Continuity of the Principles of Universal Grammar in First Language Acquisition: The Issue of Functional Categories

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O.   Currently a number of theories of first language acquisition call into question the continuity of the principles of universal grammar. Such studies as Guilfoyle & Noonan (1989), Lebeaux (1988), and Radford (1990) hypothesize differences in the categorial inventories of early child grammar and adult grammar. These studies suggest in particular that early child grammar lacks the functional categories INFL, COMP, and DET; the projections of those categories; and operations defined in terms of these projections, such as WH Movement and Subject/Aux Inversion. This paper focuses on the functional category issue in early child language. We argue on the basis of data from English, German, and Korean that functional categories such as INFL, COMP, and DET are present in early child grammar.

The view that functional categories are lacking in early child grammar claims that utterances like (1-3a) are to be analyzed as projections of lexical categories. When the relevant projection is clausal, it is claimed to be structurally identical to a small clause in adult grammar, an analogy specifically made by Guilfoyle & Noonan (1989), Lebeaux (1988), and Radford (1990). The examples and analyses in (1-3a) are from Radford (1990):

(1)   a.   Jem want $[_{VP}$ Mummy] $[_V$ take] it out]   (121: Jem 24)
         b.   Jem wants $[_{IP}$ Mummy $[_I$ to] $[_{VP}$ $[_V$ take] it out]
(2)   a. $[_{VP}$ $[_V$ Doing] what there] ?   (124: Claire 23)
         b. $[_{CP}$ What $[_C$ are] $[_{IP}$ they $[_{VP}$ doing there]]]?
(3)   a. $[_{NP}$ lady $[_{N'}$ $[_N$ cup] coffee]]   (91)
         b. $[_{DP}$ the lady $[_D$ s'] $[_{NP}$ e $[_{N'}$ $[_N$ cup] of coffee]]]

According to this hypothesis, the child utterances in (1-3a) have the indicated structures, where a VP small clause corresponds to adult IP in (1); a VP small clause with WH *in situ* corresponds to CP with WH in [SPEC, CP] in (2); and NP corresponds to DP in (3).

The evidence adduced to support the lexical projection analysis of early child language falls into two types. First, the X^0 category corresponding to the head of the relevant functional projection in adult grammar is characteristically missing in (minimally) the PF of the corresponding child utterance. Thus infinitival I^0, **to**, is missing in (1a); the tensed verb in C^0, **are**, is missing in (2a), and possessive **'s**, normally taken to be D^0 in a DP containing a possessor, is missing in (3a). Second, operations involving a functional head or a position under its projection are characteristically absent. The adult WH question in (2b) involves syntactic WH Movement (movement of WH to SPEC, CP) and Subject/Aux inversion (movement of a the tensed auxiliary in I^0 to C^0). Neither of these operations are visible in the corresponding child WH question in (2).

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Most of the researchers cited above consider, but dismiss, an alternative analysis of the data represented in (1-3). The alternative analysis claims that (1-3a) are structurally identical to the corresponding adult sentences: they contain functional heads and their projections, but the head and specifier nodes of these projections remain empty at s-structure, as in (4-6):

(4)   Jem want   [IP Mummy [I e] [VP [V take] it out]
(5)   [CP [C e] [IP [np e] [I e] [VP doing what there]]]?
(6)   [DP lady [D e] [NP e [N' [N cup] of coffee]]]

The functional projection analysis represented by (4-6) could be considered to be a version of the continuity hypothesis (Pinker, 1984), as applied to acquisition of phrase structure. This version of the continuity hypothesis proposes that the categorial inventory of child grammar is the same as the categorial inventory of adult grammar.

The primary type of argument against the functional projection hypothesis is a form of Ockham's Razor: if overt functional heads and operations involving them do not occur, they should not be posited in child grammar. This argument parallels analyses claiming that various grammatical categories fail to occur in the adult grammars of natural languages, based on the absence of language-internal criteria for positing them as distinct categories. Such analyses have a long tradition: they include the claims that Salish languages lack a category N distinct from V (Kinkade, 1980), that many Australian languages lack a distinct category A (Dixon, 1976), and that Japanese lacks the functional categories COMP and DET (Fukui & Speas 1986, Fukui 1986). However as pointed out by Radford (1990: 273), the evidence that in addition to the lexical categories N, V, A, and P, the functional categories I, C, and D are "substantive" components of universal grammar seems to be be growing. If this is the case, as Radford notes (1990: 272), the hypothetical absence of these categories in early child grammar cannot be accounted for in terms of parameter setting. The point to be made here is that if indeed I, C, and D are components of universal grammar, the force of the Ockham's Razor argument against positing these categories in child grammar is weakened.

Another type of argument against the presence of functional categories in child grammar is intended to be explanatory. For example, Guilfoyle & Noonan (1988) and Radford (1990: 122-123) assert that the absence of evidence for WH movement and Subject/Aux Inversion in early child speech can be explained by the hypothesis that child grammar lacks a Spec, CP landing site for WH movement and a C^0 target for Subject/Aux Inversion. Similarly, Radford (1990: 257-8) claims that the absence of non-lexical passive in early child language can be accounted for by the absence of a theta-bar A position (i.e. Spec, IP) to be filled by NP Movement.

