

Chapter 3

On the Scope of Indefinites

3.1. Introduction

In chapter 1 we reviewed some of the evidence that the assignment of relative scope to NPs is an instance of move α . In this chapter we will start from the assumption that this is true, and proceed from there to point out some peculiarities of weak NPs with respect to scope assignment. These peculiarities will lead us to the conclusion that, although move α (Quantifier Raising) is involved in Scope Assignment, it is not possible to account for all scopal phenomena (we will discuss) in terms of QR alone. Some additional grammatical mechanism will need to be introduced.

This chapter is organized as follows. Section 3.2. introduces some features of the phenomenon of specificity, and presents the analysis of these data proposed by Fodor & Sag (1982) as an example of the lexical ambiguity approach to specificity. Section 3.3. presents some further data which indicate that the scope of indefinite NPs cannot be accounted for through QR alone. In section 3.4. we will first argue that Fodor & Sag's analysis cannot be maintained, and then propose a new analysis which treats specificity as a syntactic, rather than a lexical-semantic phenomenon. In section 3.5. we shall compare our Scope Assignment proposal with some other recent proposals, and adduce some independent evidence for our position. Finally, in section 3.6., we shall discuss some remaining problems.

3.2. On Specificity

As an introduction to the phenomenon of specificity, this section will present a rather elaborate discussion of Fodor & Sag (1982). Since there is already an extensive literature on specificity, we will restrict ourselves here to a brief presentation of the key facts, referring the reader to Fodor & Sag (1982) for an excellent overview of the subject. We will then proceed to show why, in our view, Fodor & Sag's account of the specificity phenomenon must be considered inadequate. Also, it will turn out that the notion of a [\pm specific] distinction is mistaken in itself, and must be replaced by a relative notion of specificity.

Quite briefly, there is a widespread consensus that indefinite noun phrases can be used either 'specifically' or 'non-specifically'. Before discussing this dichotomy, it is important to distinguish it from the well-known opposition between the 'referential' and the 'attributive' uses of indefinites. The latter distinction, although related to the former, should not be identified with it. It would appear, for instance, that

Higginbotham (1987) does identify the two dichotomies, in his rejection of the notion of specificity as a semantic concept. Higginbotham discusses sentences such as (1).

- (1) I saw a friend of John's today

There is a clear intuition that (1) can be used in two different ways. It can either be used to convey that the speaker has in mind a specific man, whom he chooses to describe as a friend of John's, whom he saw today, or it may convey merely that for some (perhaps unknown) friend of John's, it is the case that the speaker saw him today. Higginbotham correctly observes that this distinction, however real it may be, does not appear to be a truth-conditional distinction belonging to the theory of sense, but rather a pragmatic distinction, belonging to the theory of force. It is not clear how in terms of truth and falsehood, (1) might be taken to mean anything more or less than merely that for some x , x a friend of John's, it is the case that the speaker saw x today. Although correct in itself, Higginbotham's observation does not really justify the conclusion that the interpretation of specificity belongs to the theory of force. The specific and non-specific uses of indefinites can quite easily be distinguished truth-conditionally in linguistic contexts containing scoped elements. In a sentence such as (1), however, which does not contain any scoped elements (apart from the indefinite itself) the specific/non-specific distinction coincides with the referential/attributive distinction, which was already referred to pragmatics by Ioup (1975).

In a sentence containing an indefinite NP along with some other scoped element, we can say that the indefinite is 'non-specific' if it is interpreted in the scope of the scoped element, and 'specific' if this is not the case. (2) is something of a core example.

- (2) Melissa wants to buy a motorcycle

This sentence can either mean that there is a specific motorcycle Melissa wants to buy, or that Melissa wants it to come about that there is some motorcycle that she buys. The former, specific reading might be represented by placing an existential quantifier outside the scope of the modal verb which binds a variable in the embedded object position, the latter, non-specific reading might be represented by the opposite scopal order, as in (3a) and (3b), respectively (this analysis was proposed by e.g. Fodor (1970)).

- (3) a. $\exists x$ motorcycle(x) & Melissa_{*i*} wants [PRO_{*i*} to buy x]
 b. Melissa_{*i*} wants [$\exists x$ motorcycle(x) & PRO_{*i*} to buy x]

The truth conditions for these readings for (2) are different (the truth of (3a) e.g. implies the existence of motorcycles, whereas the truth of (3b) does not), so that Higginbotham's objection is no longer appropriate. However, although this would

seem to imply that the $[\pm\text{specific}]$ distinction corresponds to a real semantic distinction, this does not necessarily mean that specificity is a feature that must be incorporated into the grammar, rather than remain a descriptive term. Since the ambiguity of (2) can be analyzed in terms of relative quantifier scope, as in (3), there is no need to say that the grammar assigns two structures to this sentence, one where the indefinite has the feature $[\text{+specific}]$, and one where it has the feature $[\text{-specific}]$. Instead, we can resort to the independently motivated rule of Quantifier Raising to obtain two LF-structures very much like (3a & b), with two relative orders for the modal and the indefinite. Thus the question is not whether there is such a notion as 'specificity', but rather whether or not this notion must be incorporated in the grammar.

In Fodor & Sag (1982) it is argued that indefinite NPs are indeed ambiguous between a specific reading and a non-specific reading. Fodor & Sag (henceforth: F&S) claim that the indefinite article *a* is marked as either $[\text{+specific}]$ or $[\text{-specific}]$; if the indefinite article is $[\text{+specific}]$, the indefinite NP is interpreted as a referential expression, whereas if the article is $[\text{-specific}]$, the NP is interpreted as a quantificational expression. Consider (4) as an example.

- (4) every boy kissed a redheaded girl

In chapter 1 we saw that examples of this type are ambiguous (cf. example (I,3)); (4) can either mean that every boy kissed some (perhaps different) redheaded girl, or that a specific redheaded girl was kissed by every boy. We also saw that this is a real ambiguity, not a matter of vagueness. The ambiguity can be accounted for by deriving the LF structures (5a) and (5b) for (4).

- (5) a. $[_S \text{ every boy}_i [_S \text{ a redheaded girl}_j [_S t_i \text{ kissed } t_j]]]$
 b. $[_S \text{ a redheaded girl}_j [_S \text{ every boy}_i [_S t_i \text{ kissed } t_j]]]$

F&S's analysis, however, provides a third alternative structure. They allow for the structures in (5a & b), where the indefinite article is $[\text{-specific}]$, and also for the LF in (5c), where the article is $[\text{+specific}]$, hence the indefinite is referential and does not undergo QR.

- (5) c. $[_S \text{ every boy}_i [_S t_i \text{ kissed a redheaded girl}_r]]$

I have given the object in (5c) the subscript *r* to indicate its referentiality. I will not go into the semantic interpretation of referential indefinites here; suffice it to say that the object (5c) is interpreted in much the same way as *Mary* is in *every boy kissed Mary*, except that the reference of the referential indefinite is a function of the context of utterance. Note that although the indefinite is structurally in the scope of *every boy*, this does not affect its single reference, any more than *Mary* can refer to different

persons named Mary if the name is structurally in the scope of a quantifier. Thus, analyzing an NP like *a redheaded girl* as a referential expression has the same effect as analyzing it as a quantified expression and placing this quantified expression outside the scope of all other scoped elements. The upshot of this is that (5c) is equivalent to (5b), where the indefinite is outside the scope of the quantified subject.

