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Wh- Movement in Child Catalan

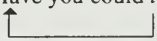
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This study examines the production of wh- questions in the speech of four monolingual child speakers of Catalan who were recorded longitudinally as part of the study carried out by Serrà & Solé, obtained from the CHILDES Data Base (MacWhinney & Snow, 1985). In this data all wh- questions produced appeared to be adult-like, in contrast with the non-adult-like production of this construction in child English, Swedish, Dutch and German. However, there is an initial period in which no wh- questions at all are produced, in spite of the fact that other aspects of syntax, such as negation, clitic-placement and complementation seem adult-like in this same period. During this "no wh- question" period, there is a concomitant absence of verbal tense morphology, with the exceptions of present and irrealis forms (imperatives, root infinitives, root gerunds and root participles). Interestingly, the onset of wh- questions appears to correlate with the onset of a much wider variety of tense morphology. Given this observation and Rizzi's (1991) hypothesis that wh- questions and tense morphology are crucially linked in adult syntax, I propose that the early absence of wh- questions is a consequence of the early underspecification of tense.

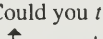
What can child language development tell us about the principles that govern the domain of the mind dedicated to language? In answering this question, I will take the goal of formal linguistic theory to be the discovery of principles of mind. In determining what these principles are, all forms of relevant data should be brought to bear. For example, modules of grammar such as syntax and semantics can be selectively impaired in cases of aphasia (cf. Grodzinsky, 1990), suggesting the validity of a linguistic theory which divides syntax and semantics into distinct domains. In this way, an independently substantiated theoretical division between syntax and semantics is confirmed by neurobiological evidence. Similarly, in spite of all of the logically possible permutations of English auxiliaries, Stromswold (1990) presents evidence which suggests that children do not raise the lower auxiliary when forming questions, as in (2):

(1) You could have picked up the banana.

(2) *Have you could *t* picked up the banana?



(3) Could you *t* have picked up the banana?



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This fact provides evidence for a principle of Universal Grammar (UG) known as Relativized Minimality (Rizzi, 1990) which governs how syntactic elements can move. Roughly, the principle says that things of the same type (verbal heads in this case) cannot move over one another when moving to a higher clausal position, as occurs, by hypothesis, in (2). Thus, study of child language data confirmed an independently established principle of Universal Grammar, Relativized Minimality. Consequently, a first question to ask about how questions are formed during the development of child Catalan is: Are there phenomena in child Catalan which might either confirm or falsify current conceptions of how questions are formed in adult Catalan? We will return to this question below.

Thus, the explanatory goal of this study is to contribute insight to the theoretical enterprise of developing a theory of linguistic cognition, as in generative grammar. Another important goal, however, is simply an accurate account of the facts of the development of child Catalan. This second goal is important because it makes basic research in child language relevant to other fields of linguistics, some of which have traditionally been called applied linguistic fields. For instance, without some clear idea of what the facts of monolingual child Catalan are, it is impossible to make judgements about the development of *bilingual* Catalan child language. That is, without normal, baseline data on child Catalan, it is difficult to judge whether bilingual Catalan children are developing Catalan on a normal linguistic schedule or not. Such monolingual data has been used in the development of the Independent Development Hypothesis (cf. Bergman, 1976, Paradis & Genesee, 1996). Similarly, in the field of communicative disorders, it is impossible to determine whether child Catalan syntax is developing on a normal developmental schedule without knowing what that schedule is in normally developing children, as in the four children studied here (cf. Anderson, 1999). In this way, careful descriptive studies of normal monolingual grammatical development are, for two fields of applied linguistics, crucial components of their work, without which their practitioners cannot hope to have a clear picture of developmentally impaired or bilingual development. The principle area of syntax to be addressed in this study is the development of question formation in child Catalan. Let us now turn to a description of the phenomena of non-adult like questions in child language.

It has been noted that children have difficulty producing adult-like questions in the early stages of their grammatical development. Child English speakers have been shown in various studies to either drop or fail to invert auxiliaries (Davis, 1987; Klima & Bellugi-Klima, 1966; Stromswold, 1990).

English

(4) What he can ride in? (Klima & Bellugi-Klima, Period 1)

(5) Where Ann pencil? (Klima & Bellugi-Klima, Period 3)

Child speakers of German, Dutch, and Swedish have also been reported to produce errors in question formation, although of a slightly different nature. These

children include the verb and place it correctly, but appear to leave out the wh-word itself (Swedish examples from Santelmann, 1995; Dutch from van Kampen, 1997; and German examples from Penner, 1994).

Swedish

(6) *är det?* (Tor 19, 2;8)
is that? (Missing *vad*, 'what')

(7) *kan den inte domma in?* (Tor 25, 2;11)
can it not come in? (Missing *varför*, 'why')

Dutch

(8) *zeg je nou?* (Sarah, 2;1.19)
say you then? (Missing *wat*, 'what')

(9) *heet zij nou?* (Laura, 3;5.30)
calls she then? (Missing *hoe*, 'how')

German

(10) *isch das?* (S, 2;0)
is this? (Missing *wo*, 'where'/*was*, 'what')

The aim of the present article is to first determine whether or not errors of this kind occur in child Catalan and, if so, to explain them. To begin with, one must understand that to form an object wh- question in Catalan, the verb is placed before the subject and the wh- element is placed at the beginning of the sentence, as in (12). Consequently, if child Catalan speakers made errors similar to those made in child English, we might expect them to produce sentences like (13), with an uninverted verb, or (14), with a missing auxiliary. If they made errors similar to those made in child Swedish, Dutch and German, we might expect them to make errors such as that exemplified in (15), with a missing wh- element.

