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## ACQUISITION ARCHIVES

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# Syntax at Age Two: Cross-Linguistic Differences<sup>1</sup>

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The 1990s witnessed a major expansion in research on children's morphosyntactic development, due largely to the availability of computer-searchable corpora of spontaneous speech in the CHILDES database. This led to a rapid emergence of parallel findings in different languages, with much attention devoted to the widely attested difficulties in inflectional morphology in the speech of two-year-olds. First written in 1995, and framed within the terms of contemporary syntactic theories, this article argues that cross-linguistic differences in the distribution of children's morphosyntactic errors provide important clues to the source of the errors, in particular whether they are morphological or syntactic in origin. The article takes as its starting point some striking previous findings that children's verb inflection errors are systematically correlated, on a sentence-by-sentence basis, with errors in the use of overt subjects, and with the use of syntactically complex constructions such as *wh*-questions. The article shows that these correlations are found in some languages but not in others, and argues that these differences are predictable, based on the verb movement and case licensing properties of individual languages. The article argues that children's errors reflect a combination of grammatical and speech production deficits.

### 1. INTRODUCTION

There's a lot missing from the speech of a typical two-year-old. This in itself is of no great interest to the linguist—after all, there are lots of other things that two-year-olds aren't

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<sup>1</sup>This Acquisition Archives article first appeared in October 1995 in C. Schütze, K. Broihier & J. Ganger (eds.), *Papers on Language Processing and Acquisition*, MIT Working Papers in Linguistics #26, Cambridge, MA: MITWPL. Portions of this article also appeared in 1996 as 'Root Infinitives are Finite' in A. Stringfellow, D. Cahana-Amitay, E. Hughes & A. Zukowski (eds.) *Proceedings of the 20th Annual Boston University Conference on Language Development [BUCLD 20]*, Somerville, MA: Cascadilla Press, and are reprinted here with permission of the author.

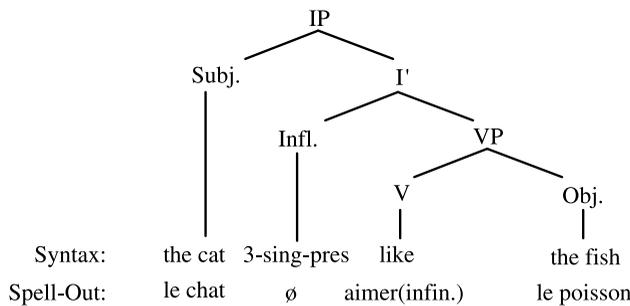
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that great at. What makes the two-year-old more interesting to the linguist is that there are striking regularities in what gets missed out where. This article takes a cross-linguistic look at regularities of omission in two-year-old syntax and morphology, primarily at so-called ‘root infinitives’ (Weverink 1989; Wexler 1994; Rizzi 1994b), and argues for the following main conclusions:

- (i) Root infinitive clauses are not due to a deficit in syntactic or morphological knowledge.
- (ii) Root infinitive clauses are fully represented finite clauses in which merger of the verb with inflection has been delayed, as in the hypothetical French sentence in (1) (omitting extraneous structure).

(1)



- (iii) The cause of the delay in merging the verb with inflection<sup>2</sup> is difficulty with the process of *accessing* morphological knowledge, which is not yet an overlearned, automatic process for the child.

My account of root infinitives depends on the interaction of the detailed knowledge children have of their target language at a very early age with one specific performance factor: the task of accessing morphological knowledge.

Unlike many linguistic analyses of differences between what children and adults say, I will not be arguing that the child is missing a crucial item of knowledge, or has taken a wrong step in the deductive process of learning the target language. And unlike many theories based on performance factors, I will not be assuming that performance systems merely interpret the output of linguistic computations: I will be claiming that performance systems for production are able to influence linguistic computations, albeit in a restricted manner.

My argument proceeds on two fronts. Sections 2 and 3 stress the difference between what two-year-olds seem to know about language and how reliably they deploy this knowledge, and point to one cross-linguistic difference that influences how reliably children deploy their knowledge. Sections 4–6 focus more on the specifics of my syntactic analysis of root

<sup>2</sup>In speaking of ‘merger’ of the verb with inflection in this article, I intend to remain neutral with regard to how the verb and inflectional heads join, whether by syntactic head raising of the verb or lowering of INFL (Emonds 1976, 1978; Pollock 1989; Chomsky 1991) or by postsyntactic merger under adjacency (Chomsky 1957; Halle & Marantz 1993; Bobaljik 1994). Throughout this article I will be assuming that morphological forms are supplied by spell-out rules that apply to the surface structure of sentences, i.e., a post-syntactic morphological component. For arguments for this position see Beard (1966, 1991); Aronoff (1976, 1994); Anderson (1992); Halle & Marantz (1993).

infinitive clauses. Section 4 takes a cross-linguistic look at the interaction of finiteness with *wh*-fronting and null subjects, two of the phenomena which have provided the best arguments that children—unlike adults—allow nonfinite root clauses (Crisma 1992; Krämer 1993; Rizzi 1994b). I argue that once the independent factors of verb position and verb form have been separated, these phenomena in fact support the claim that children do *not* allow root nonfinite clauses. Section 5 presents my account of what root infinitive clauses are in more detail. Section 6 compares agreement neutralization effects in adults and children that appear to be the mirror image of one another, and shows that they are in fact extremely similar. Finally, Section 7 compares my proposal with some well known linguistic analyses of root infinitive clauses.

## 2. KNOWLEDGE AND USE

One of the more robust findings about children's early use of inflectional morphology is that when they use it, they use it right. Of course, children often utter things which are inappropriate in the target language, but these are overwhelmingly errors of omission rather than errors of substitution. A case of substitution would be the use of English 3rd person singular *-s* to mark agreement with a 1st person subject.<sup>3</sup> The contrast between omission and substitution becomes particularly clear once we distinguish between marked and 'default' forms within morphological paradigms, such that use of the default value of a feature instead of a marked value amounts to failure to choose any value for that feature. This point has been demonstrated in a number of areas, and appears to be a reliable finding across a number of languages, as the following examples illustrate.<sup>4</sup>

### 2.1. Agreement

In languages with overt agreement morphology, children almost always use the agreement morphemes appropriate to the argument being agreed with. The majority of errors are errors of omission rather than errors of substitution. When verbal agreement morphemes are missing, children commonly use an affix which indicates nonfinite morphology. This probably shouldn't be taken as a substitution error. Rather, it is a regression to a more general, default form.<sup>5</sup>

Data from Clahsen and Penke's (1992) analysis of the Simone corpus of German (Miller 1976) show a strong contrast between *failure to use* agreement affixes, which is rather common,

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<sup>3</sup>There is one kind of 'substitution' that is used regularly by some children at certain points in development, namely the use of AUX+Verb where just an inflected main verb is required, e.g., *It's go like this; He does want a cookie*. See Stromswold (1990) and Zukowski (1994) for discussion of cases like this in English, and Boser (1989) for similar cases from early German. These extra auxiliaries may be viewed as a further instance of the use of default forms by children.

<sup>4</sup>This issue has sometimes been discussed in the literature on acquisition of inflectional morphology under the heading of *morphological imperialism* (cf. Slobin 1966, 1973; Pinker 1984).

<sup>5</sup>While infinitives are the default verbal forms most commonly used in the Western European languages which are the focus of this article, there is no reason why they should be the privileged default forms across all languages. For example, Crago & Allen (1994) document the widespread use of participial default forms by children learning Inuktitut. Poeppel (1996) also suggests that root infinitives are just one special case of default verbal forms.

TABLE 1  
Agreement Errors in the Simone Corpus of Early German  
(Adapted from Clahsen & Penke 1992)

	<i>Use in Obligatory Contexts</i>		<i>Appropriate Use</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
<i>Simone 1;7-2;8</i>				
<i>-st</i>	106/130	81.5	106/106	100
<i>-t</i>	1192/1432	83	1192/1217	98

TABLE 2  
Agreement Errors in Early Italian (Adapted from Guasti 1992)

	<i>Correct Agr.</i>		<i>Root Infinitive</i>		<i>Incorrect Agr.</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
<i>Martina 1;8-2;7</i>	478	93.5	25	4.9	8	1.6
<i>Diana 1;10-2;6</i>	610	98.1	3	0.4	9	1.5
<i>Guglielmo 2;2-2;7</i>	201	95.7	2	1	7	3.3

and *incorrect use* of agreement affixes, which is almost nonexistent (see also Poeppel & Wexler 1993). Table 1 compares these two measures of success in use of agreement for the subject agreement affixes *-st* (2nd singular) and *-t* (3rd singular).

As the table shows, in somewhere between one-fifth and one-sixth of the contexts requiring these agreement suffixes, the suffix is not used; but instances of using one of these affixes in an inappropriate context (i.e., when the suffix does not match the person and number of the subject) are extremely rare.<sup>6</sup>

Table 2, which is derived from Guasti's analysis of three corpora of early Italian (Guasti 1992; data from Cipriani et al. 1991, available on CHILDES, MacWhinney & Snow 1985), shows essentially the same point. Agreement is used correctly where required by all three children. Moreover, the child with the highest rate of failure to use correct agreement (Martina) does not show a correspondingly high rate of incorrect use of agreement; rather, she is the child with a much higher rate of root infinitive use than the other two children.

In all of these cases, substitution of one agreement morpheme for another is extremely rare. If it happens that a particular morpheme is less reliably used than another, this tends to mean that it is *omitted* more often. A comparison of the first columns of Tables 1 and 2 reveals that the major quantitative difference between the German and Italian data is in rates of correct usage in obligatory contexts, and not in the rates of incorrect agreement use.

<sup>6</sup>Clahsen & Penke (1992) also provide figures for other agreement suffixes, but these are more difficult to interpret, because these other endings (*-n*, 1st/3rd plural; *-e/ø*, 1st singular) are homophonous with either infinitival or truncated stem forms.

TABLE 3  
Case Errors in Russian, German, and English

	<i>Correct Case</i>		<i>Default Case</i>		<i>Incorrect Case</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Peter & Andrei (R)	694	93	29	4	22	3
Andreas (G)	210	94	8	3.5	6	2.5
12 children (E)	19561	93.5	1242	6	105	0.5

## 2.2. Case

In languages with widespread overt case-marking on noun phrases, case substitution errors are extremely rare. Table 3 shows data from NPs in two Russian children (Babyonyshev 1993) and one German child (Andreas: Schütze 1995; data from CHILDES, cf. Wagner 1985), and from pronouns in 12 English-speaking children (Rispoli 1994). As Schütze (1995) points out, most instances of failure to use the correct case involve uses of a default case.

The English pronominal data are particularly interesting here, because in English, unlike Russian and German, the default case on pronouns (accusative) is not the most frequent case,<sup>7</sup> indicating that retreats to the default case do not predominate in case errors merely because of their high frequency.

## 2.3. Tense

It is much less straightforward to check whether children's usage of tense morphology is appropriate to the context in which it is used, especially when relying on transcript corpora, but at least one study (Behrens 1993) has addressed this question. Behrens examined utterances in context for seven German corpora to check the correspondence between the tense morphology used and the intended temporal reference. Behrens reports that all seven children produce a large proportion of nonfinite root verbs in addition to finite forms. The nonfinite forms appear to be compatible with a wide range of temporal references, whereas finite forms are overwhelmingly used with a temporal reference appropriate to adult German. In other words, when finite tense markings are used, they are almost always used correctly.

The one corpus for which Behrens presents quantitative data on the relationship between temporal reference and tense usage is the Simone corpus (Miller 1976). Interpolating somewhat from Behrens's data, we can construct Table 4, which shows the proportion of target-like usages of present and *Perfekt*<sup>8</sup> tense forms.

<sup>7</sup>Nominative forms are far more common than accusative forms in both adult and child speech. Frequency counts from the tagged Francis & Kucera (1982) corpus of adult English show that all nominative pronouns are used two to three times more often than their accusative counterparts. Rispoli's (1994) survey of 12 English-speaking children's pronoun usage shows that they use nominative forms more than twice as often as non-nominative forms.

<sup>8</sup>In Simone's dialect of spoken German, the *Perfekt* is almost always used to refer to past events; the preterite is mostly avoided in speech, and correspondingly Simone uses it extremely rarely. The figures in the table include all utterances containing a perfect participle, whether or not the obligatory auxiliary is overtly expressed.

TABLE 4  
Simone's Usage of Tense Morphology (Adapted from Behrens 1993)

<i>Simone 1;9-2;8</i>	<i>No. of Uses</i>	<i>Minimum<sup>a</sup> % Target-Like</i>
Present	377	97
Perfekt	293	99
Infinitive <sup>b</sup>	355	n/a

<sup>a</sup>These are extremely conservative *lower-bound* estimates of the proportion of appropriate uses of present and perfect tenses, and the appropriateness levels could easily be 100%. As can be seen from a couple of examples, the utterances that I have counted as non-target-like could quite easily be appropriate forms (the examples I examined were only those which Behrens labeled as non-target-like).

I have counted as inappropriate those uses of the present tense that potentially refer to completed events, such as when Simone says *ich habe meine auf* 'I have mine open,' just after she has peeled her tangerine. The utterance could be referring either to the peeling event in the past or to the result of peeling which extends into the present, in which case it is fully target-like and appropriate.

I have counted as inappropriate uses of perfect tense references to future events, such as when Simone says *gleich 'mone ausgetrunk* 'soon Simone will have drunk it all up.' This could easily be an elided future perfect tense, which would make it an entirely appropriate use of the perfect participle.

<sup>b</sup>The infinitives included in these figures consist of references to past, present and future events, and to intentions. Those infinitives which Behrens coded as commands or 'other' were excluded from the count.

As is clear from the table, at a stage at which Simone is using root infinitives in a significant proportion of her utterances, when she does use finite verb forms, she uses them correctly with almost no exceptions. What is more, Behrens reports that the children use the present and perfect tenses for the whole range of possible uses in the target language at a stage where they are still producing large numbers of root infinitives. Thus, root infinitive usage does not seem to correspond to any lack of knowledge about tense.

#### 2.4. Form-Position Correlations

A crucial additional finding is that morphological omissions often have syntactic reflexes. For example, where finite verbs and infinitives appear in different positions in the target language, root finite verbs and root infinitives appear in different positions in the speech of two-year-olds. A couple of examples of this are shown in Tables 5a and 5b. Table 5a, which comes from Poeppel and Wexler's study of one German child aged 2;1 (Andreas, cf. Wagner 1985; CHILDES), shows that almost all inflected verbs appear in second position, whereas the vast majority of root infinitives appear clause finally (Poeppel & Wexler 1993; cf. Mills 1985; Clahsen 1988/1991; Meisel 1990; Boser et al. 1992; Verrips & Weissenborn 1992).<sup>9</sup> Table 5b

<sup>9</sup>For similar evidence from verb placement in Dutch see Haan (1987) and Weverink (1989).

