

LITTLE MINIMALISTS: QUESTION FORMATION IN CHILD ENGLISH

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1. Introduction

In the Minimalist Program, Chomsky (1995) argues that question formation results from the syntactic presence in C-position of a strong question affix, Q (following Baker, 1970). For Chomsky, Q is a “strong affix;” strong features must be checked by PF (phonetic form), and thus Q requires an overt head, realized by Subject-Auxiliary Inversion (SAI) (cf. Radford, 1997: 247; Marantz, 1995). Furthermore, Q has a strong [+wh] specifier feature which must be checked via specifier-head agreement, through the movement of a wh-operator to spec-CP (Radford, 1997: 271-4). Figure 1 shows this analysis for a question of English:

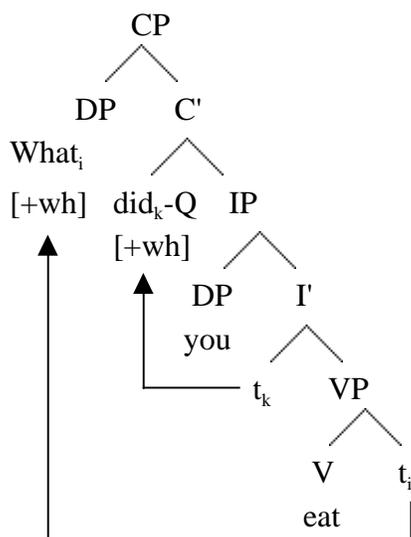


Figure 1. The English question “What did you eat?” I-head “did” raises to give Q an overt head; wh-phrase “what” moves from object position in VP to check the [+wh] feature of Q.

Finally, in the minimalist analysis, *wh-in situ* words are interpreted in situ at logical form (LF) through the mechanism of absorption (cf. Reinhart, 1995: 14-17, for a discussion), in which Q quantifies over *wh-in situ* (see also Baker, 1970).

The present paper looks at child English for evidence of the minimalist analysis of question formation. Support for the analysis in child language is important for meeting the learnability requirements of the theory. First I argue that children are aware of the existence of CP. Next I examine evidence for the

existence of the Q-morpheme in child language. Then I look for data on spec-head agreement, and finally for evidence of binding of *in situ* wh-words. I argue that children are using attested adult language patterns, even if these patterns are not present in adult English.

2. CP in child language

In Chomsky's theory, Q is a C-head. But are children even aware of CP? The small clause hypothesis (Radford, 1990) argues that children in the early multiword stage (20 to 23 months) lack functional categories like IP, DP and CP.

However, Italian, Spanish and Catalan children, for example, use 1st, 2nd, and 3rd person agreement on verbs from the earliest multiword utterances, and do so with a very low error rate (Guasti, 2002: 121). This is taken as evidence for the presence of AGR, a component of IP, in child grammar.

Secondly, French children less than two years old distinguish distribution of finite versus non-finite verbs (Pierce, 1992; Wexler, 1994):

- | | | |
|-----|-----------------------------------|------------------------------------|
| (1) | (a) pas manger (Nathalie, 1;9) | pas casser (Daniel, 1;8) |
| | "not eat-INF" | "not break-INF" |
| | (b) veux pas lolo (Nathalie, 2;0) | marche pas (Daniel, 1;8) |
| | "want-FIN not water" | "works-FIN not" (Pierce, 1992: 65) |

In (1a), the infinitival verbs "manger" and "casser" come after the negative "pas," while in (1b), "pas" is after finite verbs "veux" and "marche." Both these patterns conform to the adult language, where infinitive forms stay in VP, but finite verbs raise over NEG to I to get tense (Pollock, 1989; Wexler, 1994), and thus constitute evidence for IP structure in child language.

Wexler (1994) found a similar restriction on the distribution of tensed verbs in negative English clauses. Sentences like **Mary not plays baseball*, where a tensed verb stays in VP, are unattested in child data. This suggests children know that tense is in a higher (functional) domain, IP, and cannot "affix hop" over NEG.

What about CP? Evidence for CP in child language comes from comprehension. German is a V2 language, where the tensed verb occurs in the second position (C-head). Davis (1987: 682-684) notes that German children are exposed mainly to V2 sentences, yet their earliest multiword utterances are verb-

final constructions. Therefore, Davis argues that German children must recognize the rule of SAI and the existence of CP in order not to apply SAI.