Catalan

(11) *En Joan ha menjat la poma.* (Adult-like Declarative)
Joan has eaten the apple.

(12) *Què ha menjat en Joan?* (Adult-like Question)
What has eaten Joan?

(13) *@Què en Joan ha menjat?* (Question with no Subject-Verb Inversion - Unattested)[1]
What Joan has eaten?

(14) *@Què en Joan menjat?* (Question with a Dropped Auxiliary - Unattested)
What Joan eaten?

(15) *@En Joan ha menjat?* (Question with a Dropped Wh-Word - Unattested)
Joan has eaten?

However, we will see below that child speakers of Catalan do not make errors of either the kind found in child English or of the kind found in child Swedish, Dutch and German. Similarly, Guasti (1996) reports that child speakers of Italian, a related Southern Romance language, appear to produce only adult-like, obligatorily inverted wh- questions from very early. On the basis of these facts, Southern Romance child languages would appear to constitute an exception to the trend found in other child languages with respect to wh- question errors in that there are none. Children appear to simply behave as adults do from the very beginning.

Nonetheless, in this study I will argue that this "exceptionality" of child Southern Romance languages is only apparent and that in fact child speakers of Catalan (and perhaps Italian) do have a grammatical deficit vis-à-vis question formation. I will argue that this deficit prevents them from producing any wh- questions whatsoever in the early stage, in contrast to the child speakers of the Germanic languages mentioned, who are able to produce wh- questions but produce them incorrectly. Further, I will suggest that a particular part of clause structure, the Tense Phrase, is unspecified in early child Catalan and that this underspecification is responsible for the early absence of questions. By *underspecification* I mean that the part of the clause to which verbs move to attach to a tense morpheme is present, but has no syntactic, semantic, or phonetic content.

In the second section, I will establish that there is, in fact, a deficit in early wh- question production. This is important because research on the development of questions in children has suggested that wh- question production is adult-like. In the following section, I will explore two possible explanations for the early absence of wh- questions. First, I will address the possibility that this deficit is due to general syntactic immaturity in the speech of the Catalan-speaking children. Then, I investigate the possibility that the absence in the child grammar of the part of clause structure to which wh- elements are hypothesized to move in the adult grammar, CP (the complementizer phrase), is the cause of the deficit. Next, I suggest that an adult theory of wh- question formation (Rizzi, 1991) provides a promising line of inquiry into the cause of the deficit. I then briefly discuss the particular grammatical model I assume (Chomsky, 1995) and the way in which Rizzi's theory may be interpreted in this model. Finally, I suggest that by assuming a crucial dependence between the development of the Tense Phrase in child Catalan clause structure and the development of wh- questions, the early absence of wh-questions in child Catalan (and possibly child Italian) can be explained.

A WH- QUESTION DEFICIT IN CHILD CATALAN

Do child speakers of Catalan have a deficit in their production of wh- questions? Asking this same question for child Italian, Guasti (1996) reports that the child Italian production data is error-free with respect to wh- questions. Guasti looks specifically at whether child Italian speakers fail to invert subjects and verbs, as do child English speakers. She reports that three Italian-speaking children of the Calambrone corpus, whom she studied, never produced an uninverted, hence non-adult-like, question, as in (16).[2]

(16) *@Che Gianni ha mangiato?*
What Gianni has eaten?

Of course because Italian is a null-subject language,[3] one can only determine whether subject-verb inversion has failed to take place if an overt subject has been used. According to Guasti (1996), out of 171 spontaneous utterances produced by Martina (1;8 - 2;7), Diana (1;10 - 2;6), and Guglielmo (2;2 - 2;11), 67 had overt subjects. Of these overt subject questions, which are the ones capable of telling us whether or not inversion has occurred, only three included non-inverted word orders, and these were *perchè* (why) questions which are grammatical in the adult language without inversion. These results are summarized in Table 1.

Table 1: Wh- Questions, Wh- Questions with Overt Subjects, and Inverted Wh- Questions with Overt Subjects in Three Speakers of Child Italian from the Calambrone Corpus (Sumarized from Guasti, 1996)

	Total # of Wh-Questions	Total # of Wh-Questions with Overt Subjects	Total # of Inverted Wh-Questions with Overt Subjects
Diana (1;10 – 2;6) Guglielmo (2;2 – 2;11) Martina (1;8 – 2;7)	171	67	64

Thus, Italian-speaking children appear to form questions in an essentially adult-like way from the beginning.

If we analyze wh- questions in child Catalan using Guasti's methodology, we find a similar result. That is, if we cull all questions asked by the four monolingual Catalan speaking children from the Serrà and Solé corpus from the CHILDES data base (MacWhinney & Snow, 1985), and then count the number of wh- questions with overt subjects with and without inversion we get the results in Table 2.[4]

As illustrated in Table 2, out of 146 wh- questions that these four children asked, 37 had overt subjects.

Table 2: Wh- Questions, Wh- Questions with Overt Subjects, and Inverted Wh- Questions with Overt Subjects in Three Speakers of Child Catalan from the Serrà and Solé Corpus of the CHILDES Data Base (MacWhinney & Snow, 1985)

	Total # of Wh-Questions	Total # of Wh-Questions with Overt Subjects	Total # of Inverted Wh-Questions with Overt Subjects
Gisela (1;7 – 3;0) Guillem (1;0 – 3;1) Laura (1;7 – 3;3) Pep (1;0 – 3;0)	146	37	37

All of these 37 questions had either a left dislocated subject, as in (17), or an utterance-final subject, as in (18), both of which are well-formed in the adult language.

