No Question About Free Relatives: Evidence from Child English*

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The family of constructions in English involving “Wh words" and their equivalents in other languages have held great importance for a long time within the generative tradition of syntax and semantics. Specifically, a lot of work has focused on analyses which theoretically unify different varieties of Wh constructions (as in Chomsky 1977) and to examine the relationship between Wh constructions and question constructions more generally (as in Karttunen 1977). That is, the similarities between the constructions in (1) and between those in (2).

(1) Wh Constructions

a What did Dora eat?
b What Dora ate is delicious
c I don’t know what Dora ate

(2)
a Did Ben eat a sandwich?
b I don’t know whether Ben ate a sandwich.
c Why did Ben eat a sandwich?

In what follows I will examine evidence from child and adult English which begins the extent to which these constructions are in fact related in their syntactic representations. The focus will be in particular on the different sorts of interpretations given to two different embedded Wh constructions, Free Relative Clauses (FRCs, like (1b)) and embedded Wh questions (like (1c)). I will argue that the evidence favors a distinction between the syntactic representation of these two different constructions despite apparent similarities.

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The structure of the paper is as follows: The first section details some previous approaches to a variety of different Wh constructions, especially in embedded contexts, in adult and child language. The second section presents evidence from adult English data supporting an approach to Free Relative Clauses which does not involve Wh movement as it is traditionally conceived of. The third section gives background on approaches to Tough Movement constructions in adult and child language. The fourth and fifth sections describe the design, results, and implications of two experiments which explore predictions for child language of the theoretical approaches developed in the previous sections. The sixth section discusses pragmatic factors which may have been at play in both experiments. The seventh and final section summarizes the findings of the previous sections and the problems these data raise for theoretical approaches to Wh constructions.

1 Wh and Question Constructions

In many ways, the formation of different types of question clauses and the syntax of Wh constructions are closely tied in English. In this section, I will review previous work demonstrating (or asserting) this connection in adult and child language. Key ideas that will be seen are the existence of similarities between question clauses (a semantic class) and Wh clauses (a syntactic class; clauses involving Wh movement), and similarities across crosslinguistic strategies of linking main and embedded clauses, particularly with regard to linking embedded Wh clauses to matrix question clauses.

1.1 Main and Embedded Questions

An important step in describing the relationship between Wh movement and question formation is some understanding of question formation as a whole. A leading idea driving a lot of investigations comes from Hamblin's (1973) suggestion for the formal semantics of questions, namely that they denote a set of possible answers. So, the questions in (3) would have the denotations in (4)

(3) a Is the wolf scary?
b What did Dora see?

(4) a {The wolf is scary, the wolf is not scary}
b {Dora saw a wolf, Dora saw a bear, Dora saw nothing, . . . }

Karttunen (1977) proposes that both matrix questions and embedded questions should be unified semantically (though Karttunen's suggested semantics strictly proposes that question clauses denote specific answers rather than sets of possible answers), giving the sentence-denotation pairs between (5a-b) and (6a-b).

(5) a Ben knows whether the wolf is scary.
b Ben knows what Dora saw.

(6) a Ben knows that {the wolf is scary, the wolf is not scary}
b Ben knows that {Dora saw a wolf, Dora saw a bear, Dora saw nothing, . . . }

Another relevant property of the semantics of questions, and Wh questions in particular, is that they require exhaustivity; that is, an answer to a Wh question must be exhaustive (or as exhaustive as possible given with the respondent knows). That is, in (7), (a) is an unacceptable answer because it does not list all the possible (true) answers to the question; (b) is a better answer. The answer in (c) is better than (a) in that while not being complete, makes clear that it is as complete as the respondent's knowledge allows.

(7) Who came to the party (Ben, Molly, and Theodor came)
a #Ben
b Ben, Molly, and Theodor
c I know Ben came (but I don't remember who else)

In English, the usual syntactic correlate of question formations are auxiliary inversion (leftward movement of the item marking tense left, with 'do' inserted in the absence of an independent auxiliary) and Wh movement (fronting of a phrase containing a Wh word). Notable about these are that while Wh movement has to occur in all clauses (matrix or embedded) with question semantics which contain a Wh word, auxiliary inversion does not occur in embedded contexts.

(8) a Have you met Ben?
b Who has Ben met?
c To whom has Ben given apples?

(9) a I wonder whether you've met Ben
b I wonder who (*has) Ben has met
c I wonder to whom Ben gave apples

It thus appears that auxiliary inversion is not a necessary correlate of question formation; further on we will see that Wh movement (of at least one sort) may also be a product in non-question contexts, and pursue one possible explanation as to why this should be the case.

1.2 Wh movement and Relative Clauses

A second environment in which Wh movement is seen is in the formation of Relative Clauses. The most clear evidence for this is in the fact that both involve Wh items fronting within a clause and leaving a gap.

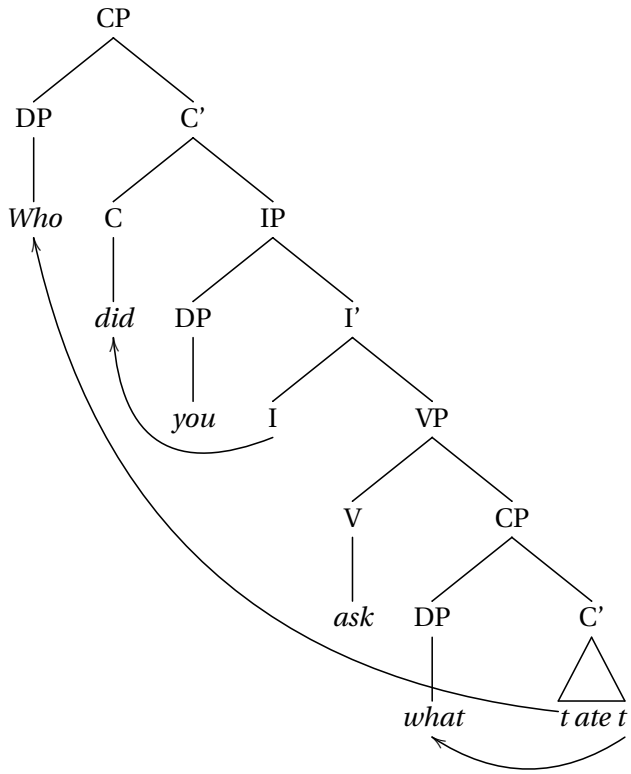
(10) a Ben introduced Molly to the man **who** she had met (*him) before
b Ben introduced Molly to the man **to whom** she had given a book

A second piece of evidence for this similarity is in the interaction of both relative clauses and embedded questions with the formation of matrix Wh questions. Specifically, that both relative clauses and embedded questions create “islands" to further Wh movement (Ross 1967); that is, the matrix Wh word cannot be interpreted within another clause in which Wh movement has occurred. This is demonstrated by the ungrammatical questions in (11); in (a), the subject of the lower verb ‘eat’ can’t be pronounced in the matrix left-most position while the same verb’s object is fronted within the local clause; (b) shows that the subject of a verb within a relative clause cannot be Wh moved past the relativizing Wh word ‘which’.

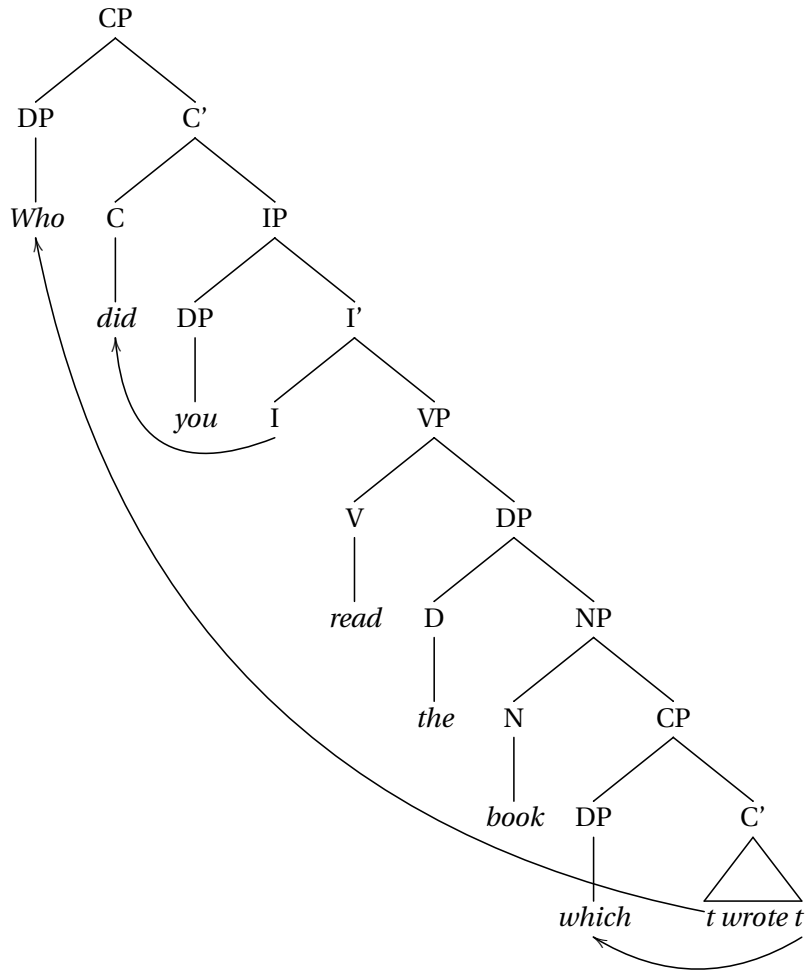
(11) a *Who did you ask what ate
b *Who did you read the book which wrote

