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1. Introduction

Rizzi (1989), developing a proposal first made in Rizzi (1988) and incorporating an important modification from Cinque (1989) (see also Aoun (1986) for a related discussion), argues that whether *wh*-expressions can undergo so-called "long" movement depends on whether they are referential or function only as operators. He claims that non-referential *wh*-phrases lack a referential index and so leave unindexed traces when they move. These unindexed traces, to be linked to the moved phrase associated with them, must be governed by a local antecedent. The indexed traces left by the movement of a referential *wh*-phrase, on the other hand, do not require antecedent government because they are bound by (coindexed with) their antecedent. The difference between the two classes of phrase is predicted to show up in movement out of *wh*-islands ("long movement"). Since the filled intermediate COMP in these cases blocks antecedent government, the movement of non-referential *wh*-phrases should be impossible. Movement of referential *wh*-phrases, on the other hand, should be relatively acceptable, though degraded slightly by the subjacency effect.

The distinction between referential and non-referential *wh*-phrases overlaps the complement/adjunct distinction and is meant to supersede it (see Epstein (1987) for another attempt to reduce the complement/adjunct distinction to indexing differences). Thus, the well-known asymmetry between cases like (1) and (2) is to be a consequence, not of the fact that adjuncts are not theta governed (see Chomsky 1986), but rather of the fact that they are not referential:

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Note from the Editors: This paper was written in 1989 but not published until now. We include it here in order to make this widely cited work more easily available. It has not been updated and so lacks all reference to recent work on the topic.

(1) Which problem were you wondering whether to tackle?
(2) *How were you wondering which problem to tackle?

Rizzi's motivation for stating the constraint on long movement in terms of referentiality instead of theta government is that some verbal complements that are clearly theta governed nonetheless resist long movement. These complements are of two types: idiomatic and amount quantified objects. The idiomatic cases, however, are problematic for a number of reasons,[1] leaving the amount quantified objects as the clearest instances of the phenomenon Rizzi describes. The resistance of *wh*-amount quantifiers to long movement from theta-governed positions is shown by the contrast between (3) or (4) and (5):[2]

(3) a. How much did the book cost?
b. How much did Bill pay for the book?
(4) a. How much did Bill say that the book cost?
b. How much did Bill decide to pay for the book?
(5) a. *How much did Bill wonder whether the book cost?
b. *How much did Bill wonder whether to pay for the book?

In all of these sentences the phrase *how much* is the complement of a verb. In the (a) sentences it is a measure phrase complement and in the (b) sentences it is a simple direct object. Nonetheless, the long movement in (5) is unacceptable. Since government and theta role assignment obtain here, it seems reasonable to suppose that the nature of the moved *wh*-phrase is responsible for the deviance in (5). What is wrong, according to Rizzi, is that the *wh*-amount quantifier is not referential.

This approach to understanding the ill-formedness of (5) seems promising to us, and in the discussion that follows we will try to understand better in what the referentiality requirement might consist. Our investigation, however, will lead to conclusions somewhat different from Rizzi's. In the first place, it is easy to show, as Rizzi himself recognizes, that a simple referentiality requirement will not account for the general failure of adjuncts to extract by long movement. Therefore, at least at our current level of understanding of the phenomena, we must continue to block the extraction of adjuncts per se. Secondly, we can show that the referentiality requirement is a semantic and pragmatic

[1]These reasons include the fact that it is unclear whether idiomatic objects are theta governed and the fact that even short movement of idiomatic objects is often unacceptable. For these reasons we have chosen to limit our discussion to the amount quantifier case, where the facts and their interpretation seem clearer.