(17) *Papa on és?* (Guillem - 2;11.25)
papa where is
Where is Papa?

(18) *On està la groga?* (Gisela - 2;8.0)
where is the yellow
Where is the yellow one?

While looking at the data from Guasti's (1996) perspective tells us that the Italian and Catalan children do not make the same errors that child English speakers make, it may not tell us anything about errors that might be specific to these particular child languages. That is, we might expect that the errors that occur in child Southern Romance, if there are any, will be different from the child English errors because the errors we find in child German, Dutch, and Swedish are also unlike the child English errors.

So, to examine the Catalan children's development in greater detail, each verbal utterance in each file was coded for tense and illocutionary force (question, statement, command, etc.). Then, using text search utilities on a UNIX computer, the number of occurrences of each code was calculated for each file. Using this procedure to calculate the total number of verbal utterances per file and the total number of wh- questions per file, we get the results in Table 3.

What stands out in Table 3 is that there is a lengthy period in the data of all four children before they produce any wh- questions at all. In Table 3, there are two columns after each child's age. The first of these gives the number of verbal wh- questions for the particular file and the second gives the total number of verbal utterances produced in that file. The numbers in bold are considered to be the first non-formulaic wh- question which included a verb for each child. The wh-questions occurring before those in bold, in the data of Guillem and Laura, are

Table 3: Verbal Wh- and Total Verbal Utterances (VU) in Four Monolingual Catalan-Speaking Children

Gisela			Guillem			Laura			Pep		
	Wh-	VU		Wh-	VU		Wh-	VU		Wh-	VU
(1;7,14)	0	0	(1;0,0)	0	0	(1;7,20)	0	0	(1;0,27)	0	0
(1;8,3)	0	8	(1;1,23)	0	0	(1;9,7)	0	6	(1;1,28)	0	0
(1;8,24)	0	11	(1;1,29)	0	0	(1;10,22)	0	25	(1;3,23)	0	0
(1;9,0)	0	4	(1;4,18)	0	0	(1;11,12)	0	37	(1;4,24)	0	5
(1;10,7)	0	10	(1;4,26)	0	0	(2;5,5)	0	25	(1;5,29)	0	13
(1;11,11)	0	2	(1;5,29)	0	0	(2;2,13)	1	52	(1;6,23)	0	10
(2;1,23)	0	7	(1;6,26)	0	2	(2;4,11)	1	13	(1;8,0)	0	7
(2;2,6)	0	0	(1;7,15)	0	2	(2;5,8)	0	72	(1;8,30)	0	12
(2;4,25)	0	49	(1;7,22)	0	0	(2;6,25)	4	41	(1;10,6)	0	73
(2;6,23)	0	29	(1;8,0)	1	14	(2;7,20)	1	120	(1;11,6)	4	50
(2;8,0)	19	224	(1;9,12)	0	26	(2;8,30)	1	148	(2;0,0)	0	18
(2;9,16)	8	154	(1;9,24)	0	11	(2;11,17)	7	157	(2;1,1)	1	59
(2;11,0)	4	103	(1;11,13)	0	36	(3;0,2)	5	293	(2;2,3)	5	92
(3;0,29)	0	23	(2;0,12)	0	16	(3;3,21)	1	220	(2;3,10)	3	106
			(2;1,14)	0	27				(2;4,4)	5	95
			(2;2,11)	0	8				(2;5,4)	7	163
			(2;2,28)	2	19				(2;6,15)	1	19
			(2;3,12)	0	4				(2;7,8)	2	121
			(2;3,18)	0	26				(2;7,28)	0	12
			(2;4,24)	4	37				(2;9,10)	7	197
			(2;5,25)	4	30				(2;10,15)	4	99
			(2;5,29)	1	24				(2;11,10)	0	100
			(2;6,10)	10	35				(3;0,27)	1	114
			(2;7,9)	0	44						
			(2;7,25)	1	71						
			(2;9,8)	2	99						
			(2;10,3)	4	29						
			(2;11,5)	5	35						
			(2;11,21)	2	68						
			(2;11,25)	7	91						
			(3;0,0)	1	7						
			(3;1,18)	8	68						

possibly formulaic, lexicalized units, given in (19) and (20). The number of total utterances is provided to show that questions are not missing as a consequence of the child not producing any utterances at all.

(19) *Què és això?* (Guillem - 1;8.0)
what is that?

(20) *Què és?* (Laura - 2;2.13)
what is (that)?

The reader will notice that Gisela produces 19 questions in the first file in which she produces any questions at all. This was not typical. In fact, nothing seems typical when it comes to the absolute number of wh- questions children produce. It is likely that non-grammatical considerations induced different numbers of questions in different sessions.

To be precise, only wh- words which occurred *with verbs* were counted as questions in Table 3. During the period before verbal wh- questions begin to be formed, there are, nonetheless, a wide array of wh- words which occur without verbs, as in Figure 1, (a) through (g). The importance of these utterances will become clear later.

Figure 1: Wh- Words in Child Catalan Before Verbal Questions Are Formed

(a) *Quin?* (Gisela - 1;8.24)
which (one)?

(b) *Este a on?* (Gisela, 1;8.24)[5]
this one where?

(c) *Què bé.* (Guillem, 1;8.0)
how good.

(d) *Per què no?* (Laura, 1;11.12)
why not?

(e) *Què?* (Laura, 1;11.12)
what?

(f) *On, on?* (Laura, 2;2.5)
where, where?

