

Why doesn't *why* invert?: Investigating  
the link between inversion and  
interpretation in adult and child  
grammar

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## Abstract

This paper investigates the source of children’s delayed subject-auxiliary inversion in *why* questions, first observed by Labov and Labov (1978). Previous accounts ((Thornton, 2004), (Berk, 2003)) have analyzed this phenomenon as a syntactic difference between children and adults, predicting that children who do not invert with *why* do not have access to the full range of interpretations of two-clause *why* questions available to adults. We conduct two experiments to determine the relation between inversion and interpretation in both children who do invert and do not invert with *why*. We show that not only is a syntactic account unable to explain the child facts, but this type of account (as proposed for adults by Rizzi (2001)) is also insufficient in explaining the cross-linguistic variation across adult languages. We show that differences in inversion and interpretation must be accounted for by lexical variation of individual *why* words, not due to syntactic differences in *wh*-projections.

## 1 Introduction

Classically, *wh*-phrases are partitioned into two types: arguments and adjuncts, with adjuncts showing stricter restrictions on locality than arguments. This distinction derives from the difference between arguments and adjuncts with respect to their sites of generation. Outside the domain of locality, *wh*-phrases are partitioned along a different dimension. *Why*-type phrases appear to be generated directly in the left periphery, whereas all the other *wh*-phrases must be generated VP-internally (Rizzi, 1990). Rizzi argues that this distinction is further ramified in the domain of word order. In languages which require subject-auxiliary inversion, *why*-type words are frequently the only ones exempt from this requirement. This distinction appears across many typically inverting languages, such as Italian, Spanish, and to some extent, English. This partition may derive from the fact that *why*-type words are semantically distinct from the remaining *wh*-phrases. The *why*-type *wh*-phrases play no role in the event structure of the sentence, whereas other *wh*-phrases do. In the syntax, this division is expressed in differing sites of generation from the other *wh*-phrases, which results in differences in word order. Furthermore, it has been claimed this privileged position for *why*-type words is the default setting for children’s acquisition of *why*-type words. In this paper, we demonstrate that (a) *why*-type words within a language show syntactic variability, (b) individual *why*-type words demonstrate variability in site of generation, and (c) the initial state for children’s grammars represents the full range of variability found cross-linguistically.

The classic split in *wh*-phrases is the argument-adjunct distinction. This distinction presents itself in the locality restrictions exhibited by these two types of *wh*-phrases. Adjuncts show stricter locality requirements than arguments (1), as compared to (2) (Huang, 1982).

- (1) \*Why do you wonder how t John fixed the car?
- (2) ?What do you wonder how John fixed t?

This argument/adjunct asymmetry is accounted for by the differing sites of generation of these distinct types of *wh*-phrases. Putting aside the complications associated with subjects, arguments are generated as the sister to V, and hence, in the classic formulation, are governed by V, whereas adjuncts are generated higher, in ungoverned positions<sup>1</sup>. Because *wh*-traces must be governed (Chomsky, 1981), adjuncts are restricted in their movement when arguments are not. Extraction of adjuncts gives rise to stronger island violations, as shown in (1), as compared to (2). In (1), the trace of the adjunct is not theta-governed, in violation of the ECP. This results in restrictions on movement for adjuncts.

However, this is not the only distinction that has been made among *wh*-phrases. In fact, there exists a division among the adjuncts. *How* and *why* split from the other *wh*-phrases with respect to island effects. *How* and *why* both show increased sensitivity to negative islands (5a) and (6a) (with the extracted interpretations in (5b) and (6b), respectively), over *who* (3) and *where* (4) (Rullmann, 1995)<sup>2</sup>.

- (3) a. I wonder who the coach didn't say Marcus played t  
b. The coach didn't say that Marcus played Michael Jordan
- (4) a. I wonder where the coach didn't say t Marcus played  
b. The coach didn't say that Marcus played in Madison Square Garden
- (5) a. \*I wonder why the coach didn't say t Marcus played  
b. The coach didn't say that Marcus played because he got a new jersey
- (6) a. \*I wonder how the coach didn't say t Marcus played  
b. The coach didn't say that Marcus played with gusto

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<sup>1</sup>Whether government is a primitive of the theory or derived from other considerations is immaterial to our point. What is crucial is that the argument adjunct distinction is captured somehow, most likely by capturing the differences in site of generation.

<sup>2</sup>These examples mirror two clause negative island violations such as (1).

- (1) I wonder where Judy didn't play with her dog.

However, the availability of two verbs in the embedded clause makes the illicit readings more easily available.

This contrast has been attributed to the fact that *how* and *why* can not be d-linked. D-linking refers to a *wh*-phrase's ability to be linked to the preceding discourse. Rullmann (1995) claims that extraction out of a negative island is permitted only when there is a maximal set of possible answers corresponding to d-linking. We will not go into this analysis, but we will sketch its results here. In (3a), there is a salient set of players that Marcus could have not played (for example, all the members of the high school team may be in this set). Therefore, there is a maximal set of relevant players, and extraction is allowed. However, *why* and *how* can not be d-linked. That is, there is no salient set of reasons or manners that can be linked to the discourse. In (5a), there is no maximal set of reasons that are not the reason that Marcus played, and this example is ruled out. Therefore, it seems clear that, even within the category of *wh*-adjuncts, we see evidence for a division between *wh*-phrases that can and can not be d-linked<sup>3</sup>.

Interestingly, this is not the end of the cuts across the space of *wh*-phrases that have been observed. It has been claimed that *why* differs from the remaining *wh*-phrases, above and beyond its adjunct status and its inability to be d-linked. *Why* can be extracted in cases where other adjuncts can't, as shown in (7) and (8). This is because *why* can be generated outside the VP, unlike other adjuncts. *Why* is not blocked from movement by elements in the VP, because *why* is already outside the VPs scope.

- (7) \*Comment a-t-il résolu [beaucoup de problèmes] t  
how did he solve many of the problems
- (8) Pourquoi a-t-il résolu [beaucoup de problèmes] t  
Why did he solve many of the problems

Rizzi (1991) shows that adverbial QPs, such as *beaucoup*, block extraction of adjuncts. The puzzle here is that *why* behaves differently from other adjuncts in that movement is not blocked by the adverbial, as shown in (8). However, Rizzi proposes that the acceptability of (8) arises since *pourquoi* is generated in a position higher than the adverbial, and therefore is free to move. Therefore, *why* is unique in its availability to be generated outside the VP, apart from other adjuncts.

Further support that *why* is generated higher than the remaining *wh*-phrases comes from *wh-in-situ* languages. *Why* is the only *wh*-phrase which does not show intervention effects, constraints on LF *wh*-movement, in *wh-in-situ* languages (Ko, 2005). In languages like

<sup>3</sup>*Wh*-phrases like *who* and *what* are optionally d-linked, differing from a phrase like *which book*, which must be d-linked. The relevant observation in this section is that *how* and *why* can not be d-linked, while the remaining *wh*-phrases can be.

Japanese and Korean, an NPI, such as *only*, can not precede a *wh*-phrase (9) because NPIs block covert movement of the *wh*-phrase<sup>4</sup>. Because a *wh*-phrase must check its features (moving covertly to CP), any derivation in which an NPI intervenes will fail, as in (9). The *wh*-phrase must overtly move to a sentence initial position (10) to be acceptable, where the NPI can not block the checking of the *wh*'s features. However, *why* may appear following an NPI (11), suggesting it is the only *wh*-phrase to avoid intervention effects.

- (9) \*Taroo-sika nani-o yoma-nakat-ta no?  
 Taroo-only what-ACC read-not-past Q
- (10) nani-o Taroo-sika t yoma-nakat-ta no?  
 what-ACC Taroo-only read-not-past Q  
 'What did only Taroo read?'
- (11) Taroo-sika naze sono hon-o yoma-nakat-ta no?  
 Taroo-only why this book-ACC read-not-past Q  
 'Why did only Taroo read this book?'

Because the intervention effect is a constraint on LF movement, a *wh*-phrase can not check its *wh* features covertly across a scope bearing element. However, *why* appears to be able to do so. This suggests that even though *why* can follow a scope bearing element, covert movement of *why* is not required over the element to check its *wh* features. In order to account for this fact, Ko suggests that *why* is the only *wh*-phrase which merges directly into [Spec, CP], consistent with the analysis Rizzi has proposed. In this case, *why* is merged into [Spec, CP], where it is already in a spec-head relation with the features it requires. Therefore, it need not move to check any features, avoiding intervention effects. Thus, even in the case where an NPI is precedes *why*, the sentence is acceptable, because no covert movement is required.

Furthermore, we see word order variability which distinguishes *why* from other *wh*-phrases. In languages which require subject- auxiliary inversion with *wh*-phrases, *why*-type words are frequently exempt from this requirement. This distinction appears across many typically inverting languages, such as Basque, Italian, Spanish, and English. In Basque, Italian and Spanish, all *wh*-phrases except for *why* require inversion, as is shown in (12)-(13) for Basque (from Uriagereka (1999)), (14)-(15) for Spanish and (16)-(17) for Italian.

- (12) a. Zergatik zaldunak herensugea hil zuen?  
 why knight-the dragon-the killed have  
 'Why did the knight kill the dragon?'

<sup>4</sup>In the examples in this section, Ko (2005) suggests that the subject and NPI have been scrambled to the highest position in the sentence.

- b. Zergatik hil zuen zaldunak herensugea?  
 why killed have knight-the dragon-the
- (13) a. Zer egin du Joxe Antoniok?  
 what done have Joxe Antoniok  
 'What has Joxe Antonio done?'  
 b. \*Zer Joxe Antoniok egin du  
 what Joxe Antoniok done have
- (14) a. Por qué Maria salió?  
 why maria left  
 b. Por qué salió Maria?  
 why left Maria
- (15) a. \*Qué Maria comió?  
 what Maria ate  
 b. Qué comió Maria?  
 what ate Maria
- (16) a. Perché Maria ha mangiato?  
 why Maria ate  
 b. Perché ha mangiato Maria?  
 why ate Maria
- (17) a. \*Che cosa Maria ha mangiato?  
 what Maria ate  
 b. Che cosa ha mangiato Maria?  
 what ate Maria

It is clear that in these languages, *why* behaves differently from the other *wh*-phrases with respect to word order. Whereas most *wh*-phrases trigger inversion, *why* in these languages, permits, but does not require, a non-inverted word order<sup>5</sup>. The fact that *why* behaves differently with respect to word order across typologically diverse languages is of great interest, and suggests that base generation in the CP is a prerequisite for variability in the domain of word order.

While *why* is frequently a dividing line for word order differences, we also find some variability even within this domain. In some languages, the dividing line for word order falls within the *why*-type words. In English, it is *how come* which permits a non-inverted word order, apart from the remaining *wh*-phrases (18)-(20), including *why*.

- (18) a. How come Stacey left?  
 b. \*How come did Stacey leave?
- (19) a. \*Why Stacey bought chocolate?

<sup>5</sup>We will return to the property of optionality in section (2.4.2)

- b. Why did Stacey buy chocolate?
- (20) a. \*What Stacey bought?
- b. What did Stacey buy?

Notice that, unlike *why* in Spanish and Italian, English *how come* does not allow optional inversion; it prohibits inversion. Putting aside differences in optionality for the moment, we can be confident in the generalization that word order differences frequently fall between *why*-type phrases (either *why* or *how come*) and the remainder of the *wh*-phrases.

At the general level, it is clear that *why*-type phrases behave differently from other *wh*-phrases with respect to word order. However, the specific properties of inversion differ from language to language. The two main differences revealed by the data in (12) - (20) are a) whether inversion is prohibited or optional and b) what constitutes inversion. A question also arises as to a potential third difference: what effect, if any, inversion has on interpretation, and if this effect varies cross-linguistically. The first difference is whether inversion in *why*-questions is optional (as in Spanish and Italian), or prohibited (as it is with *how come* in English). The second difference concerns which pieces of the verbal complex undergo inversion. In English, only the auxiliary moves; in Spanish, Italian and Basque, both the verb and the auxiliary must move together. Third, it has been claimed that in some languages, inversion correlates with long distance movement (Rizzi, 2001). In this paper, we investigate whether this too, is a difference across languages.

The primary syntactic focus of this paper concerns the first point of variation, namely the issue of optional inversion. It has been claimed that the ability for *why*-type phrases to appear non-inverted can be attributed to its generation in a privileged position in the left periphery (Rizzi, 2001). Assuming that word order differences can be attributed to generation in this position, we can now ask what the nature of this optionality is. One possibility, which we will call the Syntactic Variation Hypothesis, is that optionality is a language-specific property of this privileged position. That is, a language such as Spanish allows *wh*-phrases generated in this position to either trigger inversion or not. A language such as English would have the specification that this position bar inversion. The second possibility, which we will call the Lexical Variation Hypothesis, is that languages do not differ with respect to the properties of this position, but that individual lexical items may differ with respect to which position they target. On this view, *why* in languages with optional inversion would be underspecified for whether it occurs in the inverting position or the privileged one. In languages where *why* can not invert, it would be lexically specified with a feature

forcing it to occur in the privileged position. In this paper, we argue for the Lexical Variation Hypothesis, on the basis of interactions between inversion and interpretation cross-linguistically and in child language.

The second question raised by this data is: what part of the verbal complex moves to satisfy inversion? While, in this paper, we do not give a complete account of these differences, we review general assumptions about the nature of inversion processes cross-linguistically. The main goal of this paper is to account for the generalization that word order differences arise with *why*-type, but not the other *wh*-phrases. In addition, we will explore the puzzle of optionality of inversion as a prerequisite to answering this broader question.

A second major focus of this paper is the relation between inversion and movement in the left periphery. In English, it appears there is a correlation between inversion and ability to be interpreted long distance.

(21) Why did Joe say Stacey left? [ambiguous]

(22) How come Joe said Stacey left? [matrix only]

*Why*, a *wh*-phrase that triggers inversion, can be interpreted in either the matrix or embedded clause (21). *How come*, a *wh*-phrase that does not trigger inversion, can only be considered with the matrix interpretation (22) (Collins, 1991). We investigate the correlation between inversion and interpretation in both adult and child language. We claim that the relation between inversion and long distance movement does not differ across languages, requiring some revision of previous accounts.

In sum, we have presented syntactic evidence for a number of different distinctions across *wh* phrases. In every way of making the distinction, *why*-type phrases appear on the periphery, as shown in Figure (1).

Interestingly, the distinctions between arguments and adjuncts, and between d-linked and non-d-linked phrases are cross-linguistically consistent, and are active in children's grammars, at least by the age of four ((DeVilliers et al., 1990), (Thornton, 1995)). However, the dotted line, the division that splits *wh*-phrases that permit non-inverted word order from those that require subject-auxiliary inversion, varies cross-linguistically. This is an interesting point of investigation: because it varies from language to language, the cross-linguistic variability is potentially mirrored across children. It has been observed that young children delay in exhibiting subject-auxiliary inversion in *why*

**who what when where how why how come**

<b>argument</b>	<b>adjunct</b>	
<b>d-linkable</b>		<b>non-d-linkable</b>
<b>VP-internal</b>		<b>base generated</b>
<b>require sub-aux inversion</b>		<b>non-inverted</b>

Figure 1: Divisions of *Wh*-phrases

questions, long after they consistently apply inversion in other *wh*-questions, including other adjunct questions (Labov and Labov, 1978). These children, who invert with all *wh*-phrases except for *why*, will be called *Why-Non-Inverters* (WNIs). A series of investigations have attempted to explain why this lexical item differs from others in its class in the time course of child language acquisition. Claims have been made linking the delay in acquisition to the observed cross-linguistic variation (Thornton, 2004). Thornton (2004) claims that English-learning children initially generate *why* in the privileged position that *why* occupies in many languages, but not in English. She suggests that the non-inverting status of this position (Rizzi, 2001) is directly responsible for children’s lack of inversion with *why*. A competing hypothesis is that children treat *why* like *how come*, a non-inverting *wh*-phrase with similar meaning (Berk, 2003). Both of these hypotheses take evidence from children’s production as the basis of an analysis about children’s grammars. However, production is not necessarily a clear indicator of a child’s grammar, as a range of extra-linguistic factors may interfere with the sentence production mechanism, giving rise to errors not representative of the grammar itself. In fact, we show that this is precisely what is at work in the domain of children’s *why* questions. We show evidence from English-learning children’s comprehension of *why* questions that suggests that children’s grammars are intact, and like that of English-speaking adults. Given our conclusion that optional inversion is explained by the Lexical Variability Hypothesis, we argue that children’s non-inversion with *why* questions derives from an incorrect lexical representation for *why*. This predicts that WNIs grammatically allow both inverted and non-inverted *why* questions, but similar to adults and children in optionally inverting languages, prefer non-inversion for reasons having to do with the production system, not the grammar. Moreover, we show that the Syntactic Variability Hypothesis fails to encompass both the production and comprehension

data from English-speaking children. This conclusion argues against previous approaches that attribute children's errors to parametric differences in the syntactic system ((Thornton, 2004), (Berk, 2003)).