A standard analysis of these “island" effects is that Wh expressions must move cyclically from their base-generated position in an embedded clause to their spoken matrix position, and (at least in English) the embedded clause does not allow multiple Specifier positions; that is, long distance movement of one Wh expression blocks local movement of another (Chomsky 1981). This is illustrated by the tree in (12) for embedded question clauses and in (13) for relative clauses; in both cases, a Wh word in the embedded clause has moved into the specifier of the embedded CP, forcing the other Wh word to make a long-distance single-step movement into the matrix CP’s specifier, a move ruled out by Subjacency.

(12) Island violation with embedded question



(13) Island violation with relative clause



1.3 Partial Movement and Wh Scope Marking

A related pattern is seen in some languages, and seems to give support to the explanation for island effects described above *and* seems to have some relationship with children's interpretations of embedded Wh clauses. This pattern is often called "Partial Movement", and involves a Wh word which only moves to the lower specifier position (with, in many languages, an expletive Wh word in the matrix CP specifier). German is a language where either long-distance Wh movement or Partial Movement may occur; in the latter case, *all* clauses between the base generated position and the surface position must have Wh words in their specifiers.

(14) German Wh patterns (from Müller 1997)

a *Was glaubst du wann daß sie gekommen ist*
What think you when that she come is
'When do you think she is coming?'

b *Wann glaubst du daß sie gekommen ist*
When think you that she come is
'When do you think she is coming?'

c *Was meinst du was sie gesagt hat wann sie kommen würde*
What think you what she said has when she come would
'When do you think she said she would come?'

While many different approaches exist to the proper theoretical treatment of patterns like this, little of this variation calls into question that the Wh word in a partial movement case like those above has moved into a local Specifier of CP. Rather, most variation pertains to the proper semantics of the expletive Wh expression itself. These approaches divide more or less between Direct Dependency analyses, which take the *Was* in (14a and b) (or its equivalent) as coreferent with the contentful Wh word which remains in its local clause (for example Müller 2000), and Indirect Dependency analyses, which treat the expletive as coreferent with the entire clause containing the contentful Wh word (Dayal 1994, 2000). In the latter approach, the non-matrix clause is a restrictor to the scope marker in the matrix.

Dayal proposes that Hindi scope-marking constructions like (15a), while syntactically distinguishable from German, share indirect dependency semantics with both German and questions like (15b) in English. The analysis for both English and Hindi is that the second clause serves as a restrictor for the matrix Wh word. As (16) shows, both languages also share the property of blocking these constructions in the environment of matrix negation (which is not seen with English long-distance extractions).

(15) a *raj kya$_x$ soc-ta hai [sita kis-se bat kar-egi]$_x$*
raj what think-IMPF PRES [Sita who-with talk do-FUT]
'Who does Raj think Sita will talk to?'

b What does Raj think, who will Sita talk to?

(16) a **Raj kya nahi soc-ta [Sita kis-se bat karegi]*
Raj what not think-IMPF Sita who-with talk do-FUT
Intended: 'Who doesn't Raj think Sita will talk to?'

b *What doesn't Raj think? Who will Sita talk to?
cf. Who doesn't Raj think Sita will talk to?

Notably, other instances of post-posed clauses (in both question and non-question contexts) do not share this feature in English, and yet otherwise seem like they might involve similar sorts of coindexing of expletives with post-posed clauses; this is distinguished from Hindi, where equivalent constructions are still subject to negative islands.

(17) a It's not scary, what Dora saw
b Is it not scary, what Dora saw?

As Dayal proposes that necessarily similar semantics (rather than syntactic constraints) produce negative islands in each of these languages, it is thus curious that this apparently similar construction should not conform to the pattern. While I will not delve further into the etiology of negative islands, the following section will address briefly consequences for acquisition of complex Wh constructions of the similarities between the construction in (17) and scope marking constructions.

A last pattern that is of interest is a variant of this, sometimes called "Simple partial movement", involves movement of a Wh word within an embedded clause without an overt Wh scope marker in the matrix clause. Such patterns are seen in a variety of languages; (18) shows an example from Indonesian (Oiry and Demirdache 2006).

(18) *Bill tahu siapa$_i$ yang Tom cintai t_i*
Bill knows who FOC Tom loves [e]
'Who does Bill know that Tom loves'

1.4 Acquisition data

Previous studies of children's knowledge of question syntax and semantics have shown that certain aspects of question formation are trivially easy for children, while others are problematic until fairly advanced stages of acquisition. One issue of interest which frequently arises in children's acquisition of Wh constructions in English is non-adultlike construal of embedded question clauses.

Children as old as 6 may, as much as 20% of the time, appear to target embedded questions at the exclusion of matrix questions (de Villiers et al 2008). This occurs both when the embedded question appears in a matrix polar question (as in 19), and when it appears in a matrix Wh question (20).

(19) How did Ben say where he had gone?
a Adult response: By showing it on a map
b Child response: To the store

(20) Did Ben say where he had gone?
a Adult response: Yes
b Child response: To the store[1]

[1]This response is not completely ruled out in adult speech, but must be licensed pragmatically, such as in a circumstance where I am clearly looking for Ben, not just trying to find out what Ben said

Importantly, these effects do seem to be subject to syntactic constraints; specifically, finiteness of embedded clause has an impact on interpretation of embedded questions. de Villiers et al (2012) found that if the embedded clause is infinitival, children (at ages three and four) are significantly more likely to give a matrix-scope Wh answer (as in 21a, not answering in reference to what the subject did but what he said did) than with a tensed clause (as in b, answering in reference to what the subject said he did).

(21) a Did he say what to feed the rabbit? (he said he fed him a carrot)
b Did he say what Jimmy fed the rabbit? (he fed him an apple)

While it is in some senses difficult to say whether this behavior is due to non-adultlike abilities to parse complex sentences or non-adultlike grammars, the similarity between these sentences and scope marking constructions seen in other languages is suggestive of a connection, as is the fact that it is constrained by other syntactic factors. Further, children produce partial movement-like patterns while learning English (22; Thornton 1990), as well as while learning other non-partial movement languages like French (23; Oiry and Demirdache 2007).

(22) What do you think which animal says woof woof?

(23) *tu crois quoi qui est caché dans l'-sac*
you think what C is hidden in the-bag
'What do you think is hidden in the bag?'

This sort of analogy between patterns in acquisition and adult patterns crosslinguistically is also suggestive of an analysis which makes reference to different grammatical states rather than different processing abilities. In following sections I will present new data which I believe is suggestive that this grammatical approach is indeed a more accurate method of describing this type of non-adultlike linguistic behavior.

Another issue which arises in children's acquisition of Wh semantics is the exhaustivity requirement on Wh questions; adults require that Wh questions be given exhaustive responses and (monoclausal) multiple-Wh questions be given *paired* exhaustive answers.

(24) Situation: John ate an apple, a banana, and a pear

What did John eat?

Adult: An apple, a banana, and a pear
Child: An apple (or a banana, or a pear)

(25) Situation: John ate an apple, Mary ate a banana

Who ate what

Adult: John an apple, Mary a pear
Child: John ate an apple (or similar)

This sort of behavior persists for children until around 4 and a half years, notably earlier by a good degree than non-adultlike parsing of embedded questions. This seems to demonstrate that the longer-lasting issues children have with Wh constructions are due to the syntax and semantics of embedding rather than with Wh per se.

2 Free Relative Clauses without Wh Movement

2.1 How FRCs differ from other Wh constructions

On the surface, Free Relative Clauses seem like they should be given the same formal representation as other instances of English Wh constructions. Similarities between FRCs and other Wh constructions can be seen by the sentences in (26). FRCs involve a Wh word which is moved to the left edge of a clause (a-b), with filling of the argument position they vacate forbidden (c), *and* they create islands for further Wh movement (d).

(26) a Molly made what Ben ate
b *Molly made Ben ate it
c *Molly made what Ben ate it
d *Who did you make what ate (intended meaning: 'Who is such that you made what they ate?')

