 effect.[17] According to Meisel and Müller's analysis, children have "short clauses." Their argument for a short clause analysis is that children do not give any independent evidence of having a C position. A crucial fact for Meisel and Müller is that complementizers are completely absent at this stage from the language of the French-German bilingual children they studied. For these children the complementizers emerge between the ages of 2;6 and 3;0. Moreover, (though this is a less important point for Meisel and Müller) the children fail to invert the verb and subject clitic in French, as in (23) (Examples taken from Meisel and Müller). In the adult grammar, the verb could optionally raise to C in these cases (Rizzi and Roberts, 1990), as illustrated by the sentences in parentheses.

(23) a. Où il est le   papa? (cf. Où est-il le papa?)
         Where he is the Daddy
     b. Où l'est le   papier? (cf. Où est-il le papier?)
         Where it-is the paper
     c. Où il est baguette? (cf. Où est-il le baguette?)
         Where it is (the) stick

If V2 were the only evidence for a C projection in the early grammar, then I think it would be reasonable to conclude, as do Meisel and Müller, that verb raising in the various child languages we have discussed actually involves raising to a second I position and that the early grammar differs from the adult grammar in this respect (except perhaps in the case of Icelandic. See note 16). The short clause analysis is the most parsimonious one consistent with the French and German acquisition data they discuss. It is also a very elegant account requiring few ad hoc assumptions concerning the form of

the intermediate grammars. However, I believe that there is further, less ambiguous evidence of a COMP position in the early grammar.
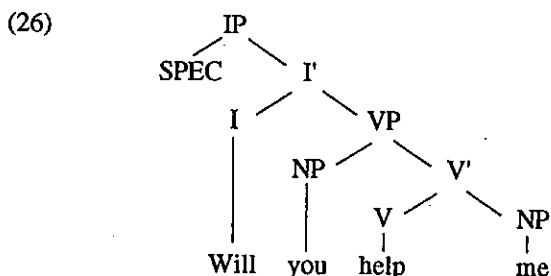
3.7. Evidence for C

Interestingly, the first piece of evidence for a C position comes from early English. Klima and Bellugi (1966) were the first to observe that English speaking children go through a stage (Klima and Bellugi's Stage C) in the development of questions in which they front the wh phrase, but fail to invert the auxiliary, as in (24). (Examples from Klima and Bellugi, 1966)

(24) a. What he can ride in?
      b. Which way they should go?
      c. Where the other Joe will drive?

These sentences bear a striking similarity to the French sentences in (23), which Meisel and Müller take as evidence that children do not have a C position. What is curious about this stage is that English speaking children who are producing the sentences in (24) do invert the auxiliary systematically in yes-no questions, as in (25).[18] (Examples from Klima and Bellugi, 1966)

(25) a. Does the kitty stand up?
      b. Is Mommy talking to Robin's grandmother?
      c. Will you help me?
      d. Can I have a piece of paper?

The inverted structures in (25) provide prima facie evidence that children do have a functional projection above the subject position, i.e. COMP.[19] However, Guilfoyle and Noonan (1988), who also argue that there is no C projection in the early grammar, have proposed that inverted sentences such as those in (25) are actually based generated with the auxiliary in I and the subject inside the VP. That is, they propose that in such cases the subject fails to raise out of its base-generated VP-internal position. The relevant structure would be as in (26).

(26)

```
                IP
              /    \
         SPEC       I'
              /         \
          I              VP
          |          /       \
          |       NP           V'
          |        |        /     \
          |        |       V        NP
          |        |       |        |
         Will     you    help       me
```

It is important to note, however, that children at this stage are well beyond the VP-internal subject stage, which we discussed earlier (see section 2.2). For example, at this point we no longer find external negation. Examples of Stage C negation are given in (27). (From Klima and Bellugi, 1966.)

(27) a.   You didn't eat supper with us.
      b.   I can't see it.
      c.   It's not cold.
      d.   I gave him some so he won't cry.
      e.   I not crying.

Moreover, the Guilfoyle and Noonan proposal raises the following question; if children can have the subject internal to VP in yes-no question, producing "apparent" inversion, why don't they allow the subject to remain in VP in wh-questions, in which case we would find "apparent" inversion in wh-questions as well, rather than the uninverted questions in (24).