These particular arguments are all open to critique, however. If child utterances like (5) are WH questions, we must ask how they are interpreted. In a theory where WH has scopal properties and scope is derived by movement, child WH questions must be analyzed as instances of abstract (LF) WH movement. In adult grammars which have WH movement at LF, movement is standardly analyzed as being to a position under S'=CP (Huang 1982, Nishigauchi 1986); abstract WH movement never involves Subject/Aux Inversion at s-structure (cf. Greenberg 1963: Universal #11). As to why early child grammar involves WH movement at LF, we might note that all natural languages with which we are familiar have contexts where WH is in situ at s-structure, while many (probably most) natural languages lack syntactic WH movement altogether. The [+LF] choice for the parameter that determines whether WH movement is in the syntax or at LF is the plausible setting for this parameter in UG at the initial state. Positive evidence for syntactic WH movement alone suffices to reset this parameter.

In contrast to the continuity account of child WH questions, the lexical projection hypothesis must assume that child WH questions are quite unlike adult WH questions in any language, in the syntax and at LF. If they do not involve WH Movement, we must know how they are interpreted; if they do, movement must involve adjunction to VP (as proposed by Radford

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1990). In either case, given the fact that the continuity account of child WH Movement is consistent both with the facts of child language and the principles of UG, the burden of proof lies with the lexical projection hypothesis.

The account of the non-occurrence of passive in early child language in terms of the absence of Spec, IP is also flawed. This account is based on the assumption that child clauses are small clause-like projections of V, and that passive involves NP movement to Spec, IP. The difficulty with this argument is that passive also occurs within VP small clauses in adult grammar, viz. *I saw [Jamie being congratulated]*. Thus whatever the account for the absence of passive in early child language (e.g. Borer & Wexler1987 , Pinker, Lebeau & Frost, 1987; Demuth 1989), it cannot follow from the hypothesis that child clauses are VP small clauses.

In addition to these difficulties with particular arguments that have been adduced in favor of the lexical projection hypothesis, empirical issues remain as well; most salient among these is the fact that arguments for the hypothesis have been based almost entirely on natural speech data. It should be noted that the hypothetical absence of functional categories is brought into question when one uses experimental methods to assess children's grammatical knowledge: several experimental studies have provided evidence that young children 'know' about the very functional categories that are missing in their early speech production (e.g. Gerken, 1987; Gerken, Landau & Remez, 1990; Egido, 1983).

Finally, if the lexical projection hypothesis were correct, it would pose an immense problem of explanation: what accounts for the developmental change from a child grammar which is not consistent with Universal Grammar to an adult grammar which is? Since there is no explanation within the theory of UG for such a change, this problem requires that we divorce the study of first languge acquisition from the study of linguistic theory to a significant degree. Radford (1990) opts for a maturational account of the acquisition of functional categories; thus presumably thrusting the burden of explanantion on biology. In the absence of the necessary biological evidence for a maturational account in this case, this proposal must remain simply a suggestion for a research program. It would be premature at best to assume that such a suggestion constitutes an explanation at our current state of knowledge.

In this paper we argue that the problem posed by the lexical projection hypothesis for the theory of first language acquisition is a spurious one: the acquisition of functional categories is not problematic, because information about functional categories (like information about lexical categories) is provided by Universal Grammar. Our arguments are based on three classes of empirical phenomena in early child language, relating to the presence in early child grammar of the functional categories COMP, INFL, and DET.. The first argument centers on word order in early child German, where the corresponding word order facts in adult German are normally analyzed as involving movement of the verb to the position of a functional head, INFL and/or COMP. The second has to do with the phenomenon of N' deletion in early child English. The third involves the acquisition of relative clauses in Korean, where children appear to initially acquire relative clause structures containing a complementizer, despite the fact that adult Korean disallows complementizers in most relative clause types.

I.   Early Word Order in German

Researchers studying the acquisition of word order in German have generally observed that early child speech is predominantly verb final (Park 1981, Roeper 1972, 1973; Miller 1976, 1979; Mills 1985 and sources cited there; Boser 1989). This generalization extends both to SV (7) and OV (8) order, as well as three word utterances like (9), where it is clearly not some version of the verb second constraint that accounts for the generalization (Mills 1985). The following examples are from Miller (1976, 79):

(7)   teddy reiten.   'Teddy ride.'   (Meike 22)

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| (8) | haus baun. | 'Build house.' | (Meike 22) |
| (9) | thomas klo machen | 'Thomas do bathroom.' | (Meike 22) |

However all researchers have also noted some incidence of VO order as well, as in (10), also from Miller's data:

| (10) | angucken männer | 'Look at men' | (Meike 22) |

In the data of Miller (1976, 79), recorded from two children between the ages of 1 and 2, verb final utterances accounted for 70% of the total (Mills 1985:). The data in Park (1981) from an older child basically confirms this pattern:

(11)   a. <u>Orderings of O and V in Two Word Utterances of Kathrin</u> (Park, 1981:26)

	Phase I (24:0-1)	Phase II (25:3-26:0)	Phase III (26:1-26:3)
O V	8 (80%)	18 (69.2%)	24 (68.6%)
V O	2 (20%)	8 (30.2%)	11 (31.4%)

b. <u>Orderings of O and V in Three Word Utterances of Kathrin</u> (Park, 1981:31)