The question we are attempting to answer is whether there is any evidence that specificity plays a role in the grammar. The ambiguity of (2) did not appear to constitute such evidence, and neither does the ambiguity of (4). In order to derive the interpretation in (5a), we must allow for a quantificational interpretation of the indefinite. But once this interpretation is available, we can also derive the interpretation in (5b) by means of QR. There is then no need to allow for a non-quantificational (referential) interpretation of the indefinite, since nothing is added by the resulting reading (5c), which is equivalent to (5b). Nevertheless, F&S believe that indefinite NPs are ambiguous between a quantificational reading and a referential reading. We shall now discuss the evidence they present in favor of this view, and return to the redundancy in their theory with respect to the ambiguity of (2) and (4) in section 3.4.1. below.

F&S present two classes of evidence in favor of the [\pm specific] ambiguity position. The first class of arguments is meant to show that the *ambiguity position* (quantification-or-reference) is not really as inferior to the *non-ambiguity position* (quantification-only) as it appears to be if we consider only (2) and (4). Some of these arguments are quite well-known. F&S consider their second class of arguments, which is new, to be conclusive evidence in favor of the ambiguity position. We will briefly consider an example of the first class, and then turn to the stronger evidence.

Consider (6) and (7).

- (6) John overheard the rumor that each of my students had been called before the dean
- (7) John overheard the rumor that a student of mine had been called before the dean

Sentence (6) cannot be interpreted as in (8).

- (8) [each of my students x [John overheard the rumor that x had been called before the dean]]

Although NPs of the type [each N'] exhibit a general tendency to take wide scope, the NP *each of my students* evidently cannot take scope outside the complex NP in (6); cf. the discussion in chapter 1, section 1.2.5.. Sentence (7), however, does have an interpretation equivalent to (9).

- (9) [a student of mine x [John overheard the rumor that x had been called before the dean]]

If we want to maintain the non-ambiguity position in view of these facts, we are forced to assume that the rule of QR can extract the indefinite in (7) from the complex NP, unlike the strong NP in (6), and unlike (Wh-)phrases undergoing overt movement and Wh-in-situ undergoing LF-movement. Although, of course, it would be technically possible to formulate the restrictions on movement responsible for the CNPC in such a way that indefinite NPs are exempted, this would probably be very much ad hoc. The ambiguity position, on the other hand, predicts the opposition between (6) and (7). The indefinite in (7) can be [-specific], i.e. quantificational, and as such be restricted to the complex NP, or it can be [+specific], hence referential. The latter option results in an interpretation that is equivalent to (9), without requiring an LF structurally similar to (9) in violation of the CNPC. The possible LFs predicted by the ambiguity position are (10a) and (10b); the referential NP in (10a) is interpreted just like a quantificational NP with wide scope.

- (10) a. John overheard the rumor that [_S [a student of mine]_t had been called before the dean]
 b. John overheard the rumor that [_S [a student of mine]_i [_S t_i had been called before the dean]]

The ambiguity position also correctly predicts that adding further barriers to movement does not in any way affect the indefinite's ability to take wide scope. Thus, whereas (11a) is extremely unacceptable, and whereas (11b) cannot possibly be interpreted as paraphrased in (11c), (11d) can easily be interpreted as paraphrased in (11e).

- (11) a. ** This is the man who John overheard the rumor that the woman who loved t was called before the dean
 b. John overheard the rumor that the woman who loved each student of mine was called before the dean
 c. [each student of mine x [John overheard the rumor that the woman who loved x was called before the dean]]
 d. John overheard the rumor that the woman who loved a student of mine was called before the dean
 e. [a student of mine x [John overheard the rumor that the woman who loved x was called before the dean]]

The same argument can also be made with respect to any other type of extraction island QR is sensitive to, such as e.g. tensed adjunct CPs.

Let us now turn to the data F&S have put forward as conclusive evidence in favor of the ambiguity position. Consider (12) (= F&S'(69)).

- (12) every teacher overheard the rumor that a student of mine had been called before the dean

(12) contains an indefinite, and two other scoped elements (*the rumor...* and *every teacher*) relative to which the indefinite's scope may vary. We have seen that if we want to maintain the non-ambiguity position, we must assume that indefinite NPs can be Quantifier Raised over an unlimited distance. We then expect (12) to be three ways ambiguous, in accordance with the three scopal orders resulting from arbitrary movement of the indefinite NP. The three LFs we would expect are given in (13) and roughly paraphrased in (14).

- (13) a. $[_S \text{ every teacher}_i [_S t_i \text{ overheard the rumor that } [_S [\text{a student of mine}]_j [_S t_j \text{ had been called before the dean }]]]]$
 b. $[_S \text{ every teacher}_i [_S [\text{a student of mine}]_j [_S t_i \text{ overheard the rumor that } [_S t_j \text{ had been called before the dean }]]]]$
 c. $[_S [\text{a student of mine}]_j [_S \text{ every teacher}_i [_S t_i \text{ overheard the rumor that } [_S t_j \text{ had been called before the dean }]]]]$
- (14) a. every teacher heard the rumor: "a student has been called before the dean
 b. for every teacher x there is some student of mine y such that x overheard the rumor that y had been called before the dean
 c. there is a student of mine x such that every teacher overheard the rumor that x had been called before the dean

Crucially, according to F&S, reading (14b) is missing for (12). This fact is taken as a refutation of the non-ambiguity position. It does not seem possible to formulate a restriction on movement which is not totally ad hoc, which allows local quantifier raising (resulting in LF (13a)), and which also allows long-distance raising ((13c)), but which does not allow medium-distance raising (which would get us (13b), paraphrased in (14b)).

If we accept F&S's ambiguity position, on the other hand, the situation with respect to (12) is as expected. The indefinite can be either [+specific] or [-specific]. If it is [+specific] it is interpreted as a referential expression, yielding reading (14c). If it is [-specific] it behaves like any other quantified expression undergoing local QR, yielding (14a). For (14b) to be obtained, the indefinite would have to be non-referential, hence quantificational, and QR would have to move it out of the complex NP, yielding (13b) in violation of the CNPC. An indefinite, F&S conclude, may

appear to have exceptionally wide scope, due to the referentiality option, but this exceptional wide scope must be maximal, for the same reason.

Again, this state of affairs should hold with all islands to QR. F&S cite the following example (= F&S'(73)).

- (15) If a student in the syntax class cheats on the exam, every professor will be fired

The island here is a tensed adjunct CP. This sentence, according to F&S, has the readings in (16a) and (16c), but not the reading in (16b).