[2]Rizzi's discussion is based on Italian examples, but the facts in English seem to be exactly parallel.

one; therefore, it need not and should not be invoked to constrain extraction syntactically. Rather, certain questions, in particular cases like (5), are unacceptable because their presuppositions are highly implausible. As expected, when contexts are constructed in which the plausibility of these presuppositions is increased, the questions become acceptable. If this view of the referentiality requirement is correct, then the extraction of complements remains syntactically free, as has been generally assumed. Here again, it seems that the referentiality effects described by Rizzi do not provide grounds for ceasing to take the complement/adjunct asymmetry as fundamental to the syntax of *wh*-extraction. Such a conclusion would only be warranted, in our view, if it were possible to show that all constraints on adjunct extraction were explicable in semantic and pragmatic terms. This possibility is worth further investigation, but it is far from certain to be correct.[3] In any case, such a conclusion would be just the reverse of the one reached by Rizzi, whose analysis constrains extraction more tightly in the syntax than previous work, since it rules out not only adjunct extractions but also some extractions of complements.

2. The Nature of Referentiality

In defining a notion of referentiality relevant to his concerns, Rizzi appeals to the discussion in Cinque (1989). The latter proposes that referential *wh*-phrases are those which are d(iscourse)-linked, in the sense of Pesetsky (1987). Under Cinque's interpretation, d-linked *wh*-phrases refer to members of a set that has been evoked in the discourse (see Prince 1981), while non-d-linked *wh*-phrases, being operators, make no such reference. Since amount quantifiers like *how much* will rarely or never be d-linked, they will not be referential and will not license long movement. Amount quantifiers pattern with bare *wh* words, which are ordinarily non d-linked, while expressions of the form

[3]One piece of evidence that supports the removal of the complement/adjunct asymmetry from the syntax is the following contrast:

(i) a. *How quickly were you wondering whether anybody could run?
b. *Quickly, I wonder whether anybody could run.
(ii) That quickly, I wonder whether anybody could run.

In (ii) the topicalized element is clearly referential and the contrast with (ib) gives evidence that this referentiality is responsible for the acceptability of the long movement. This pattern does not extend to at least some other adjuncts (see 8 below); and unless these cases can be given a semantic analysis, the complement/adjunct distinction will not be dispensible.

which+N are d-linked. Thus, consider (6) below:

(6) A man walks into an apartment building in front of two women who are conversing on the sidewalk. One says to the other: "Who/Which man just went into the building?"

If the speaker in (6) uses *who,* she indicates no expectation as to the identity of the person who entered the building. If, on the other hand, the speaker uses the phrase *which man,* she is assuming not only that the person is a man but also that he belongs to some contextually defined set salient in her interlocutor's consciousness. Therefore, in the second case, the NP expected as an answer to the question refers to an (as yet) unidentified member of that set. By taking d-linking to be equivalent to referentiality, Cinque obtains an explanation for contrasts like that between (7a) and (7b) below:

(7) a. ??What were you wondering how to fix e?
b. Which car were you wondering how to fix e?

Example (7a) sounds odd because *what* is ordinarily non-d-linked and so non-referential. It lacks a referential index and, when it moves, leaves behind an unindexed trace. This trace, therefore, must be licensed (i.e., identified) by antecedent government; but the needed trace in COMP is absent since its position is filled by *how.* (If, following Chomsky 1986, we assume movement via adjunction to VP, then the VP-adjoined trace is the offending one.) In (7b), the *wh*-phrase *which car* is d-linked and referential so that the moved *wh* and its trace are coindexed. This coindexing serves to identify the trace, making antecedent government unnecessary. This example illustrates why Rizzi (1989) adopts Cinque's definition of referentiality in preference to his own 1988 definition, which does not account for the contrast in (7). The earlier paper distinguishes referential from non-referential NP's by their theta role, stipulating that all and only NP's receiving the theta roles of participants in the event-type denoted by a verb count as referential. Under this definition the extracted element is equally referential in both of the sentences of (7); and so both extractions should be acceptable, aside from the subjacency effect, which must be abstracted away from in comparing long movement cases.

Cinque's concept of referentiality is certainly more plausible than Rizzi's original one. It seems based on a real semantic property of noun phrases with observable effects on meaning and discourse structure, while Rizzi's notion does not have any obvious linguistic reality other than its role in constraining extraction. Unfortunately, as Rizzi points out, Cinque's notion does not account for the whole range of complement/adjunct extraction asymmetries.

Consider, for example, the contrast in (8) [our English equivalent of example (36) in Rizzi (1989)]:[4]

(8) a. *For which reason don't you know if we can say [that Gianni was fired e]?
b. Which reason don't you know if we can give e for Gianni's firing?