Thus, the evidence from question formation in English argues that children at this stage do have a C projection.[20] The alternative, short clause account is inadequate in at least the respects discussed above.

There is a second argument against the hypothesis that children do not have C and that V2 in German and Dutch involves raising only as high as TP. In adult German, V2 is blocked in embedded tensed clauses because the COMP position is occupied by a complementizer. Arguably, however, a tensed verb raises to TP in both main and embedded tensed clauses (presumably to pick up ±finite inflection). If V2 effects in child language are the result of movement to TP, then we should find verb raising in both embedded and main clauses. Interestingly, children rarely make V2 errors in subordinate clauses (Clahsen, 1986, 1990; Meisel and Müller, this

volume).[21] Once they produce subordinate structures, the word order is correct. As Clahsen (1990) has observed, this result is striking since we might expect that children would initially overgeneralize the verb-second requirement. Such an overgeneralization is particularly likely if children are fronting the verb to TP, which is equally available in main and subordinate clauses.

One final argument for a C projection in early child language is wh-movement. First, wh questions are mastered quite early on, certainly within the age range we have been considering. Radford (1986, 1990) and Guilfoyle and Noonan (1988) argue that at this early stage wh-questions are generated through adjunction to VP (or IP) and not by substitution into SPEC CP, as in the adult grammar. While this is certainly a possible derivation for wh-questions, given the model of grammar that is assumed, it fails to account for the fact that in addition to questions, children produce indirect questions by about age 2;4. Some examples are provided in (28).

(28)   a.   I show you how to do it.
       b.   I remember where it is.
       c.   I show you what I got.
       d.   I don't know who is it.

These are among the earliest complex sentences used by English speaking children (Limber, 1973). Unlike wh-questions, which are plausibly generated via adjunction, indirect questions are subcategorized for, and hence the wh-phrase which heads the embedded clause must be in C.

4.   CONCEPTUAL WEAKNESS OF THE
SMALL CLAUSE ANALYSIS

In addition to the empirical difficulties discussed in the previous sections, the small clause hypothesis also suffers from a particular conceptual problem, which is that it rests on the dubious assumption that one can argue from the absence of particular lexical items in the child's language to the absence of a grammatical category in his/her grammar (Radford, 1986, 1990; Platzack, 1990; Guilfoyle and Noonan, 1988). This reasoning fails in two directions. To begin with, the fact that the child fails to utter complementizers, for example, in no way entails that the relevant category,

i.e. C, is missing since the position might simply be occupied by a null element. (See Hyams, in preparation.) Moreover, even if the category were missing, this would not necessarily result in the child not using the lexical items which are members of that category for the simple reason that he or she has the option of assigning the lexical item to a different category, or even to treat it as some sort of affix. Consider in this regard the case of *it's*, *there's*, *here's*, etc. There is good evidence that these forms are initially unanalyzed or monomorphemic (Brown, 1973 and others). By hypothesis, the copula is (mis-)analyzed as part of the NP. Similarly, Bellugi (1967), and others since, have proposed that the first negative modals, *can't* and *don't*, are not modals for the child, but unanalyzed negative elements. In these two cases, the child has analyzed a functional element as either belonging to a different category or as affix on an adjacent head.[22] So the question we should be asking is, if the early grammar does lack a particular category FP (=Functional Phrase), why does the child fail to produce lexical members of F rather than simply misanalyze these elements?

A similar point can be made with respect to the "landing site argument" against functional categories proposed by various authors. This is the idea that if there is no landing site for movement, e.g. no SPEC IP, then there will be no movement. Thus, Guilfoyle and Noonan (1988), for example, propose that children initially fail to raise subjects out of their VP-internal position because there is no SPEC IP position to raise to; a similar argument is made for the lack of passive. However, movement can happen through substitution or adjunction and there is absolutely nothing barring the child from adjoining the subject to VP. In fact, as noted in the previous section, these same authors assume that in the pre-COMP grammar, wh-questions are generated first by adjunction of the wh-phrase to VP and later to IP. In short, it seems to us that the argument for missing categories from missing data is a tenuous one.