- (16) a. if any student in the syntax class cheats on the exam, then for every professor *x* it is the case that *x* will be fired
 b. for every professor *x* there is some student in the syntax class *y* such that, if *y* cheats on the exam, *x* will be fired
 c. there is a student in the syntax class *y* such that if *y* cheats on the exam, then for every professor *x* it is the case that *x* will be fired

F&S's argument here parallels the above: (16b) is absent since, if the indefinite is to have scope outside the adjunct, it must be referential, yielding only (16c). The non-ambiguity position supposedly fails to predict this fact. However, in the case of (15) F&S's argument does not go through. The reading (16b), which the non-ambiguity position incorrectly seems to predict should be available, should arise if the indefinite NP *a student in the syntax class* is extracted from the adjunct CP through QR, but does remain within the c-command domain of *every professor*. But this option is evidently not available. The indefinite is not within the c-command domain of *every professor* to begin with; it appears quite reasonable to assume that the subject *every professor* cannot take scope over the preposed CP, as QR can adjoin QNPs to no higher node than S (Cf. the quantifier-Wh interaction data to be discussed in sections 3.5.1. and 3.5.2.2. below). Therefore, the fact that (16b) is unavailable for (15) may very well be a result of the potential scope of the subject, not of the indefinite.

An example which does allow us to check F&S's claim for the case of adjunct CP's is (17).

- (17) every professor will rejoice if a student in the syntax class cheats on the exam

A reading analogous to (16b) does appear to be available for (17). This becomes even clearer if we make the ultra-wide scope reading for the indefinite unavailable, as in (18).

- (18) every professor_{*i*} will rejoice if a student of his_{*i*} cheats on the exam

This sentence would appear to be appropriate to describe a situation, e.g., where every professor rejoices iff his worst student cheats on the exam (because he would otherwise certainly have failed it). If this is indeed the case, we must conclude that indefinites can take scope wider than strong quantified expressions can, in apparent violation of conditions on extraction islands, without becoming referential (Cf. chapter 1 section 1.2.6. for the island properties of adjuncts as in (17)). This would strongly argue against F&S's explanation of the exceptional scopal behavior of indefinites. There might also remain no motivation for adopting a grammatical notion of specificity.

The next section is a discursion, in which we will point out one further exceptional scopal property of indefinites, from which we will conclude that F&S are correct in claiming that a theory which accounts for Scope Assignment by QR alone cannot be correct. However, the findings of this section will also enable us to show, in the subsequent section (3.4.1.), that F&S's approach is equally insufficient. We will then introduce, in sections 3.4.2. and 3.4.3., a new grammatical mechanism, which will appear to be rather similar to the Scope Indexing proposed by Haïk (1984), which will supplement the QR hypothesis in such a way that the range of data discussed can be accounted for in terms of the combination of these mechanisms.

3.3. On the insufficiency of QR

In this section, we will produce evidence that the QR theory of Quantifier Scope Assignment is descriptively inadequate. Since we have started this chapter with the assumption that Quantifier Raising is involved in Scope Assignment, we will be forced to conclude that some additional apparatus must be introduced. Below, we will refer to the hypothesis that the determination of relative scope is mediated by no other mechanism than Quantifier Raising as the QR-only hypothesis.

The argument will run as follows. We have seen above that weak NPs can be assigned exceptionally wide scope, far wider scope than can be assigned to strong quantified expressions. Some more examples of this phenomenon will be presented. It is also well known that weak NPs can be assigned scope equally wide as strong NPs. The relevant examples will be repeated. However, it can also be demonstrated that weak NPs can only be assigned very narrow scope, narrower in fact than strong NPs. Three examples of this will be presented. Such a situation constitutes a paradox, if scope is assigned through Quantifier Raising alone.

Consider first of all sentences (6) and (7) (repeated as (19a & b)), and (20) through (23).

- (19) a. John overheard the rumor that each of my students had been called
before the dean
- b. John overheard the rumor that a student of mine had been called
before the dean

- (20) a. John will become unhappy if each of his girlfriends should leave him
 b. John will become unhappy if three girlfriends of his should leave him
- (21) a. John denied that every girl was beautiful
 b. John denied that a girl was beautiful
- (22) a. some girl loves every boy and wants to be a football player
 b. every boy loves a film star I know and wants to be a football player
- (23) a. I love John's picture of every boy
 b. every boy loves John's picture of a film star I know

These examples all go to illustrate the same basic observation. In each case, the strong quantified expression in the a-variant cannot take wide scope, whereas the weak NP in the b-variant can. Weak NPs appear to be exempted from each of the constraints on Quantifier Raising we discussed in chapter 1. If the scope of indefinites is determined by the application of QR, then (19b) violates the CNPC (Ch. 1, section 1.2.5.), (20b) violates the Adjunct Condition (Ch. 1, section 1.2.6.), (21b) violates the condition responsible for the ill-formedness of extraction over non-bridge verbs (Ch. 1, section 1.2.1.). The examples in (22) are rather complicated of necessity; the point is that for *every boy* in (22a) to take scope over the subject, or for *a film star I know* in (22b) to fall outside the scope of the subject, these NPs should not be scopally restricted to the conjoined VPs that contain them. Thus, wide scope is impossible in (22a), but (22b) apparently violates the CSC (Ch. 1, section 1.2.7.). Finally, (23a) obeys the definiteness restriction discussed in Ch. 1, section 1.2.4., but (23b) apparently does not, since the weak NP can be interpreted outside the scope of the subject.

If we are to maintain that Scope Assignment proceeds through QR alone, then in order to accommodate the specific readings in (19b) through (23b), we will have to assume that weak NPs do not obey the bounding conditions as strictly as strong NPs do. This assumption, although highly implausible, will preserve the QR-only hypothesis. Let us, for the sake of argument, adopt it temporarily.

Not only can weak quantified expressions take wider scope than strong NPs can, they can also take equally wide scope. Consider (24a & b) again, and (25).

- (24) a. every man loves some woman
 b. some woman loves every man
- (25) every man loves three women

If we adopt the QR-only hypothesis, then the wide scope readings for the weak objects in (24a) and (25) must be accounted for by assuming that weak NPs can take scope over the subject from object position, like the strong object NP in (24b).

The next step in the argument requires some introductory observations. Consider first (26). (Since some of the crucial data below are from Dutch, we will use Dutch examples from now on. Nothing hinges on this at present. We are using the complex determiner *all but two* here because Dutch does not have a convenient equivalent of *most*; any other non-universal determiner will do.)

- (26) Jan gaf drie boeken aan op twee na alle meisjes
'Jan gave three books to all but two girls'

At least three readings are associated with this sentence: a) each member of a set of all but two girls is given three (possibly different) books (wide scope Indirect Object); b) each member of a set of three books is given to some (possibly different) set of all but two girls (wide scope Direct Object); c) one specific set of three books is given to the members of one specific set of all but two girls.

A few minor remarks about the c-reading seem to be in order. This reading may appear to involve what is known as the collective use of a quantified expression. If that is the case, there are two possible ways of deriving this reading. Either the strong NP *op twee na alle meisjes* is given wide scope over *three books*, and interpreted collectively, or the weak NP *three books* is given wide scope, and interpreted collectively. Below, we will adopt a syntactic analysis which does not require the use of a notion of collectivity. We will assume for the moment that it is the indirect object which is given wide scope here. The reason for this assumption (which does not affect the logic of our argument here), is that, in general, weak NPs appear to allow collective interpretations more easily than strong NPs. Thus, (27a) is interpreted as involving just one table-lifting event much more easily than (27b).