(g) *Quina!* (Laura, 2;2.13)
which one!

Similarly, in the speech of Rosa, one of the child Italian speakers of the Calambrone corpus which Guasti used, we also find a period of time before any wh- questions

are produced, as illustrated in Table 4. During this same period, wh- words without verbs sometimes ocurred. We will return to the significance of these non-verbal question words below.

Table 4: The Occurrrence of Wh- Questions in the Speech of Rosa (Calambrone Corpus, CHILDES Data Base, MacWhinney & Snow, 1995)

	Wh- Questions	Total Verbal Utterances
1;7.13	0	1
1;9.11	0	14
1;10.08	3	30
1;11.24	2	30
2;0.07	6	29
2;1.14	7	32
2;01.29	2	35
2;02.11	5	43
2;4.23	36	121
2;5.25	3	78
2;6.29	17	116
2;7.26	11	146
2;9.04	13	186
2;9.24	8	178
2;10.14	12	167
2;11.12	12	167
2;11.30	50	187
3;0.24	34	158
3;1.29	15	151
3;3.23	12	208

THE PERIOD PRECEDING VERBAL WH- PHRASES IS NOT PRE-SYNTACTIC

Why should it be that child speakers of Catalan do not produce any wh-questions early on? Could it be that their grammars are in general too unsophisticated or underdeveloped for them to be able to produce questions? It would seem

not. While many of the utterances in this pre-question period are simple imperatives and 3rd person singulars, others of them seem quite sophisticated and adult-like, as in (21) through (25).

(21) *No n' hi ha.* (Gisela, 1;9.0)
not CL (partitive) CL (locative) is.
There isn't any of that.

(22) *Vull beure.* (Guillem, 1;8.0)
want (1st SG) to drink.
I want to drink.

(23) *Papa, vull probar-ho.* (Guillem, 1;8.0)
papa, want (1st SG) to try CL (ACC SG MASC)
Papa, I want to try it.

(24) *Et dono això.* (Guillem - 1;8.0)
CL (DAT 2nd SG) give (1st SG) that.
I give you that.

(25) *Dóna- me- la.* (Pep - 1;5.29)
give (2nd SG IMP) CL (DAT 1st SG) CL (ACC SG FEM)
Give it to me.

Notice that in Examples (21) through (25) partitive, accusative, dative, and locative clitics are used and that they are used in their correct verb-final position in infinitives and imperatives, as in (23) and (25), and in their correct verb-initial position with finite verbs, as in (21) and (24). Notice as well that negation seems adult-like, as in (21), as does nonfinite complementation, as in (22) and (23). In short, it does not appear to be the case that the period preceding verbal wh- questions can be characterized as pre-syntactic or as any kind of one-word stage. Why, then, are no questions used by any of these four children?

IS CP ABSENT?

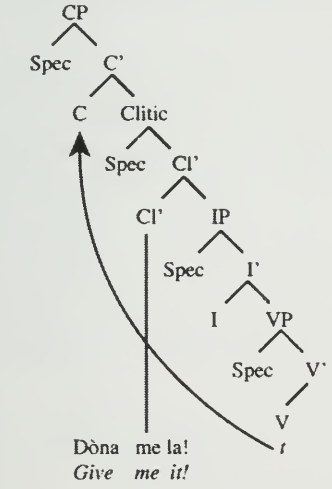
Some authors have suggested that question formation does not take place in the adult-like way in early child speech because the part of the clause to which wh-elements are hypothesized to move, the Complementizer Phrase (or CP), is not available, as in the work of Haverkort & Weissenborn (1991) for French and Meisel and Müller (1992) for German. Fortunately, in child Catalan we may test for the existence of CP, independently of wh- movement, by examining the use of imperatives. Following Rivero and Terzi (1995), I will assume that in adult Catalan, imperative verbs move to CP. Rivero and Terzi's assumption is based on the fact that imperative verbs precede clitics, as in (26), whereas finite verbs appear after clitics, as in (27).

(26) *Dóna- me- la.*
give (2nd SG IMP) CL (DAT 1st SG) CL (ACC SG FEM)
Give it to me.(1)

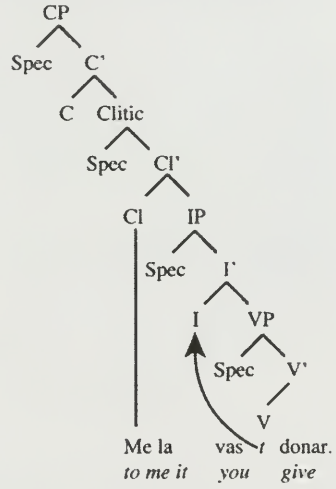
(27) *Me la vas donar.*
CL (1st SG DAT) CL (3rd SG FEM) aux (2nd SG PRET) give (INF)
You gave it to me.

Thus, Rivero and Terzi (1995) assume that clitics occupy a stationary position in the clause structure and that imperatives move over them to C, as in (28), and that indicatives move only as high as the part of the clause hypothesized to hold inflectional material referred to as Infl (or just I), as in (29).

(28) Imperative Verb Movement to C



(29) Finite Verb Movement to I



From Rivero and Terzi's perspective (1995), which I adopt, any imperative a child produces is evidence for the existence of C. And, if imperatives can move to C, then it is not the absence of C from child Catalan clause structure which prevents questions from being formed. As we can see from Table 5, many imperatives occur in child Catalan before wh- questions begin to be used. To arrive at the number of imperatives out of the total number of verbal utterances produced, given in Table 5, I searched for imperatives in all of the children's files up to and including the file just preceding the first wh- questions. This number and percentage of imperatives suggests that the construction was extensively used, and, adopting Rivero and Terzi's assumption regarding the structure of imperatives, also suggests that C was present in the children's clause structures.