However, certain constraints on the form and interpretation of free relative clauses, especially where they on the surface resemble embedded question clauses, show that despite the shared syntactic property of creating an island for further Wh movement, formation of embedded questions and of FRCs are syntactically distinct properties. The first observation which will be key to addressing this question is that verbs (and predicates in general) differ with respect to either permitting, requiring, or forbidding clausal complements. Consider the verbs in (27): 'wonder' requires a clausal complement, 'see' allows either a clausal or nominal complement, and 'eat' allows only a nominal complement.

(27) a I wondered (that John was sleeping/*an apple)
b I saw (that John was sleeping/an apple)
c I ate (*that John was sleeping/an apple)

We can use this distinction to observe subtle distinctions between embedded question clauses and Free Relative Clauses

The clearest distinction between the two syntactically is that embedded questions allow for phrasal Wh items while FRCs do not, rather requiring the fronting of a lone Wh word. In (28), the verb 'wonder', which requires a clausal complement, allows either single Wh words, Wh phrases, or Wh phrases along with Pied-Piped Prepositional Phrases to front. In (29), the verb 'eat' which requires nominal complements, only allows single Wh words to front within the complement.

(28) a I wondered what Molly ate
b I wondered which bread Molly ate
c I wondered to whom Molly had given the bread

(29) a I ate what Molly ate
b *I ate which bread Molly ate
c *I ate with whom Molly had given the bread

This restriction also holds of FRCs in other positions. While embedded question clauses in subject position may be less common than post-verbally, they may be licensed by, for example, certain adjectives.

(30) a What John ate is tasty
b *Which apple John ate is tasty[2]
c Which apple John ate is well-known

(30a-b) shows the distinction between phrasal and single-word Wh items in a subject FRC, with the former being ungrammatical. (30c) shows that changing the adjective in favor of one which semantically allows for an embedded question saves the sentence in this form. This appears to demonstrate that phrasal Wh movement requires a question interpretation in this environment.

Further evidence for this comes from the interpretation of clauses following verbs such as 'see', which may take either nominal or sentential complements. As demonstrated in (31-32), fronting of a lone Wh word allows for an ambiguity that is eliminated when a Wh phrase is fronted. Conversely, with a verb that does not take sentential complements, like 'eat', the ambiguity is again eliminated, as shown in (33).

[2]This is grammatical on Wh question reading, where a complementizer has been dropped from 'Which apple that John ate is tasty'

(31) Ben saw what Molly ate

a Ben saw that x is the thing such that Molly ate x

b Ben saw x and x is the thing such that Molly ate x

(32) Ben saw which apple Molly ate

a Ben saw that x is the apple such that Molly ate x

b *Ben saw x and x is the thing such that Molly ate x

(33) Ben ate what Molly ate

a *Ben ate that x is the thing such that Molly ate x

b Ben ate x and x is the thing such that Molly ate x

We can think of the (a) interpretations in these examples as question interpretations; they require that the matrix subject know the answer to the question raised by the complement (in terms of Hamblin semantics, that they know which member of the set of possible answers correlates to the world in which they are in); the (a) interpretation is available for (31), required for (32), and hard to make any sense of at all for (33). We can think of the (b) interpretations as non-question interpretations; they pick out a referent and the matrix verb tells us how the subject interacts with that referent, but nothing about the subject's knowledge of the referent beyond that. This interpretation is available in (31), unavailable in (32), and the only sensible option for (33).

Another feature of the FRC is that it is semantically akin in some ways to a definite description. Two semantic features of definite descriptions are that they require the existence of the thing described, and that they are necessarily exhaustive in that they describe every possible referent. (Heim 1991). (34-35) show how these hold for both definite DPs and FRCs.

(34) Existence presupposition:

a Molly gave me the apples. #There are no apples

b Molly gave me what she gathered. #She didn't gather anything.

(35) Exhaustivity requirement:

a Molly gave me the apples (#There are three apples and Molly gave me two)

b Molly gave me what she gathered (#She gathered three apples and gave me two)

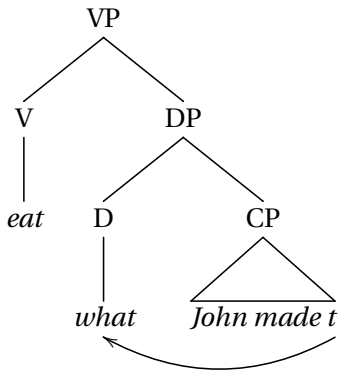
Notably, Wh questions (embedded or matrix) require exhaustivity but do not presuppose existence. (36a-b) show that an answer of 'nothing' is perfectly licit, while (36c-d) show that exhaustivity is still required.

(36) a What did Molly give you? ✓Nothing.
b I asked what Molly gave him. ✓He said, nothing.
c What did Molly give you? *An apple (she gave you two apples)
d I asked what Molly gave him. *He said, an apple (she gave him two apples)

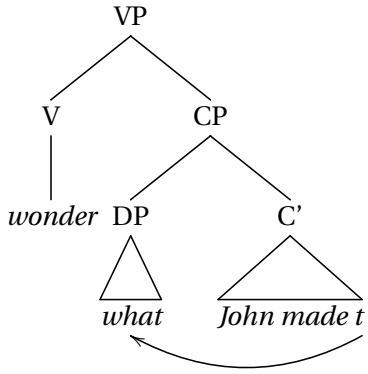
2.2 Representing FRCs formally

Donati (2006), noting correlation between predicates which take either nominal or clausal complements and those which either forbid or allow phrasal Wh movement (specifically, data like in (28-29)), offers a syntactic description of FRCs by representing them as instances of Wh head movement - movement of the Wh word itself out of its clause, adjoining with a D head which takes the clause as a complement (as in 37); embedded question clauses, on the other hand, involve the same sort of Wh syntax described in the previous section and thus allow for phrasal movement of a Wh expression into the specifier position of the embedded CP (as in 38)

(37)



(38)



Donati's explanation of this is in terms of a constraint on pied piping, specifically:

(39) A simple Wh structure excludes pied-piping exactly in those cases in which it occurs in a nominal position

Notably, this assumes that phrasal movement (ie. pied-piping) is the default Wh operation, which fails when the Wh clause is in a nominal position. This is more or less an entirely syntactic account, where the verb taking the clause as complement requires movement of a certain type. This seems descriptively roughly accurate; verbs of a certain semantic class (we can call these “knowledge verbs" in that they have some sort of requirement on what the subject knows) require complements of a certain type (CPs), and only in those environments is the pied-piping operation allowed.

This is not strictly an explanation, though, but rather a descriptive stipulation; neither is it obviously better than an explanation with a semantic origin, wherein the operation of phrasal Wh movement requires a certain interpretation. That certain verbs may be interpreted differently based on the presence or absence of phrasal interpretation would seem to point in the direction of a semantically-motivated explanation rather than a syntactic one such as Donati's, but other than this is it not clear how to choose between the two. It is sufficient for present purposes to show that there seems to be a reliable correlation between syntactic form (non-phrasal Wh movement) and semantic interpretation (definite description).

The data in (30) above would seem to indicate that some reference to semantics is important; these sentences demonstrate that even in the typically nominal subject position, a knowledge-related predicate licenses phrasal Wh movement. Other examples of English clausal subjects points in a similar direction:

(40) a That Molly brought fruit delighted me
b *That Molly brought fruit gave me apples

In this case, it is psychological/experience predicates which license clauses in a “nominal" position; the connection to the data about FRCs is generally that non-nominalized CPs are licensed in nominal positions by particular semantic types of predicates. Thus, even if we are to stick with a syntactic/categorial explanation of the behavior of FRCs, we might want a refined generalization such as (41).

(41) Wh Phrases may not occupy the specifier position of D

This may be because of requirements of which features may be on D vs. which are required to license Wh movement, and thus end up being semantic (or, strictly, a semantics-syntax interface issue) in nature.[3]

[3] I take one other departure from Donati's model, in that she assumes that, for economy reasons, single Wh words must be Wh heads rather than Wh phrases. This is implicit in her phrasing of the constraint on pied piping in (39); the phrase “exactly in those cases" seems to bar vacuous phrasal movement. To account for the semantic contrasts between FRCs and embedded questions, even where the Wh item is not phonologically complex, it seems to be necessary to revise this such that both head movement and small phrase movement are allowed and distinguishable in the grammar.

A remaining issue relevant to this is the status of 'whichever' relative clauses, as in (42), which seem on the surface to behave like FRCs but allow for apparent phrasal movement. The most notable similarity with FRCs is that they are blocked in embedded question contexts.

(42) a Molly ate **whichever apple** Ben ate
b **Whichever apple** Molly wants is fine
c *Ben wondered **whichever apple** Molly ate

Despite this apparent similarity to head-movement RCs, however, these seem to be semantically more akin to quantified nominals like 'any apple'. This can be seen in scope interactions with other quantified nominals; head-movement RCs cannot have inverse scope interpretations.