	Phase I (24:0-1)	Phase II (25:3-26:0)	Phase III (26:1-26:3)
S O V	1 (50%)	6 (35.3%)	7 (28%)
S V O	1 (50%)	3 (17.6%)	6 (24%)
O V S	-	4 (23.6%)	5 (20%)
O S V	-	-	2 (8%)
V S O	-	1 (6.7%)	1 (2%)
V O S	-	3 (17.6%)	4 (16%)

From the standpoint of the lexical projection hypothesis, there are two possible explanations for the co-occurrence of OV and VO order. One is that the child learning German is delayed in acquiring a fixed value of the Head Parameter for V' in German, perhaps because of the presence of both OV and VO order in the input data. On this view, (8) and (10) involve V-bars with heads on different sides of the projection, as in (12):

(12)   a. $[_{V'}$ haus $[_V$ baun]]
        b. $[_{V'}$ $[_V$ angucken] männer]

The other possible explanation consistent with the lexical projection hypothesis is that a [Right] value of the Head Parameter is indeed acquired for V' in German, but V O order is derived by movement of the object to the right of the verb. Under this view, (10) is an adjunction structure:

(13) $[_{V'}$ $[_{V'}$ e $[_V$ angucken]] männer]

From the standpoint of the functional projection hypothesis, the variation in (12a-b) is viewed as derived by movement of the verb. Examples such as (12b) can be analyzed as structures with subjects in SPEC, IP and the tensed verb in I^0 on the left of IP. Under such an analysis, (13a) is an instance of the verb in situ with an phonetically null modal or auxiliary and COMP; (13b) is an instance of verb movement:

(14)   a. $[_{IP}$ [e] $[_I$ e] $[_{VP}$ haus $[_V$ baun]]   (=13a)
        b. $[_{IP}$ [e] $[_I$ angucken] $[_{VP}$ männer t_V]   (=13b)

The analysis in (14) is consistent with Travis' (1984) analysis of subject-initial sentences in adult German, but the data are also consistent with an analysis in which the subject is in SPEC, CP and the tensed verb in C^0. Either analysis is consistent with the functional projection

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hypothesis. Under either view, instances of verb final word order such as (14a) involve a phonetically unrealized auxiliary.

Placement of negation provides a test to choose between the lexical and functional projection hypotheses for these data. Under the lexical projection hypothesis, sentence internal negation is adjoined to V' in the small clause, as in Radford's (1990) analysis of English examples like (15):

(15)   [VP [NP Man] [V' no [V' [V go] in there]]]   (Radford, 1990: 71 Kathryn 22)

This analysis applies straightforwardly to examples of negation in early child German such as (16), from Miller (1976, 1979):

(16)   [V' nicht [V' hause [V gehen]]]]   (Meike 22)

The lexical projection analysis of (16) makes two clear predictions. The first is that there will be occurrences of *nicht*-V-O order as well as *nicht*-O-V order. This is because the lexical projection hypothesis must claim that word order is variable within V', whether because of indeterminate d-structure order (as in 12) or the possibility of right-adjunction to V' (as in 13). The second prediction made by this hypothesis is that V-*nicht*-O order will not occur. Under the lexical projection hypothesis, V-*nicht*-O order could occur only as the result of V^0 adjunction to V'. This would consitute an instance of X^0 adjunction to X', violating the restrictions on derived X' structure proposed by Chomsky (1986b).

Both of these predictions are false. Miller (1976, 1979) lists 51 examples of utterances involving negation, including 20 3 and 4 word utterances. There are no instances of *nicht*-V-O. On the other hand, there are four instances of V-*nicht*-O order, 20% of the total of 3 and 4 word utterances containing negation. These examples are listed in (17):

(17)   a.   macht nicht aua   'Doesn't ouch.'   (Simone 22:3)
       b.   is nich heiss   'It isn't hot.'   (Simone 22:3)
       c.   weint nich mehr   'Cry no more.'   (Simone 22:3)
       d.   mag nicht esse   'Don't want to eat.'   (Simone 22:3)

Under the functional projection hypothesis, all of the actually occurring utterances containing negation are accounted for, as shown in (18):

(18)   a. *nicht* -O-V   [IP [NP e] [I e] nicht [VP hause [V gehen]]]   (Meike 22)
       b. V-*nicht* -O   [IP [NP e] [I weint] nich [VP mehr tV]]]   (Simone 22:3)
       c. O-V-*nicht*   [CP blumei [C esst] [IP [NP e] tI nich [VP ti tV]]] (Simone 22:3)

Under the functional projection hypothesis, (18a) is an instance of a null tense element in INFL and the verb *in situ*; (b) is an instance of verb movement to INFL, and (c) is an instance of Topicalization (movement of the NP *blume* to SPEC, CP) , accompanied by successive cyclic movement of the verb to INFL and INFL to COMP. Two orders cannot be generated under the functional projection hypothesis: *nicht*-V-O and V-O-*nicht*. The former cannot be generated because VO order results only from verb movement to INFL and/or COMP; either movement necessarily moves the verb to the left of *nicht*. The latter order would be generable only by Scrambling (right adjunction) of *nicht*; the fact that negative adverbs are not susceptible to Scrambling in adult Germanic languages (and elsewhere) indicates that this possibility is to be disallowed Crucially, neither of the orders ungenerable under the functional projection hypothesis occurs in Miller's data.