The paper proceeds as follows. In section two, we turn our attention to the syntax of the left periphery. The observed cross-linguistic differences in the distribution of *wh*-phrases have been accounted for by number of differentiated projections in the left periphery (Rizzi, 1997). In this section, we review the motivation for this highly articulated structure. Furthermore, Rizzi claims that only one of the two *wh*-sites is available as a landing site for movement. In section three, we review the arguments from Thornton (2004), suggesting that children's inversion errors derive from children generating *why* in the wrong position in the left periphery, behaving as though they are 'speaking Italian'. In section four, we review cross-linguistic evidence that forces us to revise Rizzi's approach to the left periphery. We observe that there is a correlation between the interpretation of a *why*-phrase in a two clause question in Spanish and the existence of inversion in the embedded and matrix clauses. Consequently, Rizzi's claim that only the inversion site is available as a landing site of movement can not be maintained. Instead, we show that *wh*-phrases must be lexically specified for the feature triggering inversion. In section five, we present two experiments that provide further support to our approach to the grammar of inversion. We conduct two experiments testing children's production and comprehension of *why* and *how come*, two phrases which differ with respect to inversion and interpretation in two clause questions. Contrasting these questions allows us to determine the relation between inversion and interpretation in the grammar of young children. We find that WNIs maintain the full range of interpretations available to adults with *why*, but overgenerate in the lexical specification of *why* in that they allow generation in the site that does not trigger inversion. We find that there is no link between inversion and interpretation, and this leads us to conclude that WNIs allow generation of *why* to occur in either phrase. We claim children simply need to switch from a lexical specification where generation in two positions is possible (like Spanish), to one where generation is lexically restricted to one position (as in adult English).

## **2 Inversion and Movement: Rizzi Style**

In this section, we present evidence that motivates a detailed division of the left periphery (Rizzi, 1997), with two different positions available for *wh*-phrases (Rizzi, 2001). Rizzi presents two strong proposals concerning the left periphery and *wh*-phrases. First, he proposes the position a

*wh*-phrase occupies determines its inversion characteristics. Second, Rizzi claims there is a universal ban on movement into the higher of these two positions (section (2.4.3)). He claims that only the site that allows inversion is a potential landing site of movement. After reviewing Rizzi's analysis, we outline two hypotheses concerning the nature of optional inversion (section (2.4.2)).

## 2.1 Ambiguity in Two Clause *why* Questions

*Why*, like all other *wh*-phrases in English, has the potential to move successive-cyclically across clauses. Like the other adjuncts, when at the front of a question, *why* can be interpreted at any of the potential generation sites. We see an example of this in English (23), where a two clause *why* question is ambiguous between the matrix reading *why did Joe say it* and the long distance reading *why did Stacey order pizza*.

(23) Why did Joe say Stacey ordered pizza? [ambiguous]

This ambiguity derives from the base position of *why*. If *why* were generated in the embedded clause, and moved to the front, the long distance reading would obtain. Alternatively, if *why* were base-generated in the matrix clause, the matrix interpretation would result<sup>6</sup>.

Unlike *why*, *how come* is not ambiguous in a two clause question. The question in (24) can only receive the matrix interpretation (Collins, 1991).

(24) How come Joe said Stacey ordered pizza? [matrix only]

The observation that *how come* cannot have a long distance interpretation suggests that *how come* can not be generated in the embedded clause and move to the matrix CP. Another notable difference between *why* and *how come* is that while *why* requires inversion (25), *how come* prohibits inversion (26), repeated from (18) - (19).

(25) a. \*Why Joe ate chicken?

b. Why did Joe eat chicken?

(26) a. How come Joe ate chicken?

b. \*How come did Joe eat chicken?

There have been many analyses put forth about why *how come* is different from *why* ((Collins, 1991), (Ochi, 2004), (Fitzpatrick, 2005), (Conroy, 2005)); however, for the majority of the paper, we put aside the differences between *why* and *how come*, and we return to the issue in section (5.5). There are two observations concerning *how come*: a)

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<sup>6</sup>We assume generation in CP, and not generation in the VP and moved into the CP ((Rizzi, 2001), (Ko, 2005), (Stepanov and Tsai, 2006)).

*how come* does not allow inversion and b) does not allow a long distance interpretation. This is unlike *why* in both respects, because *why* both requires inversion and also allows a long-distance interpretation. The observed correlation between inversion and interpretation has led to the suggestion that these two properties should be linked in the grammar (section (2.4.3)). However, we show that this correlation is not cross-linguistically stable, and hence, should not follow from any fundamental properties of the grammar (section (4)).

## 2.2 The Fine Division of the Left Periphery

Italian has a highly articulated left periphery. Part of this rich articulation arises because Italian allows focus phrases to occur in the left periphery. Focus phrases may occur in initial position, as shown in (27).

- (27) QUESTO Gianni ti dirà  
 This Gianni you will-say  
 'THIS Gianni will say to you'

However, *wh*-phrases and focus phrases cannot co-occur, as shown in (28) and (29).

- (28) \*A GIANNI che cosa hai detto?  
 TO GIANNI what did you tell
- (29) \*Che cosa A GIANNI hai detto?  
 what TO GIANNI did you tell

This observation suggests that *wh*-phrases and focus phrases are competing for the same position. This data has led to the claim that *wh*-phrases in Italian occupy [Spec, FocP].

The Italian left periphery contains a rich structure of topics and focus phrases. A focus phrase contains new information, and suggests the information in the remainder of the sentence is previously discussed information (Rizzi, 1997). Topic phrases differ from focus phrases in that the information in the topic phrase is old information, and it is the information in the rest of the sentence that is new information. While only one focus phrase may occur per sentence (30), multiple topic phrases may occur (31).

- (30) \*A GIANNI IL LIBRO darò (non a Piero, l'articolo)  
 TO GIANNI THE BOOK I'll give, not to Piero, the article
- (31) **A Gianni, QUESTO, domani,** gli dovrete dire  
 To Gianni, THIS, tomorrow, him you should tell

This structure suggests that there are positions for topic phrases on either side of the position for focus phrases. This suggests there is one position for topics available above the focus projection, and one position available below the focus position.

In embedded clauses, both *wh*-phrases and focus phrases follow complementizers, as shown in (32) & (33).

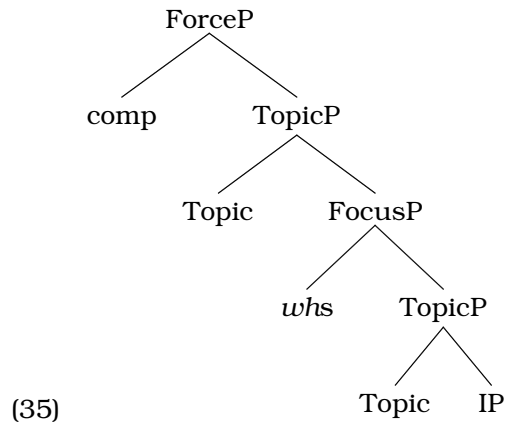
(32) Credo (\*QUESTO) che QUESTO avreste dovuto dirgli  
 believe (THIS) that THIS you should-have said-him  
 'I believe THIS you should have said to him'

(33) Mi domando (\*QUESTO) se QUESTO gli volessero dire  
 I wonder (THIS) if THIS they wanted to-say  
 'I wonder THIS if they wanted to say to him'

The word order facts suggest that there is at least one projection above the focus phrase available for complementizers. Rizzi identifies this projection as ForceP.

Thus far, we have seen evidence that complementizers occur above focus phrases, that focus phrases appear sandwiched between topic phrases, and that *wh*-phrases are in complementary distribution to focus phrases. In order to account for these differences in distribution, Rizzi (1997) proposed that the CP layer has the structure shown in (34), represented in (35).

(34) Force (Topic\*) Focus (Topic\*) Finiteness IP

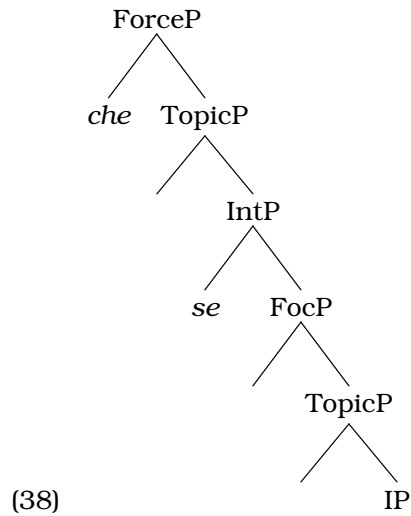


Evidence for a further division in the left periphery comes from the distribution of complementizers. Importantly, although *se* and *che* are identical with respect to distribution of focus phrases, the two complementizers are not identical with respect to distribution of topic phrases.

*Se* can both be preceded and followed by a topic phrase (36), while *che* can only be followed by a topic phrase (37).

- (36) a. Non so **se, a Gianni**, avrebbero potuto dirgli a verità  
 No know if to Gianni they could said the truth  
 'I don't know if to Gianni, they could have said the truth'
- b. Non so, **a Gianni, se** avrebbero potuto dirgli a verità  
 No know to Gianni if they could said the truth  
 'I don't know, to Gianni, if they could have said the truth'
- (37) a. Credo **che, a Gianni**, avrebbero potuto dirgli a verità  
 Believe that to Gianni they could said the truth  
 'I believe to Gianni, they should have said the truth to him'
- b. \*Credo, **a Gianni, che** avrebbero potuto dirgli a verità  
 Believe to Gianni that they could said the truth  
 'I believe, to Gianni, they should have said the truth to him'

This evidence suggests *che* occupies a position higher than *se* in the CP domain, because *che* can not be preceded by a topic phrase. This data leads Rizzi to conclude that there are two distinct complementizer positions, as shown in (38) (Rizzi, 2001).



Rizzi labels these two complementizer positions ForceP and IntP. *Che* heads ForceP, because it must precede all topic phrases, and *se* heads IntP, a position lower than ForceP, because *se* can occur between two topic phrases (36). In the next section, we review the evidence for the ability of a *wh*-phrase to occupy [Spec, IntP].

### 2.2.1 Evidence of *Wh*-phrases in IntP

As shown above, Rizzi argues that *wh*-phrases in Italian occupy [Spec, FocP] (Rizzi, 1997). However, the *why*-type phrases, *perché* 'why' and *come mai* 'how come', differ distributionally from the remaining *wh*-phrases. These observations suggest that *why*-type words occupy a position distinct from [Spec, FocP] (Rizzi, 2001). We now review the evidence in support of this conclusion.

*Wh*-phrases that occur in [Spec, FocP] can not co-occur with a focus phrase, as we have seen. This data is repeated in (39) and (40). Notice that a focus phrase can neither follow nor precede *che cosa*<sup>7</sup>.

(39) \*A GIANNI *che cosa* hanno detto  
TO GIANNI what they have-said

(40) \**Che cosa* A GIANNI hanno detto  
What TO GIANNI they have-said

If a *wh*-phrase can be followed by a focus phrase, this is evidence that it must occupy a position distinct from [Spec, FocP]. *Perché* and *come mai* can both be followed by a focus phrase (41) & (42), suggesting these *wh*-phrases occupy a position higher than [Spec, FocP]. Rizzi concludes that this position is [Spec, IntP].

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

(42) *Come mai* IL MIO LIBRO gli ha dato, non il tuo?  
how ever the my book him gave, not the yours  
'How come MY BOOK you gave to him, not yours?'

Focus phrases can not precede *perché* or *come mai*, as shown in (43) and (44), consistent with the structure shown in (38), supporting the conclusion that these *wh*-phrases occur in a position higher than FocP.

(43) \*QUESTO *perché* avremmo dovuto dirgli, non qualcos'altro?  
THIS why we should said not something-else

(44) \*IL MIO LIBRO *come mai* gli ha dato, non il tuo?  
THE MY BOOK how ever him gave, not the yours

### 2.3 Further Distributional Differences with *why*

As we have seen, not only do *perché* and *come mai* differ from the remaining *wh*-phrases in Italian with respect to distribution of focus phrases, they also differ in that they do not trigger inversion (45)-(46)<sup>8</sup>,

<sup>7</sup>The same data applies to all non-*why wh*-phrases in Italian, including *where* and *how*. This is the foundation for the claim that *wh*-phrases in Italian occupy [Spec, FocP]

<sup>8</sup>In fact, inversion is optional, a point which will be discussed in section (2.4.2)

while the other *wh*-phrases do (47)-(48)<sup>9</sup> <sup>10</sup>.

- (45) a. Come mai Gianni ha mangiato?  
How come Gianni ate  
b. Come mai ha mangiato Gianni?  
How come ate Gianni
- (46) a. Perché Gianni ha mangiato?  
Why Gianni ate  
b. Perché ha mangiato Gianni?  
Why ate Gianni
- (47) a. \*Come Gianni ha mangiato?  
How Gianni ate  
b. Come ha mangiato Gianni?  
How ate Gianni
- (48) a. \*Che cosa Gianni ha detto?  
What Gianni did  
b. Che cosa ha detto Gianni?  
What did Gianni

---

<sup>9</sup>Notice that inversion is not subject-aux inversion, as (1) is ungrammatical (Poletto, 2000).

- (1) \*Che cosa ha Gianni mangiato?  
What aux Gianni ate

A variety of proposals have been put forth to explain this fact. Rizzi and Roberts (1989) propose that case assignment in Italian must occur in a Spec-head relation, not under government. Ordinarily, nominative case is assigned by Infl when the subject occupies [Spec, IP]. In *wh*-questions, INFL moves to C satisfy the *wh*-criterion, and the spec-head relation between INFL and the subject is broken. Therefore, the only way for the subject to get nominative case is to resort to the case assignment position available to post-verbal subjects. Other approaches are presented and discussed in Poletto (2000). The details of these analyses will not be presented here.

<sup>10</sup>These examples lack a direct object, to mirror the examples in Rizzi (2001). Interestingly, inversion is not strictly subject-aux+verb inversion (even considering the notes in footnote (9)). When a direct object is added, the subject must appear at the end of the sentence, as shown in (1). Strict inversion of the aux+verb unit and the subject is ungrammatical, as shown in (2).

- (1) Perché ha mangiato il pollo Gianni?  
Why ate the chicken Gianni
- (2) \*Perché ha mangiato Gianni il pollo?  
Why ate Gianni the chicken

This is a problem for an account which claims the subject appears non-adjacent to the *wh*-phrase due to verb movement and the *wh*-criterion (elaborated in section (2.4.1)). The interfering factors are complicated for Italian, so in this paper, we sidestep the issue of inversion with a direct object. For all data points with respect to inversion and movement, we duplicate the examples in Spanish, a language in which the facts are similar and clear, without the interfering factors.

Interestingly, inversion appears to correlate with the inability to co-occur with a focus phrase. That is, only the *wh*-phrases that allow the uninverted word order can co-occur with focus phrases. This observation suggests there is a link between inversion and the position in which the *wh*-phrase occurs.

Another indication that *perché* and *come mai* differ from the remaining *wh*-phrases is that they both allow adverbials to precede the verb (49) & (50). This is a further indication of non-inversion. Assuming that adverbials occupy the left edge of VP, the order *wh*-adv-V could only occur if the verb remains inside the VP.