(43) No boy ate whichever/any apple Ben ate

a There is no boy x such that x ate any apple y such that Ben ate y
b For any apple y such that Ben ate y, there is no boy x such that x ate y

(44) No boy ate what Ben ate

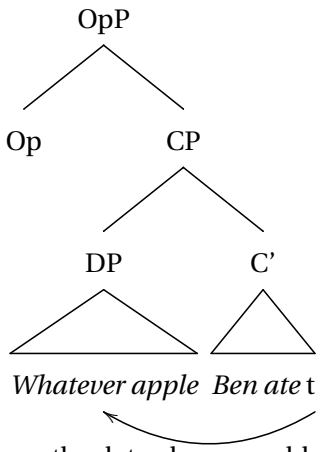
a There is no boy x such that x ate y such that Ben ate y
b *For anything y such that Ben ate y, there is no boy x such that x ate y

Specifically, what is shown by (44b) is that the relative clause in this sentence cannot be interpreted as an indefinite or free-choice item; it behaves like a definite description in being unable to take wide scope from object position, differing in this way from 'whichever' clauses. This demonstrates that the latter are more like quantified full relative clauses without overt complementizers than like free relatives derived by head movement. These will not enter into the current discussion; for current purposes it is sufficient to say that this is a separate type of relativization with distinct but similar semantic properties and dissimilar syntax; the behavior in child language of 'whichever' clauses would be predicted by this account to behave like other quantified nominals, not like definites or question clauses. An important generalization from these facts, though, might be that there is a correlation between phrasal relativization and indefinite interpretations; this generalization could be a key cue in the acquisition of these constructions.

Grosu (2003), who points out similar data indicating dissimilarity between question clauses and these sorts of relatives, analyzes both the type of free relatives of interest here and Wh-ever constructions as being of the same syntactic type, and involving Wh movement of the Wh-ever phrase; the difference from embedded question clauses seems to be attributed similarly to the syntactic position of the clause,

rather than internal differences (249f). The syntax, similar to the syntax for relatives suggested by LaBelle (1990) is roughly (45), where the head Op is a null operator which semantically transforms its sister CP to a predicate which may compose in its sentential context.

(45)



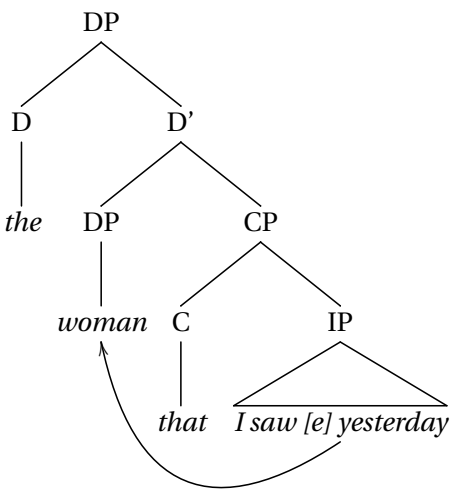
However, the data above would seem to argue against this sort of analogy with standard relative clauses, as nothing about it would explain the unavailability of phrasal Wh movement without the maximal (-ever) Wh expression.

2.3 Children's knowledge of relatives

Based on patterns in the acquisition of relativization in English and French, Guasti and Shlonsky (1995) argue that all relatives share a common type of derivation, wherein a D (or possibly N) head moves out of the clause, as in in (46).

(46) a The woman that I saw yesterday

b



Guasti and Shlonsky present arguments in favor of this analysis based on several acquisition facts. The first is that children consistently produce certain errors in the construction of full relatives, such as the use of resumptive pronouns (47) and the doubling of the relativized noun (48).

(47) (Child at 3;8, Labelle 1990)

sur la balle qu'-il l'-attrape
on the ball that-he it-catches
'On the ball that he catches it'

(48) (Child at 5;1, Labelle 1990)

sur la balle qu'-il lance la balle
on the ball that-he throws the ball
'on the ball that he throws the ball'

These types of errors are argued to imply that these children do not have access to abstract relativization operators, and consequently, the relative heads themselves are taken as operators; thus, forms like (47-48) are derived without movement. The connection to Free Relatives comes from the fact that FRCs appear earlier in children's production than do full relatives, as early as 3;6 (Flynn and Lust 1980). Guasti and Shlonsky argue that, as children generally allow for Wh movement, Wh expressions like those seen in (49) from Flynn and Lust allow children to see both the movement operation and the introduction of a relative.

(49) Cookie Monster eats what pushes Big Bird

Whatever other virtues their analysis may have, by making an analogy between FRCs and full relatives, Guasti and Shlonsky predict that either the syntactic and semantic facts presented in the previous section should not hold, or that children should not be sensitive to them. That is, children should go through a stage where FRCs and other embedded Wh constructions are treated as formally identical. In what follows I will present evidence that children are in fact sensitive to at least some elements of the distinctions outlined here between Question-forming Wh movement and FRC-forming Wh head movement.

The fact that FRCs emerge earlier than other relatives, if one assumes the syntax proposed in the previous section, is in keeping with recent proposals that children's syntax for DPs is built piecemeal, functional head by functional head, or perhaps feature by feature (Roeper 2003, Stickney 2007). That is, children have more difficulty with constructing complex DPs with multiple nested functional heads,

such as a partitive construction (50a), than a simpler structure with less functional material, such as a pseudopartitive (b), giving the former an interpretation more like the latter (Stickney 2007).

(50) a $[_{DP}\ [_{NP}$ box $[_{PP}$ of the chocolates]]]
b $[_{DP}\ [_{MP}$ box $[_{FP}$ of chocolates]]][4]

Given the assumption that an FRC involves a smaller nominal complex (a D head with a CP complement) than a full RC (an DP containing an N with a CP complement), one would expect children who have difficulty building more complex partitive DPs would also have a preference for building simpler Relatives. Thus, these data can be seen as support for the syntactic framework of FRCs as instances of head movement.

A last note of importance is the existence of Pied Piping phenomena in child language; Donati's analysis of FRCs makes the claim that Wh head movement occurs where Pied Piping is not allowed. Guasti et al (1995) point out that Pied Piping of *obliques* is never attested in children's relativization (and presumably is rare in their question formation), but as preposition stranding is also rare-to-nonexistent in child language (Labelle 1989), we might attribute this to the general difficulty of relativizing from obliques, itself a well-attested phenomenon (Keenan and Comrie 1978). Further, Donati's discussion concerns primarily Pied Piping as movement of an NP contained in a Wh expression (as in 'which book') rather than movement of a PP containing a Wh expression ('to which house'). The former can be seen fairly early in children's question formation, as seen in (51), from the Julia corpus on CHILDES (MacWhinney 2000).

(51) Julia, 3;5
I don't know which day we have these

Crucially, this shows that full DP Wh movement is allowed exactly where it would be in the adult grammar: in an embedded question. Such instances are rare, but there are no apparent instances of Wh-phrase movement in a non-licensed environment. We can generalize that phrasal Wh movement (Pied Piping in Donati's sense) is generally allowed by children, and seems that it might be restricted to environments where it is licensed by the proper semantic environment.

An aspect of FRCs which does not appear to have been studied previously in children's grammars is their semantic similarity to definite descriptions; children broadly have some knowledge of exhaustiv-

[4]MP and FP are terms from Stickney (2004) for functional heads used specifically in this construction; what is important here is that this involves a smaller syntactic representation than the full partitive in (a)

ity semantics for Wh constructions (see the previous section), but many studies have shown (Maratsos 1976, Wexler 2011, *inter alia*) that children have difficulty with the exhaustivity requirement of definite descriptions. Wexler (2011) in particular suggests that children have a specifically lexical deficit in this regard, having only an existence presupposition for 'the NP' constructions, rather than both existence and exhaustivity, as claimed for adults by Heim. This account would predict that children's FRCs, falling under the broad class of Wh constructions, might develop exhaustive semantics along with Wh questions, and as such earlier than adultlike semantics for 'the' appear.

3 Tough Movement phenomena

The phenomenon of tough movement, where a noun, interpreted as an argument of both an adjective and an infinitival clause, is syntactically proximate to the former and distant from the latter, as in (52), is well-studied within both the syntax and acquisition literatures.

(52) a Rocks are tough to lift
b This is a tough rock to lift
c It's tough to lift rocks

Certain work within the generative syntax framework (Chomsky 1973, Browning 1989) has syntactically related the behavior of Tough Movement (TM) constructions with Wh movement (rather than other types of movement phenomena); in this section I will review some of the relevant syntactic ideas, as well as findings from acquisition experiments on how children understand these constructions. This syntactic account of TM as a Wh phenomenon will also help to understand new experimental data (presented below) on children's interpretations of both TM constructions and various Wh constructions.

3.1 The representation of TM

The syntactic behavior of TM phenomena reveals three distinct adjective types, which we might call "tough", "pretty", and "heavy" types, based on their acceptability in two semantically equivalent frames. The figure below outlines these types.