TABLE 5A  
Form-By-Position Correlation in Early German  
(Poeppel & Wexler 1993)

<i>Andreas 2;1</i>	+Finite	-Finite
V2 (& not final)	197	6
V-final (& not V2)	11	37

Total = 251,  $\chi^2 = 150.26$ ,  $p < 0.0001$

TABLE 5B  
Form-by-Position Correlation in Early French (Pierce 1989, 1992)

<i>Nathalie &amp; Daniel<sup>a</sup></i>	+Finite	-Finite
<i>Pas</i> verb	6	118
Verb <i>pas</i>	121	1

<sup>a</sup>These counts probably cover ages 1;9,3-2;3,2 for Nathalie and 1;8,1-1;11,1 for Daniel (cf. Lightbown 1977), although Pierce (1992) is not clear on this point. I have excluded the two other French corpora that Pierce analyzed, Philippe (Suppes & Leveille 1973; CHILDES) and Grégoire (Champaud; CHILDES), because of the extremely low frequency of nonfinite forms in Pierce's analysis of them.

Total = 246,  $\chi^2 = 219.17$ ,  $p < 0.0001$

shows the same kind of form by position interaction in early French: finite verbs precede negation, while nonfinite verbs follow negation (Pierce 1989, 1992).

I take the examples in this section to show the following points. First, children have a good knowledge of the morphology of their target language at a very early age, as early as anybody has been able to check, in fact. In a large proportion of their utterances, however, they fail to realize this morphological knowledge. A priori, there are a couple of possible reasons for this. It could be that the omissions are fully legitimate outputs of the children's grammars. In other words, the children's grammars are less restrictive than the adults' grammars in that they allow all adult forms, *plus* the forms using defaults or omissions. Alternatively, the children's grammars could be very similar to the adults', with the omissions being less 'preferred' forms that are forced by extra-grammatical circumstances. Section 3 gives reasons why this second alternative seems more plausible.

The second important conclusion of this section is that whatever causes the morphological simplifications, it cannot be merely a process that acts upon the output of the child syntax. If it was, then we would not expect to find the form-by-position interactions shown in Tables 5a and 5b.

Note that there are a number of possible interpretations of the fact that in languages like French and German children raise finite verbs and fail to raise infinitives. This is just like adult French and German, except that infinitives cannot be root verbs for the adults. Possible explanations involve missing structure of various kinds in root infinitives ( $X^0$ s or XPs), null heads or missing movements—see Section 7 for a review of some of these alternatives. One of

the main goals of Section 4 will be to examine to what extent apparent *additional* regularities in the distribution of root infinitives are really independent phenomena, or whether they are straightforward extensions of the patterns in Tables 5a and 5b.

### 3. QUANTITATIVE DIFFERENCES

As we have seen in the previous section, two-year-old speakers of a wide range of languages use rather similar syntactic and morphological simplifications, and at more or less the same stage in development. However, there are systematic differences both within and among individuals in the use of syntactic simplifications. This section focuses on quantitative differences across time and languages. Section 4 focuses on qualitative differences between languages. The two generalizations I point to in this section are not novel observations. I include them because they are important developmental facts that have generally been underemphasized in cross-sectional linguistic analyses of two-year-olds' syntax, and which will play an important role in my account of root infinitives in Section 5.

#### 3.1. Gradual Decline

The 'root infinitive stage' lasts for different lengths of time in different children, and individual children use root infinitives with widely differing frequencies. What all of the children seem to have in common, though, is that their frequency of root infinitive use drops off gradually over time.

There is no evidence for a sudden change in the proportion of root infinitives used by any of the half dozen children for whom I have a sizeable sample of longitudinal data. We are led to the conclusion that emergence from the root infinitive stage cannot be dependent on a small but critical change in syntactic knowledge, especially when we contrast this pattern with evidence that rather sudden changes *do* occur in other areas of language development, and are plausibly explained by a change in the child's knowledge—for example, the vocabulary spurt; the onset of productive regular (and overregular) past tense usage (Marcus et al. 1992); and the use of complex predicate constructions (Snyder & Stromswold, in press). Figures 1 and 2 show the gradual decrease over time, with considerable variation from one recording session to the next, for two children learning English (Adam, Eve: Brown 1973, CHILDES) and one each learning German (Simone: Miller 1976; figures from Behrens 1993) and Dutch (Hein: Elbers & Wijnen 1992, CHILDES; data from Haegeman 1995).

#### 3.2. The Effect of Paradigmatic Complexity

Root infinitives are regularly used by two-year-old speakers of a wide range of different languages. But there is a systematic difference among languages in the frequency with which children use root infinitives. This is reflected in both the proportion of root infinitive clauses used at any given time, and in how long the root infinitive stage lasts. The generalization appears to be that children learning languages with richer inflectional paradigms use fewer root infinitives and emerge from the root infinitive stage at a younger age. This generalization

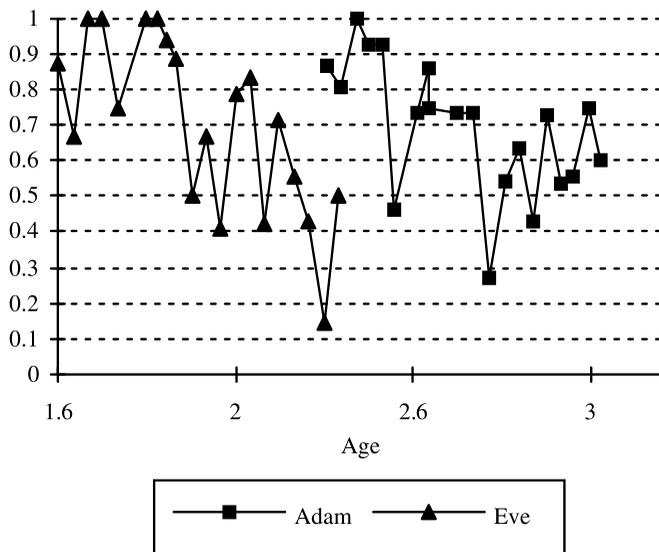


FIGURE 1 Proportion of root infinitives: English.

has been noted before (cf. Wexler 1994; Sano & Hyams 1994), but has not to my knowledge been incorporated into a syntactic account of root infinitives. It is basically a variant on the extremely common observation that children learning more complex inflectional systems do so faster (cf. Slobin 1985; Pinker 1984 and references cited therein). Figure 3 illustrates this with a scatter plot of rates of root infinitive usage by 27 children learning 9 different languages.



FIGURE 2 Proportion of root infinitives: German and Dutch.

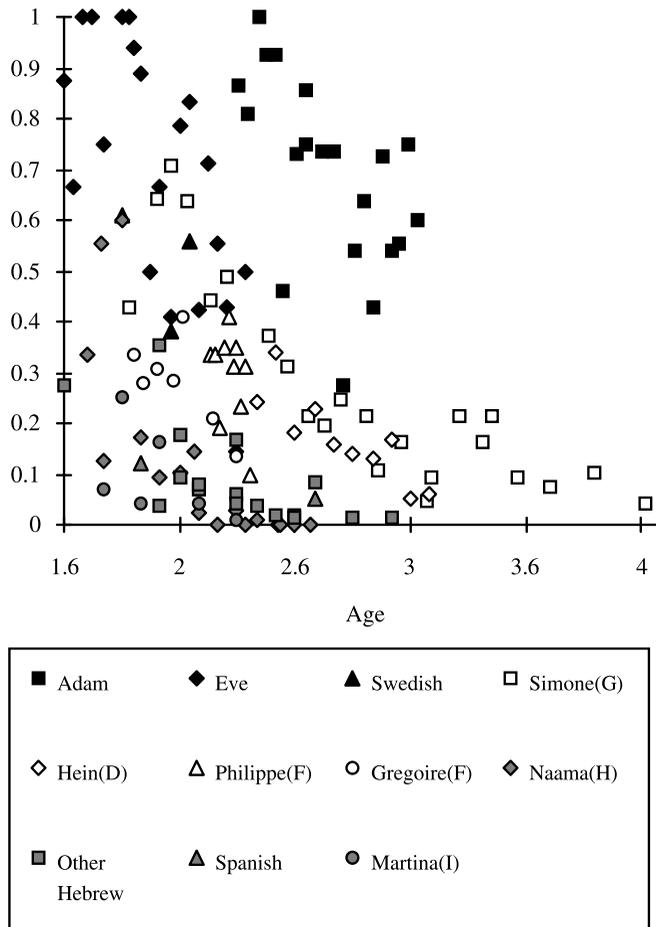


FIGURE 3 Root infinitives across languages (Sources: Italian, Guasti 1992; Spanish, Grinstead 1993; Catalan, Torrens 1992; German, Behrens 1993; Dutch, Haegeman 1995; Hebrew, Rhee & Wexler 1995; Swedish, Platzack 1990).

Since I have color-coded the languages according to the richness of their verbal inflectional paradigms, in looking at the figure the reader should attend to the shading rather than the shapes of the markers.

Figure 3 shows rates of root infinitive use at different ages for 8 children for whom I have at least 7 different points available, and for 19 further children for whom I have 1 or 2 data points.<sup>10</sup> I have separated the children into 3 groups, according to the complexity of

<sup>10</sup>For the children who are individually classified, all ages are exact. Some of the data from children for whom I only have a single data point is a summary of a number of recording sessions covering a period of a few months. In these cases I have taken the middle of the recording period as the age to plot in Figure 3. In no case was any single data point derived from more than 3 months of recording.

the inflectional paradigm of their language. Black markers represent English and Swedish, which distinguish no more than two forms in any tense. Proportions of root infinitives are highest among children in this group. Unfilled markers represent French, German, and Dutch, which distinguish up to 3 or 4 forms for regular main verbs in any tense. Proportions of root infinitives are markedly lower for this group. Finally, grey markers represent Spanish, Catalan, Hebrew, and Italian, languages which show the richest agreement paradigms.<sup>11</sup> Proportions of root infinitives are lowest in this group. Comparison of rates of root infinitive usage in the three language groups shows that rates are significantly different for all pairs of groups at each of the three time periods for which sufficient data is available, 1;9–2;0, 2;0–2;3, 2;3–2;6, despite the within-group variability due to collapsing across children, languages, and three months of development at a time.<sup>12</sup>

Rates of root infinitive use are certainly very low in the third group of languages, comprising mostly null-subject languages, but the rates are by no means zero. In very early Italian, for example, small numbers of root infinitives are found. Guasti (1992) examined three corpora of early Italian, and found a number of instances of root infinitives. For two of the children (Diana: age 1;10–2;6; Guglielmo: age 2;2–2;7), root infinitives make up only about 1% of root main verbs. However, the third child, Martina, who was recorded from an earlier age, initially uses a much higher proportion of root infinitives. Between age 1;8 and 1;11 root infinitives make up approximately 13% of her root verbs (22/164 tokens). For the remainder of the recording sessions, the occurrence of root infinitives drops to the 1% level found for the other two children (age 2;0–2;7: 3/347 tokens). Additionally, Cipriani et al. (1991, 1993) report that a dysphasic child uses root infinitives far more often than normal children, although they do not present quantitative data.

These findings raise the possibility that what causes root infinitives is not absent in Italian, but rather that it drops away at an extremely early age, in some cases before recordings start,

<sup>11</sup>The Hebrew agreement paradigm represents a mixed case. In the present tense no person distinctions are marked, only gender and number distinctions, while in past and future tense inflections person, number and gender are all distinguished. The licensing of null subjects in Hebrew is correspondingly mixed, with null subjects only being possible with 1st and 2nd persons in non-present tenses. Rhee & Wexler (1995) show that the vast majority of root infinitives in the Hebrew corpora they examined occur in environments that do not license null subjects. This difference in rates of root infinitives between different contexts is a contrast internal to Hebrew, which mirrors the contrast between languages shown in Figure 3. Root infinitives are used more frequently in systems with less rich inflectional paradigms.

<sup>12</sup>The specifics of the comparisons are as follows.

Age	Observations, mean			df	t	p (1-tailed)
	Eng/Sw	Gm/Fr/Dt	It/Hb etc.			
1;9–2;0	9, 0.71	6, 0.45		13	2.33	<0.05
		6, 0.45	9, 0.20	11	2.57	<0.05
2;0–2;3	8, 0.56	14, 0.35		10	2.36	<0.05
		14, 0.35	14, 0.07	18	7.35	<0.0001
2;3–2;6	7, 0.78	7, 0.27		8	5.76	<0.001
		7, 0.27	6, 0.01	6	7.45	<0.001

and even before the child starts to speak in a way that can usefully be recorded.<sup>13</sup> The results from Italian dysphasic children are particularly interesting, since they show how a linguistically delayed population can uncover stages of linguistic development that are masked in normal children.<sup>14</sup>

### 3.3. Conclusions

A generalization that has surfaced repeatedly in various forms in the literature on the acquisition of inflection is that children learn more complex inflectional systems earlier. The data in Figure 3 would support this idea, except that we have already seen in Section 2 that high frequency use of root infinitives does not entail lack of knowledge of the form or function of agreement. Also, to my knowledge there is no correlation between proportion of root infinitives, and the occurrence of agreement *errors*. In all of the languages surveyed in Section 2, the rate of incorrect use of case, tense, and agreement is consistently between 2% and 3%. Therefore what is delayed in the children learning languages with more impoverished inflectional systems appears to be a factor influencing *use* of their morphological knowledge, rather than a delay in the knowledge itself.

Wexler (1994) discusses the relevance of the gradual developmental change in how reliably finite morphology is used by children. He contrasts a view in which the child's knowledge is 'growing in strength' with a view in which the child has some more categorical knowledge deficit. Wexler correctly points out that the extreme rarity of agreement errors (as opposed to omissions) in the children's production is a mystery under the view that knowledge is gradually growing in strength. I agree with this argument, but I disagree with the conclusion that children must therefore have some categorical knowledge deficit. Although there is no reason to believe that knowledge of inflection is gradually changing, there is still every reason to believe that some other process involved in using inflectional knowledge is gradually changing, and that this process is crucial in understanding why children use root infinitive clauses. Sections 4 and 5 develop the details of such an account.

## 4. VERB FORM AND VERB POSITION ACROSS LANGUAGES

In this section I turn to a quite different kind of evidence that two-year-olds' syntactic representations are complete. To do this, I will examine two quite striking findings from the literature on very early syntax that have been presented as evidence that children allow nonfinite root clauses, and show that when these findings are reevaluated from a cross-linguistic perspective they turn out to better support the claim that young children *don't* allow nonfinite root clauses.

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<sup>13</sup>Schaeffer (1990) claimed that root infinitives are used in early Italian, but some researchers (e.g., Wexler 1994; Rizzi 1994b) have assumed that root infinitives are disallowed by Italian child grammar, presumably due to the scarcity of root infinitives in Italian compared to some of the other languages discussed here.

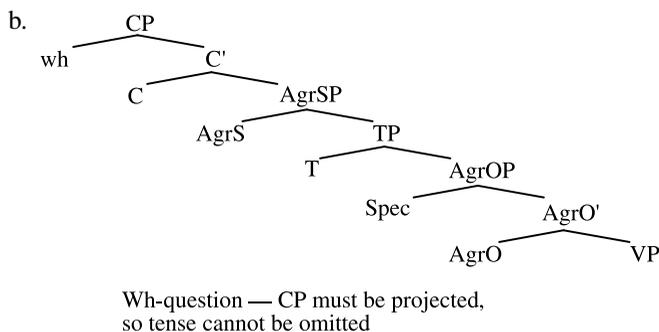
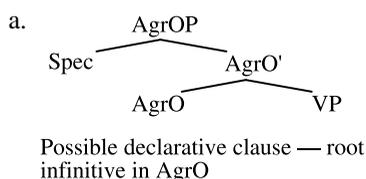
<sup>14</sup>See Rice & Wexler (1995) and Rice, Wexler & Cleave (1995) for related findings from English-speaking children with specific language impairment (SLI) that are interpreted in terms of an extended root infinitive stage.