(49) Perché (i tuoi amici) **già** **hanno** finito il lavoro?  
 Why ( your friends) already have finished the work

(50) Come mai (voi) **già** **siete** tornati a Milano?  
 How come (you) already have come back to Milan

The other *wh*-phrases do not allow adverbials to precede the verb (51) - (52), expected from their obligatory status of inversion with these *wh*-phrases<sup>11</sup>.

(51) Dove (\*già) **siete (già)** andati?  
 Where (already) have (already) gone

(52) Che cosa (\*già) **hanno (già)** fatto?  
 What (already) have (already) done

Evidence from the distribution of complementizers in Italian suggests that there are two distinct complementizer positions in the left periphery. Furthermore, the distributional differences between *why*-type phrases and the other *wh*-phrases suggest that *why*-type phrases in Italian occupy a position distinct from [Spec, FocP]. We have reviewed a cluster of properties that co-vary with word order, suggesting a link between position and word order, as shown in Table (1).

In the next section, we examine the relationship between site of generation and inversion.

## 2.4 The Link between Position and Inversion

In this section, we explore the relation between a *wh*-phrase's site of generation and whether it requires inversion. We have seen evidence

<sup>11</sup>The availability of an adverb to occur between the auxiliary and verb suggest that what appears to be aux+verb movement is not a united phenomenon, as suggested by Rizzi and Roberts (1989). This availability arises because the verb does not actually move under this account, but the subject must occur in a post-verbal position once the aux raises.

Table 1: Inversion and distribution of phrases

<i>wh</i> -phrase	Inversion	Focus Phrase Follows	Adverbial Precedes verb
<b><i>perché</i></b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>
<b><i>come mai</i></b>	<b>No</b>	<b>Yes</b>	<b>Yes</b>
<i>dove</i>	Yes	No	No
<i>che cosa</i>	Yes	No	No

that *wh*-phrases can occupy two positions in the left periphery. *Why*-type phrases in Italian occupy [Spec, IntP], because they can be followed by focus phrases. Additionally, these phrases do not require inversion. The remainder of the *wh*-phrases occupy [Spec, FocP], and furthermore, require inversion. We present the mechanism by which this link is accounted for in Rizzi's framework.

#### 2.4.1 The Wh-criterion

In order to account for inversion, we must first investigate the mechanism driving inversion in *wh*-questions. Inversion is required to satisfy the features of a *wh*-phrase. This requirement has been called the *wh*-criterion. The *wh*-criterion ((May, 1985), (Rizzi, 1996)) is shown in (53).

- (53) *Wh*-criterion: a *wh* operator and a head endowed with the *wh* feature must be in a spec-head configuration at s-structure

At s-structure, every *wh*-phrase must check its *wh*-features with a +*wh* head. In a *wh*-question in English, a *wh*-feature is generated under Tense, and T to C movement occurs. This results in the auxiliary inverting over the subject, thereby satisfying the *wh*-criterion. Under this view, inversion is a reflex of the requirements of *wh*-phrases<sup>12</sup>.

Descriptively speaking, only *wh*-phrases occupying [Spec, FocP] require inversion. *Wh*-phrases that occupy [Spec, IntP] do not require inversion. To account for this difference, Rizzi proposes that the IntP projection is special with respect to the *wh*-criterion. Because it is an interrogative projection, IntP is headed by a  $\mathcal{Q}$  feature. This head is inherently endowed with +*wh* features, and any *wh*-phrase generated in [Spec, IntP] is in a configuration which satisfies the *wh*-criterion.

<sup>12</sup>One may ask whether the same mechanism is responsible for inversion in Romance languages (where the verb moves) as in languages like English (where only the aux moves). Rizzi (1996) claims that the *wh*-criterion, as described, can account for inversion in both of these cases. The +*wh* feature that is required to check the features of the *wh*-phrase is carried on T. In Romance languages, verbs raise to T. Therefore, the verb complex must raise to check the *wh*'s features. However, in English, the verb does not raise. Therefore, T can raise to satisfy the *wh*-criterion without the verb. See footnote (9) for some further details about aux+verb movement in Italian.

Therefore, a *wh*-phrase occupying [Spec, IntP] will not require inversion.

This framework accounts for the differences in inversion observed between *why*-type phrases and other *wh*-phrases in Italian. *Wh*-phrases in [Spec, FocP] require inversion to satisfy the *wh*-criterion. *Wh*-phrases in [Spec, IntP] benefit from the endowment of IntP with +*wh* features, which allows the *wh*-criterion to be satisfied without inversion.

#### 2.4.2 Optional Inversion

Recall that inversion with *perché* and *come mai* is optional, as both inverted and non-inverted forms are permissible (shown in (54), repeated from (46)). Inversion with Spanish *por qué* 'why' is also optional, as shown in (55).

- (54) a. *Perché* Gianni ha mangiato?  
      why Gianni ate  
      b. *Perché* ha mangiato Gianni?  
          why ate Gianni
- (55) a. *Por qué* Juan salió?  
      why Juan ate  
      b. *Por qué* salió Juan?  
          why ate Juan

We have shown that *wh*-phrases that do not require inversion occupy [Spec, IntP]. In a framework where inversion is a direct result of the position a *wh*-phrase occupies, it is unclear how to derive optional inversion<sup>13</sup> There are two potential hypotheses concerning optional inversion. The first hypothesis, the Syntactic Variation Hypothesis, asserts that optionality is a language-specific property of IntP. That is, it is a parametric difference whether a given language allows any *wh*-phrase in [Spec, IntP] to optionally trigger inversion. In a language such as Italian, *perché* always occurs in [Spec, IntP], but would permit aux+verb movement, even though it is unnecessary to satisfy the *wh*-criterion. English is a language which disallows optional inversion, so verb movement is prohibited for *wh*-phrases occupying [Spec, IntP]. For this hypothesis, the question remains as to why inversion would occur if not to satisfy the *wh*-criterion.

<sup>13</sup>Baauw (1998) investigates the issue of optional inversion with *why* in both Spanish and Italian. He suggests that *why* in these languages can optionally be generated in CP or in C. When *why* is generated in [Spec, CP], it requires inversion, but disallows it when generated in C. However, we have determined that both positions *why* appears to occupy are in the left periphery, not a C position.

The second hypothesis, the Lexical Variation Hypothesis, states that IntP never allows the triggering of inversion. To account for the apparent optionality, this hypothesis would claim that individual lexical items differ with respect to which feature is required to check its features. On this view, *why* in languages with optional inversion are underspecified for whether it targets [Spec, IntP] or [Spec, FocP]. For example, in Italian, *perché* could enter the derivation as either *perché<sub>F</sub>*, generated in [Spec, FocP], or *perché<sub>I</sub>*, generated in [Spec, IntP]. Therefore, when *perché<sub>F</sub>* is generated in [Spec, FocP], inversion is triggered to satisfy the *wh*-criterion. When, *perché<sub>I</sub>* is generated in [Spec, IntP], no inversion is permitted, because IntP is already satisfied for the *wh*-criterion. This hypothesis critically maintains a direct relation between inversion and position. Under this hypothesis, inversion is never allowed for *wh*-phrases occupying [Spec, IntP]. In English, where inversion is not optional, every *wh*-phrase is specified for the position that it targets.

In the next section, we review Rizzi's arguments concerning movement and the left periphery. We present data from Spanish in section (4) that supports the Lexical Variation Hypothesis.

### 2.4.3 Movement into the Left Periphery

Inherent to the investigation of *wh*-phrases is the examination of properties of movement. Rizzi defined two positions that have different properties with respect to inversion. Furthermore, Rizzi claims these two positions differ with respect to properties of movement.

Let us now review the properties of *why*-type phrases. First, unlike other *wh*-phrases, *why*-type words can be base generated in the left periphery ((Rizzi, 1990), (Rizzi, 2001), (Ko, 2005)). Second, the ambiguity of two clause *why* questions (23) derives from the multiple potential sites of base-generation. Therefore, in English, we know that [Spec, FocP] is both a generation position, and a landing site for movement.

Rizzi (2001) claims that the same position that *why* occupies in Italian is not available as a landing site of movement. (56) is ambiguous: *perché* could have been generated in the matrix [Spec, IntP], or generated in the embedded [Spec, IntP] and moved to the matrix clause<sup>14</sup>.

<sup>14</sup>These data are as reported in Rizzi (2001). Notice that (56) does not contain an overt subject. Therefore, it is an open question whether *perché* must be generated in [Spec, IntP], or if generation in [Spec, FocP] is permitted. However, notice that if generation is permitted in [Spec, FocP], then movement to the matrix [Spec, FocP] should not be blocked, which would permit a long distance interpretation. We return to this issue in section (4.1.1).

However, (57) is not ambiguous: it can only have the matrix interpretation.

(56) Perché ha detto che si è dimesso? [ambiguous]  
why said that he resigned

(57) Perché A GIANNI ha detto che si è dimesso? [matrix only]  
why TO GIANNI said that he resigned

(57) contains a focus phrase, meaning that *perché* must occupy [Spec, IntP], because *wh*-phrases in [Spec, FocP] cannot co-occur with focus phrases. Because (57) cannot have the long distance interpretation, Rizzi takes this as evidence that [Spec, IntP] is not a potential landing site of movement. If [Spec, IntP] were a potential landing site of movement, then *perché* could have moved to the matrix [Spec, IntP], and (57) could have a long distance interpretation. Therefore, even though *perché* is generated in [Spec, IntP] in the embedded clause (56), it moves to [Spec, FocP] in the matrix clause, since this is claimed to be the only position available as a landing site of movement.

Rizzi extends this claim to the nature of these positions. He claims that [Spec, FocP] is both a generation position (in some languages) and a potential landing site of movement. But, [Spec, IntP] can only be a generation position.

This account explains why *how come* questions can not have long distance interpretations. Because *how come* is uninverted, it occupies [Spec, IntP]. Additionally, *how come* can not achieve the long distance interpretation, because the matrix [Spec, IntP] is not a potential landing site of movement<sup>15</sup>. However, *why* is generated in [Spec, FocP], which is a potential landing site of movement. Therefore, a two clause *why* question is ambiguous, because the same position is both a landing site and a generation site.

To this point, we have discussed the analysis of the left periphery developed by Rizzi. We showed that in Italian, *wh*-phrases can occupy either [Spec, FocP] or [Spec, IntP]. When a *wh*-phrase occupies [Spec, IntP], it will not require inversion, and will allow a focus phrase to follow it. A *wh*-phrase in [Spec, FocP] will require inversion and will not allow a focus phrase to immediately follow. Crucially, a theory with two sites

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<sup>15</sup>Under this account, generation in [Spec, IntP] and movement to [Spec, FocP] is permitted. This movement is not allowed with *how come*, as shown in (1).

(1) \*How come did Joe say Stacey left?

Therefore, under this account, it must be explained why this movement is not permitted in English.

for *wh*-phrases is required to describe the complementary distribution of *wh*-phrases with focus phrases, and also the correlation between the availability of focus phrases and non-inversion. Independent of the implementation of verb movement, the two positions in Rizzi's theory seem required to describe the facts presented. We also showed that *perché* in Italian allows optional inversion. We proposed two hypotheses as ways to derive this optionality, which we return to in section (4). Furthermore, we reviewed Rizzi's claims that [Spec, IntP] is not a potential landing site of movement. This claim results in non-inverted questions being restricted to the matrix interpretation. In section (4), we show that this generalization is not descriptively accurate, and suggest an alternative approach.

In the next section, we review a curious property of *why* questions in English-speaking children. Not only do *why* questions behave differently from other *wh*-phrases in Italian, but they also differ from other *wh*-phrases in first language acquisition. Therefore, an understanding of this property of child language can give us a better understanding of the left periphery.

### **3 Delayed Inversion with *why* in Acquisition**

The study of children's *why* questions has revealed a curious property of the development of questions that corresponds to the cross-linguistic observations presented in this paper. Labov and Labov (1978) studied *why* questions by a young child named Jessie. They found that Jessie resisted inverting with *why* until around 4;6 years of age, even though she was regularly inverting with *what*, *how*, and *where* by the age of 3;9, as shown in Figure (2). The puzzle remains as to why *why* lags behind in development with respect to inversion long after the remainder of the other *wh*-phrases (further evidence for this phenomenon from Sarma (1991) and Berk (2003)).

In this paper, we present a detailed division of the left periphery, which provides a mechanism in which *why*-type phrases are treated differently from the remainder of the *wh*-phrases. The delay of children's inversion with *why* has been tied to the lack of inversion in Italian *why* questions. In this section, we review two accounts which attempt to explain children's non-adult-like treatment of *why*. One account, due to Berk (2003), claims that *Why-Non-Inverters* (WNIs) treat *why* like *how come*. A second hypothesis, proposed by Thornton (2004), claims that WNIs treat *why* like Italian *perché*.

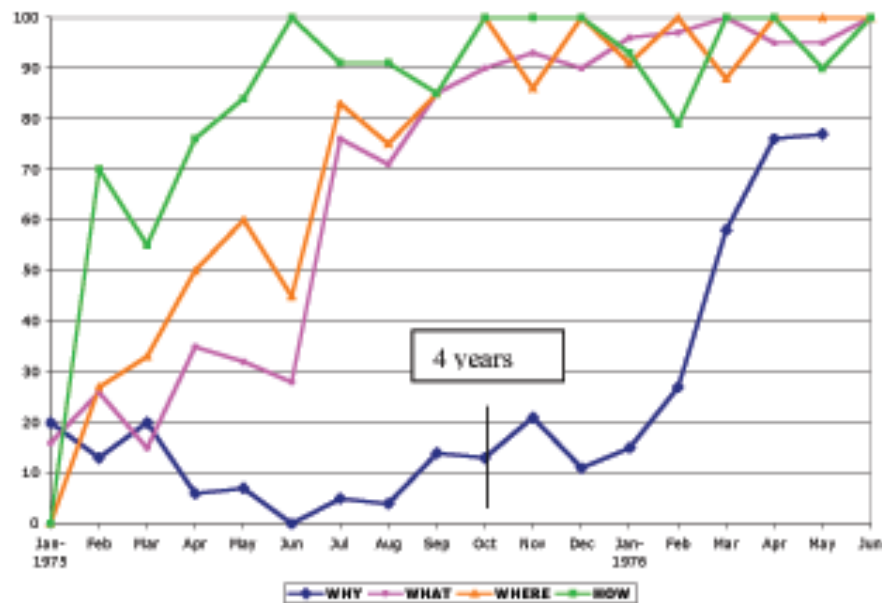


Figure 2: Jessie's productions (from Thornton (2004))

### 3.1 The *How come* Hypothesis

Berk (2003) accounted for children's delay in inverting with *why* questions by claiming that children initially treat *why* like *how come*. As we have seen, *how come* occupies [Spec, IntP], and does not allow a long distance interpretation in two clause questions. Because IntP is automatically specified for the *wh*-criterion, a *wh*-phrase generated in [Spec, IntP] does not trigger inversion. Therefore, this hypothesis suggests that *Why*-Non-Inverters are treating *why* as a non-inverting, non-moving item. Some support for the hypothesis that the *how come* position is a default comes from the observation that children do not mistakenly invert with *how come*.

### 3.2 The *Perché* Hypothesis

Thornton (2004) proposed that children are 'speaking Italian', and that WNIs mistakenly generate *why* in [Spec, IntP], resulting in delayed inversion in their *why* questions. Additionally, she claims that, like Italian, WNIs will allow movement of *why*-phrases only to [Spec, FocP].

Thornton observes a phenomenon similar to that noticed by Labov and Labov: her daughter, A.L., did not consistently invert with *why*

until 5;0 years, even though she was inverting with non-*why* questions successfully by 3;6. Support for the *Perché* Hypothesis comes from non-adult behavior with one clause, but not two clause *why* questions. During the stage in which she failed to invert in single clause *why*-questions, A.L. allowed subordinate clauses (59), topic (58) and focus (60) phrases to appear immediately following *why*.

- (58) Why every day when I wake up the hall light isn't on? (5;1)
- (59) Why if he goes to jail she can have his room? (5;0)
- (60) Why SOME OF YOUR MAKEUP I can't use (and some I can)? (5;2)

This mirrors the distribution of *perché* in Italian, because *wh*-phrases generated in [Spec, IntP] can be immediately followed by a focus phrase.