Fig. 1: Adjective types

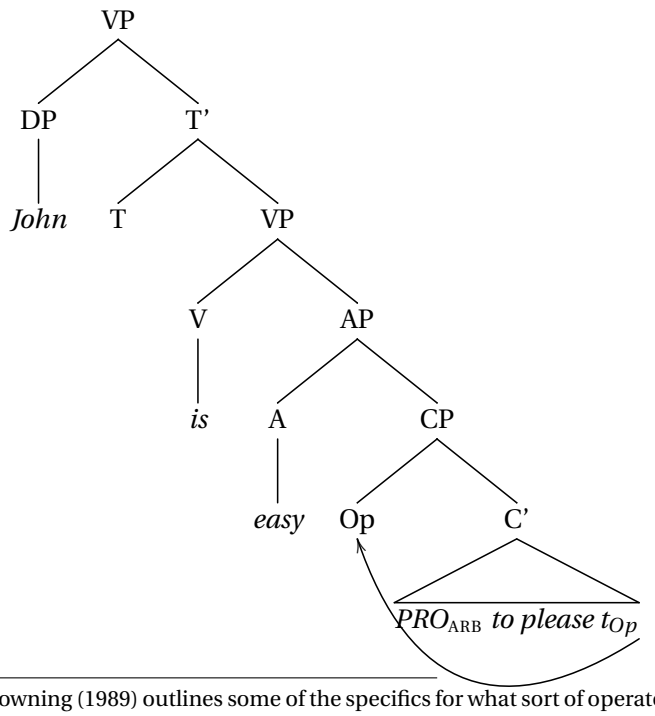
Tough	Pretty	Big
John is tough to look at	John is pretty to look at	*John is big to look at
It's tough to look at John	*It's pretty to look at John	*It's big to look at John

The following discussion will chiefly involve the representation of the first construction, wherein the sentential subject is not an expletive, and there is a Wh-like gap in the infinitival clause.

The key generalization about TM is that a surface subject is interpreted as the object of an embedded verb, in a clause licensed by a particular adjective. While TM constructions have a long history within the theoretical syntax literature, there are fairly few specific ideas about how to represent them within contemporary syntactic models. A recent analysis by Rezac (2006) is mostly a restating of ideas originally proposed in Chomsky (1973).

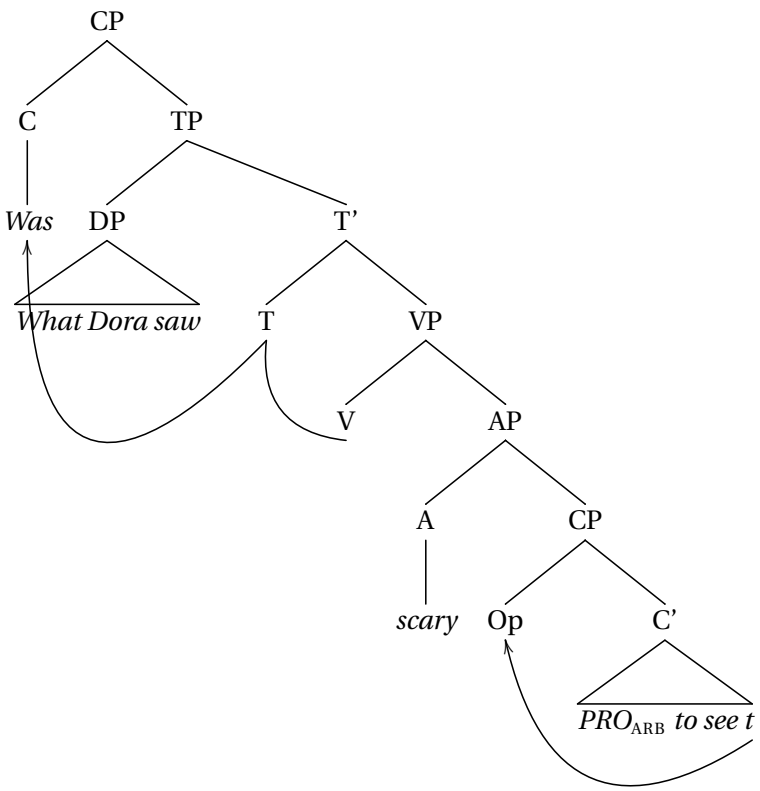
A key feature of the Chomskyan analysis is that it does not involve movement of the surface, matrix subject from the lower infinitival clause, but rather only local movement within the lower clause of a phonologically null operator which serves as a complex predicate-operator along with the adjective.[5] This syntax is illustrated in 53; how such a syntax would analyze a TM construction is shown in (54).

(53)



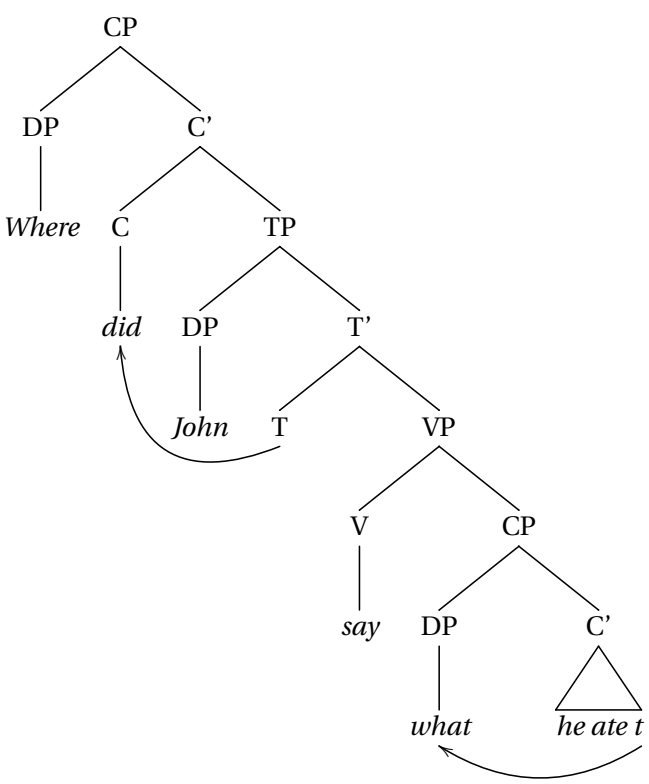
[5]Browning (1989) outlines some of the specifics for what sort of operator this should be; the key observation for our purposes here is that there is local Wh movement of this null operator rather than movement of the overt subject

(54)



In this theory, the only representational difference between these two structures is that 'was', predictably, fronts when forming the question. Based on this analysis, we can describe TM constructions as instances as embedded Wh movement, in that it involves fronting to the highest specifier position in an embedded clause. To see the syntactic analogy between these two construction types, compare (53-54) to (55).

(55)

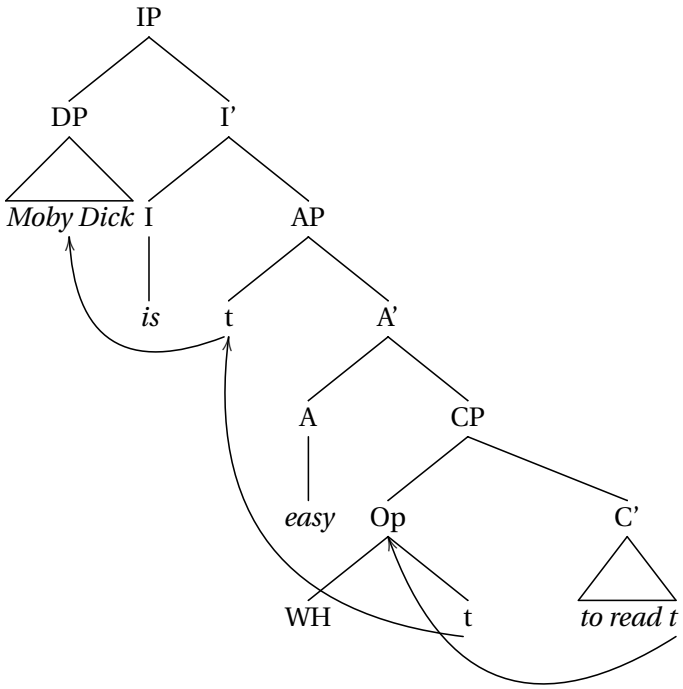


Both structures involve a clausal complements with local Wh movement, and both structures produce non-adult-like responses from children. This might lead us to the hypothesis that the two effects are related.

An alternative syntax is proposed by Hornstein (2000) and Hicks (2003), which does have the sentential subject in TM constructions moving per se. This delivers a similar surface representation, wherein the subject has moved out from within a complex operator.[6] The tree in (56) is based on Hicks's syntax, with the subject moving from its original thematic position to a thematic position related directly to the matrix predicate, eventually to its case position.

[6]At least for Hornstein, this operator itself is Wh, so for our purposes here in creating an analogy with Wh movement this analysis might not be meaningfully different.

