

# Why continuity

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**Abstract** This paper examines over 900 *why*-questions gathered in a longitudinal study of an English-speaking child from 2 to 6 years of age. The child went through a protracted stage in which many *why*-questions lacked subject-aux inversion, in contrast to other *wh*-questions. While this asymmetry has been observed in the previous literature, several new observations also emerged. First, the child permitted focus phrases, topic phrases and subordinate clauses to intervene between *why* and the subject NP in matrix *why*-questions with no I to C movement. Second, subject-aux inversion was consistently manifested in long-distance questions with tensed embedded clauses, and in utterances with *why* that were not information-seeking questions. Based on the pattern of data, it is proposed that some children initially permit *why* to merge high in the left periphery, in SpecIntP, following a proposal for Italian by Rizzi, L. (2001). On the position “Int(errogative)” in the left periphery of the clause. In G. Cinque & G. Salvi (Eds.), *Current studies in Italian syntax* (pp. 287–296). Oxford: Elsevier. The paper considers whether the child data are best explained (i) by a *why*-parameter that distinguishes languages permitting merge of *why* from those languages limited to movement (cf. Ko, H. (2005). Syntax of *why*-in-situ: Merge into [SpecCP] in the overt syntax. *Natural Language and Linguistic Theory*, 23, 867–916.), or (ii) as evidence of a universal principle. In the final analysis, the parameter account is preferred, because it explains the individual variation and the sharp transition to the adult grammar that is observed in some children.

**Keywords** Acquisition of syntax · Continuity · Parameter setting · *Why*-questions · Left periphery · Subject-aux · Inversion

## 1 Introduction

Some children acquiring English fail to exhibit subject-aux inversion consistently in their *why*-questions, long after subject-aux inversion is mastered in questions with

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other *wh*-phrases. The contrast between *why*-questions and other *wh*-questions has been documented for nearly 30 years (e.g., Labov and Labov 1978; Stromswold 1990) but questions remain about the underlying cause of the contrast. This paper introduces a new set of empirical data to the inquiry, and in so doing, offers new avenues for explanation. The data are from a longitudinal diary study of over 900 *why*-questions produced by one child, AL, from 2- to 6-years of age. The asymmetry between *why*-questions and other *wh*-questions is illustrated for AL at age 3 in example (1). At this age, questions with *why* (1a,b) mostly lacked subject-aux inversion, as compared to questions with other *wh*-phrases (1c-e). The novelty of the AL corpus, however, is the observation that, alongside the lack of subject-aux inversion, some of AL's *why*-questions feature various XP phrases intervening between *why* and the subject NP. Examples of these non-adult question forms are given in (2).

- (1) a. Why unicorns are pretend? (3;1)  
 b. Why you are going in that one? (3;2)  
 c. How did Tweetie get maked? (3;0)  
 d. When will we be big enough to climb up there? (3;1)  
 e. Who was it that you was talking to? (3;1)
- (2) a. Why SOME OF YOUR MAKE UP I can't use [and some I can]? (5;2)  
 b. Why *this time* you're opening them like that? (4;2)  
 c. Why *when I was a baby* I loved Boomer's dog food? (3;6)  
 d. Why *always when he rings* I'm asleep? (5;3)

In (2a), the object NP that bears contrastive focus has been fronted. In (2b), an adverbial phrase intrudes between *why* and the subject NP. In (2c), the XP 'intrusion' is a subordinate clause, and (2d) incorporates both an adverb and a subordinate clause between *why* and the subject NP.

There is another critical observation in accounting for the contrast between *why*-questions and other *wh*-questions. This is an asymmetry between matrix *why*-questions and two-clause *why*-questions in which a long-distance interpretation is intended. AL's two-clause questions like (3) consistently exhibited (fully adult) subject-aux inversion, unlike the matrix questions in (1a,b).

- (3) Why do you think Santa's not coming this year? (3;10)

AL's corpus of utterances with *why* reveals a further asymmetry, which represents a fine-grained differentiation among speech acts. For AL, matrix *why*-questions that seek new information, like (1a,b), frequently lacked subject-aux inversion. In contrast, *why*-questions that were suggestions and rhetorical questions, utterances that did not seek new information, were consistently produced with subject-aux inversion. Examples are provided in (4).

- (4) a. Why don't you use this as a magic wand? (3;4) [suggestion]  
 b. Why would any witch not do spells? (3;11) [rhetorical question]

Taken together, these three findings invite the conclusion that I to C movement per se is not problematic for AL. Nevertheless, AL apparently hypothesized that subject-aux inversion movement was not required in matrix (information-seeking) *why*-questions at this stage of language development. The purpose of the present paper is to explain why.

The discussion is cast within the Principles and Parameters (P&P) framework (e.g., Chomsky 1981, 1995). The P&P framework posits that many aspects of language are encoded in the language faculty as (innately specified) principles and parameters; the principles constrain the child's hypothesis space, and the parameters establish binary choices that decide among sets of properties that vary across languages. One of the empirical consequences of the P&P framework is that certain linguistic properties that are not attested in the local language, but are attested in other languages, are expected to be manifested in child language. This is called the continuity hypothesis (e.g., Pinker 1984; Hyams 1986; Crain and Pietroski 2002). This paper explores the idea that some variant of the continuity hypothesis is guiding AL's early non-adult linguistic behavior in forming matrix *why*-questions, as well as in AL's eventual convergence on adult-like *why*-questions. The proposal is that in AL's early questions that lack subject-aux inversion, the *wh*-phrase *why* is merged into the phrase structure, rather than moved, like other *wh*-phrases. This proposal is motivated by cross-linguistic research from a number of languages, including French (Rizzi 1990), Italian (Rizzi 2001), Irish (McCloskey 2003), Korean, Japanese and Chinese (Ko 2005).

The proposal draws principally on theoretical research by Rizzi (2001). To explain the syntax of *perché* (*why*) in Italian, Rizzi (2001) appeals to an extended left periphery, arguing that in Italian, *perché* is merged into the phrase structure in a position higher than the position to which other *wh*-phrases are moved. In Rizzi's proposal, *perché* is merged into SpecIntP, rather than being moved to the usual position for *wh*-phrases, SpecFocP. The Interrogative head is inherently endowed with a [+wh] feature, with the result that no verb movement is triggered when *perché* is merged in SpecIntP. When *wh*-phrases are moved to SpecFocP, the verb carries the [+wh] feature to the focus head and verb movement is triggered. The fact that *perché* does not require the verb to move to a position adjacent to the *wh*-phrase permits various topic and focus phrases to appear. In order to explain the syntax of English-speaking children's *why*-questions, I draw on the idea that children are accessing the range of positions in the left periphery utilized in Italian. The proposal is that children, too, allow *why* to merge into the higher SpecIntP position. This explains the lack of subject-aux inversion and the fact that various topic and focus phrases are compatible with these children's *why*-questions.

The paper also explores how children make the transition from that stage at which *why* may be merged in SpecIntP to the adult grammar. Two accounts are considered. The first explanation takes up Ko's (2005) proposal that there is a parameter that partitions languages into those that allow merge of *why*, and those in which *why* is limited to derivations with movement. Drawing on Rizzi's account of Italian, it can be assumed that Italian numbers among the languages permitting merge (in SpecIntP), while English is a language that requires movement of *why* to SpecFocP, as is usual for other *wh*-phrases. Assuming that children are free to choose either value for the parameter, some children may initially mis-set the *why*-

parameter, and merge *why*, giving rise to the Italian-like properties of English-speaking children's *why*-questions. Other children may choose the 'move' setting of the parameter, as is appropriate for adult English, and therefore show no such stage. The advantage of this account is that the learning component for convergence on the adult grammar is limited to parameter re-setting, in response to the mismatch between input and the child's initial parameter value. Thus, there is a considerable reduction in the amount of learning children are required to undertake (see Chomsky 2002; Rizzi 2004).<sup>1</sup>

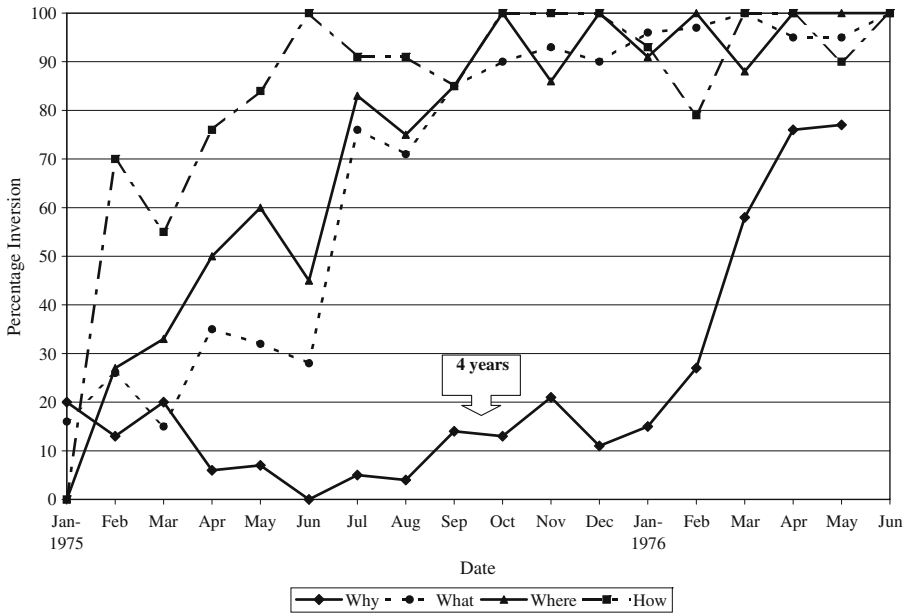
A second account of children's transition to the adult grammar is also explored. The proposal is that a universal principle directs children to initially position *why* in SpecIntP. The account accommodates the same range of child data; XP intrusions of topics, subordinate clauses, and so on, are allowed between *why* and the subject NP. The difference is in the path of acquisition that is anticipated. On this account, children acquiring English have to learn that adult English does not conform to the principle in the prototypical way. Adult speakers of English do not readily allow intrusions of topics, subordinate clauses and so on, and, in addition, subject-aux inversion is always obligatory. This account draws upon statistical learning, as conceived in Yang (2002) to explain AL's progression from the Italian-like grammar to the adult grammar of English.

The paper is structured as follows. Section 2 reviews the previous literature on the acquisition of *why*-questions. Section 3 turns to the syntax of *why* in other languages, with special emphasis on Italian. Section 4 introduces the basic facts about *why*-questions and some observations from the data from AL, the child whose data is evaluated in the present paper. Section 5 elaborates the child data, to investigate the finer-grained predictions of hypothesizing that children initially allow *why* to merge, and discusses issues of learnability. Section 6 summarizes the findings of the present investigation.

## 2 Children's *why* questions

*Why*-questions have long been noted to resist subject-aux inversion in the grammars of some English-speaking children, well after subject-aux inversion is in place in other *wh*-questions. The observation showing *why* lagging behind other *wh*-phrases in its rate of inversion is most striking in Labov and Labov's (1978) diary study of their daughter Jessie, but an asymmetry has been noted in a number of research papers including Berk (2003), de Villiers (1991), Rowland and Pine (2000) and Stromswold (1990). As can be seen in Fig. 1 below (adapted from Labov and Labov 1978), the *wh*-phrases *where* and *how*, alongside *what*, reach a high rate of inversion

<sup>1</sup>Advocates of the Principles and Parameters framework acknowledge that there is also a 'residue' of facts that must be learned, but which do not follow from the finite set of parameters. However, the emphasis of the approach is to reduce the set of facts that must be learned by children as much as possible, in order to explain children's universal mastery of language (i.e., in order to achieve 'explanatory adequacy'). The introduction of parameters to linguistic theory vastly reduces the 'residue' that children must learn.



**Fig. 1** Comparison of inversion in *why/what/where/how* in Jessie's *wh*-questions (Adapted from Labov and Labov 1978)

at about 3;9, whereas *why* did not show reliable inversion until the child is about 4;6. An abrupt change took place in the rate of inversion at about 4;3, climbing from roughly 15% to 75% in just 3 months. A similar asymmetry will be seen in AL's data.

There are, however, English-speaking children who show no lag in the rate of subject-aux inversion in their *why*-questions (e.g., Ambridge et al. 2006). Although the frequency of children's *why*-questions is often less than that of other *wh*-questions in children's naturalistic data, Stromswold (1990) finds that a number of children whose data is available on the CHILDES database invert *why* at rates close to 100%; for example, Ross (99%), Naomi (100%) and Mark (100%). Moreover, there is no apparent delay in inversion for *why*-questions as compared to other *wh*-questions in the transcripts of Abe and Sarah studied by de Villiers (1991). Nevertheless, overall, there is a lower proportion of inversion for *why*-questions than for other *wh*-questions, and this observation has received considerable attention in the literature. For example, another study that finds a difference between *why* and other *wh*-phrases is Berk (2003). In a production study of 16 children between 1;11 and 4;2, Berk reported that *how*-questions containing an auxiliary verb showed subject-aux inversion 100% (18/18) of the time. Out of the 74 *why*-questions in the data set, 18 had no auxiliary verb, so these were not included in the assessment of subject-aux inversion. Of the remaining 56 questions, however, only 28 (50%) had subject-aux inversion.