Furthermore, A.L. consistently inverted when asking a *why* question with a long distance interpretation (61)-(63) (all examples from Thornton (2004)).

- (61) Why do you think Santa's not coming this year? (3;10)
- (62) Why do you think that Boomer came in with us? (4;2)
- (63) Why do you think that Mommy would not wanna watch the show? (4;6)

Because A.L. inverted only when she intended a long distance interpretation, this suggests that *why* can move into [Spec, FocP]. As a result, Thornton claims that English-speaking children generate *why* in [Spec, IntP], and move it into the matrix [Spec, FocP], as is claimed by Rizzi for Italian. This hypothesis is in line with the continuity hypothesis, which claims that children can only make 'mistakes' that are constructions found in adult languages.

### 3.3 Predictions of Thornton and Berk's Hypotheses

The hypotheses presented by Thornton and Berk make different predictions for the acquisition of *why* and *how come*. Berk suggests that WNIs treat *why* like *how come*. This results in children producing non-inverted *why* questions. If children treat *why* like the adult *how come*, then WNIs will permit only matrix interpretations with two clause *why* questions, as is the case in the adult grammar for *how come*. Berk's hypothesis predicts that WNIs, when presented with ambiguous two clause *why* questions, will be restricted to matrix interpretations<sup>16</sup>.

<sup>16</sup>While Berk does not make this strong of a claim, she suggests that English-speaking children treat *why* like *how come*, as a lexical mistake. If it is the case that English-speaking children restrict long distance movement of *how come*, then we would expect this to extend to *why* under this account.

Thornton makes a different prediction. She claims that WNIs are 'speaking Italian': generating *why* in [Spec, IntP], but permitting movement only to [Spec, FocP]. This hypothesis predicts that when a WNI hears an inverted two clause question, he will posit that the *why* has moved to [Spec, FocP], because inversion is a cue that movement has occurred. Therefore, WNIs should interpret inverted two clause *why* questions only with the long distance interpretation.

Secondly, Thornton and Berk make a prediction about all children's interpretations of a non-inverted two clause question, like one with *how come*. Because movement to the matrix [Spec, IntP] is not permitted, *how come* must be base generated. Both Berk and Thornton predict that children will interpret two clause *how come* questions with matrix interpretations only, like adults.

### 3.4 Summary

It has been claimed that the evidence from acquisition derives from the account of the adult left periphery. We have reviewed two opposing hypotheses from Berk and Thornton concerning children's acquisition of *why* questions. In the next section, we question the empirical basis of Rizzi's theory, by investigating a broader set of data, leading to a modification of the theory. In section (5), we conduct two experiments with children that support the analysis presented in this paper, over those of Rizzi, Berk and Thornton.

## 4 A Revised Theory of Movement

In this section, we investigate a wider range of data than that originally viewed in Rizzi (2001). We show that Rizzi's original analysis can not account for the combination of inversion and movement possibilities found in Spanish and Brazilian Portuguese. We maintain the syntactic structure proposed by Rizzi (and its claims concerning the link between inversion and generation site), but we broaden its empirical scope. While Rizzi claimed that only [Spec, FocP] is available as a landing site for movement, we make a broader theoretical claim that both *wh*-positions are available as landing sites for movement. Specifically, we claim there is no universal restriction in natural language concerning which projections are potential landing sites of movement. Additionally, we provide support for the Lexical Variation Hypothesis, using evidence from Italian and Spanish. We show that the claims Rizzi made must be revised.

## 4.1 Evidence for IntP as a Landing Site of Movement

In this section, we present Italian data which poses problems for the movement account proposed by Rizzi (2001). This data suggests that this account must be broadened to incorporate a wider range of data. This broadened account is presented in section (4.3).

### 4.1.1 Italian Data with an Overt Subject

In the last section, we reviewed Rizzi's claims concerning positions and movement. Rizzi claims that [Spec, FocP] is the only one of the *wh* positions that is available as a landing site for movement. This claim is based on the observation that in Italian, two clause *perché* questions with a focus phrase block the long distance interpretation<sup>17</sup>. Therefore, Rizzi asserts that two clause questions without inversion must be interpreted with a matrix interpretation, and that questions with a long distance interpretation require inversion (because movement to [Spec, FocP] has taken place, a position which requires inversion). However, (64), repeated from (56), contains a null subject, making the claims concerning interpretation and inversion difficult to test.

- (64) Perché ha detto che si è dimesso? [ambiguous]  
      why           said that he   resigned

If we add a subject to the examples Rizzi uses as support for his hypothesis, he predicts that two clause *perché* questions that are non-inverted will have a matrix interpretation. Moreover, he predicts that the long distance interpretation would require inversion in the matrix clause<sup>18</sup>. This prediction is not borne out, as shown in (65).

- (65) Perché Gianni ha detto che si è dimesso? [ambiguous]  
      why   Gianni   said that he   resigned

(65), a non-inverted *perché* question with a subject, is ambiguous between the matrix and long distance reading<sup>19</sup>. The ambiguity must be

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<sup>17</sup>This account ignores any impact of focus on interpretation. It is not clear we want to ignore this factor.

<sup>18</sup>Cardinaletti (2005) claims that there is a difference between overt and non-overt subjects, suggesting this expectation may not be fully motivated. She, along with Uriagereka (1999), claims that movement over an overt subject is not possible, citing data in accordance with Rizzi (2001). However, the examples in these papers contain a null subject in the embedded clause. The blocking effect disappears when examples contain an overt subject in both clauses. Furthermore, a poll of native speakers revealed the data reported in this paper. While there may be dialectal differences, any dialect which allows movement into [Spec, IntP] argues against a theory with a universal ban on movement into this position.

<sup>19</sup>Some speakers of Italian claim that the long distance reading is more difficult to obtain. In this paper, we abstract away from ease and assume that availability suggests grammatical acceptability.

derived from the ability of *perché* to be generated either in the matrix [Spec, IntP], or in the embedded [Spec, IntP]. Therefore, [Spec, IntP] is a potential landing site of movement. Because a non-inverted two clause *why* question is ambiguous, this suggests that movement can occur into [Spec, IntP]. This is a critical problem for the hypothesis that movement can only occur into [Spec, FocP]. There are some additional difficulties with the movement theory proposed by Rizzi, which we cover in the following sections<sup>20</sup>.

#### 4.1.2 Languages Without Inversion

Rizzi made the claim that [Spec, IntP] is not a potential landing site for movement. The Italian data with an overt subject presented problems for this analysis, but there are other languages which create difficulties as well. In Brazilian Portuguese (BP), all question words are located in [Spec, IntP], including the *wh*-phrases that must move there.

- (66) a. Como assim o Diogo gosta de chocolate?  
       how come the Diogo likes the chocolate  
       b. \*Como assim gosta o Diogo de chocolate?  
       How come likes the Diogo the chocolate
- (67) a. Porquê o Diogo gosta de chocolate?  
       Why the Diogo like the chocolate?  
       b. \*Porquê gosta o Diogo de chocolate?  
       why like the Diogo the chocolate?
- (68) a. Quando o Diogo saiu de casa?  
       When the Diogo left the house  
       b. \*Quando saiu o Diogo de casa?  
       When left the Diogo the house
- (69) a. O que o Diogo comprou?  
       the what that the Diogo bought  
       b. \*O que comprou o Diogo?  
       the what bought the Diogo

All *wh*-phrases, including *what* and *when* fail to trigger inversion, as seen in (66) - (69). If it were the case that [Spec, IntP] were not a landing site for movement, then one would expect *wh*-phrases in generated in IP-internal positions to be required to be left in situ. In (68) - (69), *wh*-phrases move from their d-structure positions to [Spec, IntP]. This is not predicted if [Spec, IntP] is not a landing site of movement. However, Rizzi's claim centered on multi-clause movement. Could his claim be

<sup>20</sup>Therefore, we suggest that focus is responsible for the lack of long distance interpretation. We offer no account of this mechanism, and leave the discourse factors which determine which grammatical interpretation an adult chooses to further research.

salvaged if his restriction is stated as a restriction on movement from one [Spec, IntP] to a higher [Spec, IntP]? This is consistent with (68) - (69), because movement from a theta position to [Spec, IntP] would be allowed. This claim would predict that movement from one [Spec, IntP] to the [Spec, IntP] of the higher clause is banned, requiring movement instead to [Spec, FocP]. This is not borne out, as seen in (70).

- (70) O que a Ellen pensa que o Diogo comeu?  
the what the Ellen thinks that the Diogo ate  
'what does Ellen think Diogo ate?'

*O que* is generated in the embedded VP, moves to the embedded [Spec, IntP], and then moves again to the matrix [Spec, IntP]. Therefore, we see that movement into the [Spec, IntP] of a higher clause is allowed. It appears that a universal ban on movement into [Spec, IntP] runs into trouble.

One question arises with the Brazilian Portuguese data: how do we know the *wh*-items are located in [Spec, IntP]? After all, BP does not allow focus phrases to follow the *wh*-phrases, as shown in (71).

- (71) \*Porquê PARA MARIA você disse isso?  
Why TO MARIA you said this

Earlier, we showed a direct correlation between non-inversion and co-occurrence with a focus phrase. These two properties combined provided evidence that a *wh*-phrase occupied [Spec, IntP]. In the BP case, we have non-inversion, but a focus phrase is unavailable. Could this mean that *wh*-phrases in BP occupy [Spec, FocP], but allow an element other than the verb to satisfy the *wh*-criterion? This would align with Rizzi's claims, because it would then be [Spec, FocP] that is the landing site of movement. Let us see how this type of account would work.

Inflection carries the features required to satisfy the *wh*-criterion for *wh*-phrases in [Spec, FocP]. In Italian, this is realized on the verb, and in English, the auxiliary. If *wh*-phrases in BP occupy [Spec, FocP], a null element, such as an auxiliary or a complementizer, must satisfy the *wh*-criterion, because we have no evidence of inversion. We suggest there are two problems with stipulating that a null element can satisfy the *wh*-criterion.

This potential hypothesis requires a null element to satisfy the *wh*-criterion. A null item which can satisfy features would be theoretically problematic. Primarily, the generalization made by Rizzi linking inversion and position would certainly dissolve if there exist a large class of items which do not trigger inversion, but are generated in [Spec, FocP]

because the *wh*-criterion can be satisfied by a null element. This is undesirable both descriptively and in terms of learnability. Descriptively, one would need to identify all non-inverting languages, and determine if there exists a null element which could satisfy the *wh*-criterion. In a language like BP, it is difficult to tell the difference between the two potential explanations of the data (a) that *whs* are located in [Spec, FocP] versus (b) that it may be a language without a focus position. In both cases, *wh*-phrases would be unable to co-occur with a focus phrase. From a learnability standpoint, null elements present a tremendous challenge. If this were the case, inversion would no longer be a direct cue to position (because BP and Italian are both non-inverting with *why*, but allow *why* to occupy different positions), a child would need to rely on the availability of focus phrases to determine position. It is not a stretch to suggest that this type of information may be sparse and unreliable.

For these reasons, we believe it is theoretically undesirable to allow null elements to satisfy the *wh*-criterion, making the claim that *wh*-phrases occupy [Spec, FocP] in BP unfounded. Therefore, we suggest that *wh*-phrases in BP occupy [Spec, IntP]. This account requires that [Spec, IntP] be a landing site of movement. These data provide counter-evidence to Rizzi's claims that [Spec, FocP] is the only potential landing site of movement. In the next section, we show that Spanish data provide further evidence against with a hypothesis restricting movement into [Spec, IntP].

## 4.2 Evidence of Movement from Spanish

It has been claimed that Spanish *why* behaves the same way as Italian *why* ((Contreras, 1989) cited by (Rizzi, 2001)): no inversion in two clause *why* questions when the matrix interpretation is intended, but inversion when the long distance reading is intended. In this section, we show that this generalization is false. We also provide evidence that, in Spanish, movement into IntP is freely available.

Given that we find there is no universal correlation between movement and inversion, we are left with the question of why this correlation sometimes appears. Moreover, we need a new understanding of the factors governing optional inversion. Recall that we identified two competing hypotheses explaining the source of this optionality, and that the Italian data could not distinguish these hypotheses. In this section, we identify a property of Spanish that provides support for the Lexical Variation Hypothesis over the Syntactic Variation Hypothesis.

Spanish, like Italian, allows optional inversion with *por qué*, as shown in (72) - (73).

(72) Por qué Maria comió las manzanas?  
Why Maria ate the apples

(73) Por qué comió Maria las manzanas?  
Why ate Maria the apples

As discussed previously, there are two possibilities concerning optionality in inversion. The Syntactic Variation Hypothesis suggests that *por qué* is only generated in [Spec, IntP], but that inversion can occur optionally, suggesting optionality in satisfying the *wh*-criterion. The Lexical Variation Hypothesis suggests that *por qué* can be optionally generated in either [Spec, IntP] or [Spec, FocP], determined by specification of lexical features. First, we will discuss Rizzi's claims concerning the ban on movement into [Spec, IntP], then we use these observations as a tool to investigate the puzzle of optional inversion.

With respect to available readings, Rizzi predicts that movement into [Spec, IntP] is prohibited, and therefore, non-inverted two clause *why* questions should have matrix only interpretations. This is not the case, as (74) (non-inverted) is ambiguous<sup>21</sup>.

(74) Por qué Juan dijo que Maria comió las manzanas?  
Why Juan said that Maria ate the apples  
[ambiguous]  
'Why did Juan say Maria ate the apples?'

This observation mirrors what we saw in the re-investigation of Italian *why* questions in section (4.1). The ambiguity in (74) presents further evidence that movement into [Spec, IntP] is permitted. Data from Italian, Brazilian Portuguese and Spanish suggests that movement into [Spec, IntP] is, in fact, permitted. This contradicts Rizzi's claims made about the left periphery. However, now we lack a description of restrictions on movement in the left periphery. Is movement completely unconstrained? Or, is there some restriction on movement? We present evidence that supports the Lexical Variation Hypothesis over a syntactic constraint on movement.

Spanish is an ideal language for the investigation of the link between inversion and *wh*-movement, because inversion is required in every

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<sup>21</sup>Some Spanish speakers receive only a matrix interpretation with (74). These speakers disprefer inversion, and frequently assignthetic interpretations to sentences like (73). Therefore, it is questionable that these speakers share the same availability of optional inversion. These speakers also pattern with the data described in Uriagereka (1999), allowing an overt subject to block long distance movement. We leave investigation of a connection to future research.

clause between the *wh*-phrase and its trace (75) (Torrego, 1984)<sup>22</sup>, unlike English (76).

(75) Que dijo Juan que t comió Maria t?  
What said Juan that ate Maria

(76) \*What did Joe say that t did Stacey eat t?

In Spanish, if a phrase occupies [Spec, FocP] of the embedded clause at any point in the derivation, then inversion is required in the embedded clause. Similarly, if a phrase occupies [Spec, IntP], then inversion is not required in that clause. Therefore, the site of generation and the landing site of movement are clear in the surface representation, crucially required for determining the relation between inversion and site of generation.

What movement possibilities are available in Spanish? There are four logical possibilities, since the matrix clause can be either inverted or non-inverted, and the embedded clause can be either inverted or non-inverted. One of these variations was seen in (74) (Non inverted matrix, non inverted embedded). The remaining possibilities are shown in (77) - (79).