5. CONCLUDING REMARKS

The evidence just reviewed suggests a picture of grammatical development quite different from that proposed by the various versions of the small clause hypothesis. There is considerable cross-linguistic, empirical evidence for the presence of functional categories in early language. We find verbal inflection and Case-marking across a range of typologically diverse

languages, supporting the presence of one or more I projections (e.g. I, AGR, T) as well as the Case Filter. Moreover, we find clear evidence of verb movement to I in French (and Icelandic) and arguably to C in Dutch, German, Swedish, and AUX inversion to C in English. Finally, if we assume that the early grammar does contain an I projection, then we have a rather natural account of the development of negation in English and the early use of clitics in Italian.

We find evidence for functional categories at a relatively early stage of development. Most of the data discussed here are from children who are about 2 to 2 1/2 years, which is roughly the point at which children begin multi-word utterances, although as is well-known, there is a great deal of individual variation with respect to age. It is possible that children younger than this lack functional categories. However, in order to put this to empirical test, we need to look at the very early speech of children acquiring languages other than English, languages such as those discussed in this paper where the role of functional categories is overtly represented in the morphology or syntax, via inflection, verb movement, and so on.

To conclude, there are both empirical and conceptual problems with the assumption that children begin with a grammar which does not categorically represent functional heads or their projections. First, there is a wide range of cross-linguistic child language data which cannot be explained under this assumption and second, because of the conceptual problem noted in the previous section, the small clause analysis fails to *explain* the one fact it is intended to account for, namely, the absence of functional elements in those child languages where they are lacking. Finally, there has been no serious attempt to explain how or when functional categories develop if, indeed, they are absent at the early stages.[23] Thus, the theory is not only descriptively weak, but also fails to address the learnability question, which should be a central concern.

ACKNOWLEDGEMENTS

NOTES

[1] Except where otherwise noted the Italian child language data is from a longitudinal study of the acquisition of Italian which was carried out by Massimo Monegla and Emmanuela Cresti and the Collectivo di Educatori dell'Asilo Nido Rampari di San Paolo in Ferrara, Italy during 1981-1982. A total of 22 children were observed and recorded for varying lengths of time. The age range of the children is (roughly) between 1;10 and 2;10.

For further examples and more extensive discussion of the data, see Hyams (1983,1986a).

[2] Pizzuto and Caselli (1991) dispute the claim that Italian children have knowledge of the inflectional system of their language (a claim which was first made in Hyams, 1983). According to Pizzuto and Caselli, a child must show mastery of the entire verbal paradigm (all persons and tenses) in order to be credited with such knowledge. Our different positions with respect to this matter reflect differences in research focus. Our goal in this paper is not to determine when children have learned all (or any) of the inflectional affixes in their language, but rather to determine whether the early language gives evidence of an I-system. In our view children need not control an entire verbal paradigm to be credited with INFL. It is sufficient that they are productive in at least some subset of the grammatical processes which involve this category, e.g. Subject-Verb agreement, Case assignment etc.

As noted in the text, children do not show productive use of plural affixes, but neither do they use plural subjects. Thus, the fact that children do not have complete person paradigms is irrelevant to the question we are asking, though it is relevant to the question of when children have control of particular affixes. Moreover, the fact that children do not use past tense morphology might reflect general conceptual development (lack of understanding of or interest in past time), rather than any aspect of their grammatical knowledge.

In general, the question of when a child has "acquired" a particular aspect of grammar is a notoriously difficult one, since we must often make inferences about the underlying knowledge based on a child's spontaneous productions, which obviously can be affected by many factors, even beyond those which affect adult performance. So, for example, does the English speaking child "know" the 3rd person singular -s when he "uses" it 30, 40, 50, 60 % of the time. Since Brown (1973) many researchers have taken 90 % usage in obligatory context as the criterion for acquisition.However, there are other, perhaps more valid measures of acquisition, for example, overregularization of morphology, e.g. *dos, bes, goed*, etc. In this regard, Chyi (1991) notes that the three children in the Brown corpora, Adam, Eve, and Sarah, overregularized particular affixes before they were using them at the 90 % level. If overregularization reflects knowledge of a particular morphological rule, as is standardly assumed, then Brown's 90 % criterion level might be too high, i.e. it is not reflecting point of acquisition, though this is the assumption that is often made, implicitly or explicitly.

What seems clear is that our measures of acquisition must be sensitive to the particular aspect of language one is concerned with and we must distinguish lexical acquisition, e.g. words, affixes, etc. from grammatical development, e.g. grammatical categories, rules, principles, etc. This issue is discussed further in section 4.

[3] Here and throughout irrelevant nodes are ignored.