Some researchers have investigated whether or not children's early questions demonstrate an argument/adjunct asymmetry, with *why* patterning like other

adjuncts (such as *how*, *where* etc.) in its failure to invert (e.g., de Villiers 1991; Sarma 1991; Stromswold 1990). The study by de Villiers (1991) concluded that there is a division in the behavior of *wh*-phrases in argument and adjunct positions in children's grammars. In a study of several children's data from the CHILDES database, de Villiers observed a correlation between the emergence of subject-aux inversion and children's use of embedded questions with a particular *wh*-phrase. The correlation was evident for the 4 children with sufficient data: Adam, Abe, Sarah and Ross.<sup>2</sup> These data led de Villiers to propose that children have a different analysis of question formation from adults; de Villiers suggests that children start out by base-generating all *wh*-phrases as adjuncts adjoined to IP, following Rizzi's (1990) earlier account of *pourquoi* (*why*) for French.<sup>3</sup> At this stage, then, children do not project a CP phrase, and it follows that there is no C position for the auxiliary verb to move into. To reanalyze *wh*-phrases as positioned in SpecCP, as in adult English, de Villiers proposed that children must encounter each *wh*-phrase in embedded questions (e.g. 'I know what Laura did', 'She wonders why he went' etc.). The embedded questions are assumed to provide a clear indication that *wh*-phrases are positioned in the SpecCP of embedded clauses. The inference was that children then complete the generalization – analyzing all *wh*-phrases as positioned in SpecCP, including ones in matrix clauses. The reanalysis takes place piecemeal for each *wh*-phrase, once the relevant data from embedded questions is acknowledged. *Wh*-phrases that originate in argument position are the first to be reanalyzed, with adjunct *wh*-phrases, *how* and *why*, being reanalyzed later in the course of acquisition. *Why* is the last to show subject-aux inversion and to allow long-distance movement. De Villiers proposed that this was due to the fact that embedded questions with *why* are infrequent in parental speech to children (de Villiers 1991, p. 169). Once *wh*-phrases are analyzed as moving to SpecCP, on this account, I to C movement is initiated. At that point, long-distance movement becomes operative, according to de Villiers, and long-distance questions appear in children's productions. In short, on de Villiers's analysis, consistent use of subject-aux inversion precedes the appearance of long-distance questions for any *wh*-phrase, including *why*.

Finally, in a detailed study of Adam's data in the CHILDES database, Rowland and Pine (2000) observe that *why* and *how* do not pattern alike, contrary to de Villiers's (1991) claim. At least, for transcripts 19-36, when Adam was between 2;11.28 and 3;8.14, Rowland and Pine note that *how* was inverted accurately, while *why* alone was slow to invert in questions (see Rowland and Pine 2000, p 171). In the specified set of transcripts, Rowland and Pine find that Adam produced 48 *how* questions and 36 *why* questions. Of these, 85.4% of Adam's *how* questions were

<sup>2</sup>de Villiers (1991) reports that Ross inverts with *why* only after he produced indirect questions with *why*, and Stromswold reports that Ross inverts 99% overall. Presumably, this means that the majority of *why*-questions were produced by Ross only after he had acquired the adult structure.

<sup>3</sup>Rizzi (1990) makes this claim only for *pourquoi*, but de Villiers (1991) extends it to all *wh*-phrases.

inverted, but only 8.3% of his *why* questions were produced with subject-aux inversion. Rowland and Pine propose that the pattern in Adam's development was a function of learning. They claim that children have to learn, piecemeal, every combination of *wh*-phrase and the auxiliary verb/modal it can appear with (*wh* + *aux*) – 49 in all (see Table 3, p. 172). On this account, the frequent combinations of *wh* + *aux* are learned before the infrequent ones, with the most infrequent presumably being *why* + *aux*. On this account, until a particular *wh* + *aux* combination has been learned, children do not use inversion.

The account by Rowland and Pine confronts a potential problem, however. There should be a correlation between frequency of a particular question form in the parental input and its mastery, as measured by its frequency in Adam's corpus. This is not the case. What is striking is that Adam fails to invert negative *why*-questions, despite 22 instances of *why* + *don't* in the parental input that is examined (cf. Van Valin 2002).<sup>4</sup> To explain this anomaly, Rowland and Pine point out that all 22 instances in the parental input were chunks that were followed by a second person subject (*why* + *don't* + *you*) suggesting that Adam may have inferred that this frequent pattern could not be generalized across persons to *they* and *I* as well<sup>5</sup> (see also Rowland and Pine 2003). If this reasoning is to go through, any time the input has an overwhelmingly large number of *wh* + *aux* + *you* examples in the input, the child should treat this combination as a fixed phrase and fail to generalize across other persons. However, one might surmise that the *wh*-question input to children will overwhelmingly be questions with *you* subjects, no matter what the question word. This seems likely. In Ambridge et al. (2006), it is reported that the *what* + *do* adult input to Adam analyzed by Rowland and Pine (2000) contained 89 *what* + *do* + *you* questions, and only 2 *what* + *do* + *they* questions. But all 27 of Adam's own productions of *what* + *do* are inverted (see Table 3, p. 172), leaving Rowland and Pine's account of Adam's failure to invert with *why* in doubt.

In summary, the empirical evidence reveal that some but not all children treat *why* differently from other *wh*-phrases, including other adjunct *wh*-phrases, by frequently failing to carry out subject-aux inversion. In the next section, I turn to linguistic theory, and examine the syntax of *why* in cross-linguistic data. Differences in the form of *why*-questions versus other *wh*-questions are shown to extend beyond differences in I to C movement. With a more complete set of diagnostics in hand, I turn to the larger set of diary data from AL in Section 4.

<sup>4</sup>The parental input is taken from the 10 transcripts preceding the period that is studied. These transcripts were chosen to avoid any effect of the child on the maternal input. In a reply to Van Valin (2002), Rowland and Pine (2003) examine the maternal input from the same transcripts used to study Adam's questions. In those transcripts, the *why*+*did* questions number 29, and the *why*+*don't* questions number 167, making the input account look more tenuous.

<sup>5</sup>Instances of *why* + *doesn't* were counted separately, so 3rd person singular subjects did not figure in the counts.

### 3 The syntax of *why*

All *wh*-questions are subject to a universal constraint that requires a *wh*-operator to be related to a head with appropriate *wh*-features. The statement of the constraint has changed over the years as linguistic theory has developed. I will state the constraint using Rizzi's *wh*-criterion (Rizzi 1996), since my proposal is largely based on Rizzi's theory of *wh*-movement and left periphery (Rizzi 1996, 1997, 2001). As stated, the *wh*-criterion applies across the board to all *wh*-phrases.

- (5) a. A *wh*-operator must be in a specifier-head relation with a head carrying the *wh*-feature.  
 b. A head carrying the *wh*-feature must be in a specifier-head relation with the *wh*-operator.

Since Huang (1982), it has been shown that languages vary in whether the *wh*-criterion is satisfied overtly or covertly, i.e., at LF. A related observation is that languages also vary in whether the *wh*-criterion triggers I to C movement. In English and in Italian, the *wh*-feature is generated in INFL and raises to C to satisfy the constraint (Rizzi 1996). The difference is that, in Italian, the main verb moves from I to C to be adjacent to the *wh*-element; in English, an auxiliary verb moves from I to C.<sup>6</sup>

Let us turn to Italian, to contrast the syntactic behavior of *why* versus other *wh*-phrases, such as *what* (*che cosa*). The 'other' *wh*-phrases require I to C movement of the verb, as shown in (6a) and (6b). Movement is obligatory for all *wh*-phrases except *why* (*perché*) and *how come* (*come mai*). For these *wh*-phrases, verb movement is optional, not obligatory. As examples (7a) and (7b) illustrate for *perché*, both variants with and without verb movement are acceptable.<sup>7</sup>

- (6) a. Che cosa ha fatto Gianni? (Rizzi 2001)  
*what has done Gianni*  
 What did Gianni do?  
 b. \*Che cosa Gianni ha fatto?  
*what Gianni has done*  
 What did Gianni do?
- (7) a. Perché Gianni è venuto? (Rizzi 2001)  
*why Gianni has come*  
 Why did Gianni come?  
 b. Perché è venuto Gianni? (Meroni, p.c.)  
*why has come Gianni*  
 Why did Gianni come?

<sup>6</sup>A reviewer suggests that Italian may not, in fact, have T to C raising, but rather, failure of the subject to raise to SpecTP, as Suñer suggests for Spanish. This suggestion is based on the fact that in Italian, it is not just the finite auxiliary verb that raises, but an auxiliary plus past participle. For the purposes of this paper, I will follow Rizzi's (2001) proposal that Italian raises T to C.

<sup>7</sup>Throughout the paper, I illustrate the facts using *perché*, but in most cases, the same observations hold for the *wh*-phrase *come mai*. *Perché* and *come mai* do show some differences in behavior, however. As Conroy (2006) notes, *come mai* is factive, and therefore cannot be used to make suggestions. Collins (1991) and Tsai (2005) point out other differences.

There are other differences between *perché* and *come mai*, on the one hand and *che cosa* (*what*) and other ‘regular’ *wh*-phrases, on the other. One difference involves the distribution of short adverbs such as *already* (*già*). In declaratives, such short adverbs are typically permitted to appear between the verb and the past participle, as shown in (8a), with some speakers allowing the adverb to appear to the left of the verb, as in (8b).

- (8) a. I tuoi amici hanno *già* fatto il lavoro. (Rizzi 2001)  
*the your friends have already done the work*  
 Your friends have already done the work.
- b. I tuoi amici *già* hanno fatto il lavoro.  
*the your friends already have done the work*  
 Your friends already have done the work.

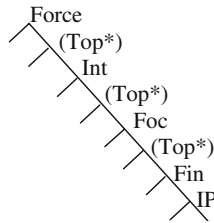
In those varieties of Italian that exhibit the pattern in (8b), questions with ‘regular’ *wh*-phrases such as *che cosa* (*what*) do not tolerate *già* to the left of the verb. This is because the inflected verb must move higher than the adverbial position, namely to C. In contrast, questions with *perché* and *come mai* allow *già* to appear to the left of the verb, presumably because movement of the verb is not required (cf. (10)).

- (9) a. Che cosa hanno *già* fatto? (Rizzi 2001)  
*what have (they) already done*  
 What have they already done?
- b. \*Che cosa *già* hanno fatto?  
*what already (they) have done*  
 What already have they done?
- (10) Perché (i tuoi amici) *già* hanno finito il lavoro? (Rizzi 2001)  
*why (your friends) already have finished the work*  
 Why have your friends already finished the work?

The observed differences in inversion of the main verb with the subject and adverb placement shown in examples (6) to (10) lead Rizzi (2001) to propose that *perché* and *come mai* sit higher in the left periphery than do the other ‘regular’ *wh*-phrases; the latter sit in the focus projection, in SpecFocP. The *wh*-phrases *perché* and *come mai* are merged in a higher position, in InterrogativeP (i.e., SpecIntP), which is hypothesized to be inherently endowed with a [+*wh*] feature. Since this head comes bearing a [+*wh*] feature, movement of the verb is not required to satisfy the *Wh*-criterion. The ordering of projections in the left periphery in main clauses is given in (11); slightly different facts obtain for embedded clauses that are not

relevant for our purposes. (The asterisk indicates the possibility of iterative projections.)

(11)



The critical observation is that, in Italian, there are two convergent derivations for *perché*-questions. *Perché* may be moved to SpecFocP. In this case, the Wh-criterion is satisfied by movement of the verb to the focus head. A second derivation merges *perché* in SpecIntP, with no accompanying verb movement.

The possibility of merging *perché* and *come mai* with no adjacency requirements for the verb leads to the expectation that material other than just adverbs may intrude between the *wh*-phrase and the main verb. Subordinate clauses are a case in point. The examples in (12) and (13) show that this word order is licensed for *perché* but not for *che cosa*. When the *wh*-phrase is *che cosa*, the *when*-clause must appear after the verb, as shown in (13b).

- (12) *Perché quando va a Milano Gianni compra il panettone?* (Meroni, p.c.)  
*why when (he) goes to Milan Gianni buys the panettone*  
 Why does Gianni buy panettone when he goes to Milan?

- (13) a. \**Che cosa quando va a Milano compra Gianni?* (Meroni, p.c.)  
*what when (he) goes to Milan buys Gianni*  
 What does Gianni buy when he goes to Milan?  
 b. *Che cosa compra Gianni quando va a Milano?*  
*what buys Gianni when (he) goes to Milan*  
 What does Gianni buy when he goes to Milan?

The fact that *perché* and *come mai* are positioned in SpecIntP, above potential topic and focus phrases, gives them considerable latitude in the elements that can appear with them. In particular, they can be followed (but not preceded by) phrases expressing contrastive focus. Other *wh*-phrases cannot be followed by such focus phrases, since they compete for the same SpecFocP position in main clauses. The facts are illustrated for *perché* in (14). Example (15) shows that a focus phrase cannot follow *che cosa*.