(77) Por qué dijo Juan que Maria comió las manzanas?  
Why said Juan that Maria ate the apples  
[matrix only] [Matrix inverted; embedded non-inverted]

(78) Por qué dijo Juan que comió Maria las manzanas?  
Why said Juan that ate Maria the apples  
[embedded only] [Matrix inverted; embedded inverted]

(79) \*Por qué Juan dijo que comió Maria las manzanas?  
Why Juan said that ate Maria the apples  
[Matrix non-inverted; embedded inverted]

(77), which exhibits inversion only in the matrix clause, maintains a matrix-only interpretation. Assuming that inversion indicates that the *wh*-phrase was generated in [Spec, FocP], it follows that *por qué* is generated in the matrix [Spec, FocP] and at no point in the derivation occupied the embedded clause. This suggests that movement can not occur from [Spec, IntP] to [Spec, FocP]. If such a movement were allowed, the long distance interpretation would be available. (78), which exhibits

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<sup>22</sup>The claim made by Torrego (1984) is not uncontroversial, but we suggest differences are dialect differences (Salanova, 2004). The judgments that follow come from two Spanish speakers, one from Spain and one from Latin America. While it may be the case that not all speakers require inversion in every clause, this appears to be a dialect separate from that reported in this paper. While the existence of such a dialect does not undermine the claims in this paper, that dialect makes testing the link between inversion and interpretation difficult. Therefore, I rely on the Spanish dialect reported by Torrego (1984).

inversion in both the matrix and embedded clauses, displays only the long distance interpretation. Because the embedded clause is inverted, *por qué* must have originated in the embedded phrase, triggering inversion, and then moved to the matrix clause, again triggering inversion. Finally, (79), with inversion in the embedded clause and non-inversion in the matrix clause, is ungrammatical. This suggests that movement from [Spec, FocP] to [Spec, IntP] is prohibited. A summary of these facts is shown in Table (2).

Table 2: Interpretation and Inversion in Spanish two clause questions

	Matrix Inv	Matrix Non-Inv
Embedded Inv	LD	*
Embedded Non-Inv	Matrix	Ambiguous

This pattern of facts can be explained in terms of a relation between the site of base-generation and the landing site. The ambiguity of (74) (non-inverted in matrix and embedded clauses) illustrates movement from IntP to IntP is allowed. The lack of a long distance interpretation in (77) (inversion in matrix, non-inverted embedded) shows that movement from IntP to FocP is not allowed. Similarly, availability of a long distance interpretation in (78) (inversion in embedded and matrix clauses) shows that FocP to FocP movement is permitted. Finally, the ungrammaticality of (79) shows that FocP to IntP movement is not permitted. These results are summarized in Table (3). The generalization

Table 3: Interpretation and Inversion in Spanish two clause *why* questions

	move IntP	move FocP
gen IntP	YES	NO
gen FocP	NO	YES

is that the position that a *wh*-phrase is generated in determines the position it can move to.

In this section, we showed that there can not be a universal ban on movement into [Spec, IntP]. However, we also showed that the relation between generation site and availability as a landing site of movement is not completely unrestricted. In fact, it appears that a *wh*-phrase must move to the same type of phrase it was generated in. In the next section, we show that the restrictions which govern movement are lexically based, as predicted by the Lexical Variation Hypothesis. Additionally, we detail the Lexical Variation Hypothesis, and indicate

an instantiation which specifies a more detailed implementation of the *wh*-criterion than that proposed by Rizzi (1996).

### 4.3 The Lexical Variation Hypothesis

We have seen that a theory which cross-linguistically restricts movement into one position does not work. We viewed this problem in light of two further possibilities. The first hypothesis, the Syntactic Variation Hypothesis, is that movement is syntactically restricted. This hypothesis claims that languages can parametrically vary in the word order possibilities they assign to each syntactic position. The second hypothesis, the Lexical Variation Hypothesis, claims that movement is restricted by lexical features. This hypothesis makes two claims. First, it predicts *wh*-phrases target positions which satisfy their lexically specified features, resulting in phrases moving to the same type of phrase they are generated in. Secondly, with respect to optional inversion, this hypothesis claims that optionality is not complete optionality, but that it is lexically governed.

The Spanish data presented in the last section shows that there is a restriction on movement that a *wh*-phrase must move to the same type of projection that it is generated in. That is, a phrase generated in [Spec, IntP] moves to the matrix [Spec, IntP]. If a phrase generated in the embedded [Spec, IntP] could move to the matrix [Spec, FocP], then one would expect (77) to have the long distance interpretation available. As shown, this interpretation is not available. In order to obtain the embedded interpretation in Spanish, either no inversion occurs (evidence of generation in [Spec, IntP], and movement to [Spec, IntP]) or inversion must occur the entire way up (evidence of generation in the embedded [Spec, FocP], and movement to the matrix [Spec, FocP]). This data supports the first part of the Lexical Variation Hypothesis, which claims that languages do not differ with respect to movement possibilities, but that each *wh*-phrase is specified for which position it targets<sup>23</sup>. The Syntactic Variation Hypothesis would predict movement into one type of phrase to be restricted, such as we saw in Rizzi's theory. Therefore, this account is not capable of parametrically restricting movement from one type of phrase to another type of phrase. Now, we must work through the details of the Lexical Variation Hypothesis, and show that the predictions for optional generation are borne out.

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<sup>23</sup>We must be careful about what 'a *wh*-phrase' means at this point. For our purposes, a *wh*-phrase may be underspecified in the lexicon which become valued as it enters the derivation, or we may have two separate lexical entries. In the latter case, it is not entirely clear how to capture the notion of 'the same *wh*-phrase'. For this reason, we consider *por qué* one lexical item, underspecified for its features.

What accounts for this requirement that *wh*-phrases must move to the same type of position they are generated in<sup>24</sup>? We claim that lexical items must have features which specify generation in either [Spec, FocP] or [Spec, IntP]. Rizzi allowed two types of features to satisfy the *wh*-criterion: the  $\mathcal{Q}$  feature heading IntP, and the +*wh* feature on Infl. He made no claims concerning the differences between these two features. Because these features are already part of the theory, and already target differential positions, we claim that these are the two features that *wh*-phrases are specified for. If this were not the case, we would expect all *wh*-phrases to be able to be generated in either position, an incorrect result.

Once it is specified in the lexicon which feature is required to satisfy the *wh*-criterion for individual lexical items, it is then clear why *wh*-phrases target the same position they are generated in. This is because only one projection contains the feature needed to satisfy the requirements of that *wh*-phrase. For example, *why* in English is generated in [Spec, FocP], so we deduce that it requires the +*wh* features from Infl to check its features. Therefore, *why* can not move to the matrix [Spec, IntP], since the  $\mathcal{Q}$  features can not satisfy the requirements for *why*<sup>25</sup>.

Now we are prepared to evaluate the two hypotheses in their accounts of optional inversion. The Syntactic Variation Hypothesis claims that languages are parameterized for word order differences by position. That is, even if a *wh*-phrase is generated in [Spec, IntP], an optionally inverting language may allow verb raising, even though it is not necessary to check any features. This predicts that a sentence which contains inversion in the matrix clause, but no inversion in the embedded clause (77) would be ambiguous. Generation could occur in the embedded [Spec, IntP] (and inversion is not required, because it is optional), and movement occurs to the matrix [Spec, IntP]. Again, inversion is optional under this hypothesis, so inversion can occur in the matrix clause. This would result in the long distance reading. However, as we saw, this reading is not available. (77) can only have the matrix interpretation.

The Lexical Variation Hypothesis states that there is no cross-linguistic variation with respect to the properties of the projections in the left pe-

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<sup>24</sup>In this paper, we consider mainly forms of *why*. However, phrases like *what* are clearly generated in an internal position, not in the CP domain. For these cases, we claim that these phrases are specified for what type of phrase they must move to (i.e. which feature they require), and movement would remain to a similar position cyclically to the front of the question.

<sup>25</sup>This leaves open the question of the exact nature of the *wh*-criterion, if different phrases have different requirements. We leave this open for future research.

riphery. Optional generation is captured by the lexicon being underspecified for which generation site is permitted. It is this possibility that is capable of maintaining the generation and movement possibilities we have seen in the previous section. Assume Spanish can generate *por qué* in either [Spec, IntP] or [Spec, FocP]. In this case, we can say that *por qué* has two entries, so that its *wh*-features can be satisfied by either type of feature, the features on the verb, or in IntP. It is crucial to maintain that *por qué*'s features can not be optionally checked by either type of feature, because this hypothesis would then be reduced to the Syntactic Variation Hypothesis. If there are two separate entries for *por qué* (or one item underspecified for features), then it is straight-forward why the feature requirements are locked when it enters the derivation. Either *por qué<sub>F</sub>* (generated in FocP) or *por qué<sub>I</sub>* (generated in IntP) enters the derivation, and once entered, does not have the possibility of switching *wh*-phrases. Therefore, the item that is entered requires movement to a position which satisfies its particular *wh* feature.

Let us consider a derivation in which *por qué* enters the derivation in the [Spec, FocP] (<sub>F</sub>) of the embedded clause, as in (80).

(80) [Juan dijo [ <sub>FocP</sub> por qué<sub>F</sub> que Maria comió las manzanas ] ]

Since *por qué<sub>F</sub>* entered the derivation in [Spec, FocP], it requires the +*wh* features from Infl to satisfy the *wh*-criterion<sup>26</sup>. In the next step of the derivation, inversion is required in the embedded clause, resulting in (81).

(81) [Juan dijo [ <sub>FocP</sub> por qué<sub>F</sub> que comió Maria las manzanas ] ]

Next, *por qué<sub>F</sub>* moves to the [Spec, FocP] of the matrix clause, and inversion occurs in the matrix to satisfy the *wh*-criterion, as in (82).

(82) [ <sub>FocP</sub> Por qué<sub>F</sub> dijo J [ <sub>FocP</sub> t que comió M las manzanas ] ]

Notice, in (82), movement to [Spec, IntP] is not permitted. *Por qué<sub>F</sub>* requires the +*wh* features from Infl, and can not be satisfied by the +*wh* features inherent to IntP, as shown in (83).

(83) [ <sub>IntP</sub> Por qué<sub>F</sub> Int J dijo [ <sub>FocP</sub> t que comió M las manzanas ] ]

In (83), there is a type mismatch between *por qué<sub>F</sub>* and the Int head, and the *wh*-criterion can not be satisfied. The derivation will not converge.

<sup>26</sup>Notice that in order to derive the observation that inversion is triggered in the embedded clause, the *wh*-criterion no longer strictly applies to checking interrogative features. This is a problem for any account in which inversion is triggered by successive cyclic movement, as in Torrego (1984). We make no additional claims concerning this issue.

Similarly, a derivation in which *por qué* enters the derivation in [Spec, IntP] will converge when movement occurs to [Spec, IntP] positions. Let us consider a derivation in which *por qué* enters the derivation in the [Spec, IntP] (<sub>I</sub>) of the embedded clause, as in (84).

(84) [Juan dijo [ <sub>IntP</sub> por qué<sub>I</sub> Int que Maria comió las manzanas ] ]

Since *por qué* entered the derivation in [Spec, IntP], no inversion is required in the embedded clause. *Int* satisfies the *wh*-criterion for *por qué<sub>I</sub>*. Next, *por qué<sub>I</sub>* moves to the [Spec, IntP] of the matrix clause, and the matrix *Int* satisfies the features of *por qué<sub>I</sub>* in the matrix clause (85).

(85) [ <sub>IntP</sub> Por qué<sub>I</sub> Int J dijo [ <sub>IntP</sub> t que M comió las manzanas ] ]

Notice, in (85), movement to [Spec, FocP] is not permitted. *Por qué<sub>I</sub>* requires the +*wh* features from *Int*, and can not be satisfied by the +*wh* features from Infl, as shown in (86).

(86) [ <sub>FocP</sub> Por qué<sub>I</sub> dijo J [ <sub>IntP</sub> t que M comió las manzanas ] ]

In (86), there is a type mismatch between *Por qué<sub>I</sub>* and the Infl +*wh* features, and the *wh*-criterion can not be satisfied. This derivation will not converge.

As shown, derivations converge only when a *wh*-phrase moves to the same type of position in which it was generated, since each lexical item requires a specific feature to check its features. It is important to note that Spanish 'optionally generates' in either FocP or IntP because it contains a lexically underspecified item, not because either feature can satisfy the features of *por qué*. If it were the case that either feature could satisfy *por qué*, we would expect FocP to IntP or IntP to FocP movement to be permitted, which is not.

The Lexical Variation Hypothesis claims that the only restriction on *wh*-movement is that the movement must occur to a position which satisfies the features of that particular *wh*-phrase. The data support this type of hypothesis. Furthermore, we showed that optionality in inversion also lends support to this hypothesis, leading to the conclusion that Spanish is a language in which a *wh*-phrase is underspecified for its features. Therefore, this is a possibility that must be available to the child. In the next section, we will investigate if this insight into how adult language works can shed light on what the grammar of non-inverting English-speaking children is.

## 5 Acquisition of Inversion and Interpretation in *why* Questions

To describe the observed correlation between word order and interpretation in *why* questions, we adopted the Lexical Variation Hypothesis, which claims that the only restriction on *wh*-movement with respect to position is a lexical one. In a similar vein, it has been observed that children's production of *why* is non-adult-like. Thornton and Berk both hypothesize that children adhere to a restriction of movement into IntP, hypotheses that are in line with the Syntactic Variation Hypothesis. They predict *Why-Non-Inverters* (WNIs) will not be able to obtain the full range of interpretations available to adults. Berk's hypothesis predicts that WNIs will interpret two clause *why* questions with a matrix only interpretation. Thornton predicts that WNIs will treat inversion as a signal of movement, and that they will interpret inverted two clause *why* questions with a long distance interpretation, as a result of a misset parameter. We have shown that neither of these strategies are reflective of the adult grammar. We predict, that if children are in line with the space of cross-linguistic variability, that they will allow movement into both positions. We claim that the source of children's overgeneration is a result of underspecification in the lexicon, as is the case in the adult grammar of Spanish. This account predicts that children, even WNIs, will maintain both the matrix and long distance interpretations of two-clause *why* questions.

We conduct two experiments testing children's production and comprehension of *why* and *how come*, two phrases which differ with respect to inversion and interpretation, to determine the relation between inversion and movement in the grammar of young children. We find that WNIs maintain the full range of interpretations available to adults with *why*, suggesting that even WNIs allow generation of *why* in [Spec, FocP]. This fact is not revealed by their production, but comes out in evidence from their comprehension.

### 5.1 Purpose

The continuity hypothesis ((Thornton, 1990), (Crain and Pietroski, 2002)) claims that children only make mistakes consistent with the range of possibilities allowed in adult human languages. Previous research attempts to adhere to the continuity hypothesis with respect to the delayed inversion in children's *why* questions: analyzing child language in light of Rizzi's analysis. Thornton claimed that English-speaking WNIs were 'speaking Italian', meaning they generate *why* in a non-inverting position, but move it to an inverted position in the matrix clause. In this paper, we show that this description and the analyses of

the adult grammar can not be maintained. Therefore, the acquisition claim must be reinvestigated. Is Thornton's analysis correct? If this is the case, children may potentially be unaligned with the continuity hypothesis, as we have not yet found an adult language which behaves according to Rizzi's predictions. Alternatively, is there an account of children's interpretations which give us insight into how their grammar is structured, that would allow us to keep children's acquisition in line with what is observed in adult languages?

Thornton (2004) claims that WNIs are speaking Italian, as described by Rizzi (2001). The *Perché* Hypothesis claims that when WNIs intend matrix interpretations, they will not invert, since they must be base generating *why* in [Spec, IntP]. When WNIs intend the long distance reading of a two-clause question, they will invert because *why* long distance movement is permitted only into [Spec, FocP], which requires inversion. If this is the case, children are predicted to produce *why* non-inverted (in [Spec, IntP]), and move it to [Spec, FocP], displaying inversion when the long distance interpretation is intended. Crucially, under this hypothesis, a child is generating in only one position. There is no optionality in generation: non-inversion means base generation and no movement, and inversion strictly signifies movement to [Spec, FocP]. It is of particular interest, then, how WNIs interpret two clause questions. Under the *Perché* Hypothesis, these children treat inversion as a cue of movement. Therefore, we would predict that WNIs would interpret two clause questions with the long distance interpretation.

Furthermore, if it is the case that children treat *why* like *how come* when they are not inverting, as claimed by Berk, this suggests that WNIs will only be able to obtain the matrix interpretations of two clause *why* questions.

The hypothesis presented in this paper predicts that for children, there is no universal ban on movement. We predict movement is restricted by the lexical features, and therefore, predict availability of long distance movement for both *wh*-phrases that do and do not trigger inversion. A table of predictions made by these three hypotheses are presented in Table (4).