- (27) a. three men lifted the table
b. all but two men lifted the table

While a QR-only theory can only assign a two-way ambiguity to an expression containing two scoped elements, (26), which contains two scoped elements, is three ways ambiguous. This fact in itself, however, does not yet appear to me to constitute conclusive evidence that the QR-only hypothesis is incorrect. We might augment the QR-only hypothesis with a stipulated [\pm distributive] ambiguity in the indefinite NP, a solution which, although far from enlightening, would leave the QR Theory of Scope Assignment essentially untouched. We might even propose a division of labour between LF and the interpretive semantic component operating on LF-structures (sometimes labelled LF'), such that (26) is assigned just two LFs by the grammar, one of which is then assigned two interpretations by the later component, which attaches a [\pm distributive] ambiguity to weak quantified expressions. This would preserve the QR-only theory to the letter. However, these solutions, while relying on an inherent (lexical) ambiguity of weak NPs, can only be valid if the ambiguity involved in (26) is

not syntactically conditioned. We will see below that this ambiguity is governed by syntactic factors.

What is of immediate interest to us here, however, is not to ascertain the status of the collective interpretations of weak or strong NPs, but simply to illustrate the obvious fact that indefinite NPs can be distributively interpreted (reading b. for (26)). This fact can only be observed in (26) by virtue of the plurality of the indefinite; the two non-narrow scope readings for the indefinite are identical if it is singular. This will lead us to the next step in our argument, and concludes our introductory observations.

We repeat (24a), the usual example of a potential wide scope indefinite object.

- (24) a. every man loves some woman

We saw in section 3.2. that it is not possible to decide on the basis of truth-conditions whether the indefinite object *some woman* in (24a), when it is not in the scope of the subject, has scope over the subject, or is simply interpreted outside the scope of the subject (e.g. by being interpreted as a referential expression). These options are equivalent, due to the singular number of the indefinite (recall the equivalence of (5b) and (5c)). Hence, it is not possible to demonstrate on the basis of (24a) that indefinite objects can take scope over the subject, and undergo QR. We should rather consider (28), where the object is plural, and the subject is non-universal.

- (28) op twee na alle mannen versloegen drie vrouwen
'all but two men defeated three women'

The QR-only hypothesis would attribute to (28) the LFs in (29a) and (29b) (translated for convenience).

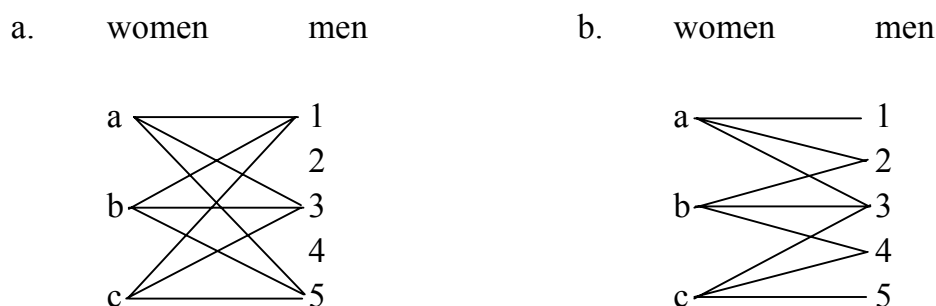
- (29) a. $[_S \text{ all but two men}_i [_S \text{ three women}_k [_S t_i \text{ defeated } t_k]]]$
b. $[_S \text{ three women}_k [_S \text{ all but two men}_i [_S t_i \text{ defeated } t_k]]]$

Assuming that indefinites can be collectively interpreted, we may expect the reading in (30a) to be available for (29b); and given the fact that plural indefinites can be distributively interpreted, we certainly expect (30b) to be available for (29b).

- (30) a. there is one set of three women Y, such that there is one set of all but two men X, such that the men in X defeated the women in Y.
b. there is one set of three women Y, such that for each woman y in Y there is a set of all but two men X such that the men in X defeated y.

For the sake of clarity, compare the diagrams below.

(31)



(30b) is true in situation (31b), whereas (30a) is true only in (31a).

The crucial observation here is that reading (30b), the distributive reading, is not available for (28). In other words, if the singular indefinite in the standard example of wide scope indefinite objects (24a) is replaced by a plural indefinite, it turns out that the indefinite object cannot really take scope over the subject. The only reading that is available, (30a), is the one which, if the indefinite did take scope over the subject, would be described as 'collective', and which cannot be truth-conditionally distinguished from a referential or otherwise scopally independent use of a structurally narrow scoped indefinite.

We can now summarize one version of our argument. If we want to maintain the QR-only hypothesis, then in order to account for the absence of (30b), we must assume that the LF in (29b) cannot be derived. In view of the fact that strong object NPs can take scope over their subjects, this implies that strong NPs can take wider scope than weak NPs can. We have also seen, however, that weak NPs can take far wider scope than strong NPs can. Above, we have mended the QR-only hypothesis with the assumption that weak NPs obey weaker bounding conditions than strong NPs. In order to prevent (29b) from being derived, we now have to adopt the opposite assumption, that weak NPs obey stronger bounding conditions. It appears, that the QR-only hypothesis is faced with a paradox. We cannot account both for the data in (19) through (23) (strong NP more local than weak NP), and for the opposition between (24b) and (28) (weak NP more local than strong NP), while maintaining that Scope Assignment operates through move α alone.

Since the conclusion we have now reached will play a rather prominent role in the discussion below, it seems worthwhile to strengthen the factual base on which it is founded. First of all, let me point out that the observation that weak objects cannot take scope over their subjects is not entirely new. A similar view is defended by Verkuyl (1988) and v.d. Putten (1989). These authors note that weak objects cannot take scope over weak subjects, as in (32).

- (32) drie mannen tilden twee tafels op
 'three men lifted two tables'

In spite of earlier reports in the literature, which may have been founded on simple

extrapolations from data with strong quantifiers, rather than on actual intuitions (Cf. e.g. Scha 1981), it seems to be impossible for the object in (32) to be interpreted with scope over the subject.

Also, relevant data from English of a slightly different type are available from the literature. Examples (33) and (34) are cited from Ioup (1975:75).

(33) Joan gave a few handouts to some pedestrians

(34) Joan gave a few handouts to every pedestrian

According to Ioup, (33) cannot be interpreted with the indirect object taking scope over the direct object, while this reading is available for (34). It follows that a QR-only theory must assume that weak NPs obey stricter bounding conditions than strong NPs. Again, we are faced with a paradox in view of other data which require the opposite assumption. For example, the indirect object in (33) can be interpreted *outside* the scope of the direct object quite easily.

There is a second version of our argument which runs slightly differently. We have seen that weak NPs move both more and less easily than strong NPs do. We can also show, paradoxically, that weak NPs move less easily than weak NPs (if movement is all that governs relative scope). For this purpose, we can present some additional, even clearer examples of the inability of indefinites to take scope over S-Structure c-commanding elements. Consider (35).

(35) a. every professor believed that John kissed three redheaded girls in the syntax class

b. $[_S [_{\text{three redheaded girls in the syntax class}}]_i [_S [_{\text{every professor}}]_j [_S t_j \text{ believed that John kissed } t_i]]]]$

The embedded indefinite in (35a) can be interpreted outside the scope of the matrix subject; F&S would attribute this reading to the referential reading of the indefinite; a QR-only theory would have to account for it by assuming the LF in (35b). If this LF is available, however, then we expect (36a) to have (36b) as one of its LFs, resulting in the reading paraphrased in (36c).