- (14) *Perché QUESTO avremmo dovuto dirgli, non qualcos'altro?* (Rizzi, 2001)  
*why THIS (we) have should said, not something else*  
 Why should we have said THIS to him and not something else?

- (15) \**Che cosa A GIANNI hanno detto (non a Piero)?* (Rizzi, 2001)  
*what TO GIANNI (they) have said (not to Piero)*  
 What have they said TO GIANNI (and not to Piero)?

The *wh*-phrase *perché* can also be both preceded and followed by topic phrases, as illustrated in the clitic left dislocation structure in (16).

- (16) Il mio libro, perché, a Gianni, non glielo avete ancora dato? (Rizzi, 2001)  
*the my book, why, to Gianni, not to-him-it (you) have still given*  
 Why have you still not given my book to Gianni?

There is an interesting asymmetry involving *perché*-questions. The asymmetry is between matrix questions and long-distance questions. We saw earlier that there are two convergent derivations in matrix questions with *perché*. First, when *perché* is in SpecIntP, no inversion takes place. By contrast, when *perché* moves to SpecFocP, verb movement is triggered, as with other *wh*-phrases. In long-distance *perché*-questions, verb movement is obligatory. In a long-distance question, *perché* is extracted from its site of origin in the embedded clause and moves successive cyclically to SpecFocP in the matrix clause, in order to satisfy the *wh*-criterion (Rizzi 2001). As a consequence, verb movement must also occur. This key difference between matrix and long-distance questions will be exploited in the investigation of AL's grammar, and grammatical development.

It must be kept in mind, however, that *perché*-questions with two clauses are not necessarily formed by long-distance movement of *perché*, as examples (17) and (18) illustrate.

- (17) Perché Gianni ha detto che si dimetterà? (Meroni, p.c.)  
*why Gianni has said that self will resign*  
 Why did Gianni say that he will resign?
- (18) Perché ha detto che si dimetterà? (Rizzi 2001)  
*why has (he) said that self will resign*  
 Why did he say that he will resign?

The question in (17) lacks inversion, as can be seen by the position of *Gianni*, which is to the left of the verb. Therefore, the only reading of the question is the local construal of *perché*; the long-distance interpretation is ruled out. So, example (17) can only be asking why Gianni *said* he would resign, and not about the reason for his resignation. If inversion is present, as in (18), the question becomes ambiguous; it can have a local reading, and it can have a long-distance reading; here, the question can be asking about Gianni's reason for resigning.

Let us summarize Rizzi's proposals for *perché* in Italian. First, in matrix questions, *perché* may either be merged in SpecIntP or it may be moved to SpecFocP, as with other *wh*-phrases, to satisfy the Wh-criterion. When *perché* is merged in SpecIntP, it does not trigger verb movement, and topic and focus phrases

may intervene between *perché* and the subject. When *perché* moves to SpecFocP, as with other *wh*-phrases, verb movement is obligatory, blocking the appearance of topic and focus phrases between the *wh*-phrase and the subject. This brings us to two-clause *perché* questions with tensed embedded clauses. Here, both the merge and move options are available. Therefore, an ambiguity arises in two-clause *perché*-questions. If *perché* is merged in SpecIntP, it can only be questioning the content of the matrix clause. If *perché* is moved into SpecFocP position, an ambiguity arises between the local (main clause) interpretation and a long-distance interpretation. On the long-distance interpretation, *perché* moves successive cyclically to SpecFocP from its origin in the embedded clause, so the content of the embedded clause is questioned.

The next step is to turn to cross-linguistic data to investigate differences in the syntax of *why* and other *wh*-phrases. Examining data from *wh*-in-situ languages such as Korean, Japanese and Chinese, Ko (2005) also reveals evidence for the base-generation of *wh*-phrases corresponding to *why*, in contrast to other *wh*-phrases. To explain what is known as the Intervention Effect, Ko (2005) takes the lead from Rizzi's (2001) analysis for Italian. In Korean and Japanese, a question word cannot generally be preceded by an element that bears scope, such as a negative polarity item or an *only* phrase. This is illustrated in the Japanese example in (19a), where the phrase *Taroo-sika* (*only Taroo*) cannot precede the question word *nani* (*what*). The word order in (19b), with *Taroo-sika* (*only Taroo*) not moved higher than the question word is grammatical. By contrast, the *wh*-phrase *way/naze* (*Korean/Japanese why*) allows scope bearing elements to precede the *wh*-phrase, as shown in (20). In (20a) it can be seen that even when *Taroo-sika* (*only Taroo*) is higher in the phrase structure than *naze*, the question is well-formed. Thus the same asymmetry between *why* and other *wh*-phrases shows up in a different domain in Korean and Japanese.

- (19) a. \**Taroo-sika nani-o yoma-nakat-ta no?* (adapted from Ko 2005)  
*Taroo-only what-acc read-not-past Q*  
 What did only Taroo read?  
 b. *Nani-o Taroo-sika yoma-nakat-ta no?*
- (20) a. *Taroo-sika naze sono hon-o yoma-nakat-ta no?* (Kuwabara 1998, cited in Ko 2005)  
*Taroo-only why that book-acc read-not-past Q*  
 Why did only Taroo read that book?  
 b. *Naze Taroo-sika sono hon-o yoma-nakat-ta no?*

According to Ko (2005) the asymmetry comes about because *way/naze* (*Korean/Japanese why*) is merged (that is, base-generated) as a modifier in SpecCP.<sup>8</sup> Other

<sup>8</sup>The relevant point is that *why* is merged, not moved. There is no empirical data that can decide whether *why* sits in a different position in the phrase structure in these languages, so Ko (2005) does not pursue a fine-grained left periphery analysis.

elements may therefore be scrambled, or A'-moved, or base-generated above this position, provided that the clause is interrogative. Other *wh*-phrases cannot be merged in SpecCP, but must move at LF to check off their features, giving rise to the Intervention Effect.<sup>9</sup>

Further, in the *wh*-in-situ languages discussed by Ko, if the clause that is modified by *why* is not an interrogative clause, then *why*, like other *wh*-phrases, must move at LF to satisfy its feature-checking requirements. This LF movement blocks the appearance of other scope bearing elements, such as phrases with *only*, from appearing higher in the phrase structure. Consider the Japanese examples in (21).

- (21) a. \*John-wa [Mary-sika naze sono hon-o yoma-nakat-ta-to] itta no? (Ko 2005)  
*John-top Mary-only why that book-acc read-not-past-C said Q*  
 Why<sub>1</sub> did John say that only Mary read that book t<sub>1</sub>?
- b. John-wa [naze Mary-sika sono hon-o yoma-nakat-ta-to] itta no?  
*John-top why Mary-only that book-acc read-not-past-C said Q*  
 Why<sub>1</sub> did John say t<sub>1</sub> that only Mary read that book?

In (21), it is shown that the scope bearing element *Mary-sika* (*only Mary*) cannot appear to the left of *naze* if the intended interpretation seeks the reason why only Mary read the book, that is, if the question is being given a long-distance interpretation. If the intended interpretation questions the reason for John saying what he did, then the question can be expressed as in (21b).

The distinction between *why* and other *wh*-phrases plays out differently across languages. In Irish, empirical evidence that *cad chuige* (*why*) and *cén fáth* (*for what reason*) are sometimes merged and sometimes moved is revealed by the choice of complementizer appearing in the question (McCloskey 2002, 2003). In (matrix) *why* questions, *why* is merged and therefore obligatorily takes the *aN* complementizer. Here, the *aL* complementizer is disallowed, because this particular complementizer marks a C whose features are checked by movement of a *wh*-phrase. The contrast is shown in (22).

- (22) a. Cad chuige a ndeachaigh tú ann? (McCloskey 2003)  
*why aN went you there*  
 Why did you go there?
- b. \*Cad chuige a chuaigh tú ann?  
*why aL went you there*  
 Why did you go there?

In long-distance questions, there is movement of *why*. On McCloskey's (2002) analysis, *why* is merged in the lower clause, so the complementizer is *aN*, as in (22a)

<sup>9</sup>Ko (2005) assumes that a *wh*-phrase is attracted to a position where its uninterpretable *wh*-feature [+Q] is checked, in keeping with minimalist syntax.

above. It then undergoes movement to the matrix clause, giving rise to the *aL* complementizer in the matrix SpecCP. This is illustrated in (23) with the reason adverbial *what reason*, which behaves in the same way as *why* in Irish.

- (23) Cén fáth a dúirt Pól a raibh Seán ann?  
*what reason aL said Paul aN was John there*  
 Why<sub>i</sub> did Paul say that John was there t<sub>i</sub>?

Pulling together the cross-linguistic facts, Ko (2005) proposes that a parameter sets apart languages which merge reason adverbs like *why* into SpecCP in the phrase structure, and those which do not.<sup>10</sup>

- (24) Ko's CMH (CP-modifier hypothesis) parameter:  
 A reason adverb in a given language may be considered to be a CP-modifier, which must be externally merged into [SpecCP] of the clause it modifies. Languages may be parameterized in whether or not they will take this UG option. Furthermore, languages may vary in which reason adverb (ex. *why*, *how come*, *for what reason*, *because*, etc.) to use to realize this UG option (Ko 2005, p.900).

For the *wh-in-situ* data from Korean and Japanese, and for the Irish data, there is no obvious data to tell whether or not *why* is base-generated higher in the structure than other *wh*-phrases, as in Rizzi's proposal for Italian, so Ko does not assume an extended left periphery. This assumption is necessary for Italian, however, in order to explain the data with topic phrases, focus phrases and verb movement. For this reason, I recast the parameter to make reference to the varying positions in the CP layer in the phrase structure, as outlined in Rizzi (2001), ignoring for the purposes of this paper, the behavior of related reason adverbials.

- (25) The *why*-parameter  
 a) *why* merges in SpecIntP  
 or  
 b) not

Italian adopts the (a) 'merge' setting of the parameter. The 'merge' setting of the parameter allows *perché* to merge in SpecIntP. Even though Italian takes the 'merge' setting of the parameter, the *wh*-parameter still makes movement of *perché* to SpecFocP a possibility. If the lack of XP intrusions and the obligatory subject-aux inversion in adult *why*-questions are diagnostic, then English takes the (b) value of the parameter. The (b) value entails that the only option for deriving *why*-questions in English is by movement to SpecFocP.

There are data that appear to contradict the conclusion that *why* can only move to SpecFocP in English, however. Rizzi (personal communication) suggests that a

<sup>10</sup>Ko (2005) also suggests that certain languages seem to designate a particular reason adverb to be merged into the structure, rather than to undergo movement, but this is not important for present purposes.

sharp contrast between the acceptability of *why* and other *wh*-phrases such as *what* would suggest that *why* takes the SpecIntP position in English also. Consider the following examples.

- (26) a. Why, when he orders pizza, does John always choose pepperoni?  
 b. What, when he orders pizza, does John always choose?
- (27) a. Why, in 2007, did he buy a 4-wheel drive vehicle?  
 b. What, in 2007, did he buy?

Speakers differ in their evaluations of the examples in (26) and (27), with some speakers finding that the (a) versions are acceptable, and others finding both (a) and (b) versions degraded. Notice that the speakers who can accept the intruding XP phrase require an inverted auxiliary verb. In this respect, adult English is not like Italian, or like child English.

Questions with an intervening topic improve considerably in special contexts, such as contexts of accusation. Imagine, Columbo, the detective, throwing a last minute question to a suspect, as illustrated in (28).

- (28) Why, Mr. Smith, just as you were walking into the building, did you take a red handkerchief out of your pocket?

The one example I have found in speech or print also takes on an accusational tone.

- (29) “Why, when Congress releases its own investigation into September 11, you, Mr. Bush, censor out twenty-eight pages that deal with the Saudis’ role in the attack?”  
 (Moore 2003, p.17)

These data make clear that adult English speakers are able to use a topic phrase following *why* in circumscribed circumstances, but even speakers with a liberal dialect are likely to find intervening focus phrases bad.<sup>11</sup>

- (30) a. \*Why, ONLY TO JOHN, did you give a book [and not to Mary]?  
 b. \*Why, EVEN IN THE MORNING, does he watch TV? [as well as in the evening]

<sup>11</sup>To check the prediction that focus phrases cannot intervene in English, I conducted a pilot survey with 5 naïve adults. I asked subjects to judge the acceptability of *why*-questions with focus phrases, topic phrases and subordinate clauses intervening between *why* and the auxiliary verb. These were contrasted with the same sentences in which the XPs were placed in final position. All XPs were adjuncts. Fillers were interspersed among the target sentences. The subjects were asked to rate the sentences on a scale from 1 to 5, with 1 being ‘natural’ and 5 being ‘unnatural’. The results were as follows. The *why FOC AUX* order was worst, with an average rating of 4.1. *Why TOP/SUB CLAUSE AUX* word order was judged as 3.2. When the intervening XP was clause final, the judgments were 2.25 and 1.25 respectively. Fillers were judged at 1.4. Thus the prediction that focus phrases are not tolerated to intervene between *why* and the auxiliary verb in English was largely borne out.