The two experiments in this section investigate which interpretations are available to both WNIs and *Why*-Inverters. Because the interpretation is a direct indication of movement, we can determine which positions children allow as landing sites of movement. Additionally, assuming that children adhere to movement into the same type of phrase, we can infer the available generation sites. These two sources of infor-

Table 4: Predictions about Interpretations available to *Why*-Non-Inverters in two clause *why*-type questions

Analysis	Production	<i>how come</i>	<i>why</i>
<i>How come</i>	Non-inverted	matrix only	matrix only
<i>Perché</i>	Non-inverted	matrix only	LD only
Lexical Variation	Non-inverted	matrix and LD	matrix and LD

mation, combined, give us a complete picture of the relation between inversion and movement in the child’s grammar.

In this section, we present an experiment designed to test if there is a correlation for children between inversion and long distance movement, and to determine the exact nature of this relation. If WNIs maintain the full range of adult-like interpretations (both matrix and long distance interpretations) with *why*, this suggests they allow both movement and generation in [Spec, FocP], as adults do. However, if WNIs are restricted in their interpretation, we can then determine their grammar and the relation between production and their comprehension. We are interested in why children produce non-inverted sentences, and what this production, in combination with a look at comprehension, tells us about the range of possibilities open to a child.

## 5.2 Description

In this section, we present two experiments designed to test the relation between inversion and interpretation. The first experiment is an elicitation task, while the second experiment is an interpretation task. The elicitation task was designed to elicit *why* questions from children, to tell whether they were consistently inverting or not. The second task was a question interpretation task, designed using the Questions-After-Stories-task (DeVilliers et al., 1990). Ambiguous questions such as (87) were asked to children after a story which made both the matrix and long-distance readings felicitous.

(87) Why did Joe say Monster ate his sandwich?

The goal of these experiments is to see if there is a correlation between inversion and availability of a long distance reading. If WNIs initially treat *why* like *how come*, as Berk suggests, then we would expect non-inversion and matrix-only interpretations to be correlated. If Thornton is correct, we would predict that WNIs treat inversion as an indication of movement, suggesting a much higher percentage of long distance interpretations. Additionally, we predict only matrix readings with *how come*, because the phrase is not inverted. If movement is not syntacti-

cally restricted, then we expect both readings to be available with both *why* and *how come* for both *Why*-Inverters and WNIs.

### 5.3 Experiment One

Experiment one is an elicitation task designed to determine whether children were inverting with *why* questions. This task is essential since previous studies have claimed a relation between lack of inversion in production and their grammar.

#### 5.3.1 Materials and Methodology

For the elicitation task, children were shown a small alien toy, and told that this alien would not talk to the experimenter, but that the experimenter needed to ask him some questions. The child was asked if he/she would ask the alien some questions to help the experimenter. The experimenter then prompted the child, as shown in (88) or (89), alternating.

(88) I need to find out where the alien lives. Could you ask him?

(89) Could you ask him where he lives?

This variation was added to assure that the child could not simply be repeating the prompt given, an effect which would appear quickly with use of different prompt forms. Once the child answered, the alien gave some answer which contributed to the ongoing discussion. This process continued until the script had been completed.

The script consisted of two practice questions, and 18 target questions: 6 *what*, 6 *where*, and 6 *why* questions. These question words were chosen so arguments, adjuncts and *why*-type questions were equally represented. Responses were recorded by audio. Children were scored as *Why*-Inverters if they inverted 5/6 times with the *why* questions. Children were scored as *Why*-Non-Inverters if they did not consistently invert with *why*, but were inverting with the other *wh*-items.

#### 5.3.2 Subjects

Subjects were 25 children between the ages of 3;5 and 5;0, with a mean age of 4;4. Children were selected from preschools surrounding College Park, MD. An additional 6 children, which were excluded from experiment two, were also excluded from experiment one<sup>27</sup>. No children were excluded on the basis of data from Experiment one.

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<sup>27</sup>Experiment two was conducted first in chronological order.

### 5.3.3 Results

Of the 25 children tested in experiment one, 6 children were WNIs, while the remaining 19 were inverting with *why*. All WNIs inverted with the remaining *wh*-phrases. The mean age of each of the groups was 4;4.

### 5.3.4 Discussion

Experiment one confirms in an experimental setting the observations from naturalistic data. We find that children fail to invert with other *why*, but succeed in inverting with the remaining *wh*-phrases, confirming that *why* inverts later than other *wh*-phrases, as found by Thornton (2004) and Labov and Labov (1978).

From experiment one, we confirm the finding that *why* inverts later than the remainder *wh*-phrases in production. However, production is not perfectly representative of grammar, and we must also view comprehension in order to understand the state of the child. From the production data available, we have two compatible hypotheses. (a) WNIs have grammars different from that of English-speaking adults ((Berk, 2003), (Thornton, 2004)), which results in non-adult-like production or (b) WNIs have the same grammar as adults, but are producing non-adult-like utterances for other reasons. In the next section, we present an experiment that determines the comprehension abilities of WNIs in order to lend support to one of the hypotheses.

## 5.4 Experiment Two

Experiment two addresses children's comprehension of two clause sentences with and without inversion. First, it has not been tested whether or not children adhere to the restriction on long distance interpretations with *how come* in order to determine if non-inversion restricts the grammar, as predicted by Thornton (2004) and Berk (2003). Once we obtain information about children's interpretations, we can determine whether there is a correlation between non-inversion in production and comprehension. In order to determine the state of a WNIs grammar, we must examine the same children on both production (experiment one) and their comprehension.

### 5.4.1 Materials and Methodology

The story interpretation task was designed using the Questions-After-Stories-task (DeVilliers et al., 1990). Pictures were shown on a computer, with a recorded voice, so that the stories were consistent between children. Children watched the stories with a puppet, and were

told that the puppet had a really hard time figuring out what happened in the story, so the puppet may need to ask a question about what happened. The target questions were either *why* or *how come* questions, as shown in (90) & (91).

(90) Why did Joe think Monster ate his sandwich?

(91) How come Joe thought Monster ate his sandwich?

Children responded to the puppet, and their response was recorded on a digital recorder, and also notated by hand. Then the experimenter began the next story.

There were a total of 24 story-question pairs in the story interpretation task. 12 of these story-question pairs were targets. Counterbalanced measures include: *wh*-phrase (*why* or *how come*), matrix verb (*say* or *think*)<sup>28</sup> and story type (matrix-biased or non-biased, described below). The remaining 12 story-question pairs were control items which test the availability of both matrix and long distance readings. 6 of the control questions are interpretable only with a long distance interpretations, as in (92) and (93).

(92) What did Joe think was in the tree?

(93) Who did Joe announce won the prize?

Half of these questions used *who*, and half contained *what*.

The remaining 6 of the control questions had only matrix interpretations available. Either *wh*-movement was blocked (by a medial *wh* as in (95) (3 questions) or by a factive verb (96) (1 question)), or was infelicitous according to the story, as in (94) (2 questions).

(94) When did Joe pretend to be a dog?

(95) Where did Joe say what big Jack rode?

(96) When did Joe figure out he got a new book?

Half of these stories used *when*, and half used *Where*. All target questions used either *say* or *think* as the matrix verb, divided evenly.

The target stories followed one of two formats. The first story format is called the 'matrix biased' story, in which the main character, Joe, has a mistaken belief about the embedded clause. The second story format is the 'non-biased' story, where no mistaken belief occurs. Critical

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<sup>28</sup>These verbs were chosen because they easily allow both readings. It has been argued that *think* is evidential, and therefore, no genuine matrix reading available. For this reason, we include *say*, which behaves as a typical verb. Furthermore, the availability of matrix readings with *think* suggests that it is not exclusively evidential.

to this task, only questions were used in which the matrix and long distance interpretations yield different answers. Notice, this is not the case in many two clause *why* questions, as in (97).

(97) Why do you think Joe is wearing a sweater?

In this case, *because it's cold outside* is both a viable reason for having this thought, and a rational reason for the wearing of the sweater. Cases such as these were avoided for this task, as clause of interpretation is critical for the experimental results.

In 'matrix biased' stories, a mistaken belief occurs about the embedded clause. These types of stories were determined to be biased toward the matrix interpretation from adult piloting. In the story, Joe believes something falsely, which biases the question towards the matrix interpretation (the reason for thinking). A sample story follows, corresponding to the scenes in Figure (3).

*Joe walks up to Monster in the lunchroom, and sees an empty plate (a). Joe says, 'Oh, you're sandwich is gone, you must have eaten lunch without me, you must have been really hungry (b). I guess I'll go eat somewhere else'. Joe leaves (c). Then, Monster reveals he did not actually eat his sandwich, but it fell on the floor (d).*

The child would then be asked the target question, as in (98).

(98) Why did Joe think Monster ate his sandwich?

There are two possible answers made salient in the story. The matrix response is *because Joe saw the sandwich was gone*, which is Joe's reason for thinking that monster had eaten. The long-distance response is *because Monster was hungry*, which is the reason that Monster would have eaten his sandwich, according to Joe.

The second format is a 'non-biased' story. In these stories, there is no confusion incurred by the main character in the story. According to adult pilot results, these stories are slightly biased toward the long-distance reading, since there is no prominent discourse reason to ask about the reasons for thought or speaking. A sample story follows, corresponding to the scenes in Figure (4).

*Joe walks into the room and sees Fred all bundled up (a). Joe says, 'Geez, you must be cold, you're wearing your coat inside'(b). Then Joe notices that the window is open, and says, 'No wonder you are cold. The window is open!' (c). Joe offers to help out and shut the window (d).*

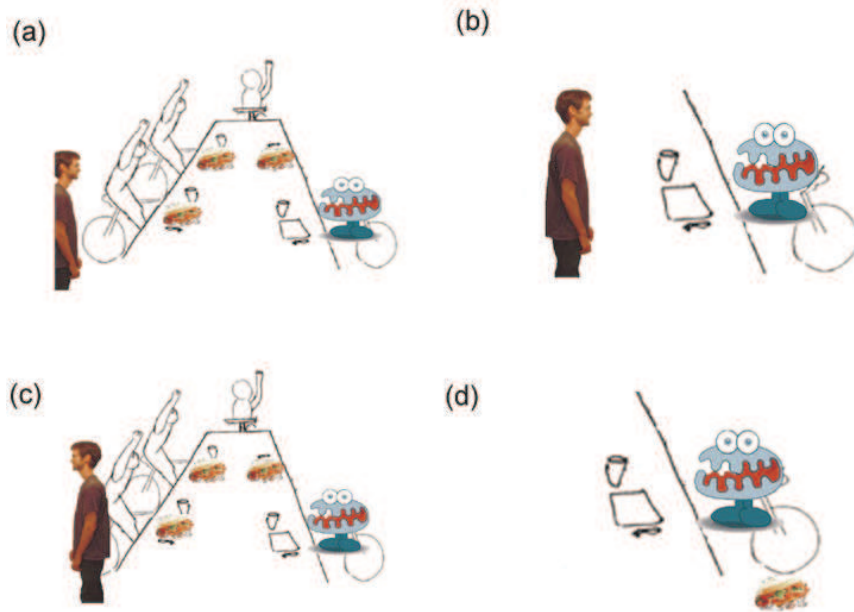


Figure 3: Matrix biased story

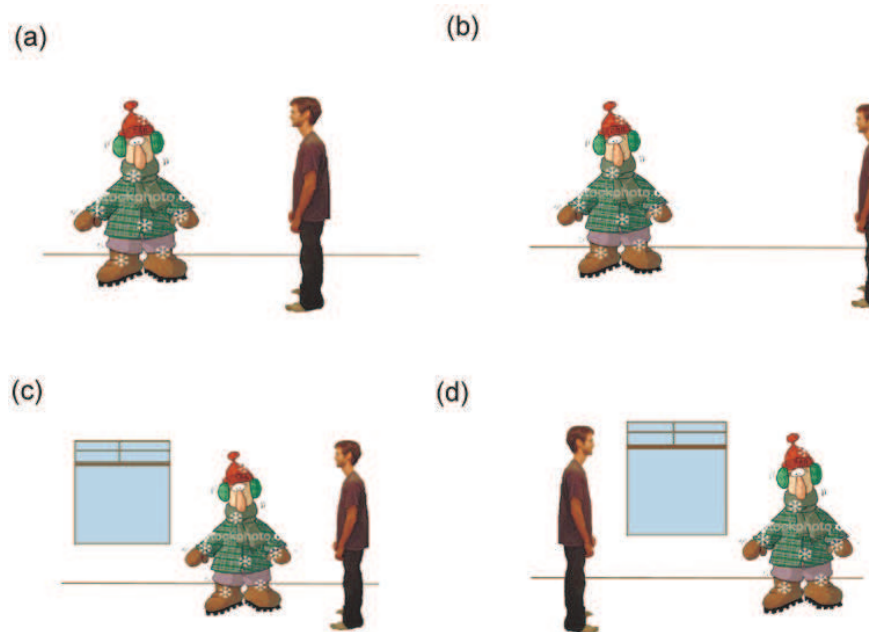


Figure 4: Non-biased Story

After completion of the story, the puppet would ask the child the target question, as in (99).

(99) Why did Joe say Fred was cold?

As in the last story format, there are two possible answers made salient in the story. The matrix response is *because Joe saw Fred wearing a coat*, which is Joe's reason for thinking that Fred was cold. The long distance response is *because the window was open*, which is the reason that Fred was cold, according to Joe.

#### 5.4.2 Subjects

The same children that participated in experiment one participated in experiment two. An additional 6 children were tested and excluded, due to responses that did not correspond to what happened in the story (e.g. responses like *because he was happy*) for more than two stories. This resulted in 25 subjects total. If a child gave non-adult answers (perhaps demonstrating theory of mind problems on the 'matrix-biased' stories), he/she was included in the study, but those particular items were disregarded for purposes of analysis of a long-distance/matrix

reading<sup>29</sup>.

Adult subjects were 14 undergraduate students recruited from the University of Maryland. The procedure was performed exactly the same as for the children, except that a puppet was not used to elicit responses. Instead, the experimenter directly asked the target questions. Responses were recorded by hand on a response sheet.

### 5.4.3 Results

Recall, experiment two was designed to investigate two questions: (a) Are children adult-like in their restriction on long distance readings with *how come?* and (b) What is the correlation between non-inversion in production and interpretation? There are two findings from this experiment with respect to these questions. The first finding is that children appear to restrict long distance interpretations with *how come*. For this study, we present proportions of matrix and long distance interpretations, equal to the number of matrix/long distance interpretations divided by the total number of responses. As shown in Figure (5), children allow more lower readings with *why* than with *how come*. This difference is statistically significant ( $p < .01$ ).

Adults, as expected, disallow a long distance reading with *how come* ( $p < .01$ ). The children do not differ statistically in allowing long distance readings with *how come* from adults ( $p = .18$ ). Although it appears that children allow more long distance readings with *why* than adults, this difference is not significant ( $p > .05$ ). These results suggest that all children are adult-like in restricting long distance interpretations with *how come*. This suggests that English-speaking children do not allow movement into [Spec, IntP], at least with this particular lexical item.

The second finding is that children WNIs have a full range of interpretations available in comprehension. Recall that previous accounts predicted either that WNIs would be restricted to matrix interpretations or to long distance interpretations. The results of experiment two show that these predictions are not borne out, as WNIs allow both matrix and long distance interpretations with two clause *why* questions, as shown in Figure (6).

There is no statistically significant difference between the number of matrix interpretations obtained with *why* between WNIs and *Why*-Inverters ( $p = .09$ ). This suggests that there is no difference between the *Why*-Inverters and the WNIs with respect to interpretations available with *why*. Furthermore, on control items, all children demonstrated ability to obtain both matrix and long distance interpretations.