(36) a. some professor believed that John kissed three redheaded girls in the syntax class

b. $[_S [_{\text{three redheaded girls in the syntax class}}]_i [_S [_{\text{some professor}}]_j [_S t_j \text{ believed that John kissed } t_i]]]]$

c. for three redheads in the syntax class y there is some professor x such that x believed that John kissed y

However, (36c) is clearly not a reading for (36a). This means that we cannot exempt the indefinite from the bounding conditions in such a way that LF (36b) is derived.

From this it follows that some additional apparatus is required besides QR to generate the non-narrow scope reading that (35a) and (36a) do allow for the indefinite: the reading where the embedded object is simply outside the scope of the matrix subject, without taking scope over it. The same observation holds in other specificity contexts. For example, while the indefinite in (37) can be interpreted outside the scope of the complex NP, it cannot be interpreted with scope over the complex NP.

- (37) John overheard the rumor that three redheaded girls had been called
 before the dean

While (37) can be about three specific girls, it cannot involve three different rumors. A QR-only theory cannot differentiate between these options.

3.4. On Relativized Specificity

3.4.1. On the insufficiency of a [\pm specific] ambiguity

In section 3.2. we reviewed Fodor & Sag's argument that QR is descriptively insufficient, since weak NPs can take local scope, or ultra-wide scope, but not intermediary scope. In section 3.3. we presented some new evidence for the insufficiency of QR: weak NPs can take ultra-wide scope, but they cannot take scope over local c-commanding elements. In this section, we will explain why, in our view, F&S's approach to the specificity phenomena under discussion is incorrect, and we will argue for a relative notion of specificity.

We object to F&S's approach both on conceptual and empirical grounds. At the conceptual level, we must object to the highly stipulative quality of the proposed [\pm specific] ambiguity of the indefinite article. First of all, of course, since this ambiguous lexical specification is not related to any other lexical or grammatical property, and does not seem to play a role in any other class of phenomena than the specificity data it was designed to account for, it appears little more than an ad hoc reformulation of the grammatical problem in question. Secondly, as we have seen that not only the indefinite article, but a whole range of weak determiners, including the numerals, display specificity effects, the lexical ambiguity approach would require that each of these determiners be marked as lexically ambiguous. Since the [\pm specific] ambiguity is not linked to the weak / strong distinction or to any other grammatical property, it must be considered purely accidental from this point of view that there are, for example, no numerals which happen not to be ambiguous along the specificity dimension. Also, it can only be accidental that in other languages than English (e.g. in Dutch), the same type of weak determiners can also be interpreted specifically. It would be preferable if the peculiar properties of weak NPs we have reviewed could be explained as the employment of options that are inherently available within the grammatical theory of scope assignment.

Two types of objections of an empirical nature can be raised against F&S's claim that the extraordinary scopal behavior of indefinites is due to a [\pm specific] (referential / quantificational) ambiguity. Firstly, we can show that this distinction does not account for all peculiar properties of indefinites. Secondly, we can argue against the validity of their basic argument in favor of this ambiguity, i.e. the absence of intermediary wide scope for indefinites. We have already come across an example on which we can base an argument of the first type. F&S's theory does not explain the scopal peculiarity discussed in the foregoing section. If indefinites are claimed to be either quantificational or referential, and nothing further is said, then we expect that indefinites, when they are quantificational, will behave just like other quantificational expressions. But we have seen that weak NP objects, unlike strong NP objects, cannot take scope over their subjects. Hence, F&S's approach is descriptively inadequate.

Examples of the second type are not easy to construct. Recall F&S's basic generalization that indefinites can take exceptionally wide scope (i.e. wider than strong NPs can), but that, if they do so, they must take the widest possible scope. If we want to find counterexamples to this claim, we must construct examples where an indefinite is assigned exceptionally wide scope (which it would not normally be expected to take, if it were a regular quantified expression), but where it nevertheless cannot be interpreted as a referential expression (remaining within the scope of some scoped element). Examples of this kind will therefore contain at least three scoped elements: the element outside the scope of which the indefinite is exceptionally interpreted, the element within the scope of which the indefinite nonetheless remains, and the indefinite itself. As a consequence, intuitions will often be very insecure. Still, some clear examples can be constructed.

One counterexample to F&S's generalization we already encountered in section 3.2.; we repeat it here.

- (18) every professor_i will rejoice if a student of his_i cheats on the exam

The indefinite *a student of his* in (18) can be interpreted outside the scope of the adjunct, yet within the scope of *every professor* (which can be inferred from the fact that the pronoun *his* that is contained in the indefinite is interpreted as a variable bound by the matrix subject).

Our second counterexample again builds on the observation in section 3.3. that indefinite objects cannot take scope over their subjects. If this is true, then (38) becomes relevant.

- (38) a. elke professor vindt dat iedere student een theorie moet aanhangen
'every professor believes that every student should support some theory'
b. [every professor x [some theory z [x believes that [every student y [y should support z]]]]]

- c. $[_S \text{ every professor}_i [_S \text{ some theory}_k [_S t_i \text{ believes that } [_S \text{ every student}_j [_S t_j \text{ should support } t_k]]]]]]$

(38a) certainly seems to have the reading roughly paraphrased in (38b); it may be taken to mean, for example, that every professor has some pet theory which he would prefer for all students to support.¹ A QR-only theory would account for this reading by deriving (the Dutch equivalent of) LF (38c) (perhaps adjoining the indefinite to the matrix-VP instead of the S; this is irrelevant to our purposes). F&S would have to account for it in the same way: since the indefinite is in the scope of *every professor*, it must be [-specific], hence it should be Quantifier Raised to the appropriate position. From this it follows, that both the QR-only theory and F&S's theory must assume that weak object NPs can take clause external scope through QR, thereby taking scope over their subjects. As we have seen in the last section, this assumption is incorrect.² From the last section it follows that scope outside the subject must be considered exceptionally wide for indefinite objects; hence F&S's theory predicts that this should only be available by virtue of the referentiality option. This prediction is not corroborated.

A similar argument can be based on (39).

- (39) a. it seems that every politician will accept a proposal endorsed by Ronald Reagan
 b. it seems that there is a proposal endorsed by R.R. such that every politician will accept it
 c. it seems that $[_S [a \text{ proposal endorsed by Ronald Reagan}]_i [_S \text{ every politician}_j [_S t_j \text{ will accept } t_i]]]]$

Due to pragmatic factors, the most prominent reading for (39a) is probably the one paraphrased in (39b), requiring the LF in (39c). Again, the availability of this reading cannot be explained on F&S's assumptions.

A third counterexample concerns (40).

- (40) a. Jan gelooft dat elk meisje van hem houdt
 b. John believes that each girl loves him
 c. [every girl x [John believes that x loves him]]

Unlike its English 'translation' in (40b), the Dutch sentence in (40a) cannot be

¹ This reading can be made pragmatically more prominent if we replace *een theorie* ('some theory') with *een theorie van hem* ('some theory of his'), forcing the indefinite to remain within the matrix subject's scope.