The fact that sentences with intruding topic phrases are judged to be acceptable by some speakers does not entail that adults produce them with any regularity, if at all. In the present context, this observation is important, because AL produced *why*-questions with intervening topic and focus phrases in pragmatic contexts that were ‘ordinary contexts’, not just in ‘special’ contexts of accusation and so on. At any rate, it is unlikely that adults produce utterances with intruding topics regularly, if the total absence of such intervening phrases in the adult input to Adam, Eve and Sarah in the transcripts on CHILDES is any indication (MacWhinney 2000).<sup>12</sup>

The English data have revealed several differences from Italian. The first difference is that only topic phrases and not focus phrases may intervene. The second difference is in movement of the verb/auxiliary verb. In Italian, when *perché* is followed by a topic or focus phrase, verb movement is not possible whereas in English, subject-aux inversion is obligatory, whether there is an intruding XP phrase or not.

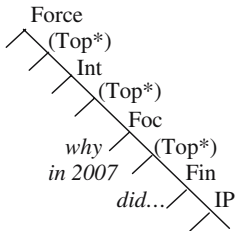
The differences between English and Italian can be interpreted in two ways. The first interpretation is to maintain that the differences stem from different settings of a parameter for *why*. A reexamination of the left periphery proposed by Rizzi (2001) shows that the adult English facts can readily be accommodated. Recall, English takes the (b) non-Italian setting of the parameter in (25); *why* must move to SpecFocP. In English, we have seen that topic phrases, but not focus phrases, can be used following *why*. As the left periphery in (31a) shows, even if *why* is moved to the ‘low’ SpecFocP position, there is still a lower projection that can be accessed for

<sup>12</sup>To test this, I conducted a search of the adult *why*-questions in the Brown corpus in the CHILDES database (MacWhinney 2000). The corpus contains 55 Adam files (in which he is 2;3 to 5;2), 20 from Eve (age 1;6 to 2;3) and 139 Sarah files (age 2;3 to 5;1). The search of adult input in all of these files yielded a total of 752 *why*-questions<sup>12</sup>. The finding is that in all 752 questions, the auxiliary verb immediately follows *why*. There is not a single case of an ‘intruding’ adverb, NP or PP, or subordinate clause before the main clause. The search reveals 17 *why*-questions that incorporate tensed subordinate clauses with *if*, *before*, *so*, *until* etc., but in every case, the subordinate clause follows the main clause. These examples from the adult input are listed in (i)

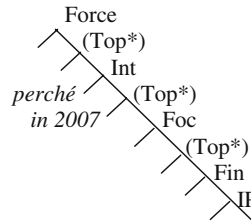
- (i)
- a. Why will I hurt myself if you won’t hurt yourself? (MOT, Adam 05)
  - b. Why don’t you move your horse before you break it? (MOT, Adam 07)
  - c. Why don’t you give one to Ursula so she can write? (MOT, Adam 08)
  - d. Why do you have to put the hat on when you’re out there? (MOT, Adam 10)
  - e. Why don’t you put it some place so that you won’t forget it? (MOT, Adam 33)
  - f. Why do you think that’s the wrong place in Italy when you’re not in Italy? (MOT, Adam 35)
  - g. Why don’t we let Paul wear it if you don’t want to? (MOT, Adam 38)
  - h. Adam # why don’t you put this over there too until you get ready to play (MOT, Adam 40)
  - i. Why don’t you turn it now so he can see it? (MOT, Adam 43)
  - j. Well # why don’t you let Paul play with it while you’re doing that? (MOT, Adam 50)
  - k. Eve # why don’t you wait until you finish your lunch before you dance? (COL, Eve 02)
  - l. Why don’t you take your socks off # while you’re at it? (MOT, Eve 17)
  - m. Here # why don’t you sit up in the chair before you fall off? (MOT, Sarah 28)
  - n. Why don’t cha finish your ice cream before it melts? (MOT, Sarah 51)
  - o. Why didn’t you put it over here so you could win? (MOT, Sarah 115)
  - p. Why do you think it’s called a dog instead of being called a cat? (MEL, Sarah 117)
  - q. Why don’t you put it up here on the table so we can see it? (MEL, Sarah 131)

topic phrases. In other words, English-speakers can access a topic projection, but it is a lower topic projection than the one used by Italian speakers and, I will suggest, by English-speaking children (cf. (31b)). Notice that when a topic phrase follows *why* in English, the auxiliary verb cannot raise as high as the focus head; instead it raises to the Fin head. Crucially, focus phrases cannot follow *why* because *why* already fills the focus projection.

(31a) Adult English



(31b) Italian



A second interpretation of the English data is to conclude that the possibility of intruding topic phrases suggests that there is no reason to posit a parameter for *why* at all. This interpretation of the data maintains that all languages merge *why* in SpecIntP and allow XP intrusions of various kinds. Such a universal principle could be stated as in (32).

(32) *Why* (or a designated reason adverbial) is merged in SpecIntP in all languages

This proposal entails that some languages simply bear more visible reflexes of *why* being merged than others. Italian, then, is a language that provides overt evidence of merging *perché* in SpecIntP, by its lack of verb movement and the appearance of topic and focus phrases. English, on the other hand, usually masks the consequences of merging *why* in SpecIntP as evidenced by the limited use of XP intrusions and by the obligatoriness of subject-aux inversion.

In the next section, we return to the facts of the child data, first laying out AL's data on subject-aux inversion.

#### 4 *Why*-questions in AL's grammar

The corpus of diary data used to investigate AL's grammar consists of 925 *why*-questions, including 467 negative questions from 2- to 5-years-old, and *why*-questions recorded less consistently from 5 to 6 years of age.<sup>13</sup> During this time,

<sup>13</sup>Diary data are sometimes criticized as a methodological tool on the basis that they represent only what catches the parent's attention, and not the more mundane. The author was aware of this drawback and endeavored to record all *why*-questions.

AL's *why*-questions, for the most part, lacked subject-aux inversion. Examples of AL's positive and negative questions with no inversion are given in (33) and (34). Here, the term 'no inversion' is used to include questions containing an auxiliary verb that is in situ, and in addition, questions in which the auxiliary verb is missing.

- (33) a. Why that boy is looking at us? (2;4)  
 b. Why the pig got eatened? (3;0)  
 c. Why the monster goed away and never comed back? (3;3)  
 d. Why those cars have their lighthead [headlights] on? (3;7)  
 e. Why grandma just wants to buy furniture? (4;3)  
 f. Why the lights are on in my school? (4;10)
- (34) a. Why you don't want torty [tortilla] and cheese by itself? (2;5)  
 b. Why anyone's not sitting in that seat? (2;6)  
 c. Why her mommy didn't buy some stickers for her? (2;5)  
 d. Why you didn't bring me to Margie's house? (2;7)  
 e. Why we couldn't park in our usual spot today? (3;5)  
 f. Why my birthday's not for a long time? (4;3)  
 g. Why they don't do swimming lessons on the stay-home days? (4;8)  
 h. Why you're not coming to the teachers' workshop today? (5;0)  
 i. Why I don't have very big braids? (5;2)  
 j. Why dogs can eat people food but people can't eat dog food? (5;5)

All of the *why*-questions in (33) and (34) seek new information; in *why* 'questions' that embody different speech acts, such as suggestions and rhetorical questions, AL used subject-aux inversion very consistently. It is clear that AL was sensitive to communicative function, and was making a more fine-grained form/function distinction than adults, since adults use subject-aux inversion across the board.<sup>14</sup>

To illustrate, AL consistently used subject-aux inversion in all suggestions (16/16) recorded in the diary data, with the earliest example at age 2;7. Rhetorical questions first appeared at 4;0, and all examples in the diary corpus (12/12) had subject-aux inversion. Jokes in the form of questions were also produced with subject-aux inversion, presumably because they are not seeking new information – the person

<sup>14</sup>In adult English, there are some minor differences between the syntactic form of the different speech acts. True information-seeking questions can be accompanied by an auxiliary verb or by a modal, whereas suggestions are always accompanied by a negative verb, and rhetorical questions generally appear with *would* or sometimes *should* in a positive or a negative form. The examples in (i) illustrate these distinctions

- (i) a. Speaker 1: Why can't we go to the park? (Information Q)  
 Speaker 2: Because the field is muddy after the rain  
 b. Speaker 1: Why don't we go to the park? (Suggestion)  
 Speaker 2: What a great idea!  
 c. Speaker 1: Why would I want go to the park? (Rhetorical Q)  
 (child's sarcastic response to a suggestion)  
 Speaker 2: Get ready to go please!

telling the joke knows the answer. The diary notes contain 8 instances of AL telling jokes, usually of the “Why did the chicken cross the road?” variety, all between ages 4;3 and 4;10. Examples of AL’s suggestions and rhetorical questions and joke questions are given in (35), (36) and (37) respectively.

- (35) a. Why don’t we go in the hay? (2;7)  
 b. Why don’t I try it on [Cinderella’s shoe]? (3;3)  
 c. Why don’t we work together on what we want to do? (3;4)  
 d. So why don’t you come on the train and we’ll go to my house? (3;4)  
 e. Why don’t you use this as a magic wand? (3;4)  
 f. Why don’t I be the leader so I can tell you where the shoe mud is? (4;10)  
 g. Why don’t you come again? (5;0)
- (36) a. Why would any witch not do spells? (3;11)  
 b. Why would I not eat my cottage cheese? (4;1)  
 c. Why would I ever do that? (4;3)  
 d. Why would you not have a good luck charm? (4;8)  
 e. Father: I hope we hit the runway!  
 Why would we not hit the runway? (4;10)  
 f. I remember my name. Daddy, why would I forget my name? (4;10)
- (37) a. Why does a watch dog go over the road? (4;3)  
 b. Why does the pig cross the road? (4;9)  
 c. Why was the seven afraid of six? (4;10)  
 d. Why did the glass tap by itself? (4;10)

The presence of subject-aux inversion in these speech acts is important, because it clearly shows that AL has mastered the syntax of the I to C movement. The use of subject-aux inversion in these speech acts contrasts with information-seeking *why*-questions, which did not show subject-aux inversion the majority of the time. Protracted failure to consistently use subject-aux inversion is shown in Table 1 below from 2 to 5;6 years of age.<sup>15</sup> The questions represented in the table are all matrix *why*-questions in which AL was seeking information; two-clause questions and strings with *why* representing other speech acts were treated separately. The table presents the overall rate of subject-aux inversion, and, the rates for positive and negative questions are also presented separately because it has been observed that in negative questions, some children exhibit some reluctance to carry the *n’t* morpheme along with the auxiliary verb to Comp (Guasti et al. 1995). This reluctance to ‘raise’ negation results in a number of different surface forms, with lack of inversion among them.<sup>16</sup> For this reason the lack of inversion may be exacerbated in children’s negative *why*-questions and, therefore affirmative questions may offer a more reliable measure of when children hypothesize I to C movement is required. AL’s data show this lag in inversion in negative questions, so for this reason, the data from positive and negative questions are presented separately.

<sup>15</sup>AL’s questions after 5;6 are not included in the table.

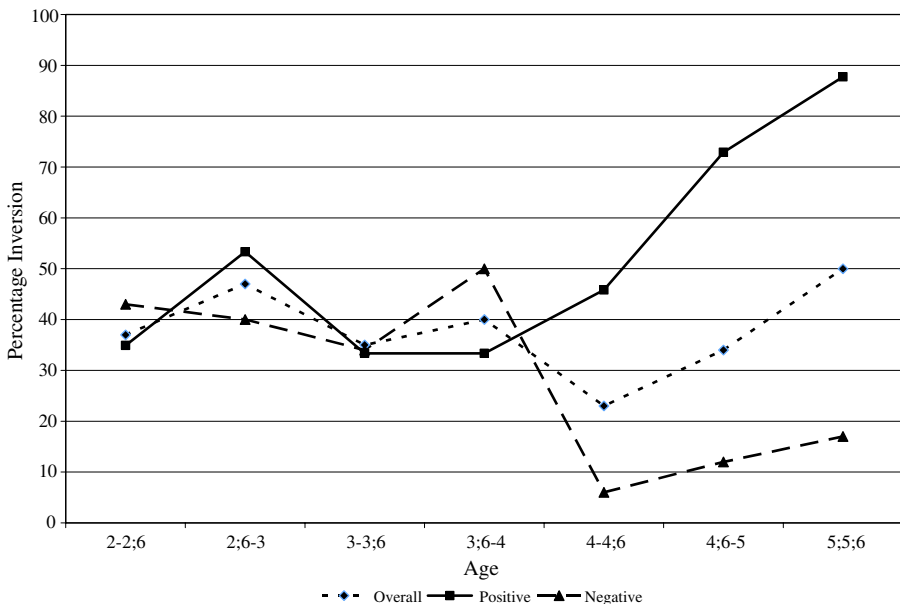
<sup>16</sup>Children also ask double-aux questions such as “What do you don’t like?” and they ask questions like “What do you not like?” with *not*, in situations where an adult would use the contracted form *n’t*.