(56) Moby Dick is easy to read



This is similar to the approach for passives and other varieties of A movement developed by Collins (2005), among others, and as such seems to make TM a kind of A movement, in that something moves out of a lower clause into an A position (the Spec position of the matrix IP). The following section, however, presents evidence from acquisition which suggests that exactly this sort of analogy is undesirable.

3.2 TM in acquisition

Studies have for a long time, from Chomsky (1969) to Anderson (2005), found that children exhibit some degree of difficulty in parsing TM constructions. Specifically, Chomsky found that children will give a subject control reading to these sentences, such that (57a) is given the parse in (b) rather than the adult-like parse in (c).

(57) a The girl is tough to see
b Child interpretation: It is tough for the girl to see
c Adult interpretation: It is tough for someone to see the girl

Most recently, however, it has been found that children as young as 4 successfully parse TM constructions (Becker et al 2012). The key factor in eliciting adult-like parses for these constructions is animacy of subject. So, (57) would be more likely to get an adult-like parse if the subject was 'the chair', rather than 'the girl'.

In light of the fact that children can, under certain conditions, correctly parse TM constructions, it is crucial to keep in mind that children routinely perform very poorly at A-movement constructions, to the extent that one hypothesis intended to explain their performance is that children's grammars are wholly lacking in the resources to create A-chains (Borer and Wexler 1987). This would, of course, suggest that Hicks's (2003) and others' development of an A-movement analysis of TM is problematic, as it predicts children should perform at least as poorly on TM as they do on, for example, raising.

In fact, even in the absence of findings suggesting that children can occasionally give adultlike parses to TM constructions, the types of non-adultlike parses they give are exactly type of parse they seem unable to construct in A-movement constructions like raising. Consider (58); The parse in (a) represents the type of non-adultlike behavior seen in studies like Chomsky (1969), while the type in (b) represents an adultlike parse. What both have in common is that the matrix subject is associated both with the matrix predicate (the adjective) and with the lower predicate (the infinitival verb). Compare with (59); (a) shows an adultlike parse of a raising construction - which looks quite similar to the childlike subject control parse in (58b), and which shares with both parses that the matrix subject is interpreted as an argument of two predicates; A movement errors like the parse in (59b) occur where the child interprets the subject in only one argument position.

(58) a The girl$_i$ is tough PRO$_i$ to see
b The girl$_i$ is tough PRO to see (e)$_i$

(59) a The girl seems (e)$_i$ to be reading the book
b The girl is reading the book

The sorts of errors children do and don't make in TM constructions, and their moderate ability to avoid the former, both are suggest that TM is not being treated like it is an A-movement construction; this fact is problematic for any approach to treat TM and A-movement constructions as a unified phenomenon, and supportive of approaches which treat TM as a WH movement phenomenon, per Chomsky (1977).

Theories of the 'pretty' type of adjective (which disallows constructions where the subject is low and an expletive 'it' is used) vary on whether these should be treated as instances of mandatory movement (Solan 1978) or proof of non-movement. Solan presents data that children have greater difficulty with this type than with the 'tough' type - specifically, that non-adultlike interpretation of these adjectives persisted longer than for the other type. Solan argues that the fact that children are exposed to sentences with and without expletives for Tough adjectives, and only hearing subject position sentences for Pretty

adjectives, it is easier to learn the structure of the former, and thus children are more quickly able to interpret Tough subjects as objects of the lower verb.

The important aspects of the acquisition of TM constructions that are most relevant to the model of Wh movement presented here are that children are better at TM constructions than they are at raising constructions and that their errors seem to be attributable to a preference to interpret animate arguments as agents, while inanimate arguments are allowed to be patients. With data having been presented to support these claims, the following section presents an experiment showing a more direct relationship between Wh movement and TM constructions in children's linguistic behavior.

4 Experiment 1

The first experiment was designed to test if children treat Wh words in non-Question Wh clauses - that is, Wh heads in Free Relative Clauses, as matrix question words. In this experiment, children were presented with stories and then asked a question about the story.

4.1 Design and Materials

The experiment examined two semantically and syntactically related question forms. Both are polar questions asking whether something from the story (described by an FRC) can be accurately described by a particular adjective. In one form, the FRC is in the in situ subject position (60a), and in the other form, it has been post-posed (60b).

(60) a Was what Dora saw scary?
b Was it scary, what Dora saw?

The experiment also compared questions where the target, (adultlike) answer would be "yes" with those where it would be "no" - in terms of the above questions, whether or not the thing which Dora saw was or was not scary. Lastly, the experiment compared answers to questions based on the type, in terms of the Tough Movement (TM) typology, of adjective included. Following the findings of Becker et al (2012) that TM constructions are easiest for children in the presence of inanimate sentential subjects, all the subject FRCs in this experiment had inanimate referents.

Each story was read to the child, with an accompanying picture illustrating the two characters in each story in the environment of the events. The form of each story was such that there was one character

confused about some element of the story; specifically, they were confused about whether some thing (the referent of the FRC) had or lacked some quality (denoted by the adjective). At the end of each story, the child was asked to help the character figure it out, by asking a question like one of those in (60). A sample story is illustrated in (61).

(61) Dora and Boots were walking through the woods. Dora saw something behind a tree. It was a wolf! The wolf was scary, so Dora ran away. Boots wanted to know what Dora saw, but he's easily frightened, and is worried about what he might see. Maybe we can help him. **Was it scary what Dora saw?**

A complete list of the stories and corresponding questions used in this experiment can be found in Appendix A.

Each child was presented with four stories: two of each type of target answer and two of each syntactic frame. Adjective type was tested across subjects. The child's response to each question, as well as whether or not a correct answer was given (taking into consideration whether they seemed to have given the question a Wh or polar parse), along with any other comments the child had about the story.

4.2 Predictions

A strict interpretation of the theory developed in the above sections - that is, that the Wh words in FRCs do not correspond to a Question feature of any sort - would predict that children give Wh answers at no point in this experiment. At the very least it would predict that children answer non-matrix questions at a much lower rate than they have done in previous studies using embedded question clauses. If children know that Wh questions require Wh movement per se (or at least the possibility of covert Wh movement), they should not entertain question interpretations of the Wh heads in FRCs, and should parse FRCs as definite descriptions, *not* as question clauses. As such, the only possible target question for children to choose to answer should be the matrix polar question.

The effect of FRCs being post-posed depends somewhat on one's interpretation of their syntax and semantics. A noteworthy fact about these constructions is that they bare surface similarity to the Wh-scope marking construction in Hindi-Urdu which Dayal (2000) analyzes in terms of an "indirect dependency" between the scope marker and the embedded question word; the expletive item in the main clause is coreferent with the postposed clause.

(62) a *Boots kya soch-ta hai ki Dora-ne kya khaya*
Boots what think-IMP PRS ki Dora-ERG what ate
'What does Ben think Dora bought?'

b Boots kya$_i$ sochta hai [ki Dora-ne kya khaya]$_i$

(63) Was it$_i$ tasty, [what Ben ate]$_i$

As discussed above, the apparent (but limited) similarities between Hindi-Urdu scope-marking constructions and this sort of post-posed Relative Clause in English may cause children to confuse the semantics of the two, and thus treat questions of this form as partial movement constructions. For the present purposes, this translates to a prediction that that there should be no difference in the likelihood of Wh answers being elicited by either the post-posed or non-post-posed question frames, given that the expletive 'it' is semantically equivalent to the post-posed item.

If there is an effect of adjectival type, it would likely be that questions with adjectives which allow TM constructions elicit a greater number of Wh responses than those that do not. The reason for this relies on the analysis of TM constructions developed above, wherein TM involves local Wh movement of an abstract operator to the highest spec in the lower clause. Such movement is analogous to local Wh movement in embedded question constructions, particularly such as the one in (64a) from de Villiers et al (2012). Compare the movement of the Wh word in the embedded question there to that of the abstract operator in (b).

(64) a Did Jimmy say [what to get t]

b Was what Dora saw scary [Op to see t]

In both cases, there is local Wh movement in a lower clause. Note also that this does not rely at all on the presence of the Wh word in the FRC, in keeping with other ideas expressed here. It does, however, rely on the assumption that children can (and do) represent TM sentences as having the licensed infinitival clauses, even when they are not spoken; that is, the experimental sentences were 'Was what Dora saw scary' rather than 'Was what Dora saw scary **to see**'. As such, a lack of effect of adjective type could be analyzed as either an argument against the analysis of TM constructions developed here, or simply as children not including this unspoken material in their representations of these sentences.

As the relevant syntactic considerations don't concern the expletive 'it is scary to…' construction, no difference would be predicted to exist between the 'tough' and 'pretty' adjective types, which differ only

in whether or not they allow the latter construction. It is only predicted that each of these types would be more likely to elicit Wh answers than 'heavy' type adjectives.

4.3 Results

39 natively English-speaking children were tested from three schools in Hampshire County, Massachusetts. The children's ages ranged from 3;10 to 6;10, and the mean age of the subjects was 5;4. Of those 39 children, one child's answers had to be excluded from the data; as such, the data reflect a total of 152 instances of question and answer.