In English, auxiliary learning is contingent on exposure to inverted yes/no questions (Newport et al., 1977), where the auxiliary appears in the phonologically prominent initial position (CP). Children's first constructions, however, are often uninverted. Davis again argues that English children too must be aware of the existence of CP and SAI in order not to produce SAI clauses themselves (1987: 717-719). I take this as evidence for the presence of CP in child language.

3. Q in child language

In this section, I argue that we also find evidence for a strong Q morpheme requiring an overt head in child English. This supports Chomsky's analysis of question formation. An interesting contrast is the approach to wh-questions developed by Rizzi (1996): Rizzi uses no Q, instead arguing that questions have a [+wh] feature in T (i.e. on the auxiliary). For Rizzi, [+wh] auxiliaries undergo I to C raising to fulfill the wh-criterion – they must be in a Spec-head relation with a [+wh] operator. The wh-criterion is summarized as follows:

- A. A wh-operator must be in a Spec-head configuration with a [+wh] head.
- B. A [+wh] head must be in a Spec-head configuration with a wh-operator

In contrast, I to C movement under a Q analysis is driven by Q's need for a phonetically overt head, because Q is a strong affix. Let us look at the evidence.

A typical error in child question production is overuse of an auxiliary. Consider the following examples of yes/no questions:

- (2) Is I can do that? (3;0)¹
Is you should eat the apple? (3;0)
Is Ben did go? (3;0) (cited in Radford 1997: 265)
- (3) Are you want one? (Kristen, 2;4-2;5)
Are you got some orange juice? (Kristen, 2;4-2;5)
Are you sneezed? (Kristen, 2;4-2;5) (cited in Davis, 1987: 392)

¹ Where available, I give the age of the child producing the utterance in brackets (years;months).

A variant of this error is overtensing (tense on both auxiliary and verb):

- | | | |
|-----|-----------------------------------|------------------------------|
| (4) | Did we ate? (N.E., 2;5) | (Kuczaj, 1976) |
| | What did you bought? (1;10 – 2;6) | (Hurford, 1975: 300) |
| | Does it opens? | (cited in Radford 1997: 265) |

What these examples have in common is the appearance of some overt auxiliary in the sentence-initial Q position. I will examine three explanations for the emergence of this error pattern. The first two proposals employ a movement analysis; the final proposal employs Merge. In addition, I will argue that the data above are not consistent with Rizzi's (1996) "Q-less" proposal.

First, it has been proposed (cf. Hurford, 1975; O'Grady, 1997, 164) that these children engage in a flawed copying and deletion process. For example, in a base sentence [_{IP} The girl is playing], the auxiliary "is" is copied to the Q position in C-head (5). In the adult phonological form, the clause-internal "is" is then deleted (6):

(5) [_{CP} [_C is_i-Q [_{IP} the girl [_I is_i] [_{VP} playing]]]]?

(6) [_{CP} [_C is_i-Q [_{IP} the girl [_I ~~is~~_i] [_{VP} playing]]]]?

From this perspective, children producing (5) are copying but not deleting (6).

However, the analysis does not explain why children do not produce deletion errors involving wh-movement; sentences like "*What did I see what?" are not attested (O'Grady, 1997: 165). Nor does this theory explain why children in (2-3) seem not to copy an element of the base sentence at all, but a non-present "is" or "are" (i.e. in the first example, the base "I can do that" contains no "is"). Finally, the copying and deletion analysis doesn't explain why particular children have a preference for a particular question-initial marker (subjects in Crain & Nakayama, 1987, for example, use "is" overwhelmingly; Davis (1987), in contrast, cites a subject in (3) above who prefers to use "are").

A second analysis for the presence of this pattern is the Syntactic Blends Hypothesis (SBH) proposed by Nakayama (1987). When processing load becomes too heavy, children are more likely to start a sentence with inversion, but then revert to intonation. This syntactic blend of inversion and intonation results in a double auxiliary. However, this explanation also has no principled account for

patterns like (2-3) where the “inverted” auxiliary is not in the base version of the sentence, or for child-specific preferences for a particular auxiliary in Q.