**Table 1** Percentage of inverted *why*-questions produced by AL

	All Questions	Positive Questions	Negative Questions
Age	Percentage Inverted (Raw Numbers in Parentheses)		
2-2;6	37 (53/144)	35 (37/106)	42 (16/38)
2;6-3;0	47 (37/78)	53 (23/43)	40 (14/35)
3;0-3;6	35 (27/80)	33 (16/48)	34 (11/32)
3;6-4;0	40 (2/5)	33 (1/3)	50 (1/2)
4;0-4;6	23 (38/162)	46 (33/72)	6 (5/90)
4;6-5;0	34 (55/160)	72 (43/60)	12 (12/100)
5;0-5;6	50 (115/232)	88 (93/106)	17 (22/126)
Total Questions	861	438	423

Our investigation will focus on the 861 *why*-questions produced between 2 and 5;6; these are recorded in Table 1. Few questions were recorded between 3;6 and 4 years of age, possibly due to a failure to record data on the part of the author. The questions in the table that are treated as ‘inverted’ all have some form of auxiliary verb, be it a form of *have*, or *be* or *do*-support, positioned in C. Questions with a double auxiliary such as ‘What does he don’t like?’ are categorized as ‘inverted’. Questions with no overt lexical item in Comp, including questions in which *do*-support is not provided (e.g. ‘Why he comed?’) are treated as ‘uninverted’.

The figures from Table 1 are represented as a graph in Fig. 2. AL’s overall rate of subject-aux inversion with *why* stays at around 40% for some time. The final point on the graph shows the percentage of questions with inversion between 5 and 5;6. At this point, AL inverts in positive questions 88% of the time. Inversion still only characterizes 17% of her negative questions at this age; consistent inversion with negation is not achieved until after age 6. Unfortunately, data collection became

**Fig. 2** Percentage of inversion in AL's questions by age

problematic at this age, with AL producing such questions as “Why do you think *why*-questions are interesting?” (5;3). For this reason, the data were collected less systematically after 5;6 and the data after 5;6 are therefore not included.

Overall, the data reveal AL uses subject-aux inversion with *why*-questions at a rate of about 40% for roughly 3 years, at which time change is initiated. The data from suggestions, rhetorical questions and jokes have already served to demonstrate that I to C movement is used consistently for ‘strings’ with *why* that are not information-seeking questions. To fill out the picture, it is also worth checking *wh*-questions with *wh*-phrases other than *why*, to find out if AL’s grammar shows the asymmetry with other *wh*-phrases seen in Jessie Labov’s data (cf. Fig. 1). This will allow us to examine whether or not AL is respecting the *wh*-criterion.

The *wh*-criterion is a universal constraint on question formation. Given this, one might expect that subject-aux inversion would be in place across the board in all of children’s questions as soon as the relevant auxiliary verbs and modals are acquired. This is not the case, however. In general, children fail to use subject-aux inversion in some proportion of their questions. Although there is some individual variation, English-speaking children generally perform subject-aux inversion at rates around 90% (when this is calculated across questions with some form of auxiliary verb/modal over a longitudinal period) (Guasti and Rizzi 1996; Guasti 2002; Stromswold 1990). This is documented in Stromswold (1990), who carried out a detailed investigation of 12 English-speaking children from the CHILDES database. Stromswold found that in positive questions incorporating an auxiliary verb, the inversion rate was 93.4%, with individual rates ranging from 54% to 98% and a mean rate of 95%. The observation is that for the early period, children’s inversion seems to be inconsistent, with many children demonstrating I to C movement at around the 90% rate until they are over 3 years of age.

It is interesting to note that children acquiring verb raising languages are reported to be more consistent. Guasti (2002) reports data from German, Italian and Swedish showing failure to carry out I to C movement at less than 1% for German and Swedish, and at 4% for Italian.<sup>17</sup> English-speaking children’s failure to consistently carry out subject-aux inversion has been the subject of much scrutiny over the years, but there is no received explanation of the higher error rates. Guasti (2002) suggests that the error rates are higher in English-speaking for morphosyntactic reasons; auxiliary verbs/modals raise to I, while main verbs remain in V and require do-support. If Guasti is correct, and morphosyntax is responsible for children’s failure to carry out subject-aux inversion in questions consistently in the early stages, then we can hypothesize that something in addition is accountable for the more robust lack of inversion in certain children’s *why*-questions.

Diary data for AL are available from 2 to 3 years to check her rate of subject-aux inversion in ‘other’ *wh*-questions; a corpus of 431 questions (excluding subject-extraction questions) forms the data set of *wh*-questions for this period. The data are given in Table 2 below. These data are divided into two age brackets, from 2;0 to

<sup>17</sup>The percentage may be slightly higher for Italian due to the amount of data analyzed and the age of the children. Guasti (1996) analyzed data from 5 children between the ages of 1;7 and 2;10, showing that 5/125 questions did not exhibit I to C movement. The German data from Clahsen et al. (1995) analyzed 9 children from 1;7 to 3;8, showing 6/703 without I to C movement, and the Swedish data from Santelmann (1998) analyzed 13 children from 1;9 to 3;0, showing 5 questions, or 1% without I to C movement. Santelmann does not specify how many questions with I to C movement the data set contained.

**Table 2** Percentage of subject-aux inversion with ‘other’ *wh*-phrases for AL from 2 to 3 years

	What	Wh-N	Where	How	Other
Age	Percentage Inverted (Raw Numbers in Parentheses)				
2;0–2;6	94 (115/122)	76 (31/41)	83 (74/89)	56 (5/9)	55 (6/11)
2;6–3;0	94 (61/65)	82 (18/22)	86 (24/28)	92 (12/13)	100 (28/28)
Total Questions	187	63	117	22	39

2;6, and from 2;6 until 3 years. There were 428 object extraction and adjunct extraction *wh*-questions, including both positive and negative questions.<sup>18</sup> The ‘inverted’ questions all had some form of an auxiliary verb in Comp. Included as ‘inverted’ in this number are non-adult questions with doubling of the tense or auxiliary (‘What did I breaked?’), and ones with *be*-support instead of *do*-support (‘What are you have?’).

AL’s overall inversion rate, across *wh*-question types for the year-long period, was 87%, 84% (231/272) in the first 6 months, and 92% (143/156) in the second 6 months. These overall rates are slightly lower than those calculated by Stromswold for the 12 children from CHILDES, but it should be kept in mind that the data sets for those children would have extended well beyond 3 years of age.<sup>19</sup>

AL’s failure to carry out subject-aux inversion cannot be attributed to those questions that require *do*-support. In the first time period, AL produces 76 ‘other’ *wh*-questions with main verbs. Of these, 66 were produced with *do*-support, and in another 10 questions AL failed to provide *do*-support. That is, *do*-support was provided correctly 87% of the time. The raw data can be seen in Table 3 for the time period from 2;0 to 2;6. In the second period, there are 43 questions with main verbs, and *do*-support is present 91% (39/43) of the time. In the earlier period, however, an overt reflex of the features is often realized both in Comp and on the main verb as well, resulting in structures with aux/tense doubling. Nevertheless, AL has clearly concluded that I to C movement must take place to satisfy the *wh*-criterion.

The data from AL’s ‘other’ *wh*-questions from 2 to 3 years of age can be overlaid on the curve showing the proportion of inversion in AL’s positive *why*-questions. It is clear from the graph in Fig. 3 below that AL’s ‘other’ *wh*-questions have a different trajectory from her *why*-questions. By age three, ‘other’ *wh*-questions exhibit a consistently high rate of I to C movement, as compared with her *why*-questions, which have a prolonged period of around 40% inversion.

The data from AL’s ‘other’ *wh*-questions from 2 to 3 years of age confirm that AL has concluded at this age that *wh*-questions other than *why* require I to C movement.

<sup>18</sup>The data do not include a lot of negative questions. By including them, I have given a conservative estimate of inversion. This is because negative questions are more likely to resist inversion (see Guasti 2002; Guasti et al. 1995; Stromswold 1990).

<sup>19</sup>Differences can be seen across *wh*-phrases. There are 186 *what* questions, for example, and these are inverted over 90% of the time throughout the time period from 2 to 3 years. Examples with complex *wh*-phrases (*which-N*, *what-N*, *whose-N*) are listed separately as these *d*-linked *wh*-phrases are often found to induce lower rates of subject-aux inversion, as they do for A.L (cf. Thornton 1995). The data for *where* is robust at both age brackets, and it can be seen that AL is providing an auxiliary verb over 80% of the time. Fewer examples are available for *how*, but the data show the same high rate of inversion by 3 years. The ‘other’ category in Table 2 includes *when*, *who* and *how-Adj* questions. At the later age bracket, the 28 ‘other’ questions include 16 *when*-questions and 10 *how-Adj* questions (e.g., *how long*, *how tall* etc.).

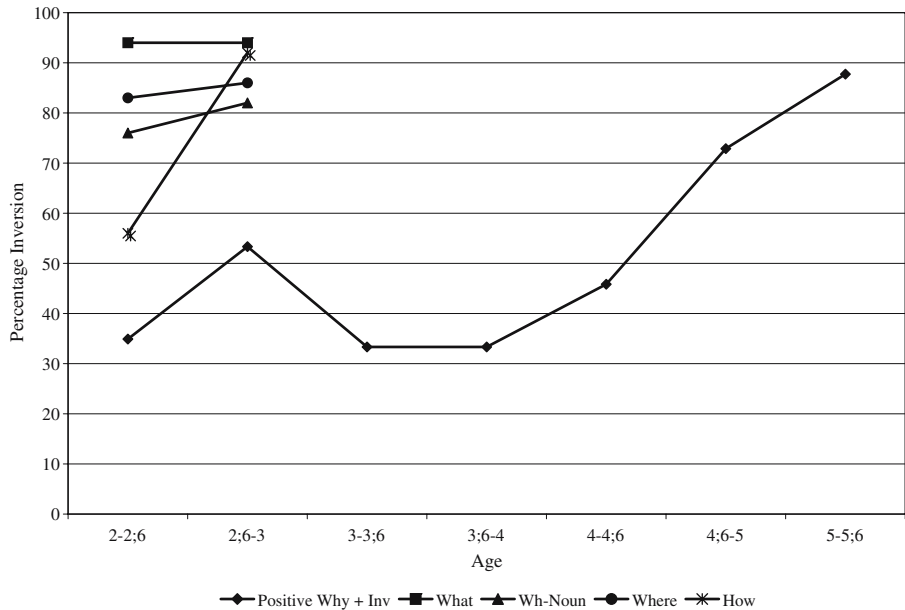
**Table 3** AL's 'other' *wh*-questions

Age	No. of Questions with Inversion			No. of Questions with No Inversion			Total Questions
	Modal/Have/Be	Contracted Copula	Do-Support	Aux in Situ	No Aux	No Do-Support	
2;0-2;6	77	87	66	27	5	10	272
2;6-3;0	89	14	39	10	0	4	156
Totals	166	101	105	37	5	14	428

Although the rate of subject-aux inversion is not perfect for these other *wh*-phrases, it contrasts significantly with the inversion rate for *why*-questions. This supports the idea that AL is drawing on Universal Grammar to form some hypothesis about the syntax of information-seeking *why*-questions. To this point, however, our investigation has been limited to facts about subject-aux inversion. In the next section, I draw on a larger set of data to argue that AL has hypothesized that *why*-questions may be generated by merge of *why* in SpecIntP, as in Italian.

### 5 Acquisition of *why*-questions

The exploration of children's *why*-questions is built on the idea of continuity advanced in Crain and Pietroski (2002) – that children's hypotheses may be appropriate for some language, but not their own. Here, I pursue the parallel with Italian. The cross-linguistic data showed that in Italian, verb movement is not



**Fig. 3** Percentage of inversion in AL's questions by age; *Why* compared with 'other' *wh*-phrases

obligatory in *perché*-questions, which looks similar to English-speaking children's failure to provide obligatory subject-aux inversion in *why*-questions. In this next section, I pursue the Italian parallel, by investigating the ramifications of proposing that English-speaking children are merging *why* in SpecIntP.

### 5.1 The 'merge in SpecIntP' hypothesis

The characteristics of *perché* questions in Italian, as laid out in Rizzi (2001) can be used as the basis for generating a number of predictions about English-speaking children's *why*-questions.

In Italian, information-seeking questions are formed by merge of *perché* in SpecIntP, but the possibility of merging *why* in SpecIntP does not preclude movement of *perché* to SpecFocP; this derivation also satisfies the *wh*-criterion. The difference is that merge of *perché* does not require verb movement, whereas movement of *perché* to SpecFocP does. This gives rise to the first prediction, that AL's *why*-questions will frequently, but not always, exhibit a lack of subject-aux inversion. Second, the rate of subject-aux inversion with *why*-questions should contrast with other *wh*-phrases, for which subject-aux inversion is obligatory. Furthermore, if children permit *why* to be merged in SpecIntP, we might expect the cluster of properties that follow to be similar to Italian.<sup>20</sup> Since the Int head is inherently endowed with [+wh] features, verb movement/subject-aux inversion is not triggered, and various phrases may be generated in the left periphery between *why* and the subject of the sentence. The third prediction is that focus phrases may intrude, the fourth prediction to be tested is that topic phrases will appear, and the fifth prediction that subordinate clauses may be generated to the left of the subject. Prediction six compares matrix and long-distance *why*-questions. When the *wh*-phrase *why* modifies the embedded clause, it is generated in the embedded clause and therefore must move to SpecFocP in the matrix clause. Subject-aux inversion is thus predicted to be obligatory in questions in which a long-distance interpretation is intended.