One might question, however, whether all of these imperative forms indeed involve movement to C. Noticing that most of these imperatives are 2nd person familiar imperatives, which are homophonous with third person singular indica-

Table 5: Number and Percentage of Imperatives Out of the Number of Total Verbal Utterances Produced by Each Child in an Early State of Child Catalan

	Number and Percentage of Imperatives Out of the Number of Total Verbal Utterances
Gisela (1;7 - 2;6)	31/120 (26%)
Guillem (1;0 - 2;2)	80/134 (60%)
Laura (1;7 - 2;2)	59/144 (41%)
Pep (1;0 - 1;10)	60/154 (39%)
Total	230/552 (42%)

tive forms, one might want to suggest that these are really "bare verb" forms in Catalan that are produced lower in clause structure which do not raise to C.[6] However, if we adopt Rivero and Terzi's assumption that clitics are positionally stable, then the occurrence of imperative verbs to the left of clitics constitutes evidence for the existence of C. In fact, all of the imperative forms that occur with clitics in this "pre-wh" stage occur to their left, as in examples (30) to (35), suggesting adult-like movement of imperative verbs to C.

Catalan

(30) *Dóna-me- la.* (Pep, 1;5.29)
give me (CL DAT) it (CL ACC FEM SG)
Give me that.

(31) *Busca-la.* (Pep, 1;6.23)
seek it (CL ACC FEM SG)
Look for it.

(32) *Dóna 'm.* (Laura, 2;2.13)
give me (CL DAT)
Give me.

(33) *Tornem- hi.* (Laura, 2;2.13)
return (1st PL IMP) there (CL LOC)
Let's go back there.

(34) *Tu dóna 'm iogurt.* (Guillem, 1;8.0)
you give me (CL ACC) yogurt
You give me yogurt.

(35) *Ajuda 'm.* (Guillem, 1;9.12)
help me (CL ACC)
Help me.

Thus, it would appear that examples of imperative which occur with enclitics are neither "frozen forms" nor root infinitives and consequently constitute evidence of the existence of the C projection in child Catalan. Consequently, the inactivity of C is unlikely to be the reason for the lack of question formation in these child languages.

THE WH-/TENSE ASYMMETRY IN CHILD CATALAN

If neither general syntactic immaturity nor the unavailability of the C projection are responsible for the absence of questions early on in child Catalan, what is the cause of this apparent developmental delay? In this section I will suggest a possible explanation linking the delay in wh- question formation to a delay in grammatical tense marking.

The Wh- Criterion

A possible explanation for the inability of these children to form questions is that another aspect of child functional structure is not yet syntactically active, namely, Tense. Rizzi (1991) hypothesizes that Tense and wh- question formation are related in an important way. This hypothesis is based on the observation, following Haïk (1990), that there are languages in which an interrogative inflectional morpheme must always be present when questions are formed. Thus, Haïk notes that in Palauan, verbs in affirmative sentences carry an indicative mood morpheme (glossed as *R*), as in (36), while verbs in wh- questions carry an irrealis morpheme (glossed *IR*), as in (37).

Palauan

(36) **Affirmative**
Ng- kileld-ii a sub a Droteo
R3s-heat- PF-3s soup Droteo
Droteo heated the soup.

(37) **Wh- Question**
Ng-nerga a le-silseb-ii a se'el-il?
cl-what IR-PF-burn-3s friend-3s
What did his friend burn?'

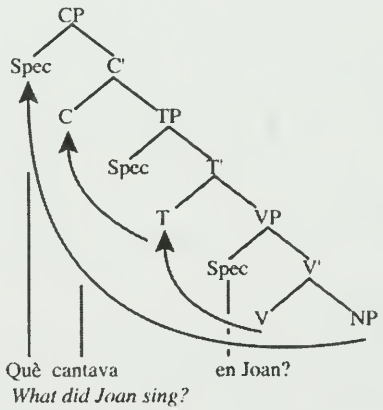
Rizzi (1991) proposes that this wh- morpheme, which is phonetically visible in Palauan and other languages, is in fact present in many (if not all) languages, though not phonetically visible. In Rizzi's (1991) formulation, this wh- morpheme is directly associated with the tense morpheme. This formulation is geared towards explaining why verbs (the auxiliary verb in the case of English) seem to raise above the subject in English and French in wh- questions. His idea is that the verb raises to the part of the clause where inflectional morphemes are added and at that point the verb acquires not only the tense morpheme, but also the invisible

wh- morpheme. This wh- morpheme is bound by a condition that obliges it to be adjacent to the wh- question word (i.e., *what*, *where*, etc.). This is similar to the condition on direct objects in English that they must be adjacent to verbs.[7] This adjacency condition requires the verb to move to the front of the sentence, where it can be adjacent to the wh- word. Rizzi calls this adjacency condition the *Wh-Criterion*, which is formalized in (38).

(38) **The Wh- Criterion** (Rizzi, 1991)
a. A Wh- operator must be in a Spec-head configuration with a [+wh] X_0.
b. A [+wh] X_0 must be in a Spec-head configuration with a Wh operator.

In (39), we see the verb move in two steps from the head of the Verb Phrase (V) to the head of the Tense Phrase (T), where it picks up both the tense morpheme and the wh- morpheme by Rizzi's (1991) hypothesis, and then moves to the head of the Complementizer Phrase (C). (The Catalan wh- phrase *què* moves to the specifier of the Complementizer Phrase).