The other possibility in the Minimalist Program is that children are not using Move, but rather Merge to combine an overt aux with Q. From this perspective, the doubling errors in (2) to (4) are evidence for a preposed question marker before an uninverted sentence (O’Grady, 1997: 173). Again, this analysis is consistent with the existence of Q, whose strong affixal nature requires an overt head; it also provides a principled explanation for why different children might prefer a particular aux in Q and why this aux might not appear elsewhere in the sentence. Because English has no adult example of an overt merged question marker in matrix clauses, we expect different children to use different aux to fill this role.

Thus, in yes/no questions with overuse of an auxiliary, children may simply be merging an overt Q to an uninverted question. Other languages also have an overt Q-marker in questions not using SAI: Bulgarian uses “li” or “dali” (Savova, 2002), Japanese uses “ka,” and French has “est-ce que.” Furthermore, in adult English, complementizer “if” merges with Q in embedded clauses like [_{IP} I wonder [_{CP} if-Q [_{IP} he is feeling better]]] (Chomsky, 1995: 289; Radford, 1997: 295-6). Thus child English is consistent with adult language processes. Furthermore, young children may prefer Merge over Move as a sentence-building mechanism².

Finally, I note that patterns like (2-3) are also difficult to reconcile with Rizzi’s (1996) Q-less analysis. If the [+wh] feature is generated in T, on the auxiliary, why put another, entirely different aux in the sentence initial position? If, on the other hand, there is a strong Q in the CP, we have a principled explanation for the patterns in (2-3).

4. Spec-head agreement: The [+wh] feature in child English

Guasti (2002: 191) found that children from age 1;6 to 5;1 used wh-movement, producing less than 1% of their wh-utterances without movement (and these were almost always ‘echo’ questions). This data is consistent with the minimalist proposal that Q carries a [+wh] feature that must be checked through spec-head

² A modification of this merge analysis may be needed to account for the tensed forms of “do” appearing in (4); we could postulate that children combine merge (“do”-support) with move (of tense features only) (Hurford, 1975; Radford, 1997: 250, on movement of grammatical features only) in order to realize an overt head for Q. Alternately, “do” errors may be “performance-mediated” and not syntactic (Davis, 1987: 383-6; Stemberger, 1982, 2003).

agreement with a [+wh] specifier (a moved wh-operator). Furthermore, this [+wh] feature is present from the earliest multiword utterances:

- (7) What did you bought? (1;10 – 2;6)
 What did you found? (1;10 – 2;6) (Hurford, 1975: 300)
- (8) Where Daddy put the window? (2;11)
 What Papa have? (1;11) (Guasti, 2002: 202)
 What you gonna wear? (S., 2;0 – 2;6)
 Why you waking me up? (Davis, 1987: 604-5; 618)
- (9) What soldier marching?
 Where my mitten? (Davis, 1987: 604)
 What dat train doing? (2;4) (Guasti, 2002: 202)
- (10) What's that? (1;5-1;8)
 Where's helicopter? (1;5-1;8)
 Where mummy? (1;5-1;8) (Radford, 1990)

However, there are two different ways that this agreement can be accomplished: Merge, or Move. In a movement analysis, the wh-phrases raise to spec-CP (cf. Radford, 1994; Guasti, 2002). As Davis (1987) argues, this movement is the essence of an adult wh-question system where there exists a “filler-gap” dependency between the wh-word and its base-generated position. Data in (7) and (8) have verbs which the children already use with the proper number of complements in non-wh-phrases, and so contain a uniquely identifiable trace of wh-movement. These data thus support the presence of an adult system of wh-movement with a filler-gap dependency (Davis, 1987: 605).

However, data in (9) and (10) do not show this dependency. These clauses contain no uniquely identifiable gap, or tend to have the formulaic pattern *wh('s) NP?*, or semi-formulaic patterns *wh('s) NP doing? / wh('s) NP go?* (Radford, 1990: 16-17, 125). These are therefore consistent with a Merge analysis: the child merges a [+wh] operator with spec-CP. The Merge proposal is particularly consistent with children's early wh-questions, which tend to have these formulaic structures (cf. Radford, 1990).

That children are using Merge and not Move α at an earlier stage of language development is an interesting possibility (see also De Villiers et al., 1990, 278-285), and consistent with the Minimalist Program's assumptions: we absolutely need Merge to put words together into a sentence, but why Move α is needed is not as immediately apparent. Movement, for Chomsky, costs the grammar, and "takes place only when forced (Last Resort)" (1995: 235).