Across these 152 points of data, there were 16 instances of Wh answers, a rate of roughly 10 percent. The results are summarized in Figures 3-5, showing total numbers of Wh answers by condition as well as rate of Wh answers in the condition, as a percentage of instances of each condition which elicited a Wh response.

Fig. 3 *Wh responses by Target Answer*

	Number	Rate
Yes	12	15.4%
No	4	5.1%

Fig. 4 *Wh responses by RC position*

	Number	Rate
In situ	11	14.1%
Postposed	5	6.4%

Fig. 5 *Wh responses by Adjective Type*

	Number	Rate
Tough	8	15.4%
Pretty	7	13.4%
Heavy	1	3.8%

An analysis of the data shows significant effects of polarity of target answer, frame, and adjectival type. Pairwise T-tests show significantly more Wh responses to questions with 'yes' as the target answer ($t = -9.11$, $p < .001$) and questions without postposition of the FRC ($t = -8.66$, $p < .001$) than questions with

'no' as the target answer and questions where the FRC is postposed, respectively. The two TM-types of adjectives, the 'tough' and 'pretty' types, did not significantly differ from each other ($p > .05$). Each of these two types differs significantly from the non-TM, 'heavy' type ('tough', $t = 37.7$ 'pretty', $t = 17.18$, both $p < .001$).

Not included in these results are two instances of responses where something like a Wh answer follows a polar answer ("Yes, a wolf"). While these are interesting in their own right, they do not appear to be answers to the embedded question in the sense discussed here, as the question being answered appears to be the matrix (that is, polar) question.

4.4 Discussion

While the fact that children produce Wh answers in these contexts around 10% of the time generally, or as much as 15.4% in particular conditions, does not generally seem to support the idea that children are sensitive to the syntactico-semantic distinction between Question Wh clauses and non-question FRCs, a closer look at the distribution of Wh answers in the experiment might reveal that things are not as simple as that.

Three particular things seem to be directly evidenced by these results. First, children's sensitivity to target answer polarity suggests that they are taking into account the answer to the whole question with which they are presented, rather than just the Wh clause. Whereas an account of children's non-matrix question responses that assumes children are only parsing the embedded question would not predict that the correct answer to the matrix question should affect the response to the embedded one, an account which says that children are parsing entire sentences before deciding to give non-matrix answers makes no such prediction and is able to cope with these data.

Second, the significant effect of dislocation of the FRC suggests that there is some semantic effect of post-posing FRCs, and that one may not be derived from the other. The description presented above, assuming that the two were semantically equivalent, failed to predict this sort of effect.

Lastly, the effect of adjective type suggests that children are sensitive to the distinct syntactic properties of TM versus non-TM adjective types, in the former but not the latter allowing infinitival complement clauses including a +Wh abstract operator. Further, the strong influence of TM-type adjectives in eliciting Wh questions seems to suggest that in fact children are able to include unspoken clausal complements to adjectives where they are licensed - that is, that 'scary' can be represented as 'scary to see'

- and that the local Operator movement analysis of TM in Chomsky (1977, inter alia) constructions correctly analogizes local Operator movement with Wh movement, as well as confirming the general finding that, given the proper conditions, children are able to properly parse TM constructions as such and have some knowledge about what adjectives are of what types.

While the result regarding the effect of postposition was contrary to the prediction that postposition should have no effect (given the similar syntactico-semantic representation of sentences with and without postposition), this result does show that children are not misanalyzing postposed FRCs as secondary questions, as adult speakers might for sentences like (65).

(65) Was it scary? What did Dora see?

Utterances like (65) in adult discourse could be understood as pairs of questions, or as indicating that the second question is the more important one to answer; children did not appear to be giving this interpretation to the postposed relative clauses in the experiment, indicating that the FRCs are in fact not analyzed as question clauses. Other than that, though, it is difficult to say much about this particular result. One could say that the linear position of the Wh word close to the beginning of the sentence makes it more likely that it will be misanalysed as being a question Wh word with matrix scope. However, such an analysis goes somewhat against the rest of the data, which largely seem to suggest that the FRC is in fact not analyzed as a question word. Ultimately more study would have to be done to say much about the root of this particular result.

5 Experiment 2

The second experiment had two primary aims: to test the predictions of the developed above about the syntactico-semantic nature of Free Relative Clauses by comparing the subject FRC frame tested in Experiment 1 with embedded question constructions, and to replicate the adjectival-type distinction seen in Experiment 1.

5.1 Design and materials

The design of the second experiment was somewhat different from the first. Though the two experiments both involved the presentation of stories followed by questions about them, the form of the stories were

altered slightly. The manner of this alteration was that in the second experiment's stories, there were two characters who each interact with some other thing in the story, the two things differing in terms of the adjective which was asked about. So, while in the first story one character would see something scary and the second character wonder about that thing, in the second, one character would see something scary and the second see something not scary.

A second change, necessary because of the difference in the form of the stories, was that, since a character in the story was not confused about what was going on in the story, the child was instead asked the question by a puppet. Before the experiment the child was introduced to the puppet, Cookie Monster, with the explanation that Cookie Monster sometimes gets confused and would have some questions for the child about the stories.

A last change to the experiment was that, in order to more closely examine the effect of adjective type, each story had two versions (of which each child would only see one), which differed in terms of what type of adjective was being discussed in the story. Because the first experiment did not seem to reveal any difference between the two adjective types which allow TM constructions, only two types were contrasted in this experiment: TM and Non-TM. The Adjective type factor as well as the polarity-of-target-answer factor made for four total conditions for each experimental item. (66) shows such an item, with both versions of the story and all four versions of the question.

(66) TM Ben and Molly were walking through the forest. There were lots of animals around, some of them hiding behind trees. Ben looked behind a tree and saw a wolf! The wolf was scary, so Ben ran away. Molly saw some squirrels behind another tree. The squirrels were running around chasing each other. It was really funny! She decided to try and find Ben, to show him the funny squirrels.

a Was what Ben saw scary?

b Was what Molly saw scary?

*TM Ben and Molly were walking through the forest. There were lots of animals around, some of them hiding behind trees. Ben looked behind a tree and saw an elephant. The elephant was so big, it was amazing! Molly looked behind another tree and saw a baby squirrel. The squirrel was really small. Then Ben came and told her to come look at the big elephant.

c Was what Ben saw big?

d Was what Molly saw big?

In addition to 8 such experimental items, 8 filler and control items were included. These are illustrated below and included four Wh questions with embedded question clauses (67a), two questions of similarform to the experimental items but with the word 'something' (b) replacing the FRC, and two simple polar questions (c).

(67) a Where did Dora ask what Ben bought?
b Was something tough?
c Did Molly see the eagle?

A complete list of the stories and corresponding questions can be found in Appendix B.

At the beginning of the experiment, each child was instructed regarding the process of the stories and questions, introduced to the puppet, and shown the two characters who appear in all of the stories.

5.2 Predictions

Given the results of the first experiment, a 10-15% rate of Wh answers to the experimental items was expected. More specifically, it was expected that particularly the experimental items with TM adjectives would elicit Wh answers at around this rate, and the questions with non-TM adjectives were expected to elicit few if any Wh answers. In comparison, the control items which had Wh questions with embedded Wh clauses were expected to elicit medial responses more often - about 20% of the time, the rate generally seen in studies of this construction in children of this age range.

The control items which replaced FRCs with 'something' were expected to behave roughly similarly to the experimental items; this is because, as discussed above, the presence of the Wh word in the experimental items was not necessarily the trigger for the Wh answers which children gave in the first experiment, but rather the presence of the abstract operator associated with TM constructions (as discussed above). As such, replacing the FRC with a phrase lacking a Wh word should have no effect on whether or not Wh answers are given in this frame.

The filler items were predicted to produce entirely adultlike responses. Nothing about them suggests that children of this age range should have any trouble parsing them.

5.3 Results

12 children from two schools in Hampshire County, Massachusetts, were tested in this experiment. Their ages ranged from 4;1 to 7;7, with a mean age of 5;10. Of these 12 children, the data from two had to

be excluded for inability to complete the experiment. Consequently the data reflect 160 instances of question and and answer; 80 instances of the experimental items and 80 of the filler and control items.

Of the 80 instances of the experimental items, there was one instance of a Wh answer. Questions with 'something' replacing the FRC produced only two Wh answers. Embedded Wh questions produced 20 medial answers. A summary by child of non-adultlike answers to the different item types (excluding the simple polar questions, which unsurprisingly produced no non-adultlike answers) is shown in Figure 6. Figure 7 shows rates of non-adultlike answers by question type.