² Note that this conclusion holds even if it is assumed (as has sometimes been done in the literature, especially w.r.t. English examples with weak subject NPs) that weak object NPs sometimes can take scope over their subjects. Even if we concede this possibility (which I do not) this reading is very difficult to obtain. The reading in (38b) however is easily obtained; hence QR cannot account for this reading.

interpreted as paraphrased in (40c), or only with great difficulty.³ We are not presently concerned with the cause of the distinction between English and Dutch here. We simply observe that the tensed complement in (40a) must be considered an extraction island for QR in Dutch. If this is the case, then F&S would expect that in Dutch indefinites can take scope outside the embedded clause only by becoming referential. This is not true.

- (41) a. elke professor gelooft dat een student van hem de slimste van allemaal is
'every professor believes that a student of his is the smartest of (them) all'
b. for every professor x there is a student of x y such that x believes y to be the smartest

(41) cannot only mean that the professors all hold the trivial belief that some student is the smartest, it can also mean that every professor has his favorite student, as paraphrased in (41b).

The fourth and last argument is related to the third. We saw in chapter 1, section 1.2.1. that *each girl* in (40b) can only take scope outside the matrix predicate by virtue of this predicate being a bridge verb. If the matrix verb is a non-bridge verb, the embedded clause is a scope island. Hence, F&S's generalization predicts that weak NPs embedded under a non-bridge verb can only take scope outside this verb if they become referential. Although intuitions are insecure, we believe that this prediction is not fully borne out. Consider (42).

- (42) a. John whispered that everyone had fallen ill
b. every professor whispered that a girl had fallen ill
c. [every person x [John whispered that x had fallen ill]]
d. [every professor x [a girl y [x whispered that y had fallen ill]]]

Although the reading for (42b) paraphrased in (42d) is admittedly not the most prominent, it is certainly much more easily available than the (42c)-reading for (42a). This is not what we expect to find, if both readings are to be derived through the same mechanism (QR of the embedded subject), but it is what we expect if (42c) involves a disallowed instance of move α , while (42d) only violates some ill-understood pragmatic restriction associated with non-bridge verbs.

To end this section, we will present some further evidence in which, due to the

³ The truthconditional distinction between the matrix-clause scope for the quantifier in (40c), and the embedded-clause scope is slight. Suppose Joan, Mary and Peter are the girls, and John believes Peter is a man who moreover does not love him. Then (40c) is false, yet the narrow scope reading for the quantifier may be true.

presence of special circumstances, the 'intermediary scope' reading is particularly prominent and very clear intuitions are possible.

In one type of example, the special circumstances consist of the presence of the specificity marker *certain* in the indefinite (forcing it to take scope outside a scope island) in combination with a bound variable pronoun contained in the noun's complement (forcing it, at the same time, to remain within the scope of the binder of the pronoun, hence remain non-referential)⁴. It will turn out that this combination of factors, rather than imposing contradictory requirements on the weak NP's interpretation and resulting in some type of semantic irregularity, or even ungrammaticality (as we would expect under F&S's assumptions) leads to perfectly acceptable interpretations with the required properties.

In the second type of example, we will make use of the presence of the adjective *different* (*ander* in the Dutch examples) in the indefinite NP. This adjective has some peculiar semantic properties which can be illustrated by means of the following example.

- (43) every farmer told each of his farmhands a different story

We are not interested here in the reading where the story being told differs from some story previously mentioned or made prominent in the discourse. Rather, we are concerned with the two readings where *a different story* is 'linked' to one of the universally quantified NPs. If it is linked to *every farmer*, then (43) implies that for every farmer, there is some story he tells his farmhands, which is different from any of the stories told by other farmers. If *different* is linked to *each of his farmhands*, (43) implies that for every farmer *x*, each farmhand of *x* is told a story which is not told to any other farmhand of *x*.

The latter reading makes clear the relevance of the notion of 'linking': while no two farmhands of each farmer are told the same story, this reading does not exclude the same story from being told to two farmhands belonging to different farmers. Thus, the *story*-variable is not required to take on a different value for every value assigned to variables bound by every higher quantifier, it is merely required to take on a different value for every value assigned to the variable bound by one specific higher quantifier: this is the quantifier to which we will say the adjective is 'linked'.

The former reading (*different* linked to *every farmer*) makes clear that the indefinite modified by *different* may not be in the scope of a lower quantifier than the one it is linked to. If the weak NP is linked to the subject, it must be interpreted

⁴ Hornstein; (1984) presents a specialized syntactic treatment of *a certain N'* (and *any N'*) as 'Type I' quantifiers, which are 'namelike' expressions that do not undergo QR, and are generally interpreted as having wide scope. Hintikka; (1986) has argued that this generalization is incorrect, on the basis of examples similar to those presented below (as well as other examples). We are not presently concerned with the cause of the exceptional properties of *a certain*, but only with the way in which NPs containing this element can be allowed to act the way they do, given the properties of the general syntactic theory of scope.

outside the scope of the indirect object. I.e. it cannot be the case that for each farmer, each of his farmhands is told some story, which may or may not be different from stories being told to his immediate colleagues, but which must be different from stories told to other farmers' farmhands. It appears then, that there is a requirement (which may be syntactic or semantic in nature) on the linked reading of *different*, in that it must be immediately in the scope of the quantifier it is linked to. The same restriction applies, as we will see below, to any other interfering operators which are not quantificational in nature⁵.

The correctness of our observations on the semantics or syntax of *different* is not relevant to the logic of our argument here. These observations merely explain, I believe, why it is that we can use this adjective to force out the particular 'intermediary scope' readings we are interested in, in the following examples. These examples each contain an indefinite NP modified with *different* (or *ander*) contained in a scope island, which in turn is in the scope of a universally quantified NP. The properties of the adjective described above will force the weak NP to be interpreted outside the scope island, but inside the scope of the universal. Again, the result, rather than being ungrammatical due to a forced illicit application of move α across the scope (extraction) island, is perfectly grammatical in each case, indicating that the syntactic rules of scope assignment must be so designed as to allow indefinites to take indefinitely non-narrow scope without becoming referential.

In the third type of example, we will make use of weak NPs containing the adjective *other* (again *ander* in Dutch) in its anaphoric use, as exemplified in (44).

- (44) every student kissed an other student

Other is used anaphorically here; its anaphoric link to *every student* forces the choice for the student being kissed to depend on the choice of the kissing student, in that they may not be identical. Anaphora of this type is discussed in Barwise (1987). The adjective's anaphoric dependence upon the subject forces the object in (44) to be interpreted in the subject's scope (hence remain non-referential) in much the same way as when a lower QNP contains a pronoun coindexed with a higher QNP. Unlike QNPs containing bound pronouns, however, QNPs containing the *other*-anaphor tend to take scope immediately below the antecedent (at least in Dutch), although readings where the anaphoric QNP is in the scope of yet another operator, intervening between it and the antecedent, are possible. (We might, again, strengthen this tendency by replacing *an other* with *a certain other*.) This combination of properties allows us to construct counterexamples to F&S's generalization.