The questioned elements in these two sentences are equally referential yet there is a sharp contrast in their acceptability. The fact is that reason adverbs can never be extracted from *wh*-islands; and this phenomenon is not obviously a result of their referential status. To account for this case Rizzi proposes to keep his referential theta role requirement on extraction as a supplement to Cinque's referentiality requirement. But since Cinque's requirement covers all variation in the acceptability of long movement out of argument positions, the only effect of Rizzi's theta role requirement is to capture argument/adjunct asymmetries like (8). In other words, the contrast in (8) shows that an argument/adjunct asymmetry in long movement remains, which is not due to referentiality effects. As we mentioned earlier, this remaining asymmetry may have another semantic or pragmatic explanation or it may be syntactic, as up to now it has seemed to be. In either case, the use of a referentiality requirement to constrain long movement does not allow one to dispense with the distinction between complements and adjuncts.

In associating referentiality with d-linking, Cinque raises for us, though he does not himself discuss it, the question of exactly what semantic property is controlling acceptability differences like those in (7). According to Pesetsky, a d-linked *wh*-phrase is one whose use in a question limits the range of felicitous answers to the members of a contextually defined set; and it is reasonable to suppose that non-d-linked expressions make no reference to contextually defined sets. However, it is not obvious that non-d-linked expressions are in any semantic or pragmatic sense "non-referential". Their use does constrain answers to membership in fixed sets. The sets are only rigidly (i.e., semantically), and very broadly, rather than contextually, and more narrowly, defined.

[4]The obvious hypothesis that the contrast in (8) is due to the fronting of a PP versus an NP is incorrect. Compare the sentences below:

(i) a. Which child were you wondering whether to give books to?
b. To which child were you wondering whether to give books?

Here there is a slight asymmetry, probably due to the fact that preposition stranding is generally more natural than pied-piping in English. The difference, however, is not comparable to the sharp contrast in (8).

Thus, in (9a) below, expected answers are constrained to belong to the set of human beings while in (9b) the answer is expected to be a non-human entity:

(9) a. Who fell?
b. What fell?

In the end, we will argue that *wh*-expressions in matrix questions[5] are always "referential" in some sense and that Cinque's non-referential examples have another analysis than the one he proposes. Nonetheless, the dichotomy he sets up is revealing and we will continue to use the terms "referential" and "non-referential" as convenient labels for the two cases Cinque has isolated.

3. Amount Quantifier Movement Out of *Wh*-Islands

Cinque notes in passing that amount quantifier *wh*-expressions are ambiguous and that this ambiguity affects whether they can undergo long movement. Given his perspective, he assumes that the two interpretations of these expressions differ simply in referentiality. The ambiguity is worth further examination, however, which will reveal semantic complexities that Cinque does not discuss. Consider the following case:

(10) How many books did the editor publish this year?

This example looks superficially like (3), but the relative acceptability of the long movement in (11) as compared to (5) shows that there is an important difference:

(11) a. How many books did Bill wonder whether the editor would publish this year?
b. How many books did the editor wonder whether to publish this year?

The sentences of (11) are acceptable and the questioned amount quantifier phrase does seem to refer to a set of books. This becomes clear if we compare (11) to (12):

(12) a. How many books did Bill say that the editor would publish this year?
b. How many books did the editor decide to publish this year?

The sentences in (12) are ambiguous as to the apparent scope of the amount quantifier in a way that those in (11) are not; and the missing readings in (11),

[5] We are limiting our attention here to non-multiple *wh*-questions.

as expected, are the ones where the amount quantified *wh*-phrase is being taken non-referentially.[6]

If the contrast between (11) and (12) is due to a difference in the referentiality of the *wh*-phrase, then we can expect to understand better the character of this difference by closer semantic and pragmatic analysis. In particular, we might consider the relationship between *wh*-phrase referentiality and the existential presuppositions of questions (see Comorovski 1988). Every *wh*-question presupposes an existential sentence. Thus, a simple question like (13) presupposes (14):

(13) Who left?
(14) Someone left.