[4]   The only empirical evidence ever offered against the presence of adult-like principles of Case assignment is the fact that English speaking children use non-nominative subjects, e.g. *me go*. This phenomenon has not been reported for other languages, and in fact, may even be quite rare in English, as Valian (1990) notes. To the extent that it occurs in English, this may be due to the fact that accusative pronouns are more salient in that they are the ones used in isolation or in topicalized structures, e.g. *Who ? Me?*, *Him, he can't do anything right*. In languages such as Italian, where we do not find a similar distribution of accusative pronouns, there are virtually no Case errors. See Hyams (1983) for discussion of Case assignment in Italian child language.

[5]   In producing clitics, children will often omit the initial consonant, for example, *o-vedo* (I it-see) instead of the correct *lo-vedo*. See also example (3b) in the text. This occurs predominantly with the accusative clitics, which have an initial liquid, and hence is likely to be due to articulatory difficulty. This error is irrelevant to our discussion.

[6]   More precisely, Kayne (1989) proposes that Romance clitics may attach to V or to I. With tensed verbs in French and Italian, which arguably raise to I, the two options for clitic placement converge.

[7]   Guilfoyle & Noonan (1988) and Lebeaux (1989) also propose a VP internal subject analysis for Bellugi's "sentence external" negation stage. In contrast to Pierce (1989), however, these authors do not assume that there are higher functional heads at this early stage. Rather, they take the negative element to be adjoined to a VP small clause (roughly). Pierce also provides the most detailed analysis of the VP internal subject phenomenon in child language, tying it together with several other aspects of child language, for example, post-verbal subjects in early French.

[8]   The question of why English speaking children appear to exhibit greater difficulty with inflectional morphology than children acquiring more richly inflected languages, such as Italian, for example, is an interesting one. There are a number of proposals which attempt to account for this fact. In Hyams (1986b), I proposed a parameter of UG - the Stem Parameter - to account for the cross-linguistic difference in the rate of morphological development. Briefly, the parameter specifies a well-formedness condition on word formation; bare stems are either possible words, as in English, or they are non-possibkle words, as in Italian, e.g. *parl-* ('speak'). Once the parameter is set for the English speaking children, bare stems are well-formed words, and verbal inflection is learned late as a peripheral property of the language. In Italian, in contrast, bare stems are not possible and the acquisition of affixes is thereby facilitated.

More recently, Wexler (1991) has proposed that the bare forms used by English speaking children are not finite forms which lack inflection, but rather, infinitives. This hypothesis is supported by the observation that children acquiring other languages, for example, French and German, do appear to use free infinitives, that is, infinitives which are unsupported by a tensed clause (e.g. *papa manger* in French). If the forms are infinitival, then we are faced with the very interesting question of why the early grammar licenses unsupported infinitives, when the adult grammar does not, or does so only in very restricted circumstances (e.g. *John eat meat, never!*). See Wexler (1991) and Schaeffer (1990) for discussion of this issue.

In work in progress (Hyams, in preparation), I propose, following ideas of Campbell (1991) for adult English, that initially children have only a referential use of tense (i.e. specific); they do not have a quantificational (i.e. generic) use of tense. In English, the present tense (with non-statives) has only a generic reading (e.g. *?? Today John eats pasta*), while in Italian, present tense can have a specific, referential meaning, (e.g. *Oggi Gianni mangia gli spaghetti* - 'Today John eats the spaghetti'). Thus, the English present tense represents a more difficult acquisition.

This analysis predicts, however, that the English present progressive tense, which is used referentially (e.g. *John is eating pasta today*), should not pose the same degree of difficulty. In fact the progressive morpheme *-ing* is one of the earliest morphological developments (Brown, 1973). Thus English speaking children mark finiteness by means of the progressive, while Italian children use the present tense.

9   Following standard analyses, I assume, moreover, that the verb first raises to one or more inflectional head positions and then to C. Whether or not this is the case in the child grammar is discussed in section 3.5.