Note that although I am assuming here that dysphasia and SLI are just 'delayed' forms of normal language development, this is by no means uncontroversial.

4.1. Root Infinitives in *Wh*-Questions

Rizzi (1994b) suggests that although young children have complete knowledge of the structure of clauses, their grammars differ from adult grammars in allowing clauses to be incompletely projected or ‘truncated.’ In other words, any amount of material from the ‘top’ of a clause can optionally fail to be projected, but it is impossible to omit material from the middle of a syntactic tree. This theory makes a number of interesting predictions about the syntax of two-year-olds, many of which will be discussed in Section 7, but for the moment I will focus on what is perhaps the most striking prediction of Rizzi’s theory, concerning the interaction between verb-finiteness and *wh*-question formation.

According to Rizzi’s truncation theory, root infinitive clauses occur when heads containing finiteness features like tense and subject agreement fail to be projected. In other words, root infinitive clauses are either VPs, or AGROPs, as shown in (2a). Assuming that *wh*-questions require movement of a *wh*-phrase to [Spec, CP], *wh*-questions require that CP be projected. And since material from the middle of a tree cannot be left out, this entails that inflectional material must also be projected, as shown in (2b).

(2) Account in Rizzi 1994b<sup>15</sup>

Therefore, the theory predicts that children in the root infinitive stage will never produce root infinitives in *wh*-questions. Remarkably, there is evidence to support this prediction.

Crisma (1992) reports that in a two-month sample of one French speaking child Philippe (Suppes, Smith & Leveillé 1973; available in CHILDES) about 20% of declarative utterances

<sup>15</sup>Similar accounts are proposed in Crisma (1992) and Weissenborn (1994). Weissenborn’s analysis is framed in terms of a *Local Wellformedness Condition*, which differs from Rizzi’s truncation theory in certain respects, but has identical consequences for the cases under consideration here.

TABLE 6  
Disappearance of Root Infinitives in Philippe's  
*Wh*-Questions (Crisma 1992)

<i>Philippe 2;1,19-2;3,21</i>	+Finite	-Finite
Declaratives	807	195
<i>Wh</i> -questions	114	0

are nonfinite, but none of the *wh*-questions are nonfinite (Table 6). I will be referring to this phenomenon as *Crisma's effect*.

As it stands, Crisma's finding is striking support for Rizzi's theory, but there are a couple of factors that need to be controlled for before we can be confident that the effect is a general one.

First, it's a well-known fact that auxiliaries are always finite in young children's production, even among children who are producing a lot of root infinitives (Haan & Tuijnman 1988; Sano & Hyams 1994; Wexler 1994). Utterances like those in (3) are virtually unattested in early child speech.

- (3) a. \*avoir mangé  
to have eaten  
b. \*être venu  
to have come  
c. \*gekauft haben  
bought to have  
d. \*be hungry

Therefore, we need to rule out the possibility that Crisma's effect is simply the result of a proliferation of auxiliaries in *wh*-questions. In Tables 7a and 7b I have made a recount

TABLE 7A  
Distribution of Root Infinitives in Philippe's Auxiliaries

<i>Philippe 2;1-2;3</i>	Finite Aux	Infin. Aux
Declaratives	166	0
<i>Wh</i> -questions	63	0

TABLE 7B  
Distribution of Root Infinitives in Philippe's Main Verbs

<i>Philippe 2;1-2;3</i>	Finite V	Infin. V
Declaratives	444	182
<i>Wh</i> -questions	1	0

TABLE 8A  
Finiteness in Declaratives and Questions: Grégoire

<i>Grégoire 1;10-2;3</i>	<i>Finite Aux</i>	<i>Infin. Aux</i>	<i>Finite V</i>	<i>Infin. V</i>
Declaratives	79	0	119	44
<i>Wh</i> -questions	8	0	0	0

(Data from Champaud; transcripts in CHILDES)

TABLE 8B  
Finiteness in Declaratives and Questions: Nathalie

<i>Nathalie</i>	<i>Finite Aux</i>	<i>Infin. Aux</i>	<i>Finite V</i>	<i>Infin. V</i>
Declaratives	37	0	96	45
<i>Wh</i> -questions	2	0	0	0

(cf. Lightbown 1977)

TABLE 8C  
Finiteness in Declaratives and Questions: Daniel

<i>Daniel</i>	<i>Finite Aux</i>	<i>Infin. Aux</i>	<i>Finite V</i>	<i>Infin. V</i>
Declaratives	54	0	239	208
<i>Wh</i> -questions	21	0	1	0

(cf. Lightbown 1977)

of the same sample of the Philippe corpus, using slightly stricter criteria than Crisma's,<sup>16</sup> and separating main verbs from auxiliaries. And what we find is that auxiliaries—in the first table—are always finite, whether in declaratives or *wh*-questions. Main verbs, on the other hand, are almost never used in *wh*-questions. Therefore the striking effect in Table 6 is just an effect of verb type, and not an effect of clause type. Of course we haven't ruled out the possibility that *wh*-questions do exclude root infinitives in child French, we just haven't seen any evidence for it yet.

Tables 8a–c replicate the same finding for three other French corpora. There are large numbers of root infinitives in declaratives, and virtually none in *wh*-questions in all three corpora, but this is entirely due to the fact that the children's *wh*-questions all contain auxiliaries.

The French data thus fail to survive the control for verb type. However, a number of studies have shown that Crisma's effect does hold for Germanic child languages, and these cases appear not to be artifacts of verb type.

<sup>16</sup>See the appendix for details of my counting procedure, including examples of those *wh*-questions that Philippe produces, which do contain root main verbs and why they were excluded as repetitions.

TABLE 9  
 Finiteness in Declaratives and Questions: Dutch  
 (Haegeman 1995: Hein Corpus,  
 cf. Elbers & Wijnen 1992)

<i>Hein 2;4-3;1</i>	+Finite	-Finite
All clauses	3768	721
<i>Wh</i> -questions	88	2

Total = 4579,  $\chi^2 = 12.71$ ,  $p < 0.001$

Table 9 shows Haegeman's (1995) analysis of one Dutch two-year-old, where nonfinite *wh*-questions are almost completely absent, and main verbs are used in *wh*-questions, as can be seen in (4a-c). So there doesn't seem to be the same confound of verb-type in the Dutch data that we saw in French.

- (4) a. en wat doen ze daar?  
 and what do they there?  
 b. waarom blijf daar?  
 why stay there?  
 c. wie staat daar?  
 who stands there?

Tables 10–12 make essentially the same point for German and Swedish. The figures in Table 10 come from analyses of a number of German corpora in Kursawe (1994). There are no baseline figures for finiteness in declaratives here, but the study is based on children who we independently know to be producing high numbers of root infinitives in declaratives.<sup>17</sup> All but 1 of the 307 *wh*-questions in the survey occurred with a finite verb.

- (5) a. wer hat den radio?  
 who has the radio? (Simone 2;1)  
 b. was matter (= macht er)?  
 what does he? (Annelie 2;6)

Table 11 shows figures from Poeppel and Wexler (1993), which demonstrate that just like *wh*-questions topicalization structures do not contain root infinitives in early German (cf. also Boser et al. 1992). These are sentences in which something other than a subject appears in first position: this can either be an object (6a) or an adverb (6b). This parallel is not surprising if we

<sup>17</sup>Kursawe's study is based on the following corpora: Annelie, age 2;4–2;9, MLU 2.01–3.07 (Clahsen et al. 1990); Mathias, age 2;3–3;7, MLU 1.25–3.51 (Clahsen 1982); Philipp, age 3;1–3;8, MLU 2.59–4.12 (Clahsen et al. 1990); Simone, age 1;10–2;8, MLU 1.01–3.91 (Miller 1976).

The largest corpus in Kursawe's study was the Simone corpus, for which baseline finiteness rates were shown above in Section 3.

Weissenborn (1992) reaches the same conclusion about the absence of nonfinite *wh*-questions in the Simone corpus as Kursawe. However, no figures are provided there.

TABLE 10  
Finiteness in Declaratives and Questions: German  
(Kursawe 1994)

	+Finite	-Finite
<i>Wh</i> -questions	306	1

TABLE 11  
Finiteness in Subject-Initial and Nonsubject-Initial  
Declaratives (Poeppl & Wexler 1993)

<i>Andreas 2;1</i>	+Finite	-Finite
Subj.-initial	130	24
Nonsubj.-initial	50	0

Total = 204,  $\chi^2 = 8.83$ ,  $p < 0.01$

TABLE 12  
Verb Position in Early Swedish *Wh*-Questions  
(Santelmann 1994)

	Total	V2
<i>Wh</i> -questions	579	574

assume that topicalization structures are like *wh*-questions in that they require verb movement to C.<sup>18</sup>

- (6) a. Eine Fase hab ich  
a vase have I  
b. So macht der  
so makes he

Table 12, finally, shows counts of child Swedish *wh*-questions in Santelmann (1994). The table only shows that the vast majority of *wh*-questions in child Swedish appear in the V2 position. However, Santelmann (p.c.) informs me that verbs in second position in her corpus are overwhelmingly finite: therefore nonfinite *wh*-questions appear to be impossible in child Swedish, too. The examples in (7) show that main verbs are used.

<sup>18</sup>Notice that if verb movement to C is the crucial property that topicalizations and *wh*-questions in German share and that is responsible for the absence of root infinitives, then it must be the case that garden variety subject-initial declaratives do *not* require verb movement to C, given the high proportion of root infinitives in subject initial declaratives. This provides an argument against the standard 'symmetric' account of Germanic V2, which assumes uniform verb movement to C (Besten 1976), and supports the 'asymmetric' account of V2, according to which verbs need move no higher than INFL in subject-initial declaratives (Travis 1984; Zwart 1993).

TABLE 13  
Finiteness in Declaratives and Questions: English

<i>Adam 2;3-3;1</i>	<i>Inflected V</i>	<i>Uninflected V</i>	<i>% Inflected</i>
Declaratives	134	203	40%
<i>Wh</i> -questions	69	92	43%

Total = 498,  $\chi^2 = 0.43$ ,  $p = 0.51$

- (7) a. Vad gör den inne?  
       what does it in (there)      (Kenneth 2;1)  
       b. vad heter den dockan?  
       what is-called this doll      (Ask 1;11)

At this point, then, we have seen that Crisma's effect is found in German, Dutch, and Swedish,<sup>19</sup> but maybe not in French. What German, Dutch, and Swedish have in common, and where they differ from colloquial French, is that *wh*-questions require V-I-C movement. This suggests that the presence of Crisma's effect in Germanic may be due to verb movement rather than the presence of CP material. We have already seen in Section 2 that in child versions of V-raising languages, the position of the verb strongly correlates with the finiteness of the verb: if a verb raises to INFL, it is almost always finite. We next turn our attention to English, which allows us to test this possibility.

Subject *wh*-questions in English are particularly interesting, because they do not require main verbs to move,<sup>20</sup> unlike their Germanic counterparts and nonsubject *wh*-questions in English, which demand that a verb (or auxiliary) move to C. What this allows us to do, then, is to see whether Crisma's effect is due to verb movement rather than the presence of CP. Only if Crisma's effect is found in English, and all subject *wh*-questions contain a finite verb, can we be confident that it is the presence of CP rather than verb position that causes the interactions seen so far in this section.

Table 13 compares rates of inflection in declaratives and subject *wh*-questions for the first 11 months of the Adam corpus (Brown 1973; CHILDES).<sup>21</sup> Table 13 shows that the ratios are extremely similar for declaratives and subject questions for the whole 11 month period, but Figure 4 is actually a better comparison. The figure displays the finiteness rates for both clause types over time.

<sup>19</sup>Of course, since I do not have precise figures on the number of German, Dutch, or Swedish questions that had root main verbs, it remains a possibility that the generalizations in Tables 9–12 are being distorted by a proliferation of auxiliaries. However, I do not believe that Crisma's effect is an artifact of auxiliaries in these languages.

<sup>20</sup>Assuming adverbs like *always* to be a marker of the left edge of VP, compare:

- (i) Uta always wins.  
 (ii) Uta is always winning.  
 (iii) Who always wins?  
 (iv) Who has always won?

<sup>21</sup>At the time of writing, the Adam corpus is the only English corpus available on the CHILDES database that contains a large enough number of subject *wh*-questions containing main verbs to realistically compare finiteness rates in questions and declaratives. It is fortunate that Adam is an extremely inquisitive child.

There is a rather broad scatter in Figure 4, due to the small number of tokens being counted in many of the files.<sup>22</sup> But the superimposed regression lines for both data series lie extremely close to one another, showing that the rates of inflection are essentially identical in declaratives and subject *wh*-questions. The regression lines are not significantly different.

This shows that Crisma's effect is not attested in English,<sup>23</sup> and this finding lends support to the notion that cross-linguistic differences in head movement determine whether the interaction between finiteness and question formation is found. I suggest that what is special about German, Dutch, and Swedish is that their *wh*-questions require main verbs to move to C. This is a requirement that the children apparently know and respect, so that whenever they ask a question they dutifully move V to I to C, picking up inflectional heads on the way. English subject *wh*-questions and colloquial French *wh*-questions on the other hand do not require verb movement to C, and as a result, the verbs behave just as they would in a declarative, and therefore allow root infinitives.

Notice that even if we assume that German, Dutch, and Swedish children unswervingly respect the requirement to raise verbs to C in questions and topicalization structures, this is not enough to guarantee that all *wh*-questions and topicalizations will contain correctly inflected finite verbs. Why don't some verbs wind up in C as infinitives?

Only by forcing tense and agreement to be represented in *every* clause can we guarantee that correct inflectional features will be picked up in the event that the verb should move to C, passing through INFL on its way. This ensures that V-I-C movement will cause the verb to pick

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<sup>22</sup>The counting procedure was the same as for the French counts described in footnote 16, with the important additional restriction that all utterances that required an obligatory auxiliary were ignored. This restriction differs from some studies of early child English, which have classified utterances with dropped auxiliaries as root infinitives. While this is an interesting proposal, I am unaware of any evidence that justifies equating missing auxiliaries with missing inflection on main verbs.

The kind of evidence that would provide independent motivation for this assumption would be a demonstration that the distribution of missing auxiliaries patterns with the distribution of missing inflection on main verbs. This could be a parallel with English main verbs, although auxiliaries and main verbs differ in their head movement properties. Alternatively, the distribution of missing auxiliaries in child English might be expected to parallel the distribution of root infinitives in a V-raising language like French, where main verbs show similar head movement properties to English auxiliaries. Consider the following three potential parallels, none of which are attested.