There is one fact about AL's data set that is not predicted by continuity. The parallel with Italian does not extend across speech acts, but, in fact, a parallel is not expected. It is an accident that *why*, in English, is used to express a range of communicative functions (suggestions, rhetorical questions, jokes etc.). In other languages, such as Japanese, the word for *why*, (*naze*), is reserved for information-seeking questions (Goro, personal communication). Considered in this light, it is not surprising that AL distinguishes speech acts, reserving merge of *why* for true questions, and movement to SpecFocP for other speech acts. This particular cut in the data may well be one child's choice, however, and not true of all children who merge *why*; this remains to be seen in future studies.

The predictions that follow from the proposal that AL merges *why* in SpecIntP follow:

Prediction 1: Children who permit *why* to merge in SpecIntP frequently produce *why*-questions with no subject-aux inversion, in addition to producing some *why*-questions with subject-aux inversion.

<sup>20</sup>The comparison between child English and Italian is limited to the properties of *why/perché* questions seeking information, and excludes a comparison of suggestions and rhetorical questions.

AL's data are in keeping with this prediction. Recall that AL produces a large number of *why*-questions with non-inversion, roughly 60%, with the other 40% being adult-like. This 'optionality' is expected, given that two different derivations converge in Italian. What is not known, at this point, is whether the proportions of inverted and non-inverted questions is similar in child English and Italian, or whether this proportion is subject to other linguistic and non-linguistic factors.

Prediction 2: Children who merge *why* in SpecIntP will produce *why*-questions without subject-aux inversion, in contrast to obligatory use of I to C movement in other *wh*-questions.

The data confirming this prediction was documented in Section 3, where the sharp asymmetry between AL's 'other' *wh*-questions and her *why*-questions was illustrated. In the time period between 2;6 and 3;0, for example, AL used subject-aux inversion 53% in matrix *why*-questions, as compared with 92% in questions with other *wh*-phrases.

Prediction 3: Children's *why*-questions will be compatible with a focus phrase immediately following *why*.

This prediction is substantiated in AL's data, but the empirical support is limited. The diary corpus for AL contains two examples in which the phrase immediately following *why* expresses clear contrastive focus. In (38a) the contrastive focus is placed on the subject, so this example is ambiguous; the subject YOU could be raised to SpecFocP, as in Italian, or it may be in-situ in SpecIP.<sup>21</sup> The second example is clear indication of a moved focus phrase, however. In this case, the object of the sentence SOME OF YOUR MAKEUP is positioned higher than the subject.

- (38) a. Why YOU can only do it (and I can't)? [make coffee] (3;2)  
 b. Why SOME OF YOUR MAKE-UP I can't use (and some I can)? (5;2)

Thus, *why* can be argued to be above the Focus phrase, in SpecIntP in AL's grammar. The importance of the question form in (38b) is that it is clearly unacceptable for adult speakers of English, even when the modal 'can' raises to a position higher than the subject, as in 'Why SOME OF YOUR MAKE-UP can't I use?'

Prediction 4: Children's *why*-questions will be compatible with topic phrases (preceding and) following *why*.

The data incorporate many questions in which topics follow *why*; time adverbials are particularly plentiful in AL's data. The first example is seen at age 4;2. with 10 such examples in the data before 5;6. A sample of these questions, with the topic

<sup>21</sup>Thanks to a reviewer for this observation.

phrases italicized, are provided in (39). As is the case for Italian, when a topic immediately follows *why*, there is no I to C movement.

- (39) a. Why *this time* you're opening them like that? (4;2)  
 b. Why *every winter* there's a snowstorm? (4;3)  
 c. Why *every day when I wake up* the hall light isn't on? (5;1)  
 d. Why *last time in New Zealand* you didn't give me a bath (but a shower instead)? (5;2)  
 e. Why *every day* we're still in the black car? (5;3)  
 f. Why *this morning* you weren't as pleased as you usually are when I read a book? (5;3)  
 g. Why *at Falling Water* kids can't come? (6;3)

Prediction 5: Children should permit subordinate clauses to intervene between *why* and the subject of the main clause.

Children who position *why* in SpecIntP do not require subject-aux inversion, which makes merge of a subordinate clause to the left of the subject possible. Therefore, utterances like (40a), with inversion, are not expected. Instead, *why*-questions without subject-aux inversion, as in (40b) should emerge. If the main clause precedes the subordinate clause, then subject-aux inversion will not necessarily be absent; this depends on whether the question is generated by merge or by movement of *why*. The example in (40d) with a preceding subordinate clause followed by inversion is not ungrammatical in adult English, but as discussed, there are pragmatic restrictions on this word order.

- (40) a. ?Why do when they go to Milan Italians eat panettone?  
 b. Why when they go to Milan Italians eat panettone?  
 c. Why (do) Italians eat panettone when they go to Milan?  
 d. Why when they go to Milan do Italians eat panettone?

The findings from AL are shown in Table 4.

**Table 4** Number of examples with subordinate clause and inversion in AL's data

	Subordinate Clause First	Main Clause First
Inversion	0	6
Non-Inversion	7	8
Totals	7	14

There were no examples like (40a). AL permits subordinate clauses with *if* and *when* to precede the main clause, as in (40b). Examples from the diary corpus are provided in (41). It is of note that there are two similar examples in Jessie's data listed in Labov and Labov (1978). There are no examples in AL's data with subject-

aux inversion following the subordinate clause, like (40d). This suggests AL has a different grammar from English-speaking adults who allow subordinate clauses to intervene. English-speaking adults *require* subject-aux inversion.

- (41) a. Why *when you was a kid* people called you “Rozzy”? (3;5)  
 b. Why *when I was a baby* I loved Boomer’s dog food? (3;6)  
 c. Then why *when you’re swimming* you have to put it [your face] in? (4;3)  
 d. Why *last year when I invited Emily and Julie to my party* Julie didn’t play? (4;4)  
 e. Why *if he goes to jail* she can have his room? (5;0)  
 f. Why *when I went through security* it didn’t beep? (6;4)

By contrast, when the main clause precedes the subordinate clause both examples with and without subject-aux inversion were attested. Examples are given in (42); the questions in (42a-c) have subject-aux inversion, whereas the ones in (42d-f) do not. This pattern is expected if both the merge and move options are available to AL for forming *why*-questions; presumably (42a-c) are generated by movement of *why*, and (42d-f) are formed by merging *why* in SpecIntP.

- (42) a. Why did Boomer pull you *when you was getting him*? (2;10)  
 b. Why were you worrying about using the phone *if you didn’t use the phone on this flight*? (4;10)  
 c. Why does this [ear] keep on blocking *when I put my finger in it*? (5;3)  
 d. Why I can’t have McDonalds *while I watch Power Puff girls*? (4;6)  
 e. Why you can’t get a baby *when you want one*? (4;11)  
 f. Why I cried *when I was a baby*? (4;11)

It is worth reiterating the observation that AL’s questions with XP intrusions appear to be normal everyday information-seeking questions. They are not limited to accusational special situations, as in adult grammars. This suggests that English-speaking children’s *why*-questions with XP intrusions cannot be equated with adults’ questions at this point in development.

Prediction 6: Children’s 2-clause questions with a long-distance interpretation will show obligatory inversion, in contrast to matrix *why*-questions.

Linguistic theory predicts that even at the stage *why* may be merged in matrix questions, long-distance questions should always have an inverted auxiliary verb, because the *wh*-phrase moves to SpecFocP. Most developmental accounts would predict the asymmetry to go in the reverse direction – good performance on matrix questions, and poor performance on long-distance questions. Usage-based accounts, for example, will predict mastery of inversion to be in place in matrix *why*-questions before it is mastered in the less frequent long-distance questions. For de Villiers (1991), long-distance *why*-questions emerge once subject-aux inversion has stabilized in matrix *why*-questions. Finally, accounts of children’s lagging inversion in *why*-questions that rest on cognitive or processing complexity will not predict superior performance in the production of longer, more structurally and cognitively complex long-distance questions.

Children use few long-distance questions in their spontaneous speech, and diary data are therefore likely to fall short in providing a robust data set for evaluation of the prediction. For example, in a search of Brown's corpus for Adam on the CHILDES database, de Villiers et al. (1990) found only 16 instances of long-distance movement questions in the transcripts over a three-and-a-half year period. All of the examples were with *what*, and no clear examples were found with adjuncts *how*, *where* or *why*. Therefore, in order to ensure sufficient data were available to evaluate the prediction, elicited production techniques were used periodically to boost the data set of long-distance questions from AL.

The elicitation technique requires two experimenters. One experimenter sets up the scenarios and provides the 'lead-in' required to elicit questions. The second experimenter plays the part of a puppet that interacts with the child. The child is instructed to ask the puppet to guess where various objects are hidden, or to ask its opinions about various events that were acted out in a short story with toys and props. The 'lead-in' provides the lexical items needed for the question, but avoids the targeted structure, as shown in (43).

- (43) a. Experimenter: We know there's a marble in the box, but ask the puppet what *he* thinks...  
 b. Experimenter: In that story, the Grinch wanted to have his own treasure, but then he didn't take it. Ask Kermit why he thinks...

The most conservative test of prediction 5 would be to compare subject-aux inversion in long-distance *why*-questions and in matrix *why*-questions. However, because 2-clause *why*-questions are often ambiguous between a local and a long-distance construal, it is challenging to provide situations that unambiguously elicit a long-distance interpretation, and it is also difficult to be sure which interpretation a child speaker intended. For this reason, long-distance questions with other *wh*-phrases were included in the comparison. As in long-distance *why*-questions, long-distance questions extracting a *wh*-phrase from an argument position also require subject-aux inversion. (As in long-distance *why*-questions, the *wh*-phrase moves to SpecFocP, requiring movement of the auxiliary verb to Foc, to satisfy the *wh*-criterion). The advantage of using long-distance questions extracting from argument position to evaluate AL's inversion rate is that they do not permit a local construal. In a question such as "What do you think is in the box?," the *wh*-phrase *what* is easily identified as related to the subject position of the embedded clause. Furthermore, established techniques exist to allow reliable elicitation of long-distance questions extracting from argument position (cf. Crain and Thornton 1998).

Data for evaluating the prediction was limited to the verbs *think* and *say*, verbs that easily admit long-distance interpretations. Table 5 summarizes the *wh*-questions

**Table 5** Inversion in AL's 2-clause questions with tensed embedded clauses (Age 3;0-5;6)

	'Other' <i>wh</i> -phrases	<i>Why</i>
Inversion	62	17
Non-Inversion	0	4
Totals	62	21

with the matrix verbs *think* and *say* that were spontaneously produced, or evoked from AL using elicited production techniques between ages 3- to 5-and-a-half years.

A total of 83 *wh*-questions with *think* and *say* were recorded. Of these, 79 (95%) had subject-aux inversion. Long-distance questions with *wh*-phrases other than *why* conform to the prediction of linguistic theory; inversion was present 100% of the time. Among these are questions with *how* and *when* that clearly require successive cyclic movement of the *wh*-phrase. Examples of questions with *wh*-phrases other than *why* are given in (44).

- (44) a. What did you think was in the cups before we hid them? (3;1)  
 b. Who do you think is going to get the winner's pop? (3;5)  
 c. What do you think is under daddy's chair? (3;5)  
 d. Where do you think Boomer is sleeping? (4;6)  
 e. How do you think he can save his wife and her at the same time? (4;9)  
 f. How do you think you want the outlines colored? (4;10)

Turning to AL's two-clause questions with *why* and the verbs *think/say*, 17 of the 21 elicited questions had inversion in place. A sample of AL's questions with do-support are given in (45). As mentioned, it is difficult to prove that AL intended long-distance interpretations, but if this were not the case, the asymmetry in the rate of inversion in matrix and 2-clauses questions with tensed embedded clauses would be hard to explain.

- (45) a. Why do you think Santa's not coming this year? (3;10)  
 b. Why do you think that Boomer came in with us? (4;2)  
 c. Why do you think that Mommy would not wanna watch the show? (4;6)  
 d. Why do you not think there's going to be a Little Mermaid? (4;11)  
 e. Why do you think you're gonna have a bad afternoon? (5;0)  
 f. Why do you think that my electric car only goes backwards? (5;5)

Four of the 21 questions (19%) lacked inversion. To determine whether or not these 4 questions with non-inversion are consistent with the theory, we need to ascertain whether a long-distance interpretation was intended. The four questions at issue are given in (46).

- (46) a. Why you just think Boomer's [the dog] cute? I'm cute too. (3;7)  
 b. Why you said there's no trunk in this car? (4;3)  
 c. Why he thinks a back brace protects his leg (4;4)  
 d. Why they said they might be going to a movie? Why did they say that? (4;11)

The data with non-inversion can be interpreted in two ways; either (i) AL failed to carry out successive cyclic movement and inversion, despite intending a long-distance question, or, (ii) local construal was the intended interpretation. The theory would favor (ii), but a definitive judgment must await controlled experiments on this issue.