(39)

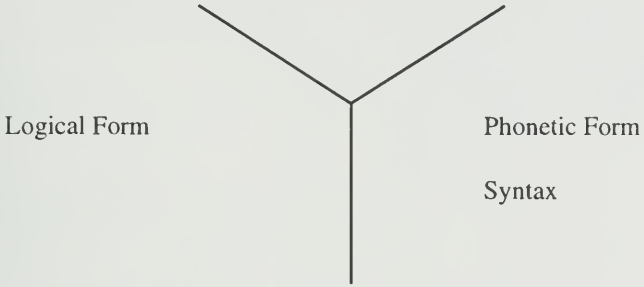


What did Joan sing?

Minimalism

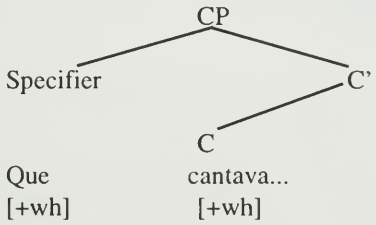
In *The Minimalist Program*, Chomsky (1995) attempts to develop an abstract theory to explain the fact that certain syntactic constituents appear to undergo movement within the clause. That is, the wh- pronoun *què* in object questions occurs at the beginning of the sentence, in spite of the fact that it is interpreted as if it were in object position, to the right of the verb. As a means of abstractly representing the motivation for this movement, Chomsky postulates a kind of feature that exists in the syntactic component of the grammar, which must be eliminated by the time that a syntactic derivation is given a phonetic form. Thus, in Figure 3, a syntactic derivation is generated which at some point branches off toward Phonetic Form, where it is pronounced. The idea is that these abstract features must be removed from the derivation before it passes to phonetic form or the derivation will "crash."[8]

Figure 2: The Computational Component in the *Minimalist Program*



According to Chomsky, these abstract features are eliminated by coming into a structural relationship with another element bearing the same feature. That structural relationship is known as the specifier-head relationship. In the case of wh-elements, and in Rizzi's (1991) formulation specifically, it means that a verb bearing an abstract wh- feature (carried by the tense morpheme) must move to the head of the Complementizer Phrase (C) and the wh- pronoun, also bearing an abstract wh- feature, must move to the specifier of the Complementizer Phrase (Spec, CP), as in (40).[9]

(40) **The Specifier-Head Relationship**



Implementing the Wh- Criterion in these terms, we see that both wh- pronouns and verbs with tense morphology must be present in order to produce a wh- question. Inferring from Chomsky's formulation of how these abstract features are eliminated, if either the tensed verb or the wh- pronoun is absent, then the abstract feature on whichever element is present will not be eliminated and will consequently cause the derivation to "crash." Thus, in Figure 2, a syntactic derivation is generated which at some point branches off toward Phonetic Form, where it is pronounced, while the rest of the derivation continues on to Logical Form, where the interpretation of the sentence is computed. Without one, the other cannot appear.

Wh- Words, Tense, and Feature Elimination

The examples in Figure 1, in Section 2, showed that during the early stage in which no syntactic questions are produced, children nevertheless produce wh- pronouns. Pep is the lone exception to this generalization. Hence there appears to be no lexical deficit with respect to the wh- words themselves that is preventing syntactic questions from being formed.

Thus, within the framework of assumptions just outlined, that leaves one other element in wh- questions which carries an uninterpretable feature, again, Tense. We can imagine that if Tense were not available to check the uninterpretable feature in these question words, then every derivation which included a question word with no tense should crash. Let us, then, examine the question of whether there is any overt morphological evidence for the existence of Tense as an active functional element in child Catalan. What we find in the way of verbal morphology in child Catalan before verbal questions are formed are second person singular imperatives, first and third person singular present indicatives, and a small number of root gerunds, infinitives, and participles, as in (41) through (44).

(41) *Me 'n vaig.* (Pep, 1;4.24)
I (REFL) CL (PART) go (1st SG PRES)
I am going.

(42) *Està aquí.* (Laura, 1;9.7)
is (3rd SG PRES) here.
It's here.

(43) *Mira.* (Gisela, 1;10.7)
look (2nd SG FAM IMP)
Look.

(44) *Dormir.* (Laura, 2;2.5)
to sleep.

As I argue in Grinstead (2000), these verb forms encode only present or irrealis temporal interpretation, which could be interpreted as the absence of tense. I will call this set of morphological tense markings *non-contrastive* to distinguish them from *contrastive* tense markings which I define as encoding speech time and event time as non-simultaneous. In Catalan, the contrastive forms include preterit, imperfect, simple future, periphrastic future, present perfect, past perfect, and the conditional. After an extended period during which only non-contrastive forms are used, contrastive tense forms begin to be used as well. I suggest that the onset of contrastive tense morphology is an indicator that syntactic and semantic tense specifications are then included in the child's syntactic structures.

Table 6: The Number of Files, Months, and Total Verbal Utterances Per Each Child's Early and Late Stage

	Number of Files	Number of Months	Total Verbal Utterances
Gisela I (1;7.14 - 2;2.6)	8	7	42
Gisela II (2;4.25 - 2;11.0)	5	7	559
Guillem I (1;5.29 - 1;9.12)	6	4	44
Guillem II (1;9.24 - 2;2.28)	6	5	117
Laura I (1;7.20 - 2;2.13)	6	7	145
Laura II (2;4.11 - 2;11.17)	6	7	551
Pep I (1;3.23 - 1;5.29)	4	5	18
Pep II (1;6.23 - 1;10.6)	5	5	102

Given the universality of some type of tense marking, I am inclined to believe that TP (the Tense Phrase) is a given part of the structure of the clause. The child's task is to specify the morphology that attaches to this category in their particular target language. Thus, I am assuming that TP comes unspecified for overt morphology, which must be learned, and that the abstract syntactic features I have referred to are not accessible to the child's grammar until the overt morphology has been learned.