This presupposition does not in any direct way constrain possible answers to the question; for example, it is perfectly possible in this case to answer "No one." Rather the presupposition is a requirement on the "askability" of a question. The speaker, in asking the question, must presuppose the corresponding existential sentence. Although the presupposition can seemingly be canceled, as in (15), the cancellation is only apparent.

(15) Who left, if anyone.

In such cases, a speaker is taken to be asking a question only when the if-clause condition is satisfied.[7] Thus, (15) as a whole does not presuppose that someone left; but it is a question only if the existential presupposition holds.

One property of the existential presuppositions of questions is that they introduce discourse referents just in the way that declarative sentences with wide scope existentially quantified NP's do. Thus, to (13) the speaker can add (16):

(16) Whoever he is better have had a good reason.

The definite pronoun *he* in (16) refers to a uniquely identifiable discourse entity in the same way when used after (13) as when used after a simple existential sentence, say (14). Thus, even in the absence of an answer to the question that identifies a leaver, the speaker of (13) (or his/her interlocutor) has introduced a discourse entity. Furthermore, in the subsequent discourse that entity

[6]Under Cinque's analysis this pattern is expected but not under Rizzi's original treatment. Obviously, the theta role of the moved *wh*-phrase does not vary between (11) and (12).

[7]This semantic point is mirrored in the intonation of our example. The question intonation occurs over the phrase *who left* with the conditional receiving declarative intonation.

is uniquely identifiable (within the given context, of course; see Hawkins 1978, Prince 1981 for analyses of this identifiability) since it can be referred to by a definite pronoun. Since the uttering of (13) gives no information about the new discourse entity except that it has the property of having left, we must say that this property is sufficient by itself to identify the entity uniquely in the context in which the question is used. This point will become crucial in the discussion to follow.

Consider the existential presuppositions of amount quantified questions. The sentence in (17) gives informally the presupposition of the non-referential (3a) and the sentences in (18) give the presuppositions of (10) on its non-referential and referential readings, respectively:[8]

(17) There is an amount of money such that the book cost that amount.

(18) a. There is an amount of books such that the editor published that amount this year.
b. There is a set of books such that the editor published that set this year.

Given these presuppositions, the questions ask for an identification of the measure of the entities introduced by the existential quantification. The measure of a set of countable objects is, of course, its cardinality; and the measure of a mass entity is an amount, expressed in units appropriate for measuring that sort of entity. Acceptable instances of long-moved amount quantifiers have presuppositions parallel to (18b). Thus, in (19a) we have a sentence structurally parallel to the acceptable (11) and (19b) gives its existential presupposition:

(19) a. How many books did Bill ask whether the company was interested in publishing?
b. There was a set of books for which Bill asked whether the company was interested in publishing them.

If we construct the existential presupposition for a long moved non-referential amount quantifier, as in (20a), in the same way as for the above examples, we obtain something like (20b):

(20) a. *How much money was John wondering whether to pay?
b. There was a sum of money about which John was wondering whether to pay it.

This presupposition is semantically well-formed but odd; that is, the sentence is unusable under most discourse circumstances, which suggests that (20a) is

[8] We are treating the two meanings of amount quantifiers over countable sets as though they were unrelated. This seems unlikely; but further work would be needed to determine whether one can be derived from the other.

perhaps not ungrammatical but merely unusable in most contexts. The oddness of the presupposition lies in its stating that there could be a specific sum of money, say twenty dollars, that could be uniquely identified in the discourse by having the property that John was wondering whether to pay it. Of course, John might plausibly wonder how much to pay, but then there is no unique sum with the property that he is wondering whether to pay *it*. As one might expect, under carefully chosen circumstances, the equivalent of (20b) can be made more plausible as a presupposition and then the equivalent of (20a) seems acceptable. Consider (21a) below with the presupposition in (21b) in the context of a sports tournament of some type:

(21) a. How many points are the judges arguing about whether to deduct?
b. There is a number of points about which the judges were arguing whether to deduct that number.