- (i) If null and overt auxiliaries were equivalent to root infinitive and finite verbs in V-raising languages, then we should expect to find Crisma's effect in English nonsubject *wh*-questions, which both Roeper & Rohrbacher (1994) and Bromberg & Wexler (1995) have shown not to be the case: both of these studies found a high proportion of missing auxiliaries in *wh*-questions.
- (ii) In V-raising languages root infinitive verbs appear extremely rarely with overt subjects (5–10% of root infinitives), as Section 4.2 shows. Although I have not counted this, I consider it rather unlikely that English utterances with dropped auxiliaries show such a low proportion of overt subjects.
- (iii) The development of overt auxiliary use, *do*-support in particular, appears to have a different time course from the development of the use of tense and agreement inflections on main verbs. For example, *do*-support is almost never used before age 3;0 in the Adam corpus, but when it does emerge, it is used reliably rather quickly. This is quite unlike the gradual increase in the use of verbal inflection.

<sup>23</sup>Roeper & Rohrbacher (1994) have also claimed the conclusion that nonfinite *wh*-questions are possible in early English. Although their conclusion agrees with mine on this point, it depends on the controversial assumption that utterances containing null auxiliaries should be classified as root infinitives (see preceding footnote). Roeper & Rohrbacher's counts were generated in the context of a study of null subjects in *wh*-questions, and therefore they only considered nonsubject *wh*-questions in English, interpreting questions of the form *What John like* as nonfinite forms, due to the missing auxiliary.

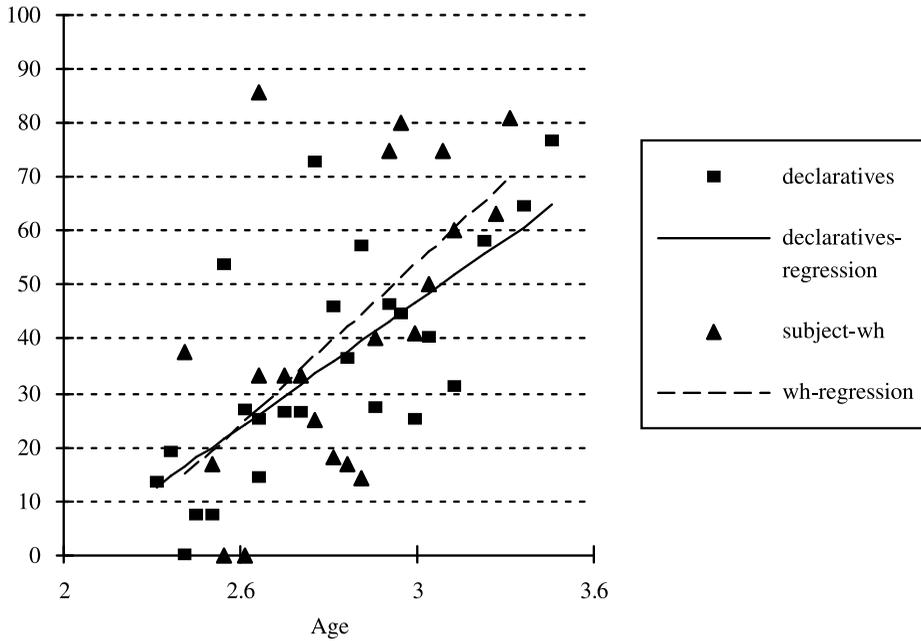
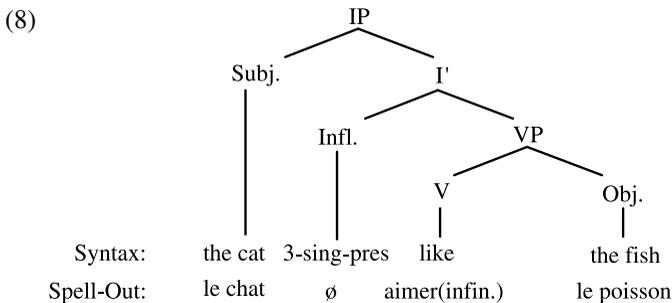


FIGURE 4 Adam,  $\pm$ finite in  $\pm wh$  (subject questions); declarative: intercept =  $-92.19$ ; slope =  $46.39$   
 subject-*wh*: intercept =  $-125.55$ ; slope =  $59.95$ .

up correct inflectional features, but more importantly it leads us to assume that all declarative clauses are finite and contain appropriate tense and agreement features, even when they are spelled-out as root infinitive clauses. Root infinitive clauses contain all the elements of an adult finite clause. They only differ from the adult clauses in that V and I have failed to merge. In the absence of a verbal host, there is no spell-out for the features of INFL, and so they are not realized. Meanwhile, since the verb lacks inflectional features, it is spelled out as a default form, an infinitive.<sup>24</sup> Therefore, a root infinitive clause would look something like (1), repeated as (8), where I have omitted extraneous structure.



<sup>24</sup>This analysis crucially requires a non-lexicalist approach to morphosyntax: verb stems and inflectional features must enter the syntax as independent syntactic elements.

Therefore what had at first appeared to be the most persuasive evidence in favor of Rizzi's truncation theory, which assumes children to have a deficit of syntactic representation, turns out to provide an argument for the absence of any representational deficit.

The argument just presented depends on the assumption that *wh*-movement/topicalization and the choice of tense and agreement features are independent syntactic processes. If there is a dependency between these constructions and inflection, then it may be possible to account for Crisma's effect without being forced to assume that children's root clauses are all syntactically finite, even when they have the form of root infinitives. An approach along these lines has been suggested to me by a number of people. Suppose that C selects finite INFL, could this account for the distribution of Crisma's effect? Stated this way, this would only account for the absence of Crisma's effect in English if we made the additional assumption that English is special in that INFL need not be picked up in questions. A variant on this idea, due to Carson Schütze (p.c.), involves assuming that there is a finiteness feature in C, so that if the verb moves to C it has to spell-out as +finite.

It is important to clarify which of my assumptions these alternatives do and do not manage to circumvent. Both alternatives share my assumption that two-year-old syntax tolerates the representation of finiteness features, whether in INFL or C, which do not get spelled-out. This seems to be unavoidable if we are to capture the cross-linguistic contrast between German, Dutch, and Swedish on the one hand, and English and (possibly) French on the other hand. The difference that the alternatives offer is that they restrict the range of clauses and languages for which unrealized inflectional features must be postulated, and do not force us to assume that all root infinitive declarative clauses contain correct but unrealized inflectional features.

Therefore the alternative proposals do make it possible to maintain another account of missing inflection in root infinitive declarative clauses. However, since something like my account of root infinitives as finite clauses with unrealized features appears to be necessary for at least English (and maybe French) *wh*-questions, there should be no need to invoke a separate mechanism to account for root infinitive declarative clauses. Moreover, if separate mechanisms *are* invoked for root infinitive clauses in declaratives and questions, the parallel between rates of root infinitive use in declaratives and questions shown in Figure 4 is quite unexpected. For these reasons I believe that assuming that C either selects or hosts finiteness features does not simplify our view of the distribution of root infinitive clauses, and may even complicate matters.<sup>25</sup>

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<sup>25</sup>An altogether different possibility would be to assume that C selects or hosts finiteness features only in V2 languages like German, Dutch, and Swedish. This would be close to a restatement of the facts, but it is not implausible, since these languages do not allow embedded nonfinite *wh*-questions like *I don't know what to do*. The test case for this proposal is a language in which questions and topicalizations require movement to C, but which allows embedded nonfinite *wh*-questions. If this kind of a language shows Crisma's effect, then we can be confident that the children are not merely respecting a constraint on embedded infinitival clauses in their root clauses. Manuela Schönenberger (p.c.) informs me that some varieties of Swiss German have precisely the relevant properties.

I am grateful to Zvi Penner (p.c.) for providing me with figures on *wh*-question production in 3 children learning Bernese Swiss German, one of the dialects that allows embedded nonfinite *wh*-clauses. Crisma's effect is present numerically—all 251 of the *wh*-questions counted by Penner contained a finite verb, at a stage when the children are producing significant numbers of uninflected verbs. However, it is not clear that the effect is so strong if we restrict attention to *wh*-questions containing a main verb. These only appear relatively late in the corpora, and so there is a danger that the numerical effect is an artifact of the predominance of auxiliaries in early Bernese *wh*-questions.

TABLE 14A  
Finiteness and Null Subjects: Dutch (Krämer 1993)

<i>Thomas 2;3-2;8</i>	<i>+Finite</i>	<i>-Finite</i>
Overt subject	431	21
Null subject	165	246

Total = 863,  $\chi^2 = 307.07$ ,  $p < 0.0001$

TABLE 14B  
Finiteness and Null Subjects: Flemish (Krämer 1993)

<i>Maarten 1;11</i>	<i>+Finite</i>	<i>-Finite</i>
Overt subject	69	11
Null subject	23	89

Total = 192,  $\chi^2 = 80.75$ ,  $p < 0.0001$

#### 4.2. Finiteness and Null Subjects

A second piece of evidence that has been presented in support of the claim that children in the root infinitive stage allow nonfinite root clauses comes from the distribution of null subjects. The argument runs roughly as follows: the vast majority of early null subjects are found in root infinitive clauses. This is reminiscent of the fact that embedded infinitival clauses license the null subject PRO in adult languages. This in turn suggests that root infinitive clauses are not only superficially similar to adult infinitival clauses—they are syntactically nonfinite. Nonfinite root clauses are disallowed in adult languages, and children must therefore have a syntactic deficit that allows them to have root nonfinite clauses.<sup>26</sup>

As in the case of the root-infinitive/*wh*-question interactions just discussed, I aim to show that a cross-linguistic view of the interaction between finiteness and null subjects in fact supports the claim that two-year-olds do not allow root nonfinite clauses, and that their syntactic representations are not at all deficient.

As before, the crucial test of the earlier claims comes when we separate the effect of verb *form* from the effect of verb *position* on the distribution of null subjects.

Tables 14a and 14b come from Krämer's (1993) cross-linguistic survey, which she uses to motivate the view that root infinitives license PRO. In Tables 14a and 14b the [–finite] column shows that the vast majority of root infinitive verbs occur in subjectless sentences in Dutch

<sup>26</sup>Guilfoyle (1984) suggested that the acquisition of consistent tense marking correlates with the disappearance of early null subjects. To my knowledge, Weverink (1989) and Pierce (1989, 1992) were the first to document the correlation between root infinitives and null subjects on a sentence-by-sentence basis. Pierce only considered pronominal subjects rather than all overt subjects, but her results are similar to other reports which considered all overt subjects, rather than just pronominal subjects.

TABLE 15  
Finiteness and Null Subjects: Andreas  
(Revision of Counts in Krämer 1993)

<i>Andreas 2;1</i>	<i>Finite Aux</i>	<i>Infin. Aux</i>	<i>Finite V</i>	<i>Infin. V</i>
Overt subject	85	0	117	22
Null subject	6	1	13	45

Main Verbs: Total = 197,  $\chi^2 = 69.55$ ,  $p < 0.0001$

(Thomas, cf. Elbers & Wijnen 1992; CHILDES) and Flemish (Maarten, cf. Gillis; CHILDES), which is most definitely not the case for finite verbs in the lefthand column.<sup>27</sup>

Krämer found the same interaction between finiteness and null subjects in the Andreas corpus of child German.<sup>28</sup> In Table 15 I have replicated her finding, with the difference that I have separated auxiliaries and main verbs, to check that auxiliaries are not distorting the data. Auxiliaries are overwhelmingly finite, as we would expect, but for the main verbs on the right hand side of the table there's a clear clustering of overt subjects with finite verbs and null subjects with nonfinite verbs. This, again, is just as is expected if a large proportion of child null subjects are PRO, licensed by nonfinite clauses.

Table 16 shows the same finding for German based on Behrens's (1993) counts of the Simone corpus. In this case, since the corpus is so large, it is possible to show in Figure 5 that the proportion of overt subjects with finite and root infinitive main verbs remains very different over a long period of time, and therefore that Krämer's effect is not due to a sampling problem.<sup>29</sup>

<sup>27</sup>Haegeman (1995) replicates Krämer's finding for Dutch in the much larger Hein corpus (cf. Elbers & Wijnen 1992; CHILDES).

<i>Hein 2;4-3;1</i>	<i>+Finite</i>	<i>-Finite</i>
Overt subject	2569	106
Null subject	1199	615

Hein: Total = 4489,  $\chi^2 = 86.01$ ,  $p < 0.0001$ .

<sup>28</sup>To my knowledge, Poeppel & Wexler (1993) were the first to observe the differing rates of null subjects in finite and nonfinite clauses in the Andreas corpus: they found 9% null-subjects in finite verb-second clauses (17/197 tokens) and 35% null subjects in nonfinite verb-final clauses (13/37 tokens). Their figures are slightly different from others in this section in that they excluded from their analysis utterances containing finite verbs in non-V2 position or nonfinite verbs in non-final position. Poeppel & Wexler's figures are extremely similar to mine and Krämer's for finite clauses (9–13%), but they counted many fewer null-subjects in nonfinite clauses than I and Krämer did. I am unsure of the cause of this discrepancy, especially since even the higher figures place Andreas's rate of null-subject use in nonfinite clauses lower than other children in this section. Krämer and I used much larger samples of nonfinite verbs in our counts, so it is likely that the extra utterances in these samples contained extremely high rates of null-subjects.

<sup>29</sup>Since these figures are taken from Behrens's counts, it was not possible to separate auxiliaries from main verbs. But if we assume that Simone's use of auxiliaries is typical, in that she only uses finite forms, possibly with low rates of null subjects, then we can infer that the only distortion of Table 16 due to auxiliaries is an increase in the rate of +finite: overt-subject clauses.

TABLE 16  
Finiteness and Null Subjects: Simone (Behrens 1993)

<i>Simone 1;8-4;1</i>	+Finite	-Finite
Overt subject	2918	278
Null subject	781	2199

Total = 6176,  $\chi^2 = 102.15$ ,  $p < 0.0001$

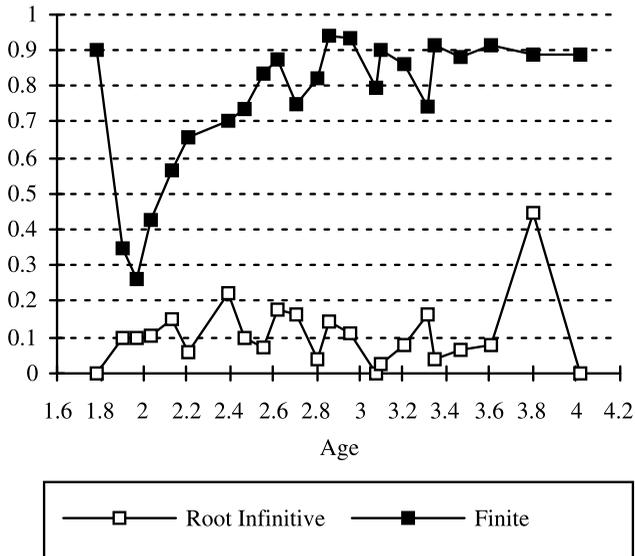


FIGURE 5 Simone, proportion of overt subjects. Figures from Behrens 1993.

Table 17 shows that the same interaction is found in early French, albeit with an interesting twist. Krämer discovered that the overtness of the subject *per se* isn't affected by finiteness of the verb, unlike what we've seen in Tables 14–16. But, Krämer showed that once preverbal and postverbal subjects are distinguished,<sup>30</sup> the interaction appears again as an interaction between finiteness and the rate of preverbal subjects, and just as clearly as in Dutch or German: preverbal subjects are very rare with infinitival verbs, but extremely common with finite verbs.<sup>31</sup>

So far the data from French, Dutch, Flemish, and German are consistent with the notion that root infinitives and null subjects cluster together, supporting the view that root infinitive clauses are genuinely nonfinite. Notice, however, that given the basic facts about form-by-position interactions in Tables 5a and 5b above, there is another account of the facts in Tables 14–17.