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<sup>29</sup>An example of this type of answer for a question like (98) would be *he didn't eat the sandwich*, which could not be interpreted as either a matrix or embedded reading

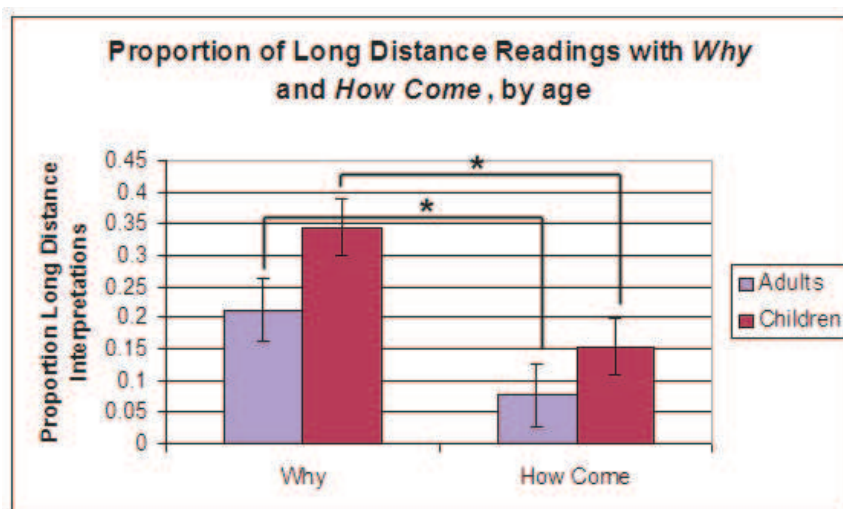


Figure 5: Adults vs. Children

This shows that even though WNIs produce *why* in [Spec, IntP], they allow movement to [Spec, FocP]. Because inversion occurs in *why* questions in English, [Spec, FocP] is the only position in which one can interpret a *why* question.

#### 5.4.4 Discussion

From experimental results, we have shown that while WNIs generate *why* in [Spec, IntP] (resulting in non-inversion), they allow movement to [Spec, FocP]. Generation in [Spec, IntP] is derived from the production facts, and movement to [Spec, FocP] is shown from the children's availability of long distance interpretations in inverted two-clause *why* questions.

The predictions made from the hypotheses of Thornton and Berk are not borne out. Recall Thornton's hypothesis: that WNIs generate in [Spec, IntP] and move to [Spec, FocP]. With this grammar, children would be unable to achieve a long distance interpretation for an item in [Spec, FocP]. Berk hypothesized that WNIs would obtain only matrix interpretations in two clause *why* questions. We showed that WNIs maintain the full range of interpretations available in the adult grammar, contra the predictions made by Thornton's and Berk's analyses.

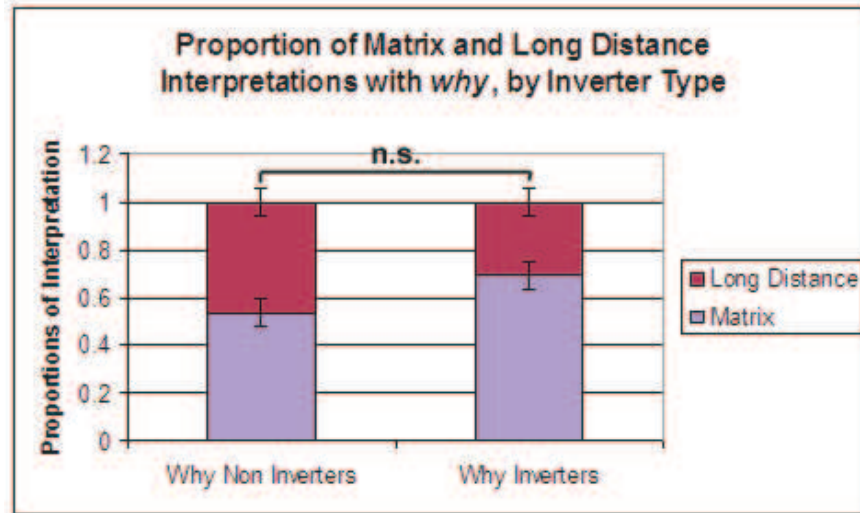


Figure 6: *Why*-Non-Inverters vs. *Why*-Inverters

Now that we have determined that even WNIs have access to both matrix and long distance interpretations, there are two explanations remaining. The first explanation is that children are in accord with the Lexical Variation Hypothesis, and allow *why* to be generated in either FocP or IntP. The second potential explanation is that children generate in [Spec, FocP], but allow movement to either position, suggesting no adult-like connection between the generation site and movement possibilities. While the experimental results can not conclusively decide between these two explanations, we claim the latter explanation is theoretically undesirable, and falls short of accounting for the facts. We claim that the data from these two experiments are support for the Lexical Variation Hypothesis.

First, let us state why a complete non-relation between inversion and movement is theoretically undesirable. In order for children to obtain both matrix and long distance interpretations, it must be the case that non-inverting children generate *why* in [Spec, IntP], but then allow movement to either [Spec, IntP], or [Spec, FocP]. We claim this hypothesis would be a difficult account to maintain as a strategy of acquisition of *why* questions. The first reason this account is undesirable is that it is unclear, under this account, what drives movement in the child's grammar. In this paper, we have investigated two hypotheses, the Syntactic Variation Hypothesis, and the Lexical Variation Hypothesis, both of which assume movement occurs to a given position for a principled

reason. If children are able to move lexical items freely, we would have difficulty characterizing their grammar under the current system. Furthermore, one would need to stipulate why it is only *why* that behaves freely with respect to movement, but not the other *wh*-phrases. This is difficult to capture if there is no mechanism to account for landing site of movement. Second, this type of mistake would be difficult to recover from. That is, if a child has a grammar as described, they would require evidence of which interpretations are available in two clause *why* questions in order to determine the restrictions on movement in their language. This type of input may be both sparse, and unreliable, as two clause questions frequently remain ambiguous even in a rich discourse context.

As an alternative account, we suggest that the data from WNIs is in line with the Lexical Variation Hypothesis. That is, the only way children behave is to assume that *wh*-phrases are specified for a given feature, and therefore, move only to the same phrase they generate in. This suggests that even though their production is often limited to [Spec, IntP], they are capable of generating *why* in either [Spec, FocP] or [Spec, IntP]. Under this account, this is the only way to permit movement to [Spec, FocP]. This means English-speaking children have grammars similar to that of Spanish, where we have seen optional generation is permitted.

We now can state why *why* is different. Because *why* is able to be generated directly in the left periphery, it can resist inversion much longer than a *wh*-phrase that can not be. Children invert quickly with *what*, because this base generation is not an option.

If generation in either [Spec, FocP] or [Spec, IntP] is optional, then why do children prefer generation in [Spec, IntP] in production? That is, why don't children invert with half of their *why* questions in production to reflect this optionality? While we do not have an answer, a suggestion that this fact is robust comes from production data in languages where inversion is optional with *why*, like Spanish. In adult Spanish, where generation in either position is allowed, adults prefer non-inversion over inversion. A preliminary CHILDES search also suggests that 4-5 year old children prefer to generate in [Spec, IntP] with *por qué* (18% of *por qué* questions), slightly more than is represented in the adult input (10%), resulting in non-inverted questions (McWhinney, 2000)<sup>30</sup>.

This may suggest that the same preference we see cross-linguistically for generation in [Spec, IntP] appears with optionally inverting lexical

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<sup>30</sup>This data comes from 20 files from the files BeccsCESNo.

Table 5: Number of *por qué* Questions Produced

	Children	Adults
Null Subject	32	44
Non-Inverted	6	3
Inverted	1	2

items, and therefore, we should not be surprised this preference arises in English-speaking children.

In order to become adult-like English-speakers, children need to learn that inversion with *why* is required, a fact which may be learned by an abundance of inverted *why* questions in the input<sup>31</sup>. Fortunately, no evidence of long distance interpretations or multi-clause utterances is needed, which may be required under alternative hypotheses.

Because movement is permitted to [Spec, FocP] in the child grammar, we suggest that WNIs allow generation in both [Spec, FocP] or [Spec, IntP]. If it were the case that children generate in [Spec, IntP], but allow movement to [Spec, FocP], as Thornton suggests, then we would expect WNIs to allow only long distance interpretations in two clause *why* questions, which is not the case. Therefore, we claim English-speaking children have the option of generating *why* in either [Spec, IntP] or [Spec, FocP]. In this way, children abide by the cross-linguistic patterns observed in many languages, that movement is restricted to a certain type of phrase, suggesting lexically specified features. Additionally, WNIs behave similarly to the grammar of Spanish, which allows *why* to be generated in either [Spec, FocP] or [Spec, IntP]. That children do not abide by the hypotheses centered on Rizzi's approach also provides evidence against a universal restriction on movement into IntP.

## 5.5 Loose *how come* Ends

Our account predicts that long distance movement would be restricted only by the site of generation. However, experiment two shows that young children (4 years of age) show knowledge of the restriction on long distance movement with *how come*, despite having a preference of long distance readings over adults. We have shown that many languages (Italian, Spanish, BP) allow generation in [Spec, IntP] and move-

<sup>31</sup>If children believe that the generation site of *why* is optional, then there is a question about how they restrict their lexicon, because all input will be consistent with a hypothesis of optionality. We expect that an indirect negative evidence account is sufficient, here. Because we claim that site of generation is part of the lexical entry, we predict *why*<sub>IntP</sub> would be eliminated in the same way that children eliminate novel verbs, such as *noising* for *to make noise*.

ment into the matrix [Spec, IntP], so it would be a problematic acquisition strategy for a child to assume that [Spec, IntP] is not an available landing site for movement (as was the hypothesis made by Rizzi and Thornton). Therefore, we have a remaining mystery: how do young children know that *how come* can not be interpreted long distance? Assuming that information about a long distance interpretation is unavailable, a child needs to look for a co-occurring piece of positive evidence. There must be another cue that allows children to determine that *how come* is different from *why*, and that it is restricted to matrix interpretations.

### 5.5.1 Phrasal Heads

Difficulty in answering this question arises from the fact that it is not agreed upon how to restrict movement with *how come* in the adult grammar. There has been one hypothesis which explains a property of *how come* which identifies the source of restriction on long distance movement. Collins (1991) suggests that *how come* is a discontinuous constituent; with *how* in [Spec, CP] and *come* as a head. The unavailability of long distance movement derives from the fact that non-constituents can not move. That *how come* contains a verbal element would be an easy property for children to observe, and perhaps they assume the head analysis quite early<sup>32</sup>.

The analysis proposed by Collins, which treats *come* as a head, also explains the lack of inversion. Since there is a head occupying C, no inversion can occur<sup>33</sup>. Collins' analysis that *how come* does not move long distance derives from a specific lexical property of that item, namely that it is not a constituent. However, the observation that other *wh*-phrases with similar semantics do not move long distance casts doubt on this type of analysis.

### 5.5.2 The Surprise Operator

*How come* is not the only *wh*-phrase in English that can not move long distance. DenDikken and Giannakidou (2002) observes that *the hell* adjuncts, such as *why the hell* can not be interpreted long distance (100).

(100) Why the hell did Joe say Stacey left? [matrix only]

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<sup>32</sup>Of course, care needs to be taken with this hypothesis. It can not be the case that any two word question phrase sparks a head analysis in children. Two word question phrases such as *che cosa* 'what' in Italian, and *por qué* 'why' in Spanish are able to move long distance and are clearly not heads. One difference with *how come* may be the verbal nature of the *come*. The fact that *come* is a verb may allow it to be a verbal head, allowing children to separate *how come* from *wh*-phrases with a complementizer component.

<sup>33</sup>Clearly, this precedes the discussion concerning the division of the left periphery.

Ochi (2004) links these types of phrases, which he calls Secondary Adjunct Phrases, with *how come*, because both disallow long distance movement<sup>34</sup>. If it is the case that the same mechanism is responsible for banning long distance movement in both of these cases, then it can not be the case that inversion plays any role. Notice that while *how come* must be non-inverted, *why the hell* is inverted (100). This suggests that lack of inversion can not be correlated to lack of long distance movement, which eliminates any appeal to differences in syntactic position.

However, now, the question still remains: what property is shared by both *how come* and adjunct *the hell*-phrases that explains the lack of long distance movement in both cases? One suggestion at a solution comes from the fact that *how come* and *the hell* share semantic properties. Both are used in situations in which the event that occurred is contrary to the speaker's expectations ((DenDikken and Giannakidou, 2002), (Lee, 1994), (Kay and Fillmore, 1999)). In this section, we show how this special felicity condition can account for lack of long distance movement<sup>35</sup>.

In this section, we define surprise as follows: the proposition expressed by the complement of *how come* goes against the expectations of the speaker (i.e. are surprise questions (Kay and Fillmore, 1999), (Lee, 1994))<sup>36</sup>. This is the case with *how come* and *why the hell*<sup>37</sup>, which are infelicitous to use when the expectation in the common ground is in line with the speaker's utterance (101)-(102). This is not the case with *why*, which can be asked as a request for information (103), even when the complement of the question is in the common ground (103a).

- (101) a. ?? We expected Joe would leave. So how come he left?  
 b. We expected Joe would stay. So how come he left?
- (102) a. ?? We expected Joe would leave. So why the hell did Joe leave?  
 b. We expected Joe would stay. So why the hell did Joe leave?

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<sup>34</sup>Ochi covers a number of other similarities, including lack of question-quantifier interaction. Because we pursue a semantic analysis, we do not outline the details of Ochi's analysis here

<sup>35</sup>Thanks to Alexander Williams for most of the semantic insight in this section

<sup>36</sup>For the remainder of this paper, the term 'complement' refers to the *how come* question, minus *how come*.

<sup>37</sup>Argument *wh* the hell-phrases behave differently from adjunct *wh* the hell-phrases (DenDikken and Giannakidou, 2002), in that they allow long distance readings, as shown in (1).

- (1) What the hell did Joe say you bought t?

- (103) a. We expected Joe would leave. So why did he leave?  
 b. We expected Joe would stay. So why did he leave?

The question part of the *how come* question is a request for a reason about why the speaker's expectations were wrong. That is, it is a question about why the presupposition was not fulfilled in the real world.

Let us now encode this information formally. In the semantics, questions contain a question morpheme, generated at the front of a question. This morpheme acts to build the set of possible answers to the questions. From the question in (104a), we build the representation in (104b). We represent the possible set of answers in (104c).

- (104) a. Who left?  
 b.  $\mathcal{Q}$  [who left]  
 c. {Joe left, Stacey left, ...}

This question morpheme is an operator which binds a variable at the site where the question word is generated (Karttunen, 1977).

Because *how come* questions express that the complement was counter to the speaker's expectations, we say that *how come* questions are surprise questions. The question operator in a *how come* question has different content from a normal question operator. Rather than building a set of possible answers, the morpheme in *how come* questions the failure of a presupposition to be met, as in (105). This contrasts with *why* questions (106), where there is no presupposition.

- (105) a.  $\mathcal{Q}_{surp}$  how come Joe left?  
 b. presupposition: Joe should not have left  
 c. question: why did the presupposition not play out?  
 (106) a.  $\mathcal{Q}$  why did Joe leave?  
 b. presupposition:  
 c. question: what is the reason such that Joe left?

In this way, *how come* questions (along with *why the hell* questions) are different from standard *why* questions<sup>38</sup>.

Now, we have the tools to explain why *how come* cannot be interpreted long distance. That is, we can now explain why the question in (107a) can not have the interpretation in (107b).

- (107) a. How come Joe said Stacey left?

<sup>38</sup>For the purposes of this analysis, it does not matter if there is a different question morpheme for surprise questions, or if there is merger of the standard question morpheme with a surprise operator.

- b. How come Stacey left, according to Joe?

(107a) has the representation in (108).

- (108) a.  $Q_{surp}$  Joe said [that how come Stacey left]
  - b. presupposition: Joe should not have said that Stacey left
  - c. question: why did Stacey leave?
- (109) a.  $Q$  did Joe say [that why Stacey left]
  - b. presupposition:
  - c. question: why did Stacey leave?

Because the *how come* question under the current interpretation has a downstairs interpretation, it is a request about information for *why Stacey left*, in the context of stating that *Joe's saying* was against expectations. Therefore, the inability of *how come* to be interpreted long distance is a consequence of the question being misaligned with the presupposition<sup>39</sup>, which does not occur with *why* questions (109). This captures the lack of long distance movement with *how come* and *why the hell* questions.