This question can be asked of one spectator by another under certain narrowly constrained circumstances. Suppose that the rules of the sport specify fixed point deductions for various infractions and that the judges are arguing about whether to call an infraction from a class requiring the deduction of a certain number of points. They have decided what class of infraction is involved but not whether actually to deduct the points. Then, if a spectator is interested only in the number of points to be deducted and not in the nature of the infraction, he/she might ask the question in (21a). If our judgment is correct here, then it follows that the unacceptability of long-movement of "non-referential" amount quantifiers is due, not to any semantic non-referentiality but rather to their quantifying over (hence, referring to) amounts rather than more usual sorts of entities.

In our sports example, the different numbers of points that can be deducted make up a situationally evoked (see again Prince 1981) set to which the questioned *wh*-phrase in (21a) is d-linked. Contexts which link *wh*-phrases to evoked sets favor long movement because they make the presupposition that there is a unique entity of the appropriate type more plausible by supplying a specific set of candidate entities that might satisfy the presupposition. But d-linking is not an absolute requirement for long movement and does not directly constrain it.[9] Thus, examples like the following seem relatively acceptable even in non-d-linked contexts:

(22) a. Who were you wondering whether to visit on your vacation?

[9]Here we differ from Comorovski (1988), who gives a semantic account of extractability from wh- islands otherwise similar to our own. See also Groenendijk and Stokhof (1982).

b. What were you wondering whether to make for dinner?

On the other hand, d-linking also facilitates the asking of syntactically simple questions where movement constraints are not at issue, as the contrast between (23) and (24) shows:

(23) ? Where did you change jobs the most?
(24) In which city did you change jobs the most?

Here in (23) it is not clear what sorts of locations are possible answers so the question is a bit hard to interpret. In (24) the phrase *in which city* links up to a context in which the locations that would serve as answers have already been evoked and so the question is more felicitous.

To summarize our discussion to this point, we have presented evidence that the problem with long-movement in "non-referential" amount questions is not that the amount quantifier is non-referential but rather that it refers to an amount.[10] In such cases, a general requirement on *wh*-questions is usually not met; namely, that their existential presupposition introduce an entity uniquely identifiable in the discourse context is. Thus, a sentence like (5a), repeated here as (25a), has the presupposition in (25b):

(25) a. *How much did Bill wonder whether the book cost?
b. There is a sum such that Bill wondered whether the book cost that sum.

In other words, (25a) is synonymous with the following question:

(26) For what specific sum of money did Bill wonder whether the book cost that sum?

This paraphrase, though perfectly grammatical and not involving long movement, is pragmatically odd in the same obvious way that an answer to that question is odd:

(27) Bill wondered about the amount ten dollars whether the book cost that.

[10] Certainly, amounts can be referential entities, as in the following sentence:

(i) The amount that I paid for the book was enough to cover two meals in a good restaurant.

It is not clear how the existence of sentences like (i) could be made compatible with the Rizzi/Cinque claim that amount quantifiers are not ordinarily referential.

Normally, one doesn't wonder about specific amounts whether some property holds of them and this fact is sufficient to account for the oddness of (25)-(27), independently of whether the examples exhibit *wh*-movement, strengthening our claim that the problem with such cases is pragmatic and semantic and that long movement of amount quantifier *wh*-phrases from complement position is not restricted in the syntax.

4. Additional Evidence

Considerable additional evidence can be adduced for the analysis presented above. The following sections discuss some of this evidence, drawing on the behavior of echo questions, the negative island effect, and scope reconstruction.

4.1. Echo Questions

With appropriate intonation, sentences containing questioned constituents can be taken as requests for information which the asker presumes to have just been introduced into a discourse but which he/she has missed. Such echo questions ordinarily use the same syntactic form as the declarative sentence that introduced the misunderstood information. In fact, they are frequently asked with the *wh* in situ, as in (28) below:

(28) The book cost *how* much?

However, it also possible, if the special intonation is retained, for the *wh* element to appear in its ordinary fronted position, as in (29):

(29) *How* much did the book cost?