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As a further difficulty for the lexical projection hypothesis, note that the analysis in (16) is unable to account for the O-V-*nicht* pattern in (19c). In order to account for examples of this type, the lexical projection hypothesis must allow *nicht* to be adjoined either to the left or the right of V'. If this possibility is allowed, we should expect instances of V-O-*nicht* as well, since under the lexical projection hypothesis the relative order of V and O within V' must be free. But this order also fails to occur, as we have seen.

In summary, the lexical projection hypothesis must allow the verb and its complement to be freely ordered within V', and the negative element *nicht* also to be freely ordered on either side of V', in order to account for the observed facts of word order in early child German. Allowing these possibilities predicts the existence of patterns that do not occur, while the hypothesis still fails to account for sentences where *nicht* occurs between verb and complement. The overall generalization which the lexical projection hypothesis fails to capture is that the patterns which do not occur in the early child data are those which are disallowed by adult German grammar. This is precisely the result which is predicted by the functional projection account.

II.   <u>N' Deletion</u>

Radford (1990: 106) points out, as a potential class of counterexamples to his claim that early child English lacks the functional category D, the occurrence of the possessive morpheme*'s* in N' Deletion contexts (Jackendoff 1971), as in (19):

(19)   That Daddy's.   (Bowerman 1973: 242 Kendall 23)

Cazden (1968) observed that children who do not use the possessive morpheme in constructions containing a possessor and possessed noun frequently do use it in N' Deletion contexts. Since the possessive morpheme is taken to be the head of DP in analyses such as Abney (1986) and Fukui and Speas (1986), Radford acknowledges that its presence in examples such as (19) is potentially problematic for his claim that early child English lacks DPs. He suggests that the possessive morpheme in these examples may be analyzed as a N' pronoun like *one*, which occurs in the same position in early child speech:

(20)   (a)   It [Daddy's]   (Radford, 1990: 107, from Smith, 1973: 68)
        (b)   [Daddy one]

Under this analysis both *'s* and *one* occupy the position of N' inside NP at d-structure; *'s*, like the corresponding morpheme in adult grammar, then cliticizes to the preceding noun:

(21)   (a) $[_{NP} [_{NP} \text{Daddy}] [_{N'} \text{'s}]]$ (Radford, 1990: 107)
        (b) $[_{NP} [_{NP} \text{Daddy}] [_{N'} \text{one}]]$

In contrast to the traditional analysis of N' Deletion (which we will continue to use as a conventional designation for the phenomenon), Saito & Murasugi (1990) argue that N' Deletion in adult grammar is to be analyzed as ellipsis of the NP complement of DP. Their argument is based on a number of parallels between VP Ellipsis and N' Deletion which can be explained if the latter is analyzed as NP Ellipsis. Both processes require the presence of an overt governor of the null VP or NP. Thus VP Ellipis in (22) below requires the presence of a tensed auxiliary or *to* in I^0, while NP Ellipsis requires the presence of *'s* in D^0 (23):

(22)   a. Kim said it would rain, and it *(did).
        b. Kim said we should go, and we wanted *(to).

(23)   Alec's book is bigger than Gordon*('s).

Following the analysis of VP Ellipsis in Zagona (1982), Saito & Murasugi attribute this requirement to the Empty Category Principle. Under this analysis, an overt governing head is required to license the null VP or NP. This shared property of VP/NP Ellipsis grounds our first argument against the functional projection analysis of (21a) and for a DP analysis, as in (24):

(24)   [DP [DP Daddy] [D 's] [NP e]]

As noted by Radford and Cazden, the typical pattern is for children to produce 's in N' Deletion contexts, but not in possessor constructions with overt possessees. The opposite pattern, i.e. one where a child produces 's in constructions with overt possessees but not in N' Deletion contexts, does not appear to occur. Thus Cazden (1968: 438) observes that during the period throughout which she studied Adam, Eve, and Sarah, all three children were more likely, up to the criterion of 90% accuracy, to supply 's in the N' Deletion context (see table in 25). This pattern occurred in spite of the fact that parents used 's in the overt possessor/possessee context 7-20 times more often than in the N' Deletion context.

(25)   Present/absent ratios for full and elliptical possessives (Brown, 1973, Cazden 1968)

Child	Age (months)	Non-elliptical [NP's N]NP	Elliptical [NP's e]NP
Sarah	27-39	.06 (2/33)	1.00 (8/8)
Adam	27-33	.16 (21/130)	.86 (37/43)
Eve	18-24	.07 (2/33)	.69 (11/16)

If the functional projection hypothesis is correct, the fact of prior acquisition of 's in the N' Deletion context can be explained by the syntactic roles of this morpheme in the two contexts. In constructions with overt possessor and possessee, 's is required only in order to assign Case to the possessor. This requirement is language- (or construction-) specific, since numerous contexts exist in grammar where Case is assigned by a null head:

(26)   a. Jean [IP embrasse] souvent tV Marie.   (Verb Raising)
        b. Jun took the book, and Naomi [V e] the candle.   (Gapping)

In N' Deletion contexts, on the other hand, the presence of 's is required by a principle of universal grammar, the ECP. Acquisition of obligatory 's in possessor/possessee constructions is dependent upon learning the language-particular details of Genitive Case assignment in English. Acquisition of 's in N' Deletion contexts follows directly from universal grammar, given the DP analysis in (25).