### 5.5.3 Learning the Surprise Restrictions

The potential roadblock to this being an effective learning strategy for the child is that young children (4 years old) show knowledge of the constraint of movement on *how come*, which may be before children are capable of acquiring the pragmatic knowledge necessary to make this argument work. We know that children around the age of 4-5 frequently fail to obtain adult interpretations due to semantic/pragmatic failure ((Crain et al., 1996), (Dehaene, 1997)). Then, it remains a mystery as to how children integrate pragmatic information into their grammar. Therefore, children's adult-like performance with *how come* is unexplained. Any account which is syntactic (i.e. correlating lack of inversion with lack of long distance movement) will automatically fail cross-linguistically. However, a semantic account relies on information children may not integrate. Therefore, the mystery remains as to how, if movement and generation are decoupled, children know the restriction on long distance interpretations with *how come*.

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<sup>39</sup>The account outlined here is a way of capturing the fact that the surprise component of *how come* is what restricts its ability to be interpreted long distance. However, this is not the only way to capture this fact. Another possible way would be to follow the semantic islands approach (Rullmann, 1995). Under this type of account, the surprise operator would prevent the generation of a maximal set of responses, and restrict long distance movement just as with negative islands.

## 6 Future Research

In this paper, we have made claims concerning the syntax and acquisition of *why*-type phrases. Even though we have accounted for a number of facts, numerous questions remain. In this section, we describe some areas remaining for future research in both syntax and acquisition.

### 6.1 Syntax

We have investigated *why*-type questions with respect to their differing positions in the left periphery. However, some questions have been raised by the claims in this paper. First, it is unclear how to explain the original Rizzi (2001) observation concerning the blocking of long distance interpretations in two clause *why* questions with a focus phrase in the matrix clause. Second, although we have suggested a way to explain the lack of a long distance interpretation with *how come*, there are many other restrictions which pattern with *how come*-type phrases that remain unexplained. Third, it has been proposed there is a relation between semantics and the position of a *wh*-phrase. This connection with the left periphery, too, remains to be examined.

#### 6.1.1 The Role of Focus

Recall Rizzi's (2001) observation that, in Italian, a focus phrase the matrix clause of a two clause question blocks the long distance interpretation, repeated in (110), repeated from (57).

- (110) Perché A GIANNI ha detto che si è dimesso? [matrix only]  
why TO GIANNI said that he resigned

Similarly, Uriagereka (1999) claims that, in Spanish, when the matrix clause of a two clause question contains an overt subject, the long distance interpretation is also blocked, as in (111), whereas (116) is ambiguous.

- (111) Por qué Juan dice que beberá cerveza? [matrix only]  
why Juan say that will-drink beer  
'Why does John say that he will drink beer?'

- (112) Por qué dice que beberá cerveza? [ambiguous]  
why say that will-drink beer

In this paper, we claim that these examples do not show that movement is restricted into IntP. However, in these cases, something restricts movement of *why* into the matrix clause.

In (110), it is a focus phrase present in the matrix clause that blocks long distance movement. In (111), it is an overt subject. What do these two types of phrases have in common? Notice, in (111), the overt subject is accompanied by a null subject in the embedded clause. Because Spanish is a pro-drop language, subjects are optional. This means, that when a subject is overt, it must have a special discourse reason to do so (Recall, our CHILDES search revealed that 89% of adult *por qué* questions contain a null subject). Therefore, we suggest that an overt subject in Spanish can play the same role as focus in blocking long distance movement.

The question that remains is the mechanism by which focus phrases block long distance movement of *why*. If it is the case that an overt subject behaves similarly, then it can not simply be a result of the syntactic position. It may be the case that the restriction to a matrix reading in these cases is simply a discourse effect. We can even recreate this effect in English, although English lacks the fine division of the last periphery. In (113), the matrix reading is available when *to Bill* is interpreted as a focus phrase<sup>40</sup>.

(113) Why did Joe say Stacey ate pizza to Bill?

That this effect also occurs in English, without being sentence initial, suggests this may be a discourse restriction on the interpretation of two clause questions. That focus in the matrix clause forces interpretation of the matrix clause makes intuitive sense, but this notion must be captured in a more formal manner.

### 6.1.2 Further Distributional Differences of SAPs

In this paper, we reviewed some interpretation restrictions on *how come* and *the hell* phrases. Namely, that these *wh*-phrases can not be interpreted long distance in two clause questions. However, a number of other restrictions have been observed with these Secondary Adjunct Phrases (Ochi, 2004). Ochi observed that these phrases pattern together in a number of other restrictions. One observation is that SAPs cannot undergo question quantifier interaction (115)-(116), while this is acceptable with *why* (114).

(114) Why did everyone leave? [wh > every, every > wh]

(115) How come everyone left? [wh > every, \*every > wh]

(116) Why the hell did everyone leave? [wh > every, \*every > wh]

<sup>40</sup>Recall, the distinction between a focus phrase and a topic phrase is that a focus phrase is new information. Both the matrix and long distance readings are available in (113) when *to Bill* is interpreted as a topic phrase. This would occur in a case where *Joe said one reason to Bill, but another reason to Susan, and another to Tom*, and one is asking about what the reason is that Joe gave to Bill.

(115) can ask about *the reason that all of the people left*, but cannot ask *for each person, what is the reason that person left*. Both of these readings are available with *why*.

Another restriction in the distribution of SAPs is that they cannot occur in multiple questions (118), as is permitted with *why* (117).

(117) Why did you eat what?

(118) \* Why the hell did you eat what?

While (117) can be answered with a pair-list answer, such as *I ate the hamburger for the iron, I ate the pickles because they were free,...*, (118) is ungrammatical, even when this answer is available in context.

Still, there are further restrictions that must be explained. SAPs are restricted from occurring in-situ in some languages, like Brazilian Portuguese, but are allowed in other languages, like Japanese. Some SAPs are permitted rhetorical questions (DenDikken and Giannakidou, 2002), while others are not (Conroy, 2005).

This paper has addressed the distribution of these types of phrases only from a syntactic perspective (and a hint at a semantic perspective in section (5.5)). None of what is presented in this paper can account for the data shown in this section. Clearly, additional work is needed to create an account which will describe all of the lexical and cross-linguistic variation in this domain.

### 6.1.3 Correlation Between Meaning and Syntax

In this paper, we have shown that different *why* type words have different distributional properties, suggesting they occupy different positions in the left periphery. However, we have assumed base generation in the left periphery for all *why*-type words, which may not be the case. Stepanov and Tsai (2006) have suggested that some *why*-type words can be directly generated in the CP domain, while others are generated VP internally. They suggest the split makes a semantic cut. They claim that reason *why*-type words are generated VP internally, while purpose *why*-type words are generated in CP. We will not review the motivation for this claim here, but simply raise the question concerning what effect this hypothesis makes concerning the division of the left periphery. It remains to be explored if meaning differences or further syntactic ramifications correspond to the differing positions in the left periphery.

## 6.2 Acquisition

We have suggested that English-speaking children treat *why* as an optionally inverting lexical item. However, there are a vast number of questions concerning the acquisition of *why* questions that remain to be explored. First, we do not know which indicators children use to learn a *wh*-phrase cannot be interpreted long distance. Second, it is unclear what types of input children have access to in the domain of interpretation of multi-clause questions, knowledge of which would no doubt be helpful in solving the learning problem. We outline these ideas for future research here.

### 6.2.1 *Why on Earth?*

We showed that children as young as four years old know that *how come* cannot be interpreted long distance. However, we have not determined how they come to know this fact. It is possible that children treat non-inversion as a cue of lack of long distance movement. This would be inconsistent with the hypothesis presented in this paper, but still a possibility. A second possibility is that children observe the surprise meaning of *how come* quite early, and it is this surprise interpretation that is an indicator of unavailability of long distance movement.

In order to tease these two possibilities apart, one would need an inverting *why*-type word, which contains the same sort of surprise interpretation available with *how come*. As we have seen, such a lexical item is *why the hell*. While this would not be appropriate for testing with children, a similar item such as *why on Earth* may be. A Question-After-Stories-Task with *why on Earth* would reveal whether children allow a long distance interpretation with an inverting, but semantically surprised element.

However, it is not clear what we could conclude from such an experiment. If children reject long distance interpretations with *why on Earth*, there are two possible interpretations. The first interpretation is that children know the surprise status of *why on Earth*, and therefore, are rejecting long distance interpretations for adult-like reasons. The second interpretation is that *why on Earth* is a lexical item that children do not hear very often, and children first assume a *why*-type word can not be interpreted long distance. In this case, children would not have adult-like knowledge about surprise *why* questions, but the result falls out of default assumptions. Similarly, if we find that children allow long distance readings with *why on Earth*, we can not conclude information about their grammar. One interpretation is that children rely on non-inversion as a cue, and since *why on Earth* inverts, they

assume it can be interpreted long distance. A second interpretation is that children simply do not have enough experience with *why on Earth* to have learned its surprise status. In this case, they are adult-like in their knowledge with *how come*, but have not gained this representation with *why on Earth*.

It is necessary to determine how children's grammars are restricted, and how they come to learn these restrictions. *Why on Earth* is a *why*-type word that separates out two potential strategies children may use for restricting long distance interpretations. However, the results from such an experiment are not so clearly interpretable. Further research must be done concerning children's default interpretations, the lexical items they have learned, and their connections before such an experiment can be successfully conducted and interpreted conclusively.

### **6.2.2 Default Assumptions of Movement**

It has been found that young children prefer the long distance interpretation in two clause adjunct questions (DeVilliers et al., 1990). Experiment two shows that a small increase in the number of lower readings allowed by children than by adults. Although this result was not significant in our experiment, the question still exists as to why this observation holds.

One thing we do not yet know is what a child's default interpretation of two clause *why* questions is. Is it the case that children assume a *why*-type phrase does not move long distance until proven otherwise? This would be convenient in the learning of restrictions on long distance movement (in cases like with *how come*), but would seem to predict that very young children would rely on matrix interpretations. Alternatively, it could be the case that children learn long distance movement early from *wh*-phrases like *what*, which must be interpreted long distance in two clause questions. In this case, the question arises as to why the interpretation of argument *wh*-phrases would effect that of adjuncts.

Further complicating this question is that we do not know what drives interpretation in adults. That is, although adults arrive at one interpretation when presented with an ambiguous two clause question, we have very little evidence concerning what factors drive which interpretation is selected. Further research is needed in this realm, as well.

### 6.2.3 Available Input

In the previous section, we discussed some questions about what children's defaults are. However, this question to some extent, relies on the question of what evidence is available to the child. Specifically, do children have access to information about interpretation of two clause *why* questions?

Another ambiguity in natural language is the interaction between scope and negation. (119) can be interpreted as *none of the horses jumped* (isomorphic) or *not all of the horses jumped* (non-isomorphic) (Musolino et al., 2000).

(119) Every horse didn't jump over the fence

Let us assume that a child must figure out if the non-isomorphic interpretation is available in their language. In a situation where two horses jump over the fence and one does not, and the sentence in (119) is uttered, this is a useful cue for the child. This statement-world pairing would be inconsistent with the isomorphic interpretation, so it may be possible that information about interpretation (in a rich context) may be available to the child.

The same may not be the case for *why* question ambiguity. Consider the sentence in (120).

(120) Why do you think they call them counties? (example from Google)

The first difficulty a child encounters is that the question may be addressed to them, in which case the child has no access to information about which reading was intended. However, assume that the child observes a question-answer pair between two adults. If the answer is felicitous under only one interpretation, this may be a way in which a child learns about which interpretation was meant. However, no answer will disambiguate between the two readings in (120). As discussed in the context of our experimental design, only situations in which one person has a false belief will the two readings be disambiguated. Therefore, it seems very unlikely that children have access to the interpretations which correspond to sentences.

The word order-interpretation problem is made even more complex in Japanese, where *why* can occupy multiple positions, each yielding different interpretation possibilities (121)-(124).

(121) Naze Joe-wa Stacey-ga kitato omotteiru-no? [ambiguous]  
why Joe-nom Stacey-top came think-Q  
'Why does Joe think Stacey came?'

- (122) Joe-wa naze Stacey-ga kitato omotteiru-no? [ambiguous]  
 Joe-nom why Stacey-top came think-Q
- (123) Joe-wa Stacey-ga naze kitato omotteiru-no? [embed only]  
 Joe-nom Stacey-top why came think-Q
- (124) Joe-wa Stacey-ga kitato omotteiru-no naze? [matrix only]  
 Joe-nom Stacey-top came think-Q nom

If a child must have evidence about interpretation to learn what readings are available, then a Japanese-learning child will have a very difficult task.

It seems that children may not have access to disambiguating information about interpretation of two clause *why* questions. However, this means that restrictions on interpretation must follow from other correlated, easily observable properties. Therefore, a puzzle remains concerning how children learn available interpretations cross-linguistically, and what light this may shed on their default states.

### 6.3 Summary

In this section, we have seen that a number of questions remain concerning both the syntax and acquisition of *why*-type words. We hope that investigation of these two areas will lead to a greater understanding of the structure of *why* questions, and what information children bring with them to the learning problem.

## 7 Conclusions

This paper investigated the source of children's delayed inversion with *why* questions. This delayed inversion mirrors the distribution of *wh* phrases cross-linguistically; *why* is frequently a non-inverting *wh*-phrase even in languages where the remainder of the *wh*-phrases trigger inversion. This parallelism suggests a link between the mechanism underlying children's grammar of *why* questions, and the grammar of *why* in languages which do not require inversion. Therefore, we investigated the distribution of *why* questions cross-linguistically.

In this paper, we adopted a feature-based system of the left periphery, as developed by Rizzi (1997, 2001). Although we adopted the relation between word order and site of generation, the strictest interpretation of this hypothesis claims that IntP, the privileged position for *why* questions, is not available as a landing site of movement. This claim made cross-linguistic predictions, and suggested a restricted correlation between word order and interpretation. We found that, although it is the

case that word order restricts interpretation, evidence from Italian and Spanish shows the relevant restriction does not prohibit movement into IntP. Instead, we showed that movement is restricted to the same type of phrase the *wh*-phrase was generated in.

The observation that *wh*-phrases must move to the same type of phrase they are generated in led to an investigation of the mechanism underlying optional inversion. We outlined two competing hypotheses: the Syntactic Variation Hypothesis suggested that the properties of IntP differ cross-linguistically with respect to movement permitted. The Lexical Variation Hypothesis claimed that the syntax of IntP remains identical cross-linguistically, but the optionality we see is a result of underspecification at the lexical level. We showed that the Lexical Variation Hypothesis must be correct, otherwise the interpretations in Spanish would not be able to be described.

Moreover, we determined that the source of variation in *why* questions cross-linguistically extends naturally to children. Recall, we have determined that in the adult grammar, *wh*-phrases must move to the same type of phrase they are generated in. This competed with the hypotheses put forth by Thornton and Berk. Thornton predicted movement must occur to FocP, regardless of position of generation. Berk also suggested movement into IntP is barred, and assumed that production of non-inverted *why* questions is an indicator of their sole generation in IntP. These accounts predicted that children who are not inverting with *why* will be restricted in their interpretation of two clause *why* questions. We conducted two experiments on the production and interpretation of *why* and *how come* questions. We showed that children who are not inverting maintain the same interpretations as children who are inverting. This suggested that non-inverting children are able to generate *why* in both [Spec, FocP] and [Spec, IntP], just as is in optionally inverting languages.

In sum, we investigated the available divisions in *wh*-phrases. *Wh*-phrases divide into a number of different classes. Most of these divisions (as in the argument/adjunct distinction and ability to be D-linked) are consistent cross-linguistically, but the location of the dividing line concerning word order is not. It appears that *why* questions are most likely to appear non-inverted, even in languages where the remainder of the *wh*-phrases trigger inversion. Since there is wide variation, this is an area where we would expect children to be open to the range of choices. We showed that English-speaking children do allow some lexical overgeneration, but do not appear to differ syntactically from English-speaking adults. We claimed this observation reflects the

adult grammar. Although we believe *why* may differ in its lexical specification cross-linguistically, we claimed that the syntax of the left periphery is the same in every language. The restriction that *wh*-phrases move in a manner consistent with their feature specifications, reduces the hypothesis space available to the child.

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