<sup>30</sup>To give an impression of how many of the utterances this control is excluding, postverbal subjects account for around 10–20% of the utterances in Krämer's data: Nathalie, 120/599 = 20%; Philippe, 107/976 = 10%; Daniel, 45/478 = 9%.

<sup>31</sup>Pierce (1989, 1992: 110) found similar percentages to those shown in Table 17, although she was only comparing rates of pronominal and null subjects in finite and nonfinite clauses.

TABLE 17  
 Finiteness and Preverbal Overt Subjects: French (Krämer 1993)

	<i>Prevb-Subj./Inf.<sup>a</sup></i>		<i>Prevb-Subj./Fin.</i>	
	<i>n</i>	%	<i>n</i>	%
Nathalie 1;9–2;3	49/295	17	209/304	69
Philippe 2;1–2;6	11/194	6	523/782	67
Daniel 1;8–1;11	11/205	5	96/273	35

<sup>a</sup>The denominator in these counts is the sum of all preverbal, postverbal, and null subjects. Auxiliaries and main verbs have not been separated here.

Nathalie: Total = 599,  $\chi^2 = 165.99$ ,  $p < 0.0001$ ; Philippe: Total = 976,  $\chi^2 = 235.04$ ,  $p < 0.0001$ ; Daniel: Total = 478,  $\chi^2 = 59.84$ ,  $p < 0.0001$

All of these languages are V-raising languages, and we already know from studies like Pierce (1990, 1992) and Poeppel & Wexler (1993) (see Section 2 and further references cited there) that in these languages children reliably raise finite verbs and fail to raise nonfinite verbs. Therefore it is possible that null subjects are clustering with *unmoved* verbs rather than with *nonfinite* verbs. This could be because V-I movement is somehow necessary for the licensing of overt subjects, and therefore would have nothing to do with the licensing of PRO by nonfinite clauses. I am not denying that finiteness is a necessary condition on the licensing of overt subjects (for adults or children). What I am suggesting is that in V-raising languages finiteness may not be a sufficient condition for overt subject licensing, verb movement may also be required to license an overt subject. This could be the reason why in adult French main verbs fail to undergo V-I movement in infinitival clauses.

English allows us to decide whether it is the form or the position of children's verbs that has an effect on null subject rates, since it is not a verb raising language. If it is the *form* of the infinitival verbs in Tables 14–17 that makes them cluster with null subjects then we should find the same interaction in English that Krämer found in French, German, Dutch, and Flemish. If, on the other hand, it is the *position* of the nonfinite verbs that is crucial in Tables 14–17, then the effect should disappear in English, where both finite and nonfinite verbs are unmoved.

Tables 18a and 18b show the results of my analysis of null subject/finiteness interactions in the Adam and Eve corpora (Brown 1973; CHILDES). For neither child is there any evidence that null subjects and uninflected verbs cluster together. These analyses are restricted to utterances with a clear 3rd person singular subject, where it is possible to distinguish finite from nonfinite forms. The counts are also restricted to main verbs, since auxiliaries in English have different head movement properties from main verbs.

Eve uses null subjects with almost exactly the same frequency, whether the verb is inflected or not.<sup>32</sup> In Adam's case, there's even a small tendency to use more null subjects with finite verbs, the opposite of what Krämer found for French, German, Dutch, and Flemish. Both children show a quite different pattern from what we have seen in the V-raising languages.

<sup>32</sup>These rates of null subject usage are significantly lower than the rates found in a number of other studies. See Appendix A for discussion of my counting procedures and why the null subject rates are so low.

TABLE 18A  
Finiteness and Null Subjects: Eve (Files 01–20)

<i>Eve 1;6–2;3</i>	+Finite	–Finite
Overt subject	78	138
Null subject	8	17

Total = 241,  $\chi^2 = 0.17$ ,  $p = 0.68$

TABLE 18B  
Finiteness and Null Subjects: Adam (Files 01–20)

<i>Adam 2;3–3;0</i>	+Finite	–Finite
Overt subject	79	195
Null subject	34	47

Total = 355,  $\chi^2 = 4.98$ ,  $p = 0.026$

TABLE 19  
Null Subjects with Uncontracted *Am*, *Is*, *Are* (Sano & Hyams 1994)

	<i>Am</i>	<i>Are</i>	<i>Is</i>	%	<i>Main V</i>	%
<i>Eve 1;6–2;3</i>	0/4	0/36	0/109	0	25/241	10
<i>Adam 2;3–3;0</i>	0/1	0/71	13/114	7	81/355	23
<i>Nina 1;11–2;4</i>		0/19	2/50	3		

Since English contrasts with the other languages reviewed, and null subjects are evenly distributed between utterances containing finite and nonfinite root verbs, I conclude that the apparent null subject/root infinitive interaction in the languages shown in Tables 14–17 is in fact a clustering of *unmoved* verbs with null subjects. There is no finiteness/null subject interaction in child English, because finiteness has no effect on verb position, and therefore verb position cannot be a crucial factor in the licensing of overt subjects in English.

Notice now that those few English verbs that *do* raise to INFL, namely the auxiliaries, do show a radically different rate of null subjects. Sano and Hyams (1994) report that with the English verb *be* the rate of null subjects drops to almost zero in the Adam, Eve, and Nina (Suppes 1973; CHILDES) corpora. Table 19 compares their figures with the rates of null subjects with main verbs in my counts—proportions of null subjects are clearly lower with auxiliaries.<sup>33</sup>

<sup>33</sup>Since Sano & Hyams attributed the proliferation of overt subjects with auxiliaries to the finiteness of the auxiliary rather than to its position, they predicted that null subjects should be very rare with all finite verbs, not just auxiliaries. Given that they found substantial numbers of null-subjects with inflected main verbs in English, they were forced to assume that English *-s* and *-ed* inflections are actually nonfinite participial forms for young children. By making the distinction between nonfinite verbs and unmoved verbs here I am free to assume that inflected main verbs in English are finite forms for the children.

I assume that in the V-raising languages surveyed in this subsection (i.e., all except English), licensing of overt subjects is contingent on verb movement, and that INFL alone is not sufficient to license nominative case. Finite INFL is a necessary condition on nominative case licensing, but it is only an effective licenser when it is hosted by a lexical head, such as a raised verb. Also, following Shlonsky (1987) and Baker (1991), I assume that the case licensing requirement on overt arguments is a subcase of a *Generalized Visibility Condition*, which requires that NPs which are phonetically interpreted must be case-licensed by the input to PF, and NPs that are interpreted semantically must be case-licensed by LF. This means that the null argument *pro*, which isn't phonetically interpreted, but is semantically interpreted, does not require case-licensing until LF. As a consequence, if early null subjects are *pro*, overt verb movement is not required for the licensing of null subjects. Verb movement *is* required in order to license an overt subject, however.

Since verb raising in Dutch, German, French, etc. has the effect of making inflectional features get spelled out on the verb, this accounts for the apparent interaction between root infinitives and null subjects found in V-raising languages. However, this effect does not have anything to do with the finiteness of the clause: it is independently predicted by the differing case-licensing requirements of null and overt subjects, and the environments where V-raising is forced. In English, meanwhile, verb movement is clearly not a prerequisite for the licensing of overt subjects by INFL in the adult language, and presumably merger of the verb with inflection in any other fashion (e.g., by I-lowering or postsyntactic merger) is also not a prerequisite for the licensing of nominative case. Therefore we find null subjects evenly distributed between sentences with inflected and uninflected verbs.

As for why children learning non-null-subject languages allow null subjects in the first place, on this point I simply assume some version of the *topic-drop* account of early null subjects (Haan & Tuijnman 1988; Jaeggli & Hyams 1988; Hyams & Wexler 1993; Rizzi 1994a). According to this view, young children's null subjects are licensed by the same discourse factors that license null subjects in adult languages without rich inflection (cf. Ross 1982; Huang 1984; Haegeman 1990).

Notice that this account of the finiteness/null subject interaction in V-raising languages makes a further prediction. Since I do not take early null subjects to be PRO, I do not predict the biconditional relation in (9).<sup>34</sup>

(9) root infinitive  $\leftrightarrow$  null subject

Instead, my account only predicts that overt subjects with root infinitives should be ill-formed, since they violate the Generalized Visibility condition. There is nothing blocking a null subject with a finite verb, beyond whatever is blocking finite verbs for the children in any case. I predict the following contingency:

(10) root infinitive  $\rightarrow$  null subject

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<sup>34</sup>The relation in (9) corresponds most closely to the account in Sano & Hyams (1994). A number of other articles have also argued that null subjects with root infinitives are PRO, but have also allowed for null subjects with finite verbs, assuming that these null subjects are instances of 'topic drop' (Krämer 1993; Bromberg & Wexler 1995).

TABLE 20  
 Exceptions to the Generalization Root Infinitive ↔ Null Subject

	<i>Finite: Null-Subject<sup>a</sup></i>		<i>Nonfinite: Overt-Subject</i>	
	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Thomas	165	19	21	2
Maarten	23	12	11	6
Hein	1199	27	106	2
Simone	781	13	278	5
Andreas	13	7	22	11
Philippe	259	27	11	1
Nathalie	95	16	49	8
Daniel	177	37	11	2
Mean		20		5

<sup>a</sup>Recall that for the three French children the categories ‘null-subject’ and ‘overt-subject’ actually corresponds to ‘no preverbal subject’ and ‘preverbal subject’ respectively.

A quick glance at the tables above from V-raising languages shows that most utterances fall into the two cells finite: overt-subject or nonfinite: null-subject. However, if we look at the exceptions to the biconditional in (9), the figures in the remaining two cells, we find that the vast majority of the exceptions fall into the finite: null-subject category, just as (10) predicts (Table 20). Only one child of the eight, Andreas, fails to conform to this generalization.

It is fairly straightforward to distinguish the two hypotheses in (9) and (10) statistically, and show that the asymmetry between the two columns in Table 20 is not just due to a main effect of one of the initial factors ±finite or ±overt-subject. According to the theory described by (9), exceptions to the biconditional must be just noise, and therefore, assuming that noise is randomly distributed, we should expect the ‘noise levels’ in the +subject: –finite and –subject: +finite cells to be predictable from the other two cells. On the other hand, the generalization in (10) predicts that these two cells are not both noise: the –subject: +finite cell represents utterances that are grammatical for the child.

If we invert the –finite column in the tables in Tables 14–17 such that the factor ±subject is replaced by a new factor with the two levels ‘Root Inf. ↔ Null Subject’ and ‘Noise’, we can use another chi-square test to check whether the presumed noise is really a dependent variable. (11) shows the procedure and the results. Since the ‘noise’ factor behaves like an independent variable, causing a disproportionate number of utterances to be –subject: +finite in all 7 children, we may conclude that (10) is a more appropriate generalization than the PRO account of early null subjects in (9).<sup>35</sup>

<sup>35</sup>Note that even in adopting the generalization in (10) we must assume that there is a certain amount of ‘noise’ in the children’s utterances. Here, the noise corresponds to the –finite: +subject utterances in the righthand column of Table 20. If we ignore Andreas, who is already anomalous, then this means that we must assume between 1% and 8% noise for each child. Although this is an uncomfortable move to be forced to make, notice that it is comparable to the level of exceptions to the classic form-by-position interactions from Pierce (1989) and Poeppel & Wexler (1993) shown in Tables 5a and 5b above—these generalizations had 3–7% exceptions.

(11)

	<i>+finite</i>	<i>-finite</i>
<i>+subject</i>	2918	278
<i>-subject</i>	781	2199

→

	<i>+finite</i>	<i>-finite</i>
<i>RI ↔ NS</i>	2918	2199
<i>'noise'</i>	781	278

Simone 1;8-4;1: Total = 6176,  $\chi^2 = 102.15$ ,  $p < 0.0001$

Thomas: Total = 863,  $\chi^2 = 42.84$ ,  $p < 0.0001$

Maarten: Total = 192,  $\chi^2 = 6.44$ ,  $p < 0.05$

Hein: Total = 4489,  $\chi^2 = 86.01$ ,  $p < 0.0001$

Philippe: Total = 976,  $\chi^2 = 58.53$ ,  $p < 0.0001$

Nathalie: Total = 599,  $\chi^2 = 17.57$ ,  $p < 0.0001$

Daniel: Total = 478,  $\chi^2 = 173.53$ ,  $p < 0.0001$

Theories which take null subjects in root infinitives to be PRO could of course accommodate the data in Table 20 and in (11) by assuming that early null subjects are of two different kinds. They are PRO when they occur in a nonfinite clause, and *pro* when they occur in a finite clause. However, this account would still not be able to account for the complete lack of interaction between finiteness and null subjects in English.

#### 4.3. Conclusion

In this section we have reviewed two pieces of syntactic evidence that children's root infinitive clauses are syntactically deficient. In both cases the cross-linguistic survey was more consistent with the view that two-year-olds' syntactic representations are complete, and they have a detailed understanding of head movement and its motivation in their target language. Their root infinitive clauses are not syntactically nonfinite. The children do regularly violate the requirement that V and INFL merge, but as I have argued Sections 2–3, this aspect of their performance appears to be due to a problem in the implementation of their morphological knowledge, and not due to a deficit in knowledge.

At this point, the reader may be concerned about the fact that two of the key arguments in this section for cross-linguistic differences in the distribution of root infinitives were based on data from English. It is not obvious that English speaking children's uninflected verbs are root infinitives—they don't bear the clear nonfinite endings that we see in children learning other languages. What's more, it might be tempting to discount the English data in order to leave a more homogeneous cross-linguistic picture.

However, there are a couple of good reasons why I think the English data should not be discounted so easily. Consider two ways in which data from English bare forms could be discounted. First, we could assume that no English bare forms are root infinitives. Second, we could assume that some English bare forms are root infinitives, but that they are mixed with large numbers of bare stems caused by speech errors.

In the first scenario, in which English is assumed to have no root infinitives at all, the effect of this is to create a new cross-linguistic puzzle. Why should it be that root infinitives are found in the long list of languages surveyed in Section 3, and English has the morphological properties that should make it conducive to high rates of root infinitives

(like Swedish), and yet English children produce no root infinitives? This move does not appear to simplify the cross-linguistic picture. It just makes English anomalous in a different respect.

In the second scenario English is assumed to have a mixture of bare stems and root infinitives. In this case we might try to hold on to the claim that there is in all languages an interaction between finiteness and *wh*-questions, and between finiteness and null subjects. We could do this by assuming that there is a numerical effect in English, but that the bare stems introduce noise into the data. However, this assumption appears to make matters worse. It would be a fine way of explaining a hypothetical situation in which English showed the same effects as German, French etc., but with a much smaller magnitude: the bare stems could account for the diluting of the effects. But what we have seen in English is that finiteness rates are *identical* in declaratives and *wh*-questions, and that the null-subject: finiteness interaction either disappears completely (Eve) or even slightly reverses (Adam). Therefore, there is nothing to be gained by assuming that English children's uninflected verbs are a mixture of root infinitives and production errors.