A second argument against the functional projection analysis of N' Deletion in child speech has to do with the alleged status of N' pronominals in child and adult grammar. The analysis of 's as an N' pronominal in (21a) is based on the hypothesis that 's occupies the same position as one in (21b), and that one actually instantiates the category N'. Under the lexical projection hypothesis N' is a maximal projection; thus NP pronominals such as it, she, he, etc, have the same categorial status as the putative N' pronominals one and 's: All pronominalize N's. Given this assumption, it is unclear how a language learner would be aware of the ill-formedness of *Daddy it corresponding to Daddy one or Daddy's. Under the functional projection hypothesis this difficulty does not arise: it, etc. are DP pronominals, while one is an NP pronominal, as shown in (27):

(27)   Sal took this picture of the harbor, and Chris took [NP that [N' one]].

A final argument for extending the same analysis to contexts like (19) in child and adult grammar follows from a property which N' Deletion shares with VP Ellipsis and IP Ellipsis (Sluicing), as pointed out by Saito and Murasugi and Lasnik & Saito (in prep.). Sag & Hankamer

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(1976: 392, 408) show that the elliptical VP and IP in VP Ellipsis and Sluicing contexts requires a linguistic antecedent:

(28)   VP Ellipsis
        a.   Hankamer: I'm going to stuff this ball through this hoop.
                Sag: It's not clear that you'll be able to [e]$_{VP}$.
        b.   [Hankamer attempts to stuff a 9-inch ball through a 6-inch hoop.]
                Sag: It's not clear that you'll be able to #[e]$_{VP}$ / do it.

(29)   Sluicing (IP Ellipsis)
        a.   Hankamer: Someone's just been shot.
                Sag: Yeah, I wonder who [e]$_{IP}$.
        b.   [Hankamer produces a gun and fires it offstage, whereupon a scream is heard]
                Sag: #Jesus, I wonder who [e]$_{IP}$.

(30)   N' Deletion (NP Ellipsis)
        a.   Saito: These dogs keep me awake with all their barking.
                Lasnik: Harry's [e]$_{NP}$ is particularly noisy.
        b.   [L& S are in a yard with several barking dogs belonging to various people]
                Lasnik: #Harry's [e]$_{NP}$ is particularly noisy.

Although we have not conducted an exhaustive survey of the data, cited examples of N' Deletion in early child English appear to occur in contexts where the elliptical NP has a linguistic antecedent. Representative examples are listed in (31) with the linguistic antecedent underlined:

(31)   a. That Daddy's.   (Bowerman 1973: 242 Kendall 23)
        b. It Daddy's.   (Smith 1973: 68 Amahl 29)
        c. Mommy's. Mommy's keys.   (Bloom 1970: 93 Gia 20)
        d. These my Kathryn's.   (Bloom 1970: 35 Kathryn 22)
        e. These mines.   (Bloom 1970: 35 Kathryn 22)

It is not always the case that examples of child N' deletion presented in the literature provide the preceding discourse context for the relevant utterance. However in the examples where such a context has been provided, N' Deletion always occurs with an intrasentential antecedent, as in (31a, b, d, and e), or with a linguistic discourse antecedent, as in (31c). In contrast, patterns such as *Daddy one* in (20b) from Smith (1973) appear to occur alone as two-word utterances. If this pattern holds up, it indicates that children impose the same general constraint that applies to XP null anaphora in adult grammar. Again, this fact is most readily explained if the categories involved in the N' Deletion phenomenon are identical in child and adult grammar: a null or elliptical NP contained in DP.

III.   Acquisition of Relative Clauses in Korean

Relative clauses in Korean provide a particularly interesting domain for investigating the continuity issue, because the major subtype of this construction, lexically headed relative clauses, give no superficial evidence to the language learner for the presence of the functional category COMP and its projection CP in adult grammar. Lexically headed relative clauses in Korean obligatorily lack overt complementizers, and do not involve movement of an overt WH operator, as shown in (32):

(32) [[appa-ka [e]$_{NP}$ ssu-nun] ankyeng]$_{NP}$
      papa-NOM   wear-PRES   glasses
   'the glasses that papa wears'

Nevertheless, Lee, Lust, and Whitman (1990), based on results from Lee (1990), argue that in the early stages of relative clause acquisition in Korean, children begin by acquiring a relative clause subtype which contains an obligatory overt complementizer, and go on to produce lexically headed relative clauses with this overt complementizer present, resulting in relative clause structures which are ill-formed in adult Korean grammar.

Lee (1990) shows that the earliest relative clause type acquired in Korean are relative clauses headed by the element *kes*, exemplified in (33).

(33) [[Mok-ey [e]$_{NP}$ ke-nun] kes] ya?   (S.P.: 23)
      neck-on   wear-PRES COMP be-Q
      'Is it what you wear on your neck?'

Relative clauses headed by lexical nouns also occurred in Lee's natural speech data, but with consistently less frequency than relative clauses headed by *kes*, particularly among younger children. Figure (34) from Lee, Lust & Whitman (1990) shows the distribution of lexically headed relative clauses (LHRC) and relative clauses headed by *kes* as a perecentage of all complex sentences produced by the children in Lee's (1990) study. Note that *kes* - headed relative clauses predominate throughout.