⁵ The properties of *each...a different* discussed here can presumably be traced to the semantics of the construction. For reasons of compositionality, it should semantically be characterized as involving not two separate quantifiers, but one complex 'pair quantifier' binding two variables. See Keenan; (1987b) for a discussion of this issue. In this, the construction differs from the construction discussed in Barwise; (1987), to which we will turn below.

We will now reconsider the structures discussed earlier in this section, replacing the indefinites with weak NPs containing either *a certain* and a bound pronoun (in the a-examples), or *different* and *ander* (in the b- and c-examples; the English b-examples double as glosses for the Dutch c-examples), or *other* and *ander* (in the d- and e-examples). In the Dutch b-examples, the distributive marking adverb *weer* ('again') associated with the universal quantifier can be added to further strengthen the relevant reading. The same effect might be obtained by using *the professors each* instead of *every professor* in the English c-examples.

Parallel to (18), containing a tensed adjunct CP as island:

- (45) a. every professor_i will rejoice if a certain student of his_i cheats on the exam
 b. every professor will rejoice [_{CP} if a different student cheats on the exam]
 c. elke professor zal (weer) blij zijn [_{CP} als een andere student fraudeert op het examen]
 d. every student_i will rejoice [_{CP} if another_i student cheats on the exam]
 e. elke student_i zal blij zijn [_{CP} als een andere_i student fraudeert op het examen]

Parallel to (38), with a weak embedded complement taking matrix scope:

- (46) a. every professor_i believes that every student should support a certain theory of his_i
 b. every professor believes [_{CP} that every student should support a different theory]
 c'. elke professor gelooft (weer) [_{CP} dat elke student een andere theorie moet aanhangen]
 c''. elke professor gelooft [_{CP} dat elke student (weer) een andere theorie moet aanhangen]
 d. every professor_i believes [_{CP} that every student should support another_i professor]
 e. elke professor_i gelooft [_{CP} dat elke student een andere_i professor moet ondersteunen]

The b-example is perfectly ambiguous, allowing the weak NP to be linked either to the upstairs universal quantifier or to the downstairs universal quantifier. The Dutch example is also ambiguous, but can be disambiguated through the placement of the adverb *weer* (46c' & c'').

Analogous to (41), where a Dutch weak embedded subject takes matrix scope with much more ease than a strong embedded subject can:

- (47) a. elke professor_i gelooft dat een bepaalde student van hem_i de slimste is
'every professor believes that a certain student of his is the smartest'
b. every professor believes [_{CP} that a different student is the smartest]
c. elke professor gelooft (weer) [_{CP} dat een andere student de slimste is]
d. every professor_i believes [_{CP} that an other_i professor is smarter than
he_i is]
e. elke professor_i gelooft [_{CP} dat een andere_i professor slimmer is dan
hij_i]

The English examples (47b) and (47d) probably are not immediately relevant because strong NPs can be extracted from this position; the Dutch examples however are striking.

Analogously to (42), the weak NPs in (48) take scope outside a non-bridge verb.

- (48) a. every professor denied that a certain student of his had fallen ill
b. every professor denied [_{CP} that a different girl had fallen ill]
c. elke professor ontkende (weer) [_{CP} dat een ander meisje ziek was
geworden]
d. every professor_i denied [_{CP} that an other_i professor had fallen ill]
e. elke professor_i ontkende [_{CP} dat een andere_i professor ziek was
geworden]

In chapter 4, section 4.2.4., we shall examine some further clear examples of 'intermediary scope' readings across extraction islands.

This concludes our discussion of Fodor & Sag's (1982) proposal. We have seen that this proposal cannot account for the data discussed in section 3.3.. Furthermore, it appears that F&S's basic generalization that indefinites are either regular quantified NPs or referential expressions is mistaken. It should be noted, finally, that the objections we have raised against F&S's proposal have not been aimed at some particular idiosyncrasy in their hypothesis, but is rather applicable to any theory that accounts for specificity phenomena by assuming a binary [\pm specific] ambiguity. The next subsection will present an alternative approach.

3.4.2. Relativized Specificity

The generalization that seems to emerge from the discussion so far is that indefinite NPs can be freely interpreted outside the scope of c-commanding scopal elements, without necessarily being able to take scope over those elements. Weak NPs can be interpreted outside the scopal domains of Adjunct Island CPs, of Complex NPs, of coordination structures, of Non-Bridge verbs, of matrix arguments from a position inside complement Ss, of their own subjects from object position, and of the object from indirect object position. But they have great difficulty taking scope *over* the most local of these elements. We will refer to this phenomenon as Relativized Specificity:

indefinite (weak) NPs can be interpreted specifically relative to any c-commanding element. If an NP happens to be interpreted specifically with respect to all c-commanding scopal elements, then the resulting interpretation will be indistinguishable from one where the indefinite is interpreted referentially. If, on the other hand, an indefinite NP happens to be interpreted specifically with respect to some, but not all c-commanding elements, then the NP must be interpreted non-referentially. We have seen, however, that in the latter case it is not possible to account for the scope of the indefinite simply by assuming that it is a quantifier undergoing QR. The question we are facing, therefore, is how Relative Specificity can be accounted for in the grammar.

We have established that Relativized Specificity cannot be described within a QR-only theory. Actually, we can go one step further and question the principle defining quantifier scope proposed in May (1977:11) and elsewhere⁶ (we will refer to this statement as "May's Scope principle"):

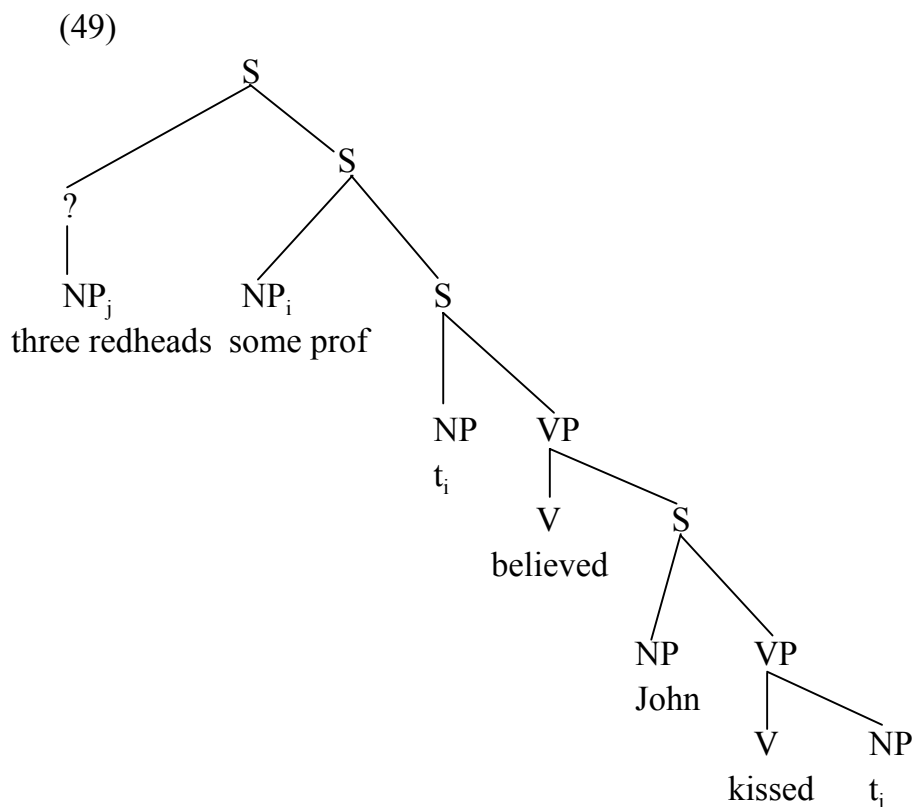
The SCOPE of a quantified phrase ϕ is everything which it c-commands.