Given that discounting all or some of the English data doesn't seem to solve any problems, whereas the account presented here actually *predicts* the complete absence of Crisma's and Krämer's generalizations in non-verb-movement environments, I think it is safe to continue to take the English data seriously.

## 5. ROOT INFINITIVES: A MIXED COMPETENCE-PERFORMANCE MODEL

In this section I draw together the evidence presented in Sections 2–5 to try to give as full a picture as possible of where two-year-olds differ from adults. The first step will be to characterize root infinitive clauses syntactically. The second step will involve trying to go beyond the syntactic description to explain why children use root infinitive clauses.

Syntactically, I claim that a two-year-old's root infinitive clause contains all of the components of an adult's finite clause. Not only are all required maximal projections present, all of the functional heads are represented just as in the adult. Root infinitives are the spell-out of verbs that have not attached to tense and agreement features by merging with the functional head I (either by V-raising or INFL-lowering). In other words, root infinitive clauses are adult clauses minus one step of head movement.

Two important points need to be made about this avoidance of V-I movement. First, that the possibility of avoiding V-I movement can be overridden by one of a number of other syntactic requirements. Second, that derivations lacking overt V-I movement are not syntactically ill-formed, even for adults: they are merely an alternative that is *usually* outranked by derivations in which V-I occurs.

Following a growing body of literature in various syntactic frameworks, but in particular Chomsky (1991) and subsequent developments, I assume that there are two ways in which syntactic derivations can be ruled out. A derivation may be bad because it violates some absolute grammatical requirement, such as the case licensing requirement on NPs, or the requirement that causes V2. Alternatively, a derivation may satisfy all absolute grammatical requirements, but be ruled out because of competing derivations that are more highly

valued. For example, a derivation involving an instance of long *wh*-movement may be outranked by another derivation containing the same elements that involves a shorter *wh*-movement. I believe that this distinction between *convergence* of derivations and *optimality* (or *economy*) of derivations plays an important role in understanding the distribution of root infinitives.

As we have seen in Section 4, overt V-I movement can be avoided by children, *unless* some other syntactic requirement must be satisfied, which forces V-I movement. Section 4.1 showed that in *wh*-movement and topicalization constructions, in which there is a requirement that I-C movement take place, this requirement is always respected, and overt verb raising is forced as a result. If we assume that the root verb must merge with INFL by LF at the latest, and that the head movement constraint applies, then the verb will have to raise to INFL before INFL raises to C. Otherwise, the trace of INFL will prevent the verb from moving to C to attach to INFL at LF. Failure of V-I movement, which blocks subsequent I-C movement, is not an option for the child. Section 4.2 showed that where case-licensing of overt nominals requires V-I movement, root infinitive clauses are not an option. V-I movement is an absolute requirement insofar as it subserves the case requirement on an NP, whereas V-I movement, which achieves nothing more than creating a single head out of the verb and inflectional material, is not an absolute requirement.

In claiming that V-I movement is not an absolute grammatical requirement, I raise the obvious question of what causes derivations involving overt V-I movement to outrank derivations without overt V-I, and why adults apply V-I so much more consistently than two-year-olds.

I assume that derivations involving overt V-I outrank those with delayed V-I for morphological reasons: overt V-I facilitates either more complete or more economical spell-out of the grammatical features in a sentence. In languages like French or German, in which inflectional features can only be spelled-out when they are attached to a verb, overt V-I movement is required if the inflectional features are to be realized at all. Therefore overt V-I movement facilitates more complete spell-out of features. In a language like English, on the other hand, inflectional features can be realized either on a main verb or by insertion of the dummy verb *do*. In this instance overt merger of V with I is favored because it is more economical than dummy verb insertion (cf. Chomsky 1957, 1991).

I assume that in sentence production the advantage of spelling-out inflectional features attached to the verb must be weighed against the cost involved in accessing the morphological spell-out of the inflectional features. For adults, accessing inflectional paradigms is a heavily overlearned process, and hence bears minimal or zero cost. This is why overt V-I is reliably applied in adults. For young children, on the other hand, accessing morphological forms is presumably not an automatic process to begin with, and as a result the cost of accessing a given form may outweigh the cost of failing to realize it. Root infinitive clauses are produced when the cost of accessing a form is greater.<sup>36</sup> The transition from the root infinitive stage to

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<sup>36</sup>Of course if these two costs were the only costs involved in production, and were identical in all contexts, then we would expect to see a sudden drop from 100% root infinitives to 0% root infinitives, even if the cost of accessing morphological knowledge was gradually decreasing. Therefore, I must assume that the attentional cost of accessing morphological knowledge varies around a gradually decreasing mean, as a result of additional factors that are either random or not yet understood.

adult-like performance can thus be seen as a transition from controlled to automatic processing of the task of accessing morphological knowledge.<sup>37</sup> This accounts for the generalizations in Sections 2–4 as follows:

- (i) By distinguishing the *form* of a child's morphological knowledge from the not-yet-automatized process of *accessing* that knowledge, no conflict arises between the fact that very young children's morphological knowledge seems almost flawless, and yet it is quite unreliably implemented, as Section 2 showed.
- (ii) Since automatizing of the access process presumably takes place gradually, and therefore the cost of accessing morphological information gradually decreases, we expect to find gradual decreases in the use of root infinitives by any given child, as we have seen in Section 3.
- (iii) Also, we can begin to integrate the fact that root infinitives disappear much earlier in languages with richer inflectional paradigms. Presumably some property of the richer inflectional paradigm facilitates the speeded automatization of inflectional access. This could be because the child speaking a more highly inflected language simply gets more practice at accessing non-null affixes. Or it could be because there is increased difficulty in accessing the less-specific inflectional paradigms of less richly inflected languages.<sup>38</sup> More detailed comparison of languages will be necessary to answer this question.
- (iv) Since requirements like V-C in questions and case-licensing are absolute (i.e., non-violable) grammatical requirements, and therefore violating them effectively carries infinitely more cost than accessing a morphological form, it is no surprise that *wh*-questions and sentences with overt subjects show few or no root infinitives in languages where these demand V-I movement.

Note that in this hybrid competence-performance account of root infinitives I do not assume that the child's grammar and the systems involved in producing the output of the grammar are encapsulated modules, unable to influence each other's actions. Nor do I assume that processing resources are divided equally among all tasks or subject to a fixed limit. 'Effort' is directed where it is most needed: this is why there is no contradiction in assuming that a performance limitation underlies the production of simple root infinitive clauses, and yet no root infinitives are produced in syntactically more complex *wh*-questions in early Germanic. The assumption that attentional resources are evenly divided and that any task has a constant amount of attention devoted to it ought to be as unrealistic for child language production as it is for adults.

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<sup>37</sup>For a general model of controlled and automatic processing, and the transition from one to the other see Schneider & Shiffrin (1977) and Shiffrin & Schneider (1977).

<sup>38</sup>The 'specificity' of inflectional affixes in a given language would have to be a property of a paradigm as a whole, rather than of individual affixes, since English *-s* is used in just the same environments as the Italian 3rd person singular present tense suffix, but there is an enormous difference in how reliably two-year-olds use *-s* and its Italian counterpart.

## 6. DISAGREEMENT BETWEEN ADULTS AND CHILDREN

Although one obvious goal of language acquisition research is to uncover generalizations about language that would be inaccessible if we only had adult speakers to work with, it is often reassuring to discover that children's errors are mirrored by grammatical phenomena in other languages. In these cases we may assume that the child has merely taken a wrong turn and is temporarily caught in an incorrect corner of the UG grammar space. This has been a common approach to early null subjects (e.g., Hyams 1986), and similar attempts have been made to assimilate child medial-*wh* constructions to adult parallels (e.g., Thornton 1990, 1995).

The phenomenon discussed in Section 4.1 under the heading of Crisma's effect is rather peculiar in this regard. Recall that in a number of languages children produce large numbers of root infinitives in declarative clauses, but none at all in their *wh*-questions. There is a clear parallel to this effect in a number of adult languages, and yet it appears to be a near mirror image of what we see in two-year-olds. In languages that exhibit the so-called 'Anti-Agreement Effect' (AAE: Ouhalla 1993) agreement is present in declarative clauses, but disappears when the agreed-with argument is extracted.<sup>39</sup> The AAE is found in Berber (Sadiqi 1986; Guerssel 1987), Breton (Hendrick 1988), Welsh (Borseley & Stephens 1989), Turkish (Kornfilt 1985), Palauan (Georgeopoulos 1985, 1991), Yimas (Foley 1991; Phillips 1996), Fiorentino and Trentino (Brandi & Cordin 1989), and a number of other languages.<sup>40</sup>

Some examples from Breton and Fiorentino are shown in (12). In Breton the agreeing form of the verb (in parentheses) is replaced by the non-agreeing 'analytic' form; in Fiorentino the 3rd person plural form in parentheses is replaced by a 3rd person singular form. In other languages agreeing forms are replaced by non-agreeing participles, or the verb changes in mood—to a mood with a non-agreeing paradigm.

- (12) a. Petore paotred a lenne (\*lennent) al levrioù  
 which boys COMP read read:3pl the books  
 'Which boys read the books?' (Breton: Borseley & Stephens 1989)
- b. Quante ragazze gli has (\*le hanno) parlato con te?  
 'How many girls it has spoken to you?'  
 (Fiorentino: Brandi & Cordin 1989)

A striking additional property of the AAE in a number of languages is that in negative questions and long *wh*-extraction agreement becomes optional or obligatory. These particular effects are present in some languages, but not others. Examples of the undoing of the AAE by negation are shown in (13).

<sup>39</sup>Wexler (1994, fn. 44) attributes to Teresa Guasti the suggestion that root infinitives in children may be parallels to the non-agreeing forms found in some Celtic languages, and Wexler also speculates on whether the presence or absence of agreement in Celtic correlates with verb position. Although I find this an interesting possibility, my primary concern here is somewhat different: I am less concerned with whether root infinitives and non-agreeing adult forms are the 'same' at some level, than I am with showing that the processes that cause non-agreeing forms to be available in some constructions but not others are the result of very similar interactions in children and adults.

<sup>40</sup>This section draws heavily on descriptions and cross-linguistic generalizations in Ouhalla (1993), although my analysis differs somewhat from the account given there. See also Haik (1990) for extensive discussion of related effects in a number of languages.

- (13) a. Ar vugale ne (\*lenne) lennent ket al levriou  
 the children NEG read read-3pl NEG the books  
 ‘The children who did not read the books.’ (Breton: Hendrick 1988)
- b. tamghart nni ur t-ssn Mohand  
 woman COMP NEG 3fs-know M.  
 ‘The woman who does not know Mohand.’ (Berber: Ouhalla 1993)

While it is tempting to draw a parallel between the AAE and Crisma’s effect, it is not immediately obvious why the two phenomena should involve an almost opposite distribution of agreeing and non-agreeing forms. This section presents an account of the AAE, which closely parallels the account of child root infinitive constructions that I have given here. The purpose of this is first to show that effects of verb-movement delay are not only restricted to child language, and second to show that root infinitive constructions and anti-agreement effects are extremely similar, although descriptively their distributions are the opposite of one another.

Consider the following version of my account of Crisma’s effect, formulated in the terms of strict constraint rankings, as in Optimality Theory (Prince & Smolensky 1993). I assume that there are three relevant constraints: the first, which I call I2C, forces movement of INFL to C in *wh*-questions; the second, INERTIA prevents verb raising if it requires costly access to morphological knowledge;<sup>41</sup> the third, SPELL-OUT favors the overt realization of inflectional material. Note that since the realization of inflection demands verb movement, INERTIA and SPELL-OUT make conflicting demands. The three constraints are ranked as in (14).

- (14) I2C ≫ INERTIA ≫ SPELL-OUT

In a *wh*-question in a V2 language, where the I2C constraint is activated, the I2C constraint overrides the conflict between INERTIA and SPELL-OUT. SPELL-OUT gets satisfied, but only as a consequence of I2C. In subject-initial declaratives, on the other hand, the I2C constraint is ineffective, so the conflict between INERTIA and SPELL-OUT becomes relevant: it is resolved in favor of INERTIA, and a root infinitive clause is the result.

Now consider a similar account of anti-agreement effects. In this instance we are crucially dealing with languages that do not have an I2C requirement in *wh*-questions, but which are also Italian-type null subject languages in which *pro* is subject to an identification requirement (Rizzi 1986).<sup>42</sup> Identification of *pro* is satisfied by overt agreement, which may be realized when a verb moves overtly to adjoin to AGR. In such a language, the three relevant constraints are IDENTIFY, which forces *pro* to be identified by overt agreement; INERTIA, which delays verb movement where possible, as in (14); and SPELL-OUT, which is the same as above. The ranking is also reminiscent of (14).

- (15) IDENTIFY ≫ INERTIA ≫ SPELL-OUT

<sup>41</sup>INERTIA is essentially a grammaticalization for the purposes of this discussion of the factors involved in delayed V-I merger, as discussed in Section 5. I am ignoring the details of what causes INERTIA in children here, because it is irrelevant to the discussion of its *interaction* with other constraints.

<sup>42</sup>I assume that in null subject languages of the Italian-type, subjects are always *pro*, and lexical subjects occupy adjoined positions, following Barbosa (1995).

In declarative clauses, which have a *pro* subject, the IDENTIFY constraint is activated. This forces verb movement to AGR, so that subject agreement will be overtly realized. SPELL-OUT is satisfied, but again by none of its own doing. If the subject undergoes *wh*-movement, however, a trace is left in subject position, which is not subject to IDENTIFY. Since IDENTIFY is inactivated, INERTIA wins out over SPELL-OUT and movement to AGR is delayed, causing agreement to fail to be realized. Hence the anti-agreement effect.<sup>43</sup>

What the two phenomena in my analysis share is the notion that loss of agreement is due to failure of verb movement when a higher ranked constraint is rendered irrelevant. Where the phenomena differ is that Crisma's effect arises when verb non-movement is blocked by the need to move to C to license a *wh*-operator, whereas the AAE arises when the need to move to AGR to identify *pro* blocks non-movement of the verb. The two effects are predicted to occur in languages with different head movement requirements, but syntactically they have a rather similar character.

Treating anti-agreement effects and their childhood mirror-image as cases of delayed verb movement has a number of positive consequences.

- (i) It is much easier to explain the complementarity of agreement and non-agreement exhibited by both effects if we assume that verb non-movement is always a possibility that the grammar considers, but that it is outranked by derivations involving movement in specific environments. This avoids the need to invoke specific constraints in order to make agreement impossible in *wh*-extraction contexts in AAE languages but obligatory in *wh*-extraction contexts in child V2 languages.
- (ii) The morphological form of the verb used in extraction contexts varies across AAE languages, and to a greater extent than we would expect if the AAE merely reflects a need to 'neutralize' agreement. Sometimes participial forms are used, sometimes inappropriate agreeing forms are used, sometimes the verb changes in mood, and other times forms with just a missing agreement morpheme are used.

These various forms can be explained if we assume that the verb does not move to AGR in AAE contexts, and therefore lacks any AGR specification. If the language only has portmanteau tense/agreement affixes, then default agreement is spelled-out on the verb (e.g., Fiorentino and Trentino); if the language has independent tense and agreement affixes, then agreement can be omitted without disrupting the form of the verb in any other way (e.g., Celtic, Yimas); if the language has an agreeing and a non-agreeing paradigm, then using the non-agreeing paradigm rather than the agreeing paradigm will have the same effect (e.g., Palauan).