(34)   Distribution of Lexically Headed and *kes*-headed Relative Clauses
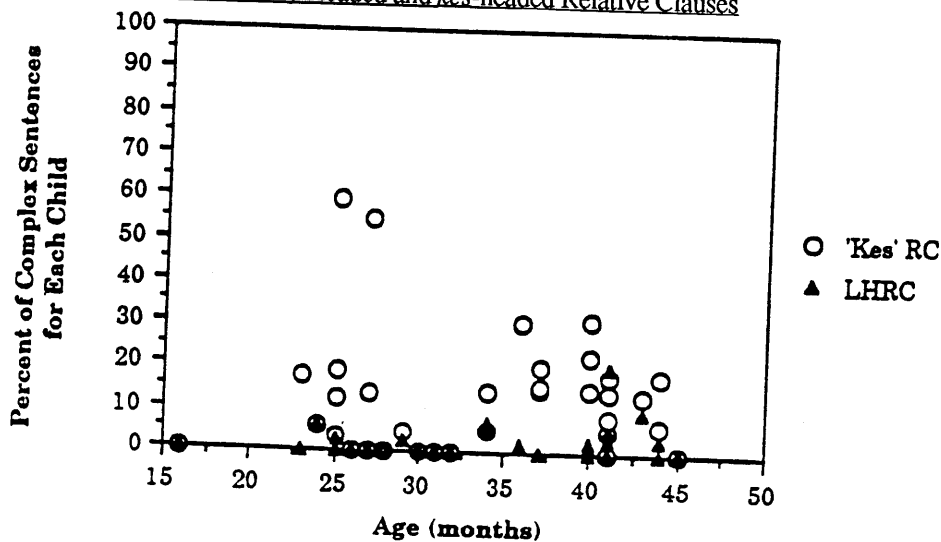
In (33) we have glossed the head element *kes* as a complementizer. This is consistent - in fact required - by the analysis of *kes*- headed relative clauses as free relatives. We believe that the predominance of *kes*-headed relative clauses in early child Korean is by itself an initial strong argument for the complementizer analysis of *kes*, given the results of a number of studies showing that free or headless relatives emerge relatively early in child grammar, and may in fact constitute an initial stage in the acquisition of relative clauses, prior to the aquisition of lexically headed relatives. A preference for free relative clauses in early child language is a result reported by Limber (1973), Flynn & Lust (1980), and Hamburger (1980) for English, and Packard (1982, 1986) for Chinese[1]. If *kes* is analyzed as a complementizer, the bracketed structure in (33) is a CP, a free relative; under this analysis the early frequency of *kes*- headed relative clauses is

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consistent with the findings for other languages. Under any alternative analysis of *kes* the distribution reported in (34) is unexplained. We now proceed to examine one such alternative analysis, the one indicated by the lexical projection hypothesis for Korean child grammar.

In adult Korean (and in early child Korean, to the extent natural speech data allows us to determine), *kes* is obligatory in free relatives (using the term pretheoretically to refer to structures like (33)). In adult Korean (33) is a well-formed free relative, but dropping *kes* results in ungrammaticality:

(35)   *[[Mok-ey [e]$_{NP}$ ke-nun] Ø] ya?
         neck-on   wear-PRES   be-Q

Under the lexical projection hypothesis, what we have been calling free relatives in child language, like (33), must be analyzed as lexical projections, presumably NPs. The position and obligatoriness of *kes* indicates that it is the head of this projection; it must therefore be analyzed as a noun. The consequent "lexical" analysis of (33) is given in (36):

(36)   [[Mok-ey [e]$_{NP}$ ke-nun]$_{VP}$ kes]$_{NP}$ ya?
         neck-on   wear-PRES one   be-Q
         'Is it the one that you wear on your neck?'

In fact the categorization of *kes* assumed by this analysis coincides with the view of *kes* as a "formal" or "bound" noun in traditional Korean grammar. On this view, *kes* would have the properties of a lexical NP with the meaning of 'the thing', or a pronoun like English *one*, as indicated by the gloss in (36). This analysis leads to the conclusion that *kes* does not head a functional projection, and that Korean in fact lacks headless relatives: *kes* is a type of lexical head.

Several arguments indicate that the lexical analysis of *kes* is incorrect. First, bound or pronominal heads like *one* in English typically show lexical restrictions: *one*, for example, is restricted to [+count] referents. Lee (1990) shows that *kes*-headed relative clauses in early child Korean are lexically unrestricted to a large degree: they may refer to animates, as in (37a), and to mass terms, as in (37b):

(37)[2]   a. [[Yo, yorekhey ha-nun] ke-y]$_{NP}$ Nolbu ya?   (J.C.: 40)
             this this.like do-PRES kes-NOM Nolbu be-Q
             'Is Nolbu (the one) who does like this?"

         b. Nay yak palp-ass-ta,   [[mek-ten] ke]$_{NP}$.   (M.K.: 37)
            my medicine tread-PAST-DEC   eat-PAST kes
            'I stepped on my medicine, (the one) that I was taking.'