Adult language also provides evidence for satisfaction of spec-head agreement for [+wh] through merge: we saw in section 3 that the complementizer "if" is proposed to merge with Q in embedded clauses in adult English (Chomsky, 1995: 289). Radford (1997: 295) also cites the following passage from Shakespeare to show the use of "whether" in Standard Middle English as a wh-operator which merges with CP in yes/no questions:

- (11) Whether dost thou profess thyself a knave or a fool?
"Do you profess yourself a knave or a fool?"

Thus, children are again following adult language patterns.

In section 3 I argued that children satisfy Q's strong affixal feature by giving it an overt aux head, and in this section I concluded that children satisfy the [+wh] feature of Q through spec-head agreement with a wh-operator. We might predict, then, that all questions produced by children would have an overt Q and a wh-operator in spec-CP. However, this is not the case. Two further questions remain to be examined: (i) why do children produce yes/no questions without a merged wh-operator (as in (2) and (3))? and (ii) why do children produce wh-questions without an overt Q (as in (8), where no SAI has occurred)?

4.1 Yes/no questions and spec-head agreement for [+wh]

If children are merging wh-operators to satisfy Q's [+wh] feature, why do children not seem to produce yes/no questions with a merged wh-operator? Patterns as in (12) do not appear to be attested in child language:

- (12) *What are you sneezed?

One possible explanation is that the merging of wh-words (like "what") in yes/no questions may not meet the semantic requirements of the interface level LF.

Children learn wh-words one by one, suggesting wh-words are functional heads (Davis, 1987: 607-10). If children learn these wh-words as quantifying over a trace variable, then clause-initial wh-words in yes/no questions (12) may be interpreted as binding a trace lower in the clause:

(13) * $[_{CP} \text{What}_i \text{ are-Q } [_{IP} \text{you } [_{VP} \text{sneezed } t_i]]]$?

Since this would yield the wrong semantic interpretation, the sentence is not produced. This is because yes/no questions have no trace variable that could be co-indexed with or quantified over by a wh-operator. An analogous situation is vacuous quantification, a semantically possible scenario not found in natural language. A sentence like “For some x, John is a cat” is semantically possible $[\exists x (\text{cat}(j))]$ but confusing and never produced (Matthewson, 2002). Similarly, a sentence like “What are you sneezed?” in (13) above is akin to:

(14) For what x did you sneeze? $[\exists x (\text{sneeze}(\text{you}))]$

The contribution of the wh-phrase “For what x” is meaningless and the sentence is not produced. Thus it is not surprising not to find such data in child language. While this account explains why wh-operators are not employed to check Q’s [+wh] feature, we might expect children to check the feature in some other way rather than simply leave it unchecked.

The answer may be to look for a different type of overt operator: not a word, but intonation. Davis (1987: 433-4) notes that the rising intonation pattern of yes/no questions is absent from wh-questions. If intonation is [+wh] and can check Q’s [+wh] feature, this explains the complementary distribution of intonation in yes/no versus wh-questions. Since wh-questions already contain a wh-operator to check Q’s [+wh], rising intonation is not required. Yes/no questions can not employ a wh-operator for the semantic reasons outlined above, and so employ rising intonation.

4.2 Wh-questions without an overt Q

Unlike German, Italian and Swedish children, some English children appear to have a stage of optional SAI (Guasti, 2002: 194-197). This is shown by data in (8) and (9). If Q is strong, why are children here not giving Q an overt aux head? One

possibility is that children are employing a null auxiliary (Guasti, 2002: 202-208). However, given that they are merging an overt aux to Q (section 3), this explanation is somewhat suspect.

An interesting possibility is that yes/no questions and wh-questions use different Q operators with different features. Children may go through a stage of posing a strong Q for yes/no questions, but a weak Q for wh-questions. Adult languages with multiple Qs are attested: for example, San Lucas Quiavini Zapotec has a yes/no question marker (èee), an echo question Q (làaa), and wh-questions without either of these markers (Lee, 2003). Another alternative along these lines is that the [wh] feature is in fact composed of several features; Shima (1998) proposes that it is composed of a [wh] feature and an [operator] feature. If children vary which of these features they employ for Q or wh-operators, we may be able to explain the variation in question formation seen here. Though intriguing, I will not pursue these possibilities further here.