Fig. 6 *Experiment 2 Results by Child*

Child	Age	Wh answers (RC)	Medial Wh	Wh answers (sthg)
1	7;5	0	1	1
2	7;0	0	0	1
3	6;10	0	2	0
4	7;5	0	3	0
5	7;7	0	2	0
6	4;7	0	4	0
7	4;1	0	2	0
8	4;3	1	3	0
9	4;9	0	1	0
10	4;7	0	2	0

Fig. 7 *Experiment 2 Results by Question Type*

	Experimental	Medial Wh	Polar (sthg)	Polar (simple)
Error rate	1.25%	50%	10%	0%
Total errors	1/80	20/40	2/20	0/20

What is immediately apparent in these results is the extreme reduction in the number of Wh responses to the experimental items, compared to the first experiment, from a rate of 10.5% to 1.25%. The one Wh answer is also notable in itself for not fitting in with the pattern observed in the first experiment, as it was a response to a question with a non-TM adjective:

(68) Q Was what Molly saw big?
A An elephant.

The lack of distinction between the extremely low rate of Wh responses to the FRC conditions and the relatively low rate of rate of Wh responses to the 'something' conditions is interesting, but as both totals are so low, it would not seem to be prudent to attempt to numerically or analytically examine this distinction further based on these data alone.

5.4 Discussion

The results of the second experiment bring up a number of new issues to consider in analyzing the different responses to different types of questions, and the role of the relevant theoretical proposals made herein in these issues.

While the data from this second experiment do not play directly into the question of how well, and how soon, children know the relationship between predicate type and clause type, they do suggest that children have some sensitivity to the different clause types. In fact, both experiments show that; even in the first experiment, where even when Wh responses to polar questions are seen, they occur at a much lower rate than medial Wh answers typically occur. Further, in the second experiment, Wh responses to polar questions are exceptionally rare, there being 3 instances out of a possible 100 altogether, compared to the 50% rate of medial answers seen here (itself somewhat anomalously higher than the average rate of medial answers, closer to 20%).

They are not, however, able to further confirm or contradict the correlation between TM syntax and implicit Wh movement. As there was only a single Wh answer to an FRC-adjective question, it is hard to read these results as saying anything about adjectival type. While the one such Wh response was in response to a question with a *non*-TM adjective, contra to expectations based on the first experiment, it is still only a single response.

Minimally, these data seem to be strong evidence against any approach to non-adultlike answers to questions with embedded Wh clauses that does not take into account the semantic relationship between Wh movement and the formal conditions which license it. Children are clearly not simply noticing a Wh question word and forcing a Wh question parse of the sentence, but are at least parsing an embedded clause as either a Wh question clause or an FRC based on the semantic conditions which embed it. This suggests at the very least that children have some awareness of the both the semantics of Wh word as relative pronoun (D head) and as question operator (DP), and the role of matrix syntax in choosing between the two.

6 Pragmatic factors in the experiments

Two facts about the experiments and their results bear discussion, with respect to the hypothesis developed here about the nature of Free Relative Clauses: (1) children's responses and explanations of their

responses largely seemed to suggest that they were interpreting the FRCs as definite descriptions and not interrogatives, and (2) changes made between the two experiments relating to the discursive context of the experimental questions affected (greatly) the rate at which children gave Wh answers to the experimental items. In this section we explore each of these points.

6.1 Definiteness presuppositions and children's explanations

The suggestion above that FRCs, in the adult grammar, have the semantics of definite descriptions, seems to be borne out in children's explanations of their polar answers. Particularly, when asked to explain how they knew the answer to a question, their explanations seem to take the referent of the relative clause as given. The exchange in (69) is typical of this.

(69) (Background: Ben played the tuba, which was hard, and Molly played the guitar, which was easy)
Cookie Monster: Was what Ben played easy?
Child: No
Experimenter: Why do you think that?
Child: 'Cause he couldn't play it

Notably absent (from both experiments) are answers to the latter question such as "Because it was a tuba", which would take the referent of the relative clause as new information worthy of comment. The sort of exchange seen in (69) indicates that the child takes the referent of the FRC as old information; that Ben played a tuba is defocused in favor of an explanation of the more interesting fact that it was not easy to play. This seems to demonstrate that children know that these free relative clauses have the old information requirement of definite descriptions, and are not treating them as either denoting sets of responses (as questions) or indefinites (as 'Wh-ever' constructions).

A notable extension of this is that it might predict that the apparent increase in the rate of Wh responses in the 'something' conditions seen in Experiment 2; being an existential, 'something' would not have this old-information requirement, and might have the pragmatic effect of answering the implicit question of what the something is. But, exploring this possibility would require more data.

6.2 The effects of experimental design

Obviously the stark contrast in the results of the two experiments suggests that something changed radically between the experiments themselves. The question stimuli were not particularly different (other

than including a greater variety of conditions in the second experiment), and the children were demographically mostly the same. Two things about the experiment, however, were changed: the presentation of the question changed from imploring a child to help a character in the story with a particular issue in the first experiment, to asking the child to clarify a point about the story to a puppet. Compare the contrasting story-question pairs in (70-71).

(70) Dora has seen a wolf and ran away. Boots wants to know what Dora saw . . .

Was what Dora saw scary?

(71) Ben has seen a scary wolf and Molly has seen a funny squirrel; Molly has gone to find Ben and tell him about the squirrels . . .

Was what Ben saw scary?

One way to think of the difference between the two experiments is that the first sets up a specific Question Under Discussion (Roberts 1996), which pragmatically takes precedence over the syntactic form of the question as it is asked. This topic is obviously a crucial one for further investigation; investigation of the role of pragmatic factors like the Question Under Discussion is both a desirable goal in itself, in that it could increase our understanding of children's knowledge of the social conditions around language use, and an important tool for other acquisition research, in that leaving these issues unexamined risks unseen confounds in other examinations of children's language.

7 Conclusion

In this study I have made two central claims: that Free Relative Clauses are semantically and syntactically distinct from embedded questions, and that children are sensitive to semantic and syntactic factors differentiating these two clause types. The data from adult English seems uncontroversially to demonstrate the validity of the former claim; and the proposal that surface strings like 'what Dora saw" can be syntactically represented, in different syntactic and semantic contexts, as either instances of Wh head movement or Wh phrase movement (Wh movement in the strictest sense) with a phonologically simple phrase. Additionally, by showing that children give non-adultlike answers (specifically, answers to non-matrix questions) at much lower rates when the clause is unambiguously an FRC than when it appears to be an embedded question, I have provided the empirical beginnings to proving the latter claim.

Further, several elements of this study provide new evidence in favor of a grammatical account of children's non-adultlike behavior in interpreting syntactically complex questions, rather than an account which emphasizes non-adultlike processing abilities: that children are sensitive to matrix predicate type (as demonstrated by the data on adjectival type in the first experiment) and that they appear to be sensitive to the target adultlike answer (as demonstrated by the data on question polarity from the same experiment) both suggest that children are paying attention to the syntactic content of the entire matrix clause even as they appear to be responding only to the embedded clause.

Finally, the different findings of the two experiments have raised new questions to be considered in the developing body of research on the effect of the Question Under Discussion in children's linguistic behavior, as well as raising questions about the effect of apparently minute changes to experimental design in producing very different results. These particular questions are particularly important to future experimental research on both child and adult language; pragmatic environment can clearly make a large difference in children's ability to display adultlike linguistic competence.

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Appendix A: Items in experiment 1

List 1

1. Was what Bugs did tough? / Was it tough what Bugs did?
2. Was what Dora saw scary? / Was it scary what Dora saw?
3. Is it fun what Elmo is doing? / Is what Elmo is doing fun?
4. Was what Donald drew easy? / Was it easy what Donald drew?

List 2

1. Is what Bugs ate tasty? / Is it tasty what Bugs ate?
2. Was what Donald drew pretty? / Was it pretty what Donald drew?
3. Was where Dora sat hard? / Was it hard where Dora sat?
4. Is where Oscar lives nice? / Is it nice where Oscar lives?

List 3

1. Was what Dora moved heavy? / Was it heavy what Dora moved?
2. Was what Donald drew colorful? / Was it colorful what Donald drew?
3. Was what Bugs wore wet? / Was it wet what Bugs wore?
4. Is where Elmo lives big? / Is it big where Elmo lives?

Appendix B: Items in experiment 2

I Experimental items

1. Was what Ben/Molly saw scary/big?
2. Was what Ben/Molly played hard/loud?
3. Was what Ben/Molly ate tasty/hot?
4. Is where Ben/Molly lives pretty/little?
5. Was what Ben/Molly drew easy/colorful?
6. Was what Ben/Molly talked about exciting/made-up?
7. Was what Ben/Molly sat on wet/comfortable?
8. Was what Ben/Molly grabbed soft/brown?

II Control/Filler items

1. What did Molly see who ate?
2. Where did Molly ask what Ben bought?
3. Who did Ben ask where the picnic was?
4. Who did Ben ask what he should bring?
5. Was something tough?
6. Was something gross?
7. Did Molly see the eagle?
8. Did Ben stay inside?