In an echo question, the existence of a specific and unique discourse entity that satisfies the question's existential presupposition is always guaranteed since the question is parasitic on the preceding declarative. Therefore, one expects, in light of our discussion, that long-movement of amount quantifiers should occur freely in echo questions. The example below indicates that it does (see the discussion in Comorovski 1988):[11]

(30) A: We asked whether the book cost ten dollars.
B: a. You asked whether the book cost how much?
OR b. How much did you ask whether the book cost?

[11]Thanks to Beatrice Santorini for drawing our attention to the echo question interpretation in long movement cases.

Of course, the circumstances under which A would utter the sentence given are quite limited since the question, "Did the book cost ten dollars?" can itself only be asked felicitously if the speaker has reason to think that ten dollars is somehow a specially appropriate price to ask about; for example, because there are reasons to think it the most likely price. However, given A's utterance, B can always ask the echo question (a) to confirm what A said; and whenever (a) is possible, so is (b).

4.2. Negative Islands

An important motivation for introducing considerations of referentiality into the description of *wh*-movement are the facts of extraction from so-called "negative islands" (Ross 1984). As Rizzi points out, these facts parallel those of long movement out of indirect questions. Thus, the negated counterparts of questions like (31), given in (32), are unacceptable:

(31) a. How much did it cost?
b. How much did you pay?
(32) a. *How much didn't it cost?
b. *How much didn't you pay?

Rizzi argues that this contrast arises because negation projects an additional phrasal boundary, NegP, which blocks antecedent government. However, this simple configurational account runs into difficulty with examples like (33):

(33) a. How much/little did you manage to pay?
b. *How much/little did you fail to pay?

Here we see that the inherently negative verb *fail* blocks movement just as an overt negative does, in contrast to the non-negative verb *manage*. In a footnote Rizzi suggests that the negative verb may raise at LF to a position that blocks antecedent government, presumably NegP, but he doesn't investigate this possibility in any detail. The plausibility of this approach is limited, given that it would seem to make a wrong prediction as to the scope of negation in sentences with the verb *fail* as opposed to those with overt sentence negation. Consider, for example, the following pairs:

(34) a. He has not always managed to pay his bills.
b. He has always failed to pay his bills.
(35) a. Everyone has not managed to pay his bills.
b. Everyone has failed to pay his bills.

In both of these cases the negation associated with *fail* has narrow scope with respect to the quantifier in the sentence while the sentence negative *not* has, obligatorily in (34) and optionally in (35), wide scope over the quantifier. If LF is the input to quantifier interpretation, then *fail* cannot raise at LF. However, *fail* does contain a negative operator able to take wide scope over a quantifier. When *fail* c-commands the quantifier from its s-structure (i.e., non-raised) position, its negation may take wide scope. Thus, the following pair of sentences are both ambiguous and the contrast between verbal and sentential negation found above having disappeared:

(36) a. He has not managed to pay all of his bills.
b. He has failed to pay all of his bills

Aside from the difficulty for the Rizzi/Cinque analysis posed by inherently negative verbs, there is also a problem posed by negative quantifiers. Thus, the unacceptable sentences in (32) are matched by sentence like those in (37) below, in which negatively quantified NP's provide the negative force:[12]

(37) a. *How much do no books cost?
b. *How much did none of you pay?

In these sentences, there would seem to be no NegP to create the barrier needed by Rizzi's account, unless somehow a negative lowering operation can be motivated at LF, an implausible option at present.

The difficulties with a syntactic account of the "negative island" effects suggest an attempt to unify them under our semantic analysis of constraints on long movement of amount quantifiers. Indeed, just as we might expect under a semantic account we find that it is possible to construct contexts where extraction from negative is allowed. Consider (38):

(38) How much didn't you pay that you were supposed to?

Here the extraposed relative clause modifying *how much* serves to introduce a unique amount into the existential presupposition of the question, which might be stated as in (39):

(39) There was a sum that you were supposed to pay that you didn't pay.

Since this presupposition is plausible, the question is acceptable. Another example that makes the same point is the discourse in (40), where the extraction sounds perfectly fine in the ironic context:[13]

[12]There is, of course, a secondary reading of these sentences with a constituent negation interpretation. On this reading the sentences are acceptable but then not relevant to the negative island effect.

[13]Thanks to Jack Hoeksema for this example.