10   We refer here to the fact that initially children do not consistently raise the finite verb to second position. In fact, at the earliest stages, the verb-final construction predominates. It would thus appear that for children V2 is initially optional, although it is an obligatory process in the adult grammar, or more precisely, a process which in the adult grammar is forced by independent principles of grammar. While this state of affairs raises an obvious learnability question, namely how does the child move from an optional to an obligatory rule in the absence of negative evidence, it also provides interesting support for the modular view of grammar. Within current theories, the obligatoriness of rule application is not built into the rule itself, but derived from independent principles. It is thus possible, and in fact to be expected, that the child would acquire the rule at some point, but may not yet have the (independent) conditions which derive its obligatory operation. This and related issues are discussed in Hyams (in preparation).

11   Clahsen (1990) assumes that at the early stages, children have IP and that second position verbs occur in I. The phrase structure he assumes at this stage is roughly that given for English in (17) in the text. Modals are base-generated in the head of I (accounting for the fact that children never place modals in final position, a point which we return to later). Clahsen also assumes that verbs marked with *-t* move to second position, as we do. However, according to Clahsen, in the early grammar *-t* marks transitivity (and not finiteness, as we have proposed). The notion of finiteness emerges only at the point at which the child has productive V2, i.e., stage IV. One might ask, however, why elements marked for transitivity should undergo verb movement inthe child's grammar. Moreover, Clahsen's analysis makes accidental the fact that it is precisely the verbs which would be finite in the adult grammar (i.e. marked with *-t*) that undergo V2, while the apparentley infinitival forms do not undergo movement.

12   Weverink (1989) provides another kind of evidence that Dutch children distinguish finite from non-finite verbs. She finds that they drop subjects only with the non-finite forms; lexical subjects appear obligatory with finite verbs. This has obvious implications for the various pro-drop analyses of child language (Hyams, 1986a) which are, however, beyond the scope of this paper.

13   These examples are from Lundin and Platzack (1988).

14   However this is not.the only interpretation of these data. For example, the children produced 4 utterances in which the verb is in third position, e.g. XP-Subject-Verb-(YP) and Subject-Adv-Verb-(YP). These can also be explained if, for some reason, Verb movement is optional in the early grammar. We have seen that this seems to be the case for both German (Clahsen, 1986) and Dutch (de Haan, 1986), where we get many verb-final utterances in the early stages (see note 10). See also Lundin and Platzack (1988), who show that children reach 90 % correct verb movement at about the age 29 months.

15   Platzack suggests that about half of these should be rote sentences (e.g. *Där är Nalle* - 'There is Teddy') and should not count as evidence for movement/functional categories. Thus,

there may only be 31 cases which are unambiguous. Even on the revised count, there are twice as many sentences supporting a movement analysis than not supporting one - 31 and 15, respectively.

[16]   The Icelandic data do not provide clear cut support for the presence of a C projection in the early grammar since it has been proposed that in Icelandic V2 involves raising of the verb to I in main and subordinate clauses (Rögnvaldsson, 1984; Thráinsson, 1986), and not to C, as in German or Dutch. Under the assumption that V raises to I, the Icelandic acquisition data provide further confirmation that there is an I projection in the early grammar.

In the next section we return to the question of what functional position the verb raises to in the various V2 child languages we have been discussing.

[17]   This is a very simplified version of the analysis proposed by Meisel and Müller. They assume that the development of V2 in child language arises from the setting and resetting of a number of parameters, including the Head Parameter and Platzack and Holmberg's (1989) Finiteness Parameter, which specifies the placement of the [±finite] either in INFL, as in English, or in COMP, as in German. Meisel and Müller assume that German children (and all children) initially place the [+F] feature in I (=T). Moreover, they assume, that while AgrP and TP are both head final in adult German, children assume a mixed system in which AgrP is head last, and TP is head initial. Thus TP is head initial and contains the [+F] operator making it a landing site for the raised verb.

Clahsen (1990) has also argued that the children do not raise the verb all the way to C, but rather to an intermediate I position.

A similar proposal is made in Jaeggli and Hyams (1988) in order to account for pro-drop effects in early German. We claimed that children initially have the tense features in INFL rather than COMP, where it is located in the adult grammar. However, our analysis was pre-Pollock and hence we did not assume a "split-INFL" system, as Meisel and Müller do.

[18]   Meisel and Müller do not discuss yes-no questions in French and thus we do not know whether French children exhibit the same curious pattern as English children, who invert only in yes-no questions.