- (iii) Within languages that exhibit the AAE some kinds of extraction produce AAE effects while others do not. All of the languages listed above show the AAE for local subject extraction in affirmative clauses, but in negative questions or long-distance extraction languages differ as to whether the AAE persists or not (Ouhalla 1993). These differences can be explained in terms of interacting constraints on verb movement: when negation

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<sup>43</sup>Notice that if the language does require that INFL move to C in *wh*-questions, I2C will be active and will presumably block any effect of INERTIA. Hence, no AAE will be found.

and embedded complementizers require that a verb raise to adjoin to them, and they are located higher than the relevant agreement head, they force the verb to move via AGR and pick up agreement features. They are effectively taking over the role of IDENTIFY in declarative clauses.

As Ouhalla (1993) shows, cross-linguistic contrasts in whether negation undoes the AAE are transparently related to the morphological status of negation, and may therefore be connected to the syntactic position of negation.<sup>44</sup> Languages in which negation appears close to the verb stem, inside agreement, still show the AAE in negative questions (Turkish). This is because the verb can still adjoin to negation without being forced to move through AGR. When negation appears ‘outside’ agreement, negative questions do not show an AAE: I assume that this is due to the fact that negation must be adjoined to by the verb and that since negation is syntactically higher than agreement, it is impossible for the verb to move to NEG without moving via AGR.

Differences in whether long extraction shows an AAE or not can be given a similar account: when embedded C requires that a verb raise to adjoin to it (i.e., when I2C applies in embedded contexts) the AAE disappears, because the verb cannot avoid moving via AGR on the way to C. When embedded C can stand alone at S-structure, and I2C does not apply, the AAE can persist in long extraction contexts. The survey of languages in Ouhalla 1993 is consistent with this interpretation, although the evidence is by no means conclusive.

Both of the languages that lack an embedding complementizer lose the AAE in long-distance extraction (Turkish, Breton). If embedded C must be filled, and there is no complementizer to satisfy this requirement, verb movement may be the only alternative. Meanwhile, although Welsh patterns with Breton with regard to most properties of the AAE, Borseley and Stephens (1989) point out that long extraction in Welsh retains the AAE (16a), in contrast to Breton (16b). This could be due to the fact that Welsh, unlike Breton, uses an overt complementizer in long-extractions, and therefore does not impose the I2C requirement and does not block verb inertia.<sup>45</sup>

- (16) a. Petore paotred a       sonj deoc’h a       lenne (\*lennent)  
           which boys   COMP think to-1sg COMP read  
           al levrioi?  
           the books  
           ‘Which boys do you think read the books?’ (Welsh: Borseley & Stephens 1989)
- b. Setu ar mere’hed hoc’heus lavaret emaint o       labourat e  
           here the women have-2pl said   be-3pl PART work   in  
           Kemper  
           Kemper  
           ‘Here are the women you said are working in Kemper.’ (Breton: Hendrick 1988)

Both Ouhalla (1993) and Haïk (1990) point out additional ways in which the distribution of the AAE is clearly related to surface structure configurations, e.g., *wh*-in-situ does not

<sup>44</sup>I assume here that something like Baker’s (1985) *Mirror Principle* is correct, and that morphological structure reflects syntactic structure to a large extent.

<sup>45</sup>The possible role of the complementizer in the difference in long extraction between Breton and Welsh is suggested by Ouhalla (1993), although no specific mechanism is proposed.

trigger the AAE. This is entirely expected under the account given here, according to which morphological requirements driving head movement are crucial to the distribution of the AAE. It is less obvious why surface configurations should matter so much under accounts like Ouhalla's and Haik's, which relate the AAE to conditions on interpretation.<sup>46</sup>

- (iv) Many languages show the AAE for subject extraction, but it is much rarer to find similar effects with object extraction. Obviously, this is partly due to the relative rarity of object agreement, but there is an additional generalization, which I believe is due to Nakamura (1995), that AAE effects with object extraction are restricted to ergative languages.

This generalization follows immediately from the account in terms of delayed verb movement. In an accusative language, where subject agreement is associated with a higher head than object agreement, the verb cannot fail to move to AGRO without also failing to move to AGRS. In other words, there is no opportunity for delayed verb movement in object extraction contexts, since subject *pro* must still be identified by agreement. However, if we adopt the widespread assumption about ergative languages that absolutive agreement is associated with a syntactically higher head than ergative agreement (cf. Murasugi 1992, Bittner & Hale 1996 and references cited therein), then it is possible for a verb to move to pick up subject (i.e., ergative) agreement features without moving as far as the object (i.e., absolutive) agreement features. This means that INERTIA has the possibility of becoming active in object extraction contexts without wreaking havoc with other inflectional features.

I hope to have shown in this section that conflicts between inertia of verb movement and verb movement requirements have effects in both adult and child language, and that Crisma's effect and the Anti-Agreement Effect are only apparent mirror images of one another. The analysis of the AAE is clearly a preliminary account, and in particular we need more evidence that non-agreeing forms occupy different positions from agreeing forms in AAE languages, to match the well-documented evidence that children's agreeing and non-agreeing forms occupy different positions (see Section 2 above). I will have to leave this task for another occasion.

## 7. ROOT INFINITIVES: PURE COMPETENCE MODELS

This section reviews some influential accounts of root infinitives that all share the assumption that root infinitives are entirely due to a problem with children's linguistic knowledge, and points out similarities and differences with my proposal.

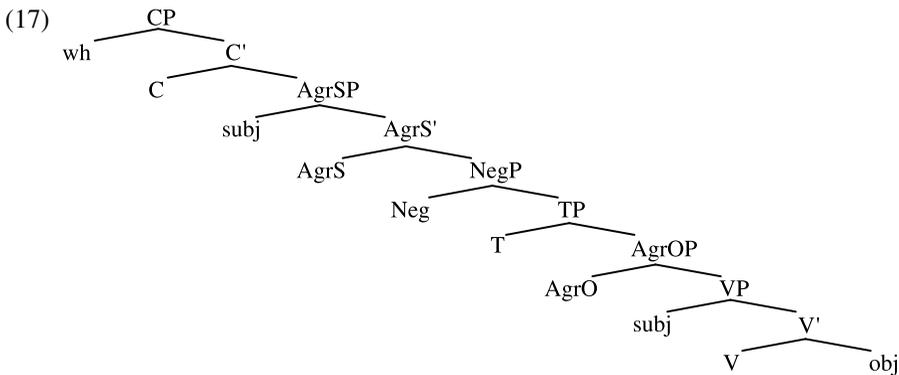
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<sup>46</sup>Ouhalla (1993) attributes the AAE to the effect of the A' Disjointness Requirement (ABDR: Aoun & Li 1993), which requires that pronouns be free in the domain of local operators. He reasons that if *pro* were licensed in the site of *wh*-extraction, then *pro* would be locally A' bound by the *wh*-operator, in violation of the ABDR. Therefore, agreement must be neutralized, in order to prevent the licensing of *pro*.

Haik (1990) proposes a similar approach for extraction-induced mood alternations. Her analysis centers on the claim that different kinds of INFL are subject to different binding requirements, which for some choices of INFL make INFL violate binding theory in *wh*-extraction contexts.

## 7.1. Clausal Truncation: Rizzi (1994b)

Rizzi (1994b) proposes that young children know the basic structure of the clause, and that it's something like (17). What's missing is the top of the tree, optionally. A child can choose to project all the way up to CP, or he can project just part of the way up. But he can't leave anything out from the middle of the tree. So the difference between the child and the adult is that the adult has to take CP as the root node of any sentence, whereas the child can choose just about anything as the root node. Rizzi assumes that the extra constraint requiring CP to be the root is something that emerges maturationally some time before the child's third birthday.



Rizzi assumes that root infinitives arise when a clause is projected only as far as VP or AGROP, and therefore tense and subject agreement heads are not projected. Along similar lines, child null subjects are taken to be possible only when the clause fails to project any higher than the subject position. This is because discourse licensed null topics are assumed to be licensed only when they are the specifier of the root node. This account predicts a number of generalizations about the distribution of root infinitives and null subjects, listed in (18–20).

- (18) a. Root infinitives are unmoved verbs, because they only occur when higher heads are not projected (Pierce 1990, 1992; Poeppel & Wexler 1993; Boser et al. 1992).  
 b. Because auxiliaries are generated in inflectional heads, there should be no root infinitive auxiliaries (cf. Haan & Tuijnman 1988; Wexler 1994).
- (19) a. Absence of Root Infinitives in *wh*-questions: when CP must be projected, INFL must be projected too (Crisma 1992; Weissenborn 1994; Haegeman 1995; Santelmann 1994; Kursawe 1994).  
 b. Root Infinitives are extremely likely to cooccur with null subjects, because nonfinite clauses license PRO (Weverink 1989; Krämer 1993; Sano & Hyams 1994).  
 c. Absence of Root Infinitives in Italian: infinitives must raise to INFL in Italian (Belletti 1990), and therefore truncation to VP is impossible.
- (20) a. Early null subjects are always sentence initial, because truncation cannot delete medial material (Rizzi 1994a; Duffield 1993).

- b. Absence of null subjects in *wh*-questions: when CP is projected, subject position is no longer sentence initial (Crisma 1992).
- c. Absence of negated Root Infinitives: NEG projection is higher than some inflectional material, and therefore negation entails the presence of inflection (Friedemann 1993).

Given the range of different properties of the distribution of root infinitives and null subjects that Rizzi's theory accounts for with the single mechanism of clausal truncation, this is an extremely elegant theory. It is also a very strong theory insofar as it relies mostly on non-language-specific mechanisms, and therefore predicts that most of the effects in (18–20) will generalize across many languages. Unfortunately, there are a number of questions concerning how well some of the effects generalize across children and across languages, as I will briefly show.

The two generalizations in (18) are quite reliable, as far as I know. However, this is no specific advantage of the truncation analysis—they can be captured by a number of competing accounts.

We have already reviewed the three generalizations in (19) in Sections 3–4 of this article. I showed that the phenomena in (19a–b) are probably confounded with the generalizations in (18). Once the independent effect of verb movement on finiteness has been controlled for, we find that generalizations (19a) and (19b) fail. In the case of (19c), I argued in Section 3 that in positing a binary distinction between languages with and without root infinitives we fail to do justice to their varying proliferation across languages. Italian children use extremely few root infinitives, unless we look at extremely young or linguistically delayed children, and the extent and duration of the root infinitive “phase” of development becomes progressively greater as we move to less richly inflected languages.

This leaves the generalizations in (20). Unfortunately, these also appear not to hold up to closer scrutiny, either. (20a) and (20b) are related effects involving null subjects. Rizzi assumes that child null subjects can only occur in sentence initial position. As a result, null subjects are disallowed in embedded clauses and clauses in which a topic or *wh*-phrase has been moved to a position preceding the subject. Rizzi (1994a) claims that *wh*-questions and embedded clauses in child English never show null subjects; Duffield (1993) and Poeppel and Wexler (1993) have shown that in child German null subjects are far more common when the subject is sentence-initial (i.e., in V1 clauses) than when a nonsubject has been fronted to initial position.

However, both Roeper and Rohrbacher (1994) and Bromberg and Wexler (1995) have disputed Rizzi's generalization about null subjects in English. Table 21 shows figures from Bromberg and Wexler (1995): they compared rates of null subjects in declaratives and non-

TABLE 21  
Null Subjects in *Wh*-Questions: English  
(Bromberg & Wexler 1995)

<i>Adam 2;3–2;10</i>	<i>Overt Subj.</i>	<i>Null Subj.</i>	<i>% Null-Subj.</i>
Declaratives	888	1801	67
<i>Wh</i> -question	187	94	33

TABLE 22  
Null Subjects in *Wh*-Questions: French (Crisma 1992)

<i>Philippe 2;1-2;3</i>	<i>Overt Subj.</i>	<i>Null Subj.</i>
Declarative	595	407
<i>Wh</i> -question	113	1

subject questions in the Adam corpus, and found that null subjects were quite common in *wh*-questions, although rather less frequent than in declaratives.<sup>47</sup>

In French, meanwhile, the effect is certainly numerically present (Table 22), but we can't draw any conclusions from this, because of the flooding of the questions by auxiliaries. We independently know that auxiliaries never appear with null subjects.

The rarity of non-initial null subjects does appear to be a robust effect in child German. However, it is not clear that this is something particular to *child* German. A similar constraint is operative in colloquial adult German. German is not usually described as a null-argument language, but it does allow fairly restricted argument omission from initial position only, so-called *Topic Drop*.

Therefore, none of the English, French, or German children show evidence of a *wh*-movement/null subject interaction, which could be due to any special non-adult capacity that they have that allows them to truncate clauses.

The one remaining prediction of Rizzi's truncation theory is the expected absence of root infinitives in negated sentences. Friedemann (1994) shows this for the corpus of a single French child. Friedemann's figures based on the Philippe corpus are shown in Table 23a. There is a much lower rate of root infinitives in negated sentences (5%) than in declaratives in general (20%). However, Levow (1995) tried to replicate this result using three other French corpora, with mixed success. As can be seen in Table 23b one child, Grégoire, shows the effect, but the other two children do not show it by any means.

Therefore, the negation/finiteness interaction which truncation theory predicts isn't clearly supported in French. Of course, this is not fatal for the theory, since Rizzi's prediction crucially depends on the relative ordering of tense and negation in the tree, something that can be easily changed. Still, negation doesn't seem to give us any reason to favor the clausal truncation approach to root infinitives.

## 7.2. Deficient Tense: Wexler (1994)

The most well-known account of root infinitives is due to Wexler (1994). The two most notable features of this account are (i) root infinitives are due to the deficient representation of a specific head, Tense, rather than to the kind of global property which Rizzi takes to be deficient in the child; and (ii) Wexler argues that the 'optional' character of child root infinitives results from the fact that two different syntactic derivations, which lead to finite and nonfinite clauses respectively, are equally costly for the child. The account, which I have outlined in

<sup>47</sup>The figures in Table 21 correspond to Figure 2 of Bromberg & Wexler (1995); thanks to Hilary Bromberg for making the raw figures available to me.

TABLE 23A  
 Root Infinitives and Negation: Philippe  
 (Based upon Friedemann 1992)

<i>Philippe 2;1-2;3</i>	<i>+Finite</i>	<i>-Finite</i>
All declaratives	807	195
Negated sentences	120	6

TABLE 23B  
 Root Infinitives and Negation: French (Levow 1995)

	<i>Neg+Tns</i>	<i>Neg-Tns</i>
Grégoire	31	0
Daniel	31	25
Nathalie	37	18

Section 5, has much in common with Wexler (1994) at one level of description, and yet differs fundamentally at another level of description.