In order to evaluate prediction 6, the inversion rate in 2-clause *wh*-questions needs to be compared with the rate of inversion in matrix *why*-questions. Linguistic theory predicts that 2-clause questions with a long-distance interpretation will all have

inversion, in contrast to less consistent inversion in matrix questions. As we have seen, overall, AL inverted in 95% (79/83) of the questions that potentially were intended as long-distance questions, as opposed to a 56% (246/438) overall inversion rate for positive matrix *why*-questions. To give a conservative assessment of the prediction, however, we need to be able to compare AL's matrix and 2-clause questions in confined periods. Table 6 compares the inversion rate for matrix *why*-questions and 2-clause questions for each 6-month period. Note that the inversion rate for matrix *why*-questions is based on positive questions only. Recall that the inversion rate for negative *why*-questions is considerably lower.

The breakdown of data in Table 6 shows that prediction 6 is best assessed in the 4;6-5;0 time period, and the 5;0 to 5;6 time period when there is sufficient data in each cell. It can be seen that in the 4;6-5;0 time period, AL inverted in positive matrix *why*-questions 72%. At the same time, her long-distance questions with other *wh*-phrases are inverted 100% of the time, and 2-clause *why*-questions 82% of the time (where the 2 non-inverted questions may be local interpretations). In the next time period, between 5;0 and 5;6 inversion has climbed to 88% in matrix *why*-questions, and again is at 100% for all of the long-distance questions. The data clearly go in the direction predicted, and in the opposite direction from alternative accounts.

The breakdown of data in Table 6 also allows us to evaluate the developmental account of de Villiers (1991). According to de Villiers, inversion comes in piecemeal for each *wh*-phrase. Once subject-aux inversion is in place for a particular *wh*-phrase, successive cyclic movement becomes available and long-distance *wh*-questions are possible. If we take inversion to be 'in place' once it has reached a 90% rate of success, then the proposal is not supported by AL's data. The last two time periods can be used to evaluate the proposal. As we saw, at both of these time periods, inversion is under 90% for matrix *why*-questions (72% and 88%), and more accurate for the 2-clause questions, at 82% and 100% for the 2 time periods respectively. Thus AL's data suggest the proposal is unlikely to be correct.

Finally, it is worth reviewing a recent experimental study by Conroy and Lidz (2007). The study identifies children who sometimes fail to invert in their matrix *why*-questions and then tests their comprehension of ambiguous 2-clause questions like *Why did Joe think Monster ate his sandwich?* in which either a local or long-distance answer was salient in the workspace. The main finding was that children who produce non-inverted *why*-questions, like adults, permit both local and long-distance interpretations of the 2-clause question. Conroy and Lidz take these findings to suggest that children's failure to use subject-aux inversion in *why*-questions is a production limitation, and that the comprehension results reflect their true, adult-like

**Table 6** Inversion rate in matrix *why*-questions and 2-clause *wh*-questions by age

Age	Positive Matrix <i>Why</i> -Questions		2-Clause Questions with 'Other' <i>Wh</i> -Phrases		2-Clause <i>Why</i> -Questions	
3;0-3;6	16/48	33%	14/14	100%	0	
3;6-4;0	1/3	33%	0		0/1	0%
4;0-4;6	33/72	46%	2/2	100%	1/2	50%
4;6-5;0	43/60	72%	25/25	100%	9/11	82%
5;0-5;6	93/106	88%	21/21	100%	7/7	100%
Totals	289		62		21	

grammar. The results are used to reject the idea that some children mis-set a parameter for *why* (as first proposed in Thornton 2004). According to Conroy and Lidz (2007), the mis-set parameter proposal entails that children will interpret subject-aux inversion in 2-clause *why*-questions as indicative that long-distance movement has taken place. Since their experimental findings show children find such sentences ambiguous, they reject the proposal that children are ‘speaking Italian’. To better assess Conroy and Lidz’s proposal, let us return to the facts of Italian. If English-speaking children have mis-set a parameter for *why*, then their grammar for *why* is like Italian. In Italian, 2-clause *perché*-questions with verb movement are ambiguous, as discussed in (18). Therefore, it seems clear that the expectation is that English-speaking children will find 2-clause *why*-questions with subject-aux inversion ambiguous also. Conroy and Lidz’s experimental finding is, therefore, exactly what the parameter setting account would predict.

In this section the proposal that AL merges *why* in SpecIntP as her initial hypothesis was tested. The findings comparing the grammars of Italian, children like AL and adult English are summarized in Table 7.

The next section details the expected transition to the adult grammar.

## 5.2 Learnability

A considerable amount of evidence has now been gathered to support the hypothesis that some English-speaking children initially hypothesize that *why* may be merged in SpecIntP, as well as being moved to SpecFocP. The next step is to understand the source of the hypothesis. The two possibilities outlined in the syntax section will be considered here. The first account to be investigated is that there is a parameter for *why*, and the second account is that there is a universal principle that permits *why* to merge; this will be called the ‘universal merge’ account. In order to adjudicate between the two accounts, I will consider (i) children’s initial grammar (ii) what changes must take place to achieve the adult state (iii) issues of individual variation and (iv) the timing and trajectory of the transition to the adult state. The section begins with the issue of how children move from their initial grammar to adult English, beginning with the mis-set parameter account.

Parameters incorporate points of language variation, and are usually conceived of as binary values that are associated with different clusters of linguistic properties.

**Table 7** Characteristics of *why*-questions in Italian, child English and adult English

	Italian	Child English	Adult English
<i>Why</i> -questions show optional inversion	✓	✓	✗
Inversion is obligatory with ‘other’ <i>wh</i> -phrases	✓	✓	✓
Focus phrases may follow <i>why</i>	✓	✓	✗
Topic phrases may follow <i>why</i>	✓	✓	✓(SAI obligatory)
Subordinate clauses may follow <i>why</i>	✓	✓	✓(SAI obligatory)
Inversion obligatory in long-distance <i>why</i> -questions, in contrast to matrix questions	✓	✓	✗

Some parameters are arguably set very early in the course of acquisition. For Baker (2001, 2005), these parameters are at the top of a parameter ‘hierarchy’ that establish broad typological divisions among human languages, including the polysynthetic parameter and the head parameter. Other parameters are only set once the most basic divisions have been decided. By contrast, Wexler (1998) claims that all parameters are set early. In fact, Wexler proposes that parameters are set ‘perceptually’, before the child is beginning to talk (although the data invoked in favor of this claim is limited to verb movement parameters). One reason Wexler offers for early parameter setting is the observation that the data required for parameter setting must be available in abundance for every child. Suppose, to the contrary, that the evidence needed for parameter setting is not available in abundance. If not, then some children would not encounter it, and would not converge on the target grammar. Since this does not happen (i.e., all children converge on the adult grammar), this makes it reasonable to suppose that whatever evidence is needed for parameter setting is readily available for all children (Lasnik and Crain 1985). If abundant evidence entails early parameter setting, then the claim that a parameter for *why* is set late in the course of acquisition is out of step with Wexler’s conclusions.

One potential explanation for some children’s lateness in acquiring the adult grammar is that the data required for parameter setting could be difficult to sort out. A proposal along these lines has been advanced by J. Fodor (1998, 2003), who argues (a) that much of the available evidence for certain parameter values is ambiguous (in the sense that alternative grammars, with different arrangements of parameter values, might assign the same phrasal parse to an utterance), and (b) that children need unambiguous data for parameter setting. So even if data are readily available, Fodor contends, children must be cautious, and wait for unambiguous evidence in favor of one parameter setting or another, in order to avoid potential pitfalls (i.e., local maxima) in parameter setting. Snyder (2007) also argues for conservatism in parameter setting. Another way to avoid such pitfalls is proposed by Gibson and Wexler (1994), who point out that some parameters could be biologically timed to become available only after other parameters have already been set. A maturational unfolding of parameter values would clearly help learners by making the input less ambiguous. In all events, there are ample grounds for leaving open the possibility that some parameters, including the *why* parameter, are set late in the course of development, especially if the empirical evidence favors this possibility.

On current accounts of parameter setting, the null hypothesis is that children are free to choose either value of any parameter that is part of Universal Grammar. When freedom of choice presents a learnability problem, a default value is often specified, to ensure that positive data are available to bring about resetting of the parameter (cf. Lasnik 1989). In the present context, specifying the default setting of the *why*-parameter as the ‘move to SpecFocP’ (English) value would suffice to ensure that children begin with the subset option. The problem is that this initial setting predicts that children will obligatorily move *why* and enforce subject-aux inversion to satisfy the Wh-criterion. But this flies in the face of the empirical observation that children *fail* to engage subject-aux inversion obligatorily in their early *why*-questions. Since specifying a subset value as the default proves unworkable, let us stick with the null hypothesis, and suppose that children are free to hypothesize either parameter value.

First let us consider the learnability scenario on which (some) Italian and English-speaking children initially choose the setting of the parameter that requires them to move *why*. English-speaking children would have hit on the correct parameter setting, so they can be set aside. Italian-speaking children who adopt the ‘move’ setting of the parameter will assume that *perché*-questions require verb movement. Adult Italian contains *perché*-questions with verb raising, but, in addition, the data from adult Italian-speakers contain *perché*-questions with no verb raising. These questions without verb raising are not consistent with the child’s initial hypothesis, and therefore parameter resetting is triggered to the ‘merge’ setting. Furthermore, if we assume that the cluster of properties associated with merging *why* in SpecIntP form part and parcel of the triggering data, there is more confirming data available for the ‘merge’ setting of the parameter. In particular, *perché*-questions that incorporate a focus phrase between *why* and the subject NP are informative. If the child assumes, in keeping with the ‘move’ setting of the parameter, that *perché* is moved to SpecFocP, then focus phrases are not expected to follow, since SpecFocP is already filled by the *wh*-phrase. The presence of focus phrases following *perché* in adult grammars therefore serves to inform children that *perché* may be merged higher than the focus phrase, and the parameter should be set to the ‘merge in SpecIntP’ value. The proposal that specific input or cues trigger grammatical change is along the lines proposed by Lightfoot (1999) (cf. Lasnik 1989, for a related suggestion about the utility of specific syntactic content to overcome grammatical misanalyses). An Italian child who initially chooses the ‘merge’ setting of the parameter has, of course, adopted the correct setting for adult Italian, and all of the input will be consistent with this choice.

Next, we consider the learnability scenario according to which the alternative ‘merge’ value is the initial setting. With this parameter value, (some) Italian-speaking and English-speaking children initially assume that, as in Italian, *why* is allowed to both (a) merge in SpecIntP and (b) move to SpecFocP (because this is always an option). Since both merge and move yield convergent derivations, this means that subject-aux inversion (or verb movement) would be optional for children. This would be correct for Italian, as we have seen. But it would be problematic for English-speaking children, because subject-aux inversion is obligatory in adult English. On this scenario, then, English-speaking children would confront a subset problem. Because children would permit both adult-like *why*-questions, and non-adult-like *why*-questions, input consisting of adults’ *why*-questions would always be consistent with the child’s grammar. So the question becomes how the non-adult ‘merge’ option for generating *why*-questions could be jettisoned from children’s grammars. One possibility is that adults provide negative evidence, such as corrective feedback. However, a consensus has formed that negative evidence is not available in sufficient quantities, nor with appropriate timing, to ensure that children converge on the adult grammar (see, e.g., Brown and Hanlon 1970; Morgan and Travis 1989; Marcus 1993).<sup>22, 23</sup>

<sup>22</sup>For English-speaking children, the ‘move’ option provides derivations that are consistent with the adult input, which has subject-aux inversion in all *why*-questions. In principle, parameter resetting could incorrectly be triggered to the wrong value for English if the child were exposed to adult *why*-questions with focus phrase intrusions, but as established in Section 2, it appears that only topic phrases intrude in adult English, and these are consistent with the ‘move’ parameter setting

<sup>23</sup>The left periphery architecture in (11) permits topic phrases to follow FOC, so these do not provide data that forces parameter resetting.

So the ‘merge’ option remains problematic for English-speaking children. What children would be required to notice is that, although they themselves freely produce *why*-questions with no subject-aux inversion and with accompanying topics, focus phrases and subordinate clauses, adults do not. To explain how children converge on the adult grammar, we need to draw upon the proposal that indirect negative evidence serves as the mechanism for change. This mechanism was used by Chomsky (1981) to suggest how children recover from hypothesizing the superset value for the pro-drop parameter (see also Lasnik 1989). For the *why*-parameter, the indirect negative evidence is the observation by children that, although lack of subject-aux inversion together with the appearance of focus phrases and other XP intrusions is expected in adults’ simple sentences, these properties fail to be realized. It takes some time to amass the evidence that confirms the observation, but when the evidence is internalized, the child switches the *why*-parameter to the ‘move’ setting, and becomes adult-like. It might be said that linguists draw on indirect negative evidence as a learnability solution when all else fails. Notice that this is the fallback solution drawn on when the input data to the child are uninformative. When indirect negative evidence must be employed, then, it is expected that the adult grammar will be achieved late in the course of acquisition. This is certainly true of AL and Jessie Labov’s acquisition of *why*-questions.