To investigate the impact of the emergence of contrastive tense on the formation of questions we take the point at which the first contrastive tense morpheme is found in the speech of each child and search for questions both before and after that point for a roughly symmetrical number of files and months. For example, in the case of Laura in Table 5, the first contrastive tense morpheme is found in the seventh file, when she is 2;4.11. We then compare the preceding six files, which cover seven months, with the subsequent 8 files, which also cover 7 months. The number of files, months and total verbal utterances for both stages of each child, are given in Table 6. The point of dividing up the data in this way is to have roughly symmetrical periods of time intervals between recordings and roughly symmetrical amounts of recording time to compare. When we divide up the data in this way, we see that that there is an early stage in which there are neither wh-questions nor contrastively tensed verbs. Then, sometime after the first contrastively tensed verb is produced, questions begin to be used. This is illustrated in Table 7.

Table 7: The Onset of Contrastive Tense Marking and Verbal Wh- Question Formation

Gisela			Guillem			Laura			Pep		
	CT	Wh-		CT	Wh-		CT	Wh-		CT	Wh-
(1;7,14)	0	0	(1;5,29)	0	0	(1;7,20)	0	0	(1;1,28)	0	0
(1;8,3)	0	0	(1;6,26)	0	0	(1;9,7)	0	0	(1;3,23)	0	0
(1;8,24)	0	0	(1;7,15)	0	0	(1;10,22)	0	0	(1;4,24)	0	0
(1;9.0)	0	0	(1;7,22)	0	0	(1;11,12)	0	0	(1;5,29)	0	0
(1;10,7)	0	0	(1;8,0)	0	1	(2;2,5)	0	0	(1;6,23)	**2**	0
(1;11,11)	0	0	(1;9,12)	0	0	(2;2,13)	0	1	(1;8,0)	0	0
(2;1,23)	0	0	(1;9,24)	**1**	0	(2;4,11)	**1**	**1**	(1;8,30)	0	0
(2;2,6)	0	0	(1;11.13)	2	0	(2;5,8)	1	0	(1;10,6)	10	0
(2;4,25)	**3**	0	(2;0.12)	0	0	(2;6,25)	3	4	(1;11.6)	11	**4**
(2;6,23)	0	0	(2;1,14)	0	0	(2;7,20)	10	1			
(2,8,0)	13	**19**	(2;2,11)	0	0	(2;8,30)	12	1			
(2,9,16)	27	8	(2;2,28)	2	**2**	(2;11,17)	18	7			
(2;11,0)	23	4									

Having divided up the children's data into two stages this way (a Pre-tense and a Tensed stage), we can compare the proportions of questions out of total verbal utterances in the Pre-tense stage with the proportion of questions out of total verbal utterances in the Tensed stage. Using the chi square test given in Table 8 on the following page to make this comparison, we find that the stages are significantly different. More specifically, this means that if the same ratio of questions to total verbal utterances existed in the Pre-tense stage as exists in the Tensed stage then we would expect there to be 8 or 9 questions in the Pre-tense stage, counter to fact. Thus, the stages appear to be qualitatively different vis-à-vis question formation. A possible conclusion to draw from these facts is that the use of contrastive tense morphology is necessary for questions to be formed. This possibility is made more plausible by the fact that the link between Tense and wh-questions has been proposed on different grounds, as in Rizzi (1991).

Table 8: The Ratio of Questions to Total Verbal Utterances in Two Stages of Four Catalan-Speaking Children Compared ($x2 = 7.56$, $p < 0.01$)

	Questions	Total Verbal Utterances
Pre-tense	0	249
Tensed	47 (3.5%)	1333

SUMMARY

To summarize, we have seen that while wh- questions in child Catalan appear adult-like from the point at which they begin to be used, there is a lengthy period preceding their emergence during which no questions are formed. It seems unlikely that this lack of wh- questions is due to the absence or inactivity of C, given the imperative and clitic evidence presented. Furthermore, this deficit does not appear to be due to general syntactic immaturity because syntactically sophisticated constructions are used.

I have suggested that this complete absence of wh- questions can be explained by adopting Rizzi's (1991) hypothesized link between wh- questions and tense morphology. My implementation of Rizzi's hypothesized link makes use of mutual feature checking, as proposed in the *Minimalist Program* (Chomsky, 1995). Concretely, because children lack tense morphology early on, their clauses lack the ability to host one of the two wh- features necessary for mutual elimination of these features to take place. Thus, the children are left with wh- words, which carry uninterpretable features and lack the tense morphology which would carry the other wh- feature necessary to eliminate the feature of wh- words. As a result, all wh- question derivations that children attempt crash, and consequently no wh- questions are produced.

BACK TO ITALIAN

If the picture I have presented for child Catalan is correct, then a similar account of child Italian should be possible. The account developed here predicts the following:

- There should be an early period during which no verbal questions are asked.
- During this period, wh- words should, nevertheless, be available in children's vocabularies.
- The production of verbal wh- questions should not precede the use of contrastively tensed verbs.