A second argument for the complementizer status of *kes* is provided by binding theoretic considerations. Both adult and early child Korean allow internally headed relative clauses (IHRCs), as in (38). (The internal semantic heads of each relative clause are underscored in (38a-b).) IHRCs are obligatorily headed by *kes* in both adult and child Korean:

(38)   a. [[<u>piano</u> tangtang ha-nun] *(ke)] sa cwu-ya-keyss-ta.
             piano dingdong do-PRES   kes   buy give-HYP-FUT-DEC
         'Have to buy a piano that goes ding-dong'
         (Lit.: 'Have to buy what/the one piano goes ding-dong.')

         b. [[<u>Chayk</u> pily-e ka -n] *(ke)] nayil   kac-ko   o-keyss-upni-ta.
            book borrow go-PAST kes tomorrow   bring-ing come-FUT-POL-DEC
         'I will bring back the book that I borrowed tomorrow.'
         (Lit.: 'I will bring back what/the one I borrowed the book tomorrow.'

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In addition to being obligatorily present in the head position of IHRCs like (38), *kes* is the only element that is possible in that position. If *kes* in (38) is replaced by a lexical NP or pronoun, the result is ill-formed:

(39) a.*[[piano tangtang ha-nun] akki / ku kes]   sa cwu-ya-keyss-ta.
           piano dingdong do-PRES instrument/ that one   buy give-HYP-FUT-DEC
      'Have to buy an instrument/that one that piano goes ding-dong.")

     b.*[[kyokwase pily-e ka -n] chayk / ce kes] nayil   kac-ko   o-keyss-upni-ta.
          textbook boorow go-PAST book/that one tomorrow bring-ing come-FUT-POL-DEC
      'I will bring back the book/that one that I borrowed the textbook tomorrow.'

From (39) we can see that when relative clauses have a lexical noun or pronoun as a head, they cannot also be internally headed. As far as we know, this fact about Korean is also a universal: internally headed relative clauses occur across languages, as do externally headed relative clauses containing resumptive pronouns in the position of the relativized item. But externally headed relative clauses which also contain referring expressions in the position of the relativized NP do not occur, to our knowledge. The explanation for this universal is provided by the version of condition c of the Binding Theory formulated by Chomsky (1986: 86):

(40)   (i and ii apply disjunctively)
        (i) An r-expression must be A-free in the domain of its operator.
        (ii) An r-expression must be A-free.

In (40) (i) permits variables in relative clauses to be bound by the nominal head in the relative clause, since the nominal head is outside the domain of the operator. In internally-headed relative clauses, however, the internal head, a name, is not bound by an operator: names differ from variables in that only the latter are operator-bound. Thus (i) fails to apply to IHRCs, and the internal head is subject to (ii). Under (ii) the internal head of an IHRC must not be bound by an external head, because the former must be A-free. Thus doubly headed relative clauses do not occur across languages. This empirical fact, its Korean instantiation in (39), and the binding theoretic explanation proposed above all argue against the analysis of *kes* as a nominal head.[3]

A final argument for the complementizer status of *kes* comes from a particularly interesting class of examples of early relative clause in Korean, discussed by Kim (1987) and Lee (1990). In examples of this type *kes* co-occurs with a lexical head:

(41)   Kuriko   [[appa ssu-nun] ke] ankyeng-un ..   (S.K.: 44)
        then   papa wear-pres kes glasses-top
        'And the the glasses that papa wears..'

Examples like (41) are ill-formed as adult Korean relative clauses, which as we have observed contain no overt complementizer. Nevertheless they occurred in both Kim and Lee's Korean child data; Lee (1990) reports tokens of this type in the speech of approximately 22% of the 36 children she studied (see also Lee, Lust & Whitman 1990). As Lee (1990) argues, relative clauses where *kes* and a lexical head noun co-occur cannot be analyzed as NP-NP appositive structures, since the children in Lee's sample produced no structures of the form in (42) with items in the position of the head N other than *kes*; nor do such structures occur in adult Korean without a major intonational break between the two NPs.

(42)   [[[S] N]_{NP} NP]_{np}

The fact that *kes* alone appears in the embedded clause-final position in relative clauses of this type is inexplicable if *kes* functions as a noun in this context. If, on the other hand, *kes* is analyzed

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as a complementizer, its position and occurrence exactly parallels relative clause complementizers such as *that* in English. Under this analysis, *kes* appears in the predicted CP-final position for complementizers, as shown in (43):

(43)   Kuriko   [NP [CP [IP appa ssu-] nun] ke] ankyeng-un ..   (S.K.: 44)
         then   papa wear-PRES kes glasses-TOP
         'And the the glasses that papa wears..'

These three arguments, together with the parallel distribution of *kes*- headed relatives in child Korean and free relatives in other languages, strongly support the analysis of this lexical item as a complementizer in the data under discussion. In particular it is entirely unclear to us how the presence of *kes* in IHRCs and its co-occurrence with lexical heads in relative clauses like (41) could be accounted for under the analysis of *kes* as a noun. We therefore conclude that *kes* is a complementizer, and thus a functional head in child Korean relative clauses.

This result is by itself an important argument for the functional projection hypothesis. However the import of the Korean relative clause data goes far beyond the conclusion that relative clauses in child Korean contain complementizers. As we observed at the outset of this section, lexically headed relative clauses in adult Korean do not contain overt complementizers: in lexically headed relative clauses such as (32) , no overt complementizer can occur, and child relative clauses with *kes* and a lexical head co-occurring as in (41) are unacceptable in adult Korean. Thus relative clauses like (41) with overt complementizers are acquired with no positive input whatsoever from adult speech data. If, as under the lexical projection analysis, the initial grammar available to the child contains no information about functional categories and their projections, it is unclear how structures of this type are acquired at all.