(40) A: How much have beans been costing lately?
B: The price has been jumping around so much, you'd do better to ask: How much haven't they cost?

From such examples and others easily constructed, we may conclude that the same semantic account based on the plausibility of presuppositions covers extraction out of both *wh*-islands and negative contexts. Thus, further investigation supports the generalization across these two cases proposed by Rizzi, although not his specific analysis.

4.3. Scope Reconstruction

One piece of evidence adduced by Cinque in support of his use of referentiality to constrain long movement is a restriction on scope interpretation observed in Longobardi (1987). Longobardi notes a difference in the scope of the *wh* operator and the universal quantifier in sentences like the following pair:[14]

(41) How many patients do you think that every doctor in the hospital can visit in an hour?
(42) ? How many patients did you wonder whether every doctor in the hospital could visit in an hour?

Example (42) is odd because of the long moved amount quantifier but it can only be interpreted with *every* having narrow scope with respect to *how many*. Example (41), on the other hand, is ambiguous as to the scope of *every* and *how many*. Following Longobardi, Cinque attributes the ambiguity of (41) to the optional reconstruction of the moved *wh*-phrase back to its deep structure position. To explain the absence of ambiguity in (42), Longobardi points to the lack of an intermediate trace in the COMP of its embedded clause and argues that scope reconstruction requires a chain of local (antecedent governed) traces. Cinque rejects this account because other reconstruction effects, those involving pronoun binding, do not require such a chain. Thus, the sentences in (43) [Cinque's (29)] show that a *wh*-island does not block reconstruction with respect to the application of principles A, B, or C of the binding theory:

[14] Longobardi's examples are in Italian; but the facts of English correspond reasonably closely to the Italian ones so that we will base our discussion on English examples. There is a difference between the languages that we will ignore in our discussion but that merits further investigation. The English example (41) is ambiguous and at least some speakers prefer the reading under which *every doctor in the hospital* has narrow scope with respect to *how many patients*. The Italian example apparently has as its preferred reading the one with wide scope for the universally quantified NP.

(43) a. It's of herself that I don't know whether she thinks.
b. *It's of her(i) that I don't know whether Mary(i) thinks.
c. *It's of Mary(i) that I don't know whether she(i) thinks.

Given this pattern, Cinque proposes that the failure of reconstruction in (42) is due to the fact that *how many patients* is necessarily referential, having been long-moved out of a *wh*-island, and being referential, cannot occur inside the scope of a quantifier.

There are two considerations which militate against Cinque's analysis here. First of all, it is not true that long-moved *wh*-phrases cannot interact with quantifiers. Cinque apparently expects a lack of interaction because referential noun phrases (definite noun phrases and specific indefinites) ordinarily do not interact with quantifiers. On our analysis every *wh*-question phrase is associated with an existential quantifier and so has the potential to exhibit scope ambiguity. Such ambiguity is quite clearly possible; consider, for instance, the following case:

(44) a. The boss wants to know which projects every other firm still has not decided whether to bid on.
b. The boss wants lists of which projects every other firm still has not decided whether to bid on.

These sentences are ambiguous as to the relative scope of *which projects* and *every other firm*; indeed, the reading on which *every other firm* has wide scope seems the preferred one. However, on Cinque's analysis this reading should be impossible since *which project* has been long-moved and is referential. Either referentiality does not block interaction with quantifiers, in which case Longobardi's scope reconstruction effect is not explained, or, contra Cinque's central proposal, it is not a condition on long movement. Secondly, there seems to be less reason than Cinque indicates to expect scope reconstruction to pattern with reconstruction effects involving pronominal binding. The latter, at least in the core cases Cinque considers, seem to involve only the syntactic configurations under which coindexing is checked and not to involve semantic interpretation in any deep way. The former, on the other hand, occurs only in semantically intensional contexts, interacts with quantifier raising, and depends for its analysis on exactly how one interprets the quantificational character of questioned constituents. An exploration of this phenomenon is beyond the scope of this paper; but in the absence of a precise proposal regarding the semantics of scope reconstruction, there is little reason for surprise its not falling together with the binding cases.

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