Consider once again example (36).

- (36) a. some professor believed that John kissed three redheaded girls in the
 syntax class
 b. $[_s [_{\text{three redheaded girls in the syntax class}}]_i [_s [_{\text{some professor}}]_j [_s t_j$
 believed that John kissed t_i]]]
 c. for three redheads in the syntax class y there is some professor x such
 that x believed that John kissed y

Recall that whereas the embedded object can be interpreted outside the scope of the matrix subject and the matrix predicate, reading (36c) is unavailable. This example (as well as the Dutch example (28)) not only indicates that a QR theory would have to assume contradictory bounding conditions governing weak NPs, it shows that a definition of scope purely in terms of c-commanded (sub)phrase markers (as in May's Scope Principle) cannot be correct. If this principle holds, then if the embedded object in (36a) can be moved out of the scope of the matrix subject, we must assume that it can be placed outside its c-command domain. But the only way to do this in a structure such as (36) is by moving it into a position where it c-commands the subject, yielding (36b), hence (36c), which is an undesirable result. There simply is no position in the tree structure to which the object can be moved, where it neither c-commands the subject, nor is c-commanded by it.

⁶ Of course, other authors before May; have described the scope of quantified elements in terms of c-command or similar notions; cf. e.g. Reinhart; (1976:191), Jackendoff; (1972:292). We refer to May;'s formulation because it is associated with the QR theory of scope assignment under discussion here.



It would require an LF like (49), for May's Scope Principle to allow the two quantifiers to be interpreted outside each other's scope. But (49) features an otherwise unattested form of adjunction, and furthermore the wide scope NP in (49) does not c-command its trace.

Relativized Specificity (the ability to take scope outside the scope of other elements, without taking scope over those elements) cannot be described if scope is defined solely in terms of (sub)phrase markers. We will therefore propose an alternative Scope Principle, which defines the scope of an expression as the set of elements in its scope, and we will then develop a grammatical mechanism by which we can establish the content of this set for each scopal element. Since the members of such a set do not (necessarily) constitute a (sub)phrase marker, each member of the set will have to be individually designated as such. The phenomenon of Relativized Specificity thus necessitates the introduction of a system of diacritic marking. Therefore, we will propose a grammatical mechanism that diacritically marks constituents as being in the scope of some other element, and refer to it as the Scope Marking mechanism. Since QR has been established to be descriptively insufficient, the Scope Marking mechanism, although making use of QR, is not limited to QR.

It should be noted that alternatives to May's Scope Principle have been proposed before. May (1985) has proposed a modified version, and so have Haik (1984), Williams (1988) and Aoun & Li (1989). In fact, the Scope Principle we will propose is equivalent to the principle put forward by Haik (1984), although our Scope Marking mechanism works rather differently. In the remainder of this section we will simply describe our system of diacritic scope marking, the Scope Principle (to be modified

later on), and the basic properties of the Scope Marking mechanism. In section 3.5. we will then discuss the alternative proposals mentioned here, while at the same time presenting some independent evidence in favor of our own proposal.

The system of diacritics we propose works as follows. We will assume that every node in a tree structure is associated with a referential index. This holds not only for NPs, as was the case in early proposals of referential indices (Cf. e.g. Chomsky 1981), or for maximal projections, but also for heads. This assumption is in accordance with recent developments in bounding theory, starting with chapter 11 of Chomsky (1986a), which attribute the limitations of head movement described by Travis' (1984) HMC to the ECP, while assuming that empty heads may be properly governed by coindexed antecedents. These developments therefore rely on the (implicit) assumption that any node in a tree can bear a 'referential' index, irrespective as to whether it is referential or quantificational, and irrespective as to whether it can be shown to be involved in binding relations. The referential index has thus been reinterpreted as a marker of chain identity. Our system of diacritics will, provisionally, exploit these generalized referential indices⁷. Eventually, though, we may well find evidence that a slightly different type of index is required by which any given node in a structure can be uniquely identified, and by which c-command relations between any two nodes at any level of representation can be encoded.

Consider again example (24a), repeated as (50).

- (50) every man_i loves some woman_j

We will assume that any NP can bear the referential index of some other node as a superscript. Thus, (50) may actually look like (50a) or (50b) (or (50c)).

- (50) a. every man_i loves some woman_j
 b. every man_i loves some woman_i
 c. every man_i loves some woman_j

In (50b), the NP *some woman* bears the index *i* of *every man* as a superscript, in (50a) it happens to bear no superscript.

Descriptively, this mechanism will appear to be sufficient to account for the phenomena of relativized specificity we have discussed. For example, we have seen in the case of (36a) that a QR-only theory relying on May's Scope Principle can distinguish at most two configurations of two quantified NPs. This was found to be insufficient. The present mechanism on the other hand predicts at least three possible distinct configurations for two NPs: two asymmetric ones, and one without superscripts.

Recall our discussion in the introductory chapter concerning the grammatical

⁷ We are not, therefore, using the notion of 'referential' index in the sense of Rizzi; (1990) (but see below).

function of LF. We assumed there that the rules and principles governing the derivation of LF must operate in such a way that any semantic distinction which, by empirical hypothesis, is grammatically conditioned be encoded in LF-structures, in such a way that every semantic distinction of this type should give rise to a different representation at LF. In what manner these LF-representations are then mapped onto semantic representations is to be decided within a theory of meaning (perhaps: a theory of LF'), rather than within the theory of syntax. If we attribute to (50) the LF-structures in (50a) and (50b), then we allow that (50) is ambiguous along a dimension which is syntactically conditioned. The rules that map LF-structures onto semantic representations of some kind might for example map (50a) onto a representation associated with an interpretation where there is one woman such that every man loves her, and they might associate (50b) with the interpretation that for every man, there is some woman that he loves. How this mapping takes place, and what the properties of the resulting representations are, are not questions to be answered within the theory of syntax. However, we should be able to establish whether our theory of LF makes the correct predictions. Each of the semantic distinctions we want our theory to account for should indeed be associated with a distinct property of the LF-structures generated by our theory; all and only those I-language sentences which are equivalent w.r.t. each of these semantic distinctions, should be equivalent w.r.t. to the LF-property associated with the semantic distinction, so that LF-structures might in principle be mapped onto semantic representations embodying these semantic distinctions, without contradictory requirements being imposed on the operation of the mapping rules. A convenient method of ascertaining the correctness of our predictions in this respect would be to formulate a (rudimentary) theory of LF', which maps LF-structures onto some sort of semantic representation, while eschewing all matters of semantics proper which are not conditioned by syntax. The various