Under the functional projection hypothesis, on the other hand, Universal Grammar provides children with the information that relative clauses contain CPs and that CPs are headed by complementizers. Free relatives headed by *kes*, which are available in the input data, provide the information that *kes* is a relative clause complementizer. The fact that lexically headed relative clauses in Korean do not contain overt complementizers is obviously a language-particular property of Korean (it is not a property of English, for example), and therefore must be learned. We present below a possible explanation for this property of Korean and its relatively late acquisition. Prior to learning of this property of adult Korean, the grammar of child Korean permits realization of the relative clause complementizer *kes* in the complementizer position in all relative clause types, thus leading to the generation of utterances like (41).

An account for the obligatory absence of overt complementizers in adult Korean relative clauses is provided by the hypothesis that Korean undergoes raising of the tensed verb to COMP, as proposed by Choe (1988) and others. Whitman (1989) argues that the tensed verb in COMP is responsible for assignment of nominative Case to VP-external subjects, following the widely adopted analysis of nominative Case assignment by INFL in COMP in Germanic verb second languages. In contrast with Germanic V2 languages, complementizers in Korean embedded clauses are in general verbal suffixes. Whereas in Germanic presence of an overt complementizer blocks verb raising to COMP, in Korean the presence of a suffixal complementizer triggers verb raising, to support the affixal complementizer. Thus in most embedded clause types in Korean verb raising to COMP occurs, permitting assignment of nominative Case in the normal fashion within the embedded clause. The relative clause complementizer, however, *kes* is not affixal; its presence in COMP would block raising of the tensed verb and therefore nominative Case assignment. We hypothesize that this fact accounts for the obligatory absence of a complementizer in Korean relative clauses. More generally, we predict three possible realizations of COMP in languages where nominative Case is assigned to SPEC, IP by the tensed verb in COMP. Lexical complementizers may themselves be [+Case Assigner] (more precisely [-N] in some systems) , as has frequently been proposed for Germanic; the relative clause complementizer may be [+Affixal], permitting verb raising and assignment of nominative Case as in matrix clauses; or COMP may be [-Overt], permitting verb raising to COMP and again assignment of nominative Case as in

matrix clauses. The possibility that is specifically disallowed in such languages is that COMP be occupied by a non-affixal non-Case assigning lexical complementizer, such as *kes* .

Under the account of verb raising and Case assignment we have sketched above, acquisition of obligatory verb raising in relative clauses and the [-Overt] value for relative clause complementizers in Korean is dependent upon acquisition of the Case assignment system for this language. Morphological case markers in child Korean are frequently absent, as in examples such as (43), where the subject argument *appa* 'father' appears without the nominative case marker normally assigned to relative clause subjects. The prediction then follows that elimination of relative clause structures where kes and an overt nominal head co-occur should be associated with acquisition of the full Case assignment system of adult Korean.

IV. Conclusion

In this paper we have discussed data from early child speech in three languages. In each of the examples discussed we have argued that a satisfactory analysis of the data requires positing grammatical representations fundamentally identical to the representations proposed by syntactician for the corresponding adult structures. In each case the appropriate representations have included functional categories and/or their projections.

We believe that the data we have discussed support a rather strong view of the continuity hypothesis, at least in the area of categorial inventories. A last, general point is perhaps appropriate to make here. The discussion of categorial acquisition (e.g. Macnamara 1982; Pinker, 1984) often centers around the issue of how knowledge about grammatical categories is related to knowledge about the world. Knowledge about functional categories such as INFL, COMP, and DET is not related to knowledge about the world in any obvious way. At the same time, information about functional categories in adult speech is highly indirect, and as we have seen in the case of Korean, often missing altogether[4]. Thus, as Radford (1990) recognizes, the only conceivable account of the acquisition of functional categories which does not impute them to Universal Grammar at the initial state is a maturational one. We have suggested that such a view is not motivated either theoretically or empirically.

Notes

[1]Kim (1987) disputes in particular the finding of Flynn and Lust (1980) that free relatives constitute an initial stage in the acquisition of relative clauses in English, prior to the acquistion of lexically headed relative clauses. Much of this issue hinges on what counts as a free relative in child English: if one identifies as headless relatives in child English only relative clauses headed by WH words, the frequency of free relatives in early child production data is substantially diminished, as Kim argues. But this result is hardly surprising, since WH-headed free relatives require overt (syntactic) WH Movement; as is well known, syntactic WH Movement is normally lacking in early child English. If other early relative clause types, such as the "proto-relatives" discussed by Hamburger (1980) are taken into a consideration as a type of headless or free relative, the frequency of the free relative pattern in production increases considerably. It should also be noted that given the obligatory role of syntactic WH Movement in adult English free relatives and the relatively late emergence of syntactic WH Movement in child production, comprehension data is crucial to resolution of this question.

[2]*Kes* commonly occurs in colloquial Korean in the contracted forms *ke* , *ke* + case marker.

[3]We are grateful to Brad Pritchett and Atsuro Tsubomoto for discussion of the syntax of internally headed relative clauses. See Tsubomoto (1990) for discussion of related issues in Japanese IHRCs.

[4]An interesting issue which we do not pursue here is the degree to which 'syntactic bootstrapping' in fact may require the existence of functional categories (cf. Landau & Gleitman 1985).

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