[19]   Platzack (1990) reports that Swedish children produce sentences in which the verb appears in a position preceding the subject. Some of these are questions in which the verb is in first position, and others are utterances of the form (XP)-Verb-Subject. Interestingly, such structures occur only with finite verbs and never with non-finite forms. The position of the verb with respect to the subject, as well as the restriction to finite verbs, argues strongly in favor of the hypothesis that the verb is raised to C in these cases.

[20]   This leaves unanswered the question of why children sometimes fail to subject-AUX invert in wh-questions in French and English. This problem is addressed in length in Klein (1982), within an earlier (pre-CP) framework. Klein sugests that children assume AUX inversion is substitution into COMP and hence the inversion is blocked when COMP is occupied by a wh-phrase. Translating this proposal into the current framework in which COMP contains a head and specifier position (Chomsky, 1986), one possible explanation for the complementarity of wh-movement and AUX inversion would be that children misanalyze wh-elements as heads which move into C. The wh-element in C blocks AUX from substituting into that position. This proposal is purely speculative at this point. However there are empirical predictions which follow. First, children should have difficulty with wh-phrases such as *which boy*, *what bear*, etc.,

which cannot easily be analyzed as heads. Second, wh-movement at this stage should be clausebound, as other instances of head movement.

Weinberg (1990) also proposes an account of the lack of inversion in questions. She argues that lack of inversion follows from the doubly-filled COMP filter and hence constitutes the unmarked case, requiring substantial evidence to be overturned. See Weinberg (1990) for further details.

[21] Meisel and Müller (this volume) report that one of their three children, Ivar, did make V2 errors in subordinate clauses. They also reported one other instance of a German monolingual child who made such errors. Though these cases require explanation, they are the exception rather than the rule. Moreover, almost all of the V2 errors which Meisel and Müller cite occur in adjunct clauses introduced by *wenn* ('when/if') (e.g. *...wenn da komm andere schiffe dann gehn die dagegen* - 'when there come other boats then go'), or conjoined clauses. It is possible that in these cases, Ivar has analyzed the dependent clause as a main clause introduced by an adverbial *when* (Meisel and Müller suggest a similar idea). V2 would apply as in main clauses. More compelling evidence in support of their short clauses proposal would be V2 errors in subcategorized complements introduced by true complementizers. Only one such error is reported by Meisel and Müller.

[22] To offer another example, Michael (age 4;0) produces *acold* and *across* as in 'I have an acold' and 'There's an across on top of the church'. In these instances a functional element, the determiner *a*, is misanalyzed as part of the head Noun.

[23] This is not true of Lebeaux (1989), who proposes a very interesting account of the process by which the child might get from an essentially thematic grammar which lacks functional categories to an adult-like system. However, Lebeaux's account, which focusses on English child language, still suffers from the empirical problems discussed in the text insofar as it assumes that the early grammar lacks functional heads.

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CATEGORIES OF FIRST SYNTAX: BE, BE+ING, AND NOTHINGNESS

1. INTRODUCTION

The goal of this paper is to explore how aspects of knowledge (competence) and use (performance) may interact both to determine the course of language acquisition and to determine the child's productions at any given point in acquisition. At the onset of language acquisition the child is limited in its competence and in its performance. That is, the child does not yet know everything she will eventually know about her language, nor is she able to perfectly use the knowledge she does have in either producing or understanding speech. The developing child has a limited performance system which must be accommodated in production and comprehension. We can assume further that different aspects of production entail different cognitive costs, such that the more limited the performance system is, the greater the need to minimize cognitive costs.

Even when the child becomes an adult, the expression of her competence will be filtered through her performance system. For example, there will be grammatical sentences the adult will fail to understand (e.g., 'Buffalo buffalo Buffalo buffalo buffalo buffalo Buffalo buffalo'; Valian, 1990) not because her grammar is lacking but because her performance system has certain properties. (In the "Buffalo" case the problem seems to be an interaction between the single center embedding and the repeated use of the same homograph sometimes as an adjective, sometimes as a noun, and sometimes as a verb. Either alone causes some minimal difficulty; the two together stymy the parser.)

While those facts about competence and performance are obvious, exactly *how* competence and performance interrelate is not obvious at all. In the same way that we cannot investigate the child's competence except through various kinds of child performance, we cannot investigate the child's performance except as it relates to various types of competence. We are at all times dealing with an equation containing 2 unknowns. Recently, there has been increased explicit attention to the role of performance factors in acquisition. See, for example, Bloom (1990), and Valian (1991) for the