I agree with Wexler that properties of specific heads hold the key to an understanding of root infinitives—in my case this is crucial because it makes possible an account of the fact that cross-linguistic differences in head movement correlate with cross-linguistic differences in the distribution of root infinitives. However, I do not think that there is any evidence that children's representation of functional heads is deficient. As the evidence reviewed in Section 2 shows, although children often omit inflectional morphemes, when they do use inflectional morphology they show almost flawless knowledge of the role and distribution of the morphemes they are using. With respect to tense, Wexler (1994) suggests that either children's knowledge of tense is deficient, or that their knowledge of when tense must be represented in a sentence is deficient. In the light of Behrens's (1993) study of the use of German tense morphology by young children, which showed that when tense marking is used it is almost always used appropriately (see Section 2 above), it seems unlikely that basic knowledge of tense itself is missing. As regards the second possibility, I also consider it unlikely that children do not know that tense (or other finiteness features, for that matter) is an obligatory part of a root clause. The evidence for this view comes from the arguments in Section 4.1 that we must assume that children's root clauses with no overt finite inflections *are* syntactically finite, in order to capture the cross-linguistic distribution of Crisma's effect.<sup>48</sup>

The account in Section 5 parallels Wexler's insofar as it attributes root infinitives to a competition between two derivations that can have a different outcome for children than for adults. However, I do not assume that the derivations producing finite and infinitival root verbs need ever be equivalently ranked. If there were true 'optionality,' then we might expect to find roughly constant rates of root infinitive use both across languages and throughout the period

<sup>48</sup>Recall from the discussion in Section 4.1 that even if we adopt a different account of Crisma's effect from the one I argue for, it is difficult to avoid the conclusion that at least some of children's root infinitives are syntactically finite.

that a child is using root infinitives. As far as I can tell, this prediction applies to all of the accounts of root infinitives reviewed in this section. But as the evidence reviewed in Section 3 showed, we find both consistent change across time in individual children and reliable cross-linguistic differences in how often root infinitives are used. I assume that the derivations leading to finite and nonfinite root verbs are almost always in *uneven* competition, with the balance gradually shifting from an initial state in which the root infinitive derivation often or always wins, to the adult state in which the overtly finite clause always wins. By attributing this change to the increasing ease with which morphological knowledge is accessed and integrated with syntactic derivations, as access becomes an overlearned, automatic process, I can account for both the gradual reduction in the frequency of root infinitives in individual children, and for the cross-linguistic differences in the rate and time of decline of the root infinitive stage.

### 7.3. Null Aux: Whitman (1994), Boser et al. (1992)

A natural way of trying to account for root infinitives in child language is to try to claim that they are not really root verbs, and therefore children are not really violating a rather transparent and fairly robust universal of human language. If root infinitives are in fact dependent verbs, embedded under an elided auxiliary, modal or propositional attitude predicate, then they are perhaps not so mysterious. Boser et al. (1992) have proposed just this. Unfortunately, most discussion of their proposal has focused on a rather simplistic construal of their proposal, which has become known as the ‘null modal account.’ Intuitively, this proposal claims that child root infinitives, which apparently express the proposition *p*, in fact represent a proposition like ‘I want *p*.’ As has often been pointed out in the literature, examination of child corpora provides many utterances that are consistent with this interpretation, and also many that are not (cf. Behrens 1993; Krämer 1993; Poeppel & Wexler 1993, among many others).

A more general construal of the Boser et al. (1992) proposal is what’s known as the ‘null aux account.’ This proposal states that in root infinitive clauses there is always a null element in  $I^0$  or  $C^0$ , either a modal, or a semantically null auxiliary element, possibly a pleonastic equivalent of English *do*. Boser (1989) conducted an elicitation experiment that lends support to this interpretation: the young German subjects in her experiment often replaced a finite main verb in the stimulus with either an infinitival verb alone or an infinitival plus pleonastic *tun*, ‘do’ (21).<sup>49</sup>

- (21) a. Stimulus: Suzanne warf den Ball als Manfred den Schneeball warf.  
           Suzanne threw the ball as Manfred the snowball threw.  
       Child: Suzanne tat den Schneeball werfen.  
           Suzanne did the snowball throw.
- b. Stimulus: Sonja kochte den Kaffee, weil Rita den Tee kochte.  
           Sonja boiled the coffee, because Rita the tea boiled.  
       Child: Sonja Ø Kaffee kochen und der Mann tut Tee kochen.  
           Sonja coffee boil and the man did tea boil.

<sup>49</sup>Notice that both of the stimulus sentences in these examples contain a finite verb in *clause final position* in an embedded clause. It is possible that this factor is what is causing the children difficulty with the repetition.

Since a null *do* and a bundle of unrealized inflectional features are extremely similar, my account has much in common with Boser et al. (1992) and Whitman (1994). However, a subtle difference between the two accounts turns out to have significant empirical consequences. Both approaches implicitly assume that inflectional features need to be hosted by a verb-like element at some stage in the syntax. This requirement may be fulfilled by either a main verb or an auxiliary. Under the null aux theory, the requirement that INFL must be hosted is taken to apply prior to the level of S-structure/Spell-Out. This means that INFL must have a null host in root infinitive clauses, and there is presumably no need for the main verb and INFL to ever merge. Under my account, on the other hand, there is no absolute requirement that INFL be hosted by S-structure, and therefore there is no need to assume that a null auxiliary is hosting INFL. It is sufficient for the verb and INFL to merge by the LF output of the syntax. This difference may seem benign, but it makes a big difference to the account of where root infinitives are and are not possible.

Boser et al. (1992) and Whitman (1994) assume that a null aux head is only licensed when the head agrees with an overt XP in the specifier of its S-structure position. Since auxiliaries only ever agree with subjects, this accounts for the ban on root infinitives (i.e., null aux constructions) in topicalization or *wh*-question constructions. But this approach leads to incorrect predictions on the phenomena in Section 4.

First, the theory predicts that root infinitives should be possible with subject *wh*-questions, as Whitman (1994) points out. Although we have seen that root infinitives are indeed possible with subject *wh*-questions in English, in child German and Dutch root infinitives appear to be as bad in subject questions as nonsubject questions, although there is less evidence than we would wish for. For child Dutch, Haegeman (1995) reports that none of the 14 subject *wh*-questions in the Hein corpus contain root infinitives, where Hein has a rate of 16% root infinitives in declaratives. For child German, Kursawe (1994) surveyed a number of corpora and found that despite the relatively high frequency of root infinitives in declaratives, only 1 of 307 *wh*-questions contained a root infinitive. Although Kursawe does not provide separate figures for subject and nonsubject *wh*-questions, we can be fairly confident that the 306 finite *wh*-questions contain a sizeable proportion of subject questions. Therefore, we can assume that all subject questions contain finite verbs.

Under the analysis presented here, the ban on root infinitives in *all wh*-questions is explained because the requirement that C be filled overtly in a *wh*-question is an absolute grammatical requirement; if INFL moves to C overtly, but V remains in situ, V will not be able to raise to host INFL at LF, assuming that it is blocked from using the trace of INFL as an intermediate landing site in head-to-head movement. The only other alternative is for V to attach to INFL overtly, before INFL raises to C.<sup>50</sup> This explains why root infinitives are blocked in all *wh*-questions and topicalization structures in child V2 languages.

Furthermore, the difference between German, Dutch, and Swedish on the one hand and English subject questions on the other with respect to whether or not root infinitives are allowed cannot be explained under Boser et al.'s account: they assume that root infinitive clauses contain auxiliary verbs, but auxiliary verbs behave identically in *wh*-questions in child English and child Germanic. The difference in the verb movement behavior of root *main* verbs between English and Germanic should make no difference to the availability of root infinitive clauses if the root verb in these clauses is not a main verb.

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<sup>50</sup>Additionally, if INFL is phonetically null, it may not be sufficient to satisfy the requirement of C to be overtly filled.

Second, given the assumption that null auxiliary heads are licensed by an overt agreeing specifier, Boser et al. predict that overt subjects should be *more* frequent in children's root infinitive clauses than their finite clauses, which Section 4.2 showed to be the opposite of the truth in early child German, French, and Dutch. Even child English, which shows no special bias for null subjects in root infinitive clauses, does not show the increased frequency of overt subjects in root infinitive clauses that the null aux theory predicts.

## 8. CONCLUSION

I have argued that there is no evidence that two-year-olds have a deficit in syntactic or morphological knowledge, and that particular errors of omission are better explained by a problem the children have in the implementation of certain aspects of that knowledge.

Importantly, I have not been assuming that grammatical knowledge and performance systems are tightly sealed boxes, which make each system blind to the internal workings of the other. Instead, I have been assuming that there are very specific ways in which the children's performance systems interact with their linguistic knowledge, such that the cost of accessing morphological knowledge, which is not yet an automatic process for the children, interacts with a series of cross-linguistic differences in the behavior of main verbs: (i) verb movement in *wh*-questions; (ii) the role of verb movement in nominative case licensing; and (iii) paradigmatic complexity. These interactions provide an account of the distributional regularities surrounding root infinitives.

Of course, many questions remain concerning the specifics of the performance factors that I have invoked here, and this is a common weakness of theories that appeal to little understood performance factors. But this is no reason to ignore these factors; on the contrary, it makes it all the more important for future research to try to spell-out their details.

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## APPENDIX A: COUNTING PROCEDURES

### A.1. French *Wh*-Questions

The sample on which Tables 7a and 7b are based consists of 792 declaratives and 63 *wh*-questions, whereas Crisma's sample from the same files contains 1002 declaratives and 114 *wh*-questions. I exclude utterances if they meet the following criteria:

- (a) Multiple repetitions of same utterance excluded.
- (b) Repetitions of all or large part of preceding adult utterance excluded.
- (c) Repetitions *not* excluded if they contain alteration of the inflection used by the adult, or alteration of the inflection used in previous utterance by the child.
- (d) Very common routines, like *c'est* and *il y a* excluded. *Qu'est-ce que c'est NP* not excluded from *wh*-question counts.
- (e) Only infinitives, not all nonfinite forms counted. Where phonology fails to distinguish infinitives and participles (e.g., *regarder* 'to see, inf.' versus *regardé* 'seen, part. '), context is used to determine whether child is referring to completed event ( $\rightarrow$  participle) or a non-completed event ( $\rightarrow$  infinitive). Utterances in which the root verb is a past participle could involve a dropped auxiliary, a situation which I want to distinguish from true root infinitive clauses. See footnote 24 for further discussion of the status of dropped auxiliaries.

Philippe does produce a small number of *wh*-questions containing root main verbs, but these are all repetitions. Philippe is an extremely talkative child, who shows a predilection for repeating what was just said to him, as the following exchange shows. Note the *wh*-question containing a main verb.

- PHI: Va chercher mamie, la tortue.  
'Go look for mommy, tortoise.'
- MOT: Avec quoi elle va chercher mamie?  
'What is she going to look for mommy with?'
- PHI: Avec quoi elle va chercher mamie?  
'What is she going to look for mommy with?'
- MOT: Ne répète pas tout ce que je te dis et répondsmoi!  
'Stop repeating everything I say and answer me!' (Philippe, age 2:02;03)

There are 10 further instances of *wh*-questions in which Philippe uses a main verb in the 10 file sample. All but one of the 10 are clearly repetitions. Seven are verbatim repetitions of an immediately preceding adult utterance; one is a near repetition of an adult utterance: Philippe reduces *qu'est-ce qu'on fait?* to *qu'on fait?* One example consists of *pourquoi* 'why' followed by a repetition of the VP of the penultimate adult utterance, *pourquoi coupe le bois?* 'why cut the wood' (age 2;2,17). Finally, a single *wh*-question containing a main verb is spontaneous, and the verb is finite: *pourquoi j'enlève le pneu?* 'why should I remove the tire?' (age 2;3,0).

## A.2. English Null-Subjects

The rates of null subject use for Adam and Eve shown in Tables 18a and 18b are strikingly lower than many of the rates reported in the literature for English-speaking children of the same age, sometimes for even the very same two children (cf. Bloom 1990; Bromberg & Wexler 1995; Hyams & Wexler 1993; Valian 1991; Wang et al. 1992). For example, while Hyams and Wexler (1993, hereafter H&W) report that Adam is using 40–50% null subjects and Eve 20–30%, Tables 18a and 18b show Adam producing 23% null subjects and Eve just 10%. This difference is probably due to the austerity of my criteria for inclusion in the counts. Support for

this explanation comes from Wang et al. (1992) whose null subject rates for English children were closest to mine. They report two rates of null-subject usage for their English children: the overall rate is 33%, but once they excluded sentences in which null subjects “can be judged as pragmatically acceptable in the given contexts in which they were produced” the rate dropped to 15% (cf. Wang et al. 1992, 233).

I think other possible explanations of the difference can be excluded:

- (i) Size of sample: H&W used 8 out of the first 20 files for each of the Adam and Eve corpora, whereas my survey includes all 20 files for each child. The extra files could be bringing down the rates of null subject use in my counts. However, if we restrict the counts to just the files that H&W looked at my rates are still much lower than H&W’s. Adam: H&W 46%, CP 30%; Eve: H&W 29%, CP 11%.
- (ii) Combining raw scores across 20 files distorts figures. It might be that the large numbers of scored utterances in the later files are flooding the counts and pulling down the average rates of null subject use. This again fails to account for the discrepancy: mean percentages of null subject use across the 20 files are: Adam 25%, Eve 12%, which are still well below the rates in H&W (see i).
- (iii) Ignoring all but 3rd person singular contexts. The figures in Tables 18a and 18b represent just those utterances in which I considered the intended subject to be 3rd person singular. If null subjects are far more common when the referent of the subject is non-3rd person, this could account for the discrepancy. This also turns out not to be the case: a comparison of rates of null subject usage in 3rd person and 1st person contexts showed no marked difference for either child.
- (iv) There may be a semantic bias, given that present tense inflections generally only appear on English main verbs in stative or generic contexts. Stative and generic contexts may be less likely to support a null subject, compared to eventive contexts, which are more likely to be anchored in the ongoing situation and therefore more likely to support a null subject (Wexler p.c.). However, inspection of the corpus on which these counts are based shows that stativity/genericity is unlikely to be a problem. For example, the first utterances in my sample of the Adam corpus contain the following verbs: *hit, pick up, go, drive, put, fix, march, break, bite*.

Therefore, it appears that the discrepancy must be due to my counting procedure, which set strict criteria on counting an utterance as ‘spontaneous’:

- (a) I included main verbs whose subject I judged to be 3rd person singular, and which could potentially bear present tense *-s*, past tense *-ed* inflections, or an irregular past tense form.
- (b) I excluded all sentences containing an auxiliary, and all sentences in which there is obviously an auxiliary missing, e.g., *John running* (see footnote 24 above for discussion of the coding of null auxiliaries).
- (c) I excluded negated sentences with missing *do* and *wh*-questions.
- (d) I excluded sentences with the pseudo-3rd person subject *Adam* or *Eve* (the assumption that these are grammatically 1st person utterances for the children is justified by the fact that main verbs are inflected 0% of the time with these subjects).

- (e) I excluded all repetitions of adult sentences, whether the repetition was of the whole sentence or just the latter part (VP repetitions were rather common).
- (f) I excluded instances of the child repeating herself, unless the verbal inflection changed from one token to the next.
- (g) I also excluded from the null subject counts any utterances which could be considered a well-formed adult utterance in the context: see Wang et al. 1992, 233 for evidence of the importance of this control measure.

Clearly, these are extremely stringent criteria. However, any genuine phenomenon should survive these measures, as null subjects do, albeit at lower rates than normally reported.