According to the second account under consideration, the universal merge account, every English-speaking child is expected to adhere to the proposition ‘merge *why* in SpecIntP’, as a principle of Universal Grammar. It follows that both Italian-speaking and English-speaking children should initially produce *why*-questions with no subject-aux inversion/verb movement and with the full range of XP intrusions, including focus phrases. They can, of course, also move *why* to SpecFocP. Italian-speaking children need make no further changes, but, in adult English, *why*-questions require subject-aux inversion, so this account needs to explain how English-speaking children *learn* that subject-aux inversion is obligatory in English *why*-questions. In doing this, English-speaking children essentially have to learn to mask the consequences of the universal principle. Assuming that learning is generally a process that happens gradually over time, this account needs to assume that children sample the adult data through some kind of statistical learning, gradually adjusting the weights of subject-aux inversion in their grammar until reaching equivalence with the adult system. Children must learn to avoid generating XP phrases other than topics between *why* in SpecIntP. Again, assuming that children lack the kind of negative evidence that would inform them about which form/function pairs are prohibited, children will need to keep track of the examples of XP phrases that adults *do* insert between *why* and the auxiliary verb in *why*-questions and their communicative functions. They will also need to keep track of the fact that subject-aux inversion is obligatory despite the fact that *why* is merged. As we saw, AL inserted a variety of phrases between *why* and the subject, so she would have to ‘whittle down’ these expressions, and eliminate focus expressions, in order to bring her language in line with adult English-speakers rather than adult Italian-speakers. There is no reason, in principle, that such linguistic facts cannot be learned. However, it seems evident that a sophisticated statistical learning mechanism is needed to perform the task.

To this point, both the parametric account and the universal merge account are able, in principle, to explain the protracted path of acquisition in AL’s *why*-questions. Questions of

individual variation and the timing and/or trajectory of the transition to the adult state are the next topic of discussion. As noted in the introduction, there is considerable individual variation in children's acquisition of *why*-questions. Jessie Labov, AL and others show late acquisition of obligatory subject-aux inversion, but there are abundant counter-examples to the generalization that subject-aux inversion is delayed in *why*-questions for English-speaking children. As noted, the percentages of inverted *why*-questions is 100% or close to 100% for Ross (99%), Naomi (100%) and Mark (100%) (Stromswold 1990). Moreover, there is no apparent delay in inversion for *why*-questions as compared to other *wh*-questions for in the transcripts of Abe and Sarah (de Villiers 1991). The parametric account predicts this variation across children, assuming that children just pick one or other value for the *why*-parameter. The universal merge account faces difficulty in explaining differences across children, however, since it expects a uniform transition to the adult grammar. This supposition of uniformity is based on a corollary assumption that all children in the same linguistic community encounter a similar distribution of relevant exemplars (linguistic expressions or structures) (see, e.g., Yang 2002, who explicitly adopts this corollary assumption). This means that, in the long run, the relative frequencies of the input are roughly the same for every child. It is difficult to see, therefore, why different children should have such different trajectories in grammatical development on the universal merge account.<sup>24</sup>

Children's speed of transition to the adult grammar also varies on the two accounts. The parameter setting account expects a rapid transition to the adult grammar, once the child acknowledges the mis-set parameter and change is initiated. In the absence of other variables, ideally, the relevant property associated with the parameter should change rapidly from 0% to 100%. In the case of the *why* parameter, there is an extra variable because the *wh*-parameter exists alongside parameter for *why*, permitting movement of any *wh*-phrase, including *why*, to SpecFocP. Some level of subject-aux inversion in children's *why*-questions is therefore anticipated, even at the stage when the *why*-parameter is mis-set to 'merge'. In AL's grammar, there is a fairly steady 40% level of subject-aux inversion across the four years before change is initiated; in Jessie Labov's grammar it is closer to 20%. Once the *why*-parameter is reset from the incorrect 'merge' value to the target 'move' value, subject-aux inversion should quickly be elevated from 40% (or whatever it may be in the child's grammar) to near 100%, and the intrusions that were characteristic of the incorrect parameter setting should disappear. Consistent with this expectation, the data for Jessie Labov shows particularly sharp change, as illustrated in Fig. 1; at 4;6 Jessie is using subject-aux inversion at around 15%, but 3 months later, the inversion rate is at about 80%. Similar, precipitous changes from *why*-questions without inversion to ones with inversion are documented by de Villiers (1991) for Adam, Abe, Naomi and Sarah (taken from the CHILDES database; MacWhinney

<sup>24</sup>A reviewer agrees in principle with this conclusion, but suggests that it is possible that some children go through the stage 'passively', quickly sorting out the data. The suggested reason for this is that, despite similar input, children may mature at different rates, thus dealing with, or intaking the data differently. The problem with introducing maturation as an extra variable in the equation is that it renders the universal merge position unfalsifiable.

2000). The data collection for AL was not consistent around the time of grammar change, but it is clear that AL's grammar underwent fairly abrupt change at around 5-and a half years. Data in support of this conclusion come from two elicited production sessions, one at 5;5, and a second one two weeks later. By the time of these experimental sessions, AL is close to achieving the adult grammar. Details of the elicited production sessions follow.

In the elicited production game, AL asks Kermit the Frog questions about being a frog, and also about stories that the experimenter acted out with toys. The experimenters set up questions with a 'lead-in'. The assumption is that, in general, children will follow the word order of the lead-in if their grammar allows it. In some scenarios, the lead-in was designed to favor a *why*-question with an intruding adverb or subordinate clause, as in (47a) for example. In this scenario, the puppet explains that yesterday he was grumpy, but that today he is happy. Since *today* is fronted, it should be easy for the child to follow up with *Why today you are so happy?* Note, however, that AL resists this path, and asks the question with inversion and the adverb placed at the end of the question. Similarly, in (47e), the puppet and experimenter use a preposed *when*-clause, so that it should be easy for AL to take up this order and ask *Why when you eat popcorn you stand on your head?* (or even this order with inversion in the main clause), but AL chooses to ask the question with the *when*-clause placed after the main clause. These questions suggest that AL is close to adult-like at this point. There are a couple of non-adult questions in the sessions, including an uninverted negative one (48b), but subject-aux inversion is mostly in place.

(47) Session 1:

- a. [Puppet: Today, I feel very happy. Experimenter: Can you ask him why.  
Why you be so happy? So why are you so happy today?
- b. Why do you need to sit on a cushion?
- c. Why are you brushing your... your toothbrush with...  
[Puppet: Ask me again]  
Why are you brushing with the toothbrush on your arms?
- d. [Experimenter: Every day, Kermit wants popcorn. Ask him why]  
Why do you every day you want popcorn?
- e. [Puppet: When I eat popcorn, I always stand on my head.]  
Experimenter: That's weird. When he eats popcorn, he stands on his head.  
Ask him why.]  
Why do you stand on your head when you eat popcorn?
- f. Why do you think she bought some shoes?
- g. Why did... do you think Ernie ate some... the ice cream first?
- h. [Experimenter: Kermit doesn't have any teeth. Can you ask him why]  
Why do you not have any teeth?
- i. Why do you think Cookie Monster is hiding from the cookies?
- j. Why do you think the green jewel's your favorite color?
- k. Why do you think he took the hat, because he really wanted the jewel in his tummy, then he went to the xxx.  
Why do you think he bought a hat?
- l. Why are you very tired?

- (48) Session 2:
- a. [Puppet: I only eat green popcorn. Experimenter: Ask him why]  
Why do you only eat green popcorn when you first tasted it ?
  - b. [Puppet: Today, I don't need a pillow. Experimenter: Can you ask him why]  
Why you don't need a pillow?
  - c. [Puppet: I didn't like that one. Experimenter: Can you ask him why]  
Why did you not like that one?
  - d. Why do you not like it?
  - e. Why do you have those spots on your feet?
  - f. [Puppet: I never wear shoes on my feet. Experimenter: Can you ask him why]  
Why do you never wear shoes on your feet?
  - g. [Puppet: I only wear hats with elastic in them. Experimenter: Can you find out why]  
Why do you only wear hats with elastic?
  - h. Why do you think the Grinch really wanted a treasure and then he got a watermelon?
  - i. [Puppet: I don't like salty water. Experimenter: Can you ask him why]  
Why do you not like salty water?... even though I already know why.
  - j. Why do you think the tiger, he didn't take the tiger first?
  - k. Why do you think he wanted... he took the violin?
  - l. Why do you think he was really hungry in the first place and...  
Why do you think he did that even though he was really hungry?
  - m. Why do you think the knight really wanted to scare the dragon and when he got there and found a dragon he didn't want to scare it any more?
  - n. Why do you not think it's time for me to go back
  - o. [Puppet: I don't want AL to go.... Experimenter: Can you ask him why]  
Why do you not want me to go?

In contrast to the mis-set parameter account, the universal merge account invokes (statistical) learning to achieve the adult grammar, and so a more gradual path of development is expected. This is the assumption in Yang (2002), who equates triggering models of parameter setting with abrupt change, and his statistical learning model with gradual change.<sup>25</sup> Yang's claim is that parameters are set gradually, by statistical learning. Here, I am simply suggesting that when learning is involved, as is the case when English-speaking children have to 'cover up' the natural consequences of universal merge, a gradual learning curve is expected.<sup>26</sup>

<sup>25</sup>A reviewer comments that there are several ways to understand statistical learning, not all of which entail gradual learning. Hence this reviewer does not think the abruptness of development argues for one model over the other. I will simply follow Yang (2002) in assuming that parameter setting is equated with rapid change, in contrast to statistical learning.

<sup>26</sup>Yang considers the idea that the learning rate may accelerate as the child becomes increasingly confident about the match of his or her grammar with the adult grammar. This would mean that the learning curve would look more like the curve seen when parameter resetting is initiated, with more rapid change nearer the time of convergence on the adult grammar. However, Yang notes that to implement a changing learning rate is "computationally expensive", and that such approaches "deviate from the guidelines of psychological plausibility and explanatory continuity that acquisition models are advised to follow." (Yang 2002, p. 49).

This pattern of gradualness is not reflected in AL or Jessie Labov's data. There are no established criteria for rapid versus gradual change in the literature, however, so this is open for debate.

## 6 Conclusion

This paper has presented a detailed set of longitudinal data of one child's *why*-questions. The data revealed that *wh*-phrases other than *why* reveal consistent subject-aux inversion at around 3 years of age whilst *why* does not reach high rates of subject-aux inversion until after 5 and a half years of age. In addition to this asymmetry that has been reported in previous literature, the data incorporate *why*-questions with XP phrases intervening between *why* and the subject of the sentence, including (i) focus phrases (ii) topic phrases, (iii) and subordinate clauses. A second asymmetry, between the lack of inversion in matrix *why*-questions and obligatory subject-aux inversion in long-distance questions, also emerges. Cross-linguistic research motivates a new proposal of these data. The proposal is that the child, AL permits *why* to merge in a high position in the left periphery, in SpecIntP, in addition to being moved to SpecFocP like other *wh*-phrases. The consequence of this proposal, however, is that a subset issue arises. English-speaking children permit optional subject-aux inversion, while adults require it.

Two learnability accounts have been presented that provide an accurate account of AL's documented data set up to almost 6 years of age. What differs on the two accounts is how children come to have such a grammar in the first place, and how they come to shed it. Both accounts draw on some kind of indirect negative evidence to initiate change to the adult grammar. My suggestion is that change occurs late in the course of acquisition precisely because children do not have clear-cut positive evidence to draw on (cf. Fodor 1998, 2003).

On the first account, children like AL, whose *why*-questions do not have obligatory subject-aux inversion and allow intervening topics, subordinate clauses and so on, have misset a parameter and are 'speaking Italian'. When parameter resetting is eventually triggered, they shed the 'Italian' grammar and rapidly acquire the grammar of adult English. English does not permit questions with XP intrusions – except in marked circumstances, such as accusational contexts, and these are hypothesized to make use of a lower topic position, below the focus projection, as in Rizzi's left periphery (cf. (31)).

According to the universal merge account, all children merge *why* in SpecIntP. This universal principle is never 'shed'. What children acquiring English have to learn is that adult English happens not to reveal the prototypical effects of this principle in its surface syntax. Children have to learn that *why* isn't produced with lack of subject-aux inversion as might be expected, and neither does it allow focus phrases to intrude. Only topic phrases may intrude in special circumstances. Positive evidence doesn't provide children with information about what *not* to do, so on this account, learning must be coupled with indirect negative evidence to bring about obligatory subject-aux inversion and a sophisticated statistical learning mechanism to conclude that only particular pragmatic contexts are appropriate for *why*-questions with topic phrase intrusions.

At present, only the parametric account appears to offer an explanation for the individual variation that is found among children and the fact that some children undergo rapid grammatical change to the adult grammar. The children who make the distinction can be said to have misset the *why*-parameter, while the other children have settled immediately on the target value.

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