To test these predictions, the files of Rosa, one of the children from the Calambrone corpus from the CHILDES data base (MacWhinney and Snow, 1985) were coded by a fellow graduate student, Stefano Vegnaduzzo, a native speaker of Italian, for Tense and wh- questions. After tallying the codes for Tense in Italian, we find a situation which is essentially identical to child Catalan. In the early files, present indicative and imperatives are the only verb forms used. In the first file, there are a number of wh- words used without verbs, as illustrated in (45).

(45) **Wh- Words in Rosa (1;7.13)**
a. *chi!*
who!
b. *che?*
what?

As we can see in Table 9, these wh- words occurred in Rosa's vocabulary before the first use of a question or of a contrastively tensed verb, which both occurred in the third file.

Table 9: Contrastively Tensed Verbs and Verbal Wh- Questions in the Speech of Rosa (Calambrone Corpus, CHILDES)

	Passato Prossimo & Imperfect	Wh- Questions	Total Verbal Utterances
1;7.13	0	0	1
1;9.11	0	0	14
1;10.08	1	3	30
1;11.24	2	2	30
2;0.07	0	6	29
2;1.14	1	7	32
2;01.29	2	2	35
2;02.11	1	5	43
2;4.09	1	52	99
2;4.23	0	36	121
2;5.25	4	3	78
2;6.29	6	17	116
2;7.26	3	11	146
2;9.04	13	13	186
2;9.24	5	8	178
2;10.14	8	12	167
2;11.12	8	12	167
2;11.30	25	50	187
3;0.24	26	34	158
3;1.29	6	15	151
3;3.23	22	12	208

In the third file, the *passato prossimo* past tense begins to be used as *do* wh-questions. Strikingly, they not only begin to be used in the same file, but actually co-occur in the same utterance, given in (46).

(46) *Detto baba detto cosa ha detto?*
said papa said what has said
Papa said, said, what did he say?

While further study of both Catalan and Italian is necessary to confirm or refute this hypothesis, the Italian child data nevertheless suggests that Italian-speaking children, like Catalan-speaking children, pass through a period during which no verbal question formation is possible. When contrastive Tense enters their grammar, elimination of the wh- feature carried by wh- words becomes possible. This in turn allows verbal wh- question derivations to be carried out, because the impediment which caused them to crash before this point can be removed.

CONCLUSION

We now have a theory of development which suggests that children need to acquire contrastive tense features before being able to check certain of the features associated with tense. I assume throughout that the features that cause wh- movement are available as part of UG. The child then has to learn the morphology associated with Tense in order to make available an attachment site for the wh-feature.

What this means for adult linguistic theory is that the connection between syntactic tense and wh- question formation proposed by Rizzi (1991) has been confirmed in child language development. More generally, the suggestion that there is an important connection between the syntactic location of tense in the clause and the Complementizer Phrase, first attributed to den Besten (1983), has similarly been confirmed. The descriptive contribution of the study is that in child Catalan, there is a period before questions are formed when other syntactic processes nevertheless seem to be active and that imperatives seem to be used before tensed verbs and questions are used. Imperatives seem to emerge developmentally with the group of other root verb forms which do not represent temporal distinctions other than with event time and speech time as simultaneous, such as gerunds, participles, and possibly some default forms which appear to be 3rd person singular present tense. My hope in this study has been to show that there is pattern in these data and that the pattern is explicable in terms of adult linguistic theory. If the reader is still skeptical of generative linguistic theory my hope is that the description of the data may prove useful nonetheless.

APPENDIX
MORPHEMIC GLOSSES

*–Ungrammatical
t–Trace
@–Unattested
CL–Clitic
1st, 2nd, 3rd–Person
SG–Singular
PL–Plural
FEM–Feminine
MASC–Masculine
DAT–Dative
ACC–Accusative
LOC–Locative
PART–Partitive
REFL–Reflexive

NOTES

[1] The symbol @ denotes an unattested utterance.
[2] The Calambrone corpora were collected naturalistically with regular visits to the homes of monolingual native speaking children of Italian (for more detail, see Cipriani, et al., 1989).
[3] A *null subject language* is one in which the identity of the subject can be recovered either from grammatical information, such as the verb ending (e.g. only *io*, "I", can be the subject of the verb *parlo*, by virtue of the verb's ending) or by discourse information. Crucially, an overt subject such as *I, John* or *the defendants* is not always necessary in such a language, as it is in English.
[4] The Serrà and Solé study was conducted naturalistically by making monthly visits to the monolingual Catalan speaking children's homes and videotaping them. The transcripts were then donated to the CHILDES Data Base (MacWhinney and Snow, 1985). The Catalan files were downloaded from the CHILDES database and then searched for questions. The results are compiled in Table 2.
[5] *Este* is a borrowing from Spanish.
[6] In fact, I find this speculation appealing for explaining the root non-finite puzzle in child Catalan (Grinstead, 1998).
[7] cf. Stowell (1981). Notice that the adverb *suddenly* can occur anywhere in the following sentences, except in between the verb and its object.Evidence like this suggested the Adjacency Condition, proposed by Stowell.

(i) Suddenly, John hugged Grace.
(ii) John suddenly hugged Grace.
(iii) *John hugged suddenly Grace.
(iv) John hugged Grace suddenly.

[8] *Crashing* in this case would mean that the computational system had produced a derivation which included elements that the Phonetic Form component could not interpret, and consequently the resulting derivation would not be well-formed.
[9] The point of developing a precise formal model of the structural properties of wh- question formation is to allow linguists to abstractly represent properties of grammar (and consequently of the mind) which hopefully interact with other grammatical patterns, allowing us to develop a principled theory of the mind in a manner analogous to the successful theories of natural sciences.

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