I conclude by noting, however, that adult languages like French also have this option available in wh-questions:

- (15) Qui elle a rencontré *t*?
Who she has met *t* “Who has she met?” (Rizzi, 1996: 75)

5. Binding of *wh-in situ*

So far I have argued that children have CP, a strong Q and overt satisfaction of Q's [+wh] feature. A final component of the minimalist account of question formation proposes that *wh-in situ* words are interpreted *in situ* at LF, through an absorption mechanism. Reinhart argues that absorption amounts to unselective binding (Reinhart, 1995: 14; see also Heim, 1982 on unselective binding).³ Children produce few spontaneous questions with multiple wh-words. There is however, evidence from production and comprehension experiments.

Production evidence suggests that children use long distance binding from clause-initial wh-words. In these cases, children sometimes produce a medial wh-word in addition to the clause-initial operator. The following data are originally from Thornton (1990, 1995):

³ Reinhart (1995) proposes her own mechanism, quantification over choice functions, to allow *wh-in situ* expressions to be properly interpreted at LF; this also requires long distance binding.

- (16) What do you think what cookie monster eats? (Katie, 5;5)
 Who do you think who's under there?
- (17) Who do you think what babies drink to grow big? (Matthew, 3;3)
 What do you think where the marble is? (Kelly 3;11)
 Who do you think what's in there?
 What do you think which smurf really has roller skates on? (Tiffany, 4;9)
 What do you think which animal says "woof woof"? (Tiffany, 4;9)

The initial *wh*-operator is interpreted as a scope marker, binding the *wh*-element in the embedded clause; for example, in (16) and (17), the medial *wh*-element gives the question its semantic content. In Matthew's question in (17), medial "what" is the question word to be answered. If the initial *wh*-word did not bind the lower *wh*-phrase, we might expect these questions to be interpreted as yes/no questions. This is not the case, however.

For the data in (16), the most natural explanation is that children are simply leaving a copy of the *wh*-element in the lower CP, as an overt expression of *wh*-movement (Thornton, 1990). If this is the case, however, it does not constitute evidence for long-distance binding of the medial *wh*-word. However, a small number of children produce medial *wh*-questions where the two *wh*-words do not match (17). If the initial *wh*-operator is a scope marker binding the lower *wh*-phrase, we have a principled explanation for the data in (17). This explanation also explains the data in (16).

Further evidence for children's scope marking comes from comprehension: they interpret sentences like "How did Kermit ask who to call?" as referring to the medial *wh*-word "who" (de Villiers et al, 1990: 281). De Villiers et al. found that even older children (4-6 years) continue to interpret the initial *wh*-word as a scope marker for all lower *wh*-words; they answer both *wh*-words in the question "Who did the father ask what to do?," though adults only answer "who" (1990: 280-1).

Children's use of scope-marking *wh*-words is also attested in adult language. German and Hindi use so-called split *wh*-words (cf. Shima, 1998; Dayal, 1994). Dayal (1994: 137-8) presents the following example from German:

- (18) Was glaubst du, mit wem Maria gesprochen hat?
 What think you with who Maria spoke has?
 "Who do you think Maria spoke to?"

Initial “was” can be interpreted as a scope marker, since it is the medial wh-phrase “mit wem” which gives the question semantic content.

6. Conclusion

We have seen support for the basic aspects of the minimalist analysis of questions in child English. Children have CP and a strong Q affix in C° requiring an overt head. Child language also supports the presence of a [+wh] feature which must be checked through spec-head agreement. Finally, we saw evidence for long distance binding of embedded wh-phrases from a clause-initial wh-word, supporting the minimalist proposal that wh-*in situ* words can be interpreted *in situ* at LF.

The emergence of these features of question formation, based on the data here, is apparent at different ages. I argued for evidence of CP and Q’s [+wh] feature from the early multiword stage. Data arguing for an overt Q dated from a later multiword stage (2;4 on), and data for *in situ* binding of wh-words came from children aged 3;3 to 6. In addition, I argued that Merge, rather than Move α , may be a preferred sentence-building mechanism for younger children. Further research into the earlier ages in particular would be helpful in verifying the presence of Q and its syntactic features, and determining which mechanisms, Move or Merge, are used to meet the interpretability requirements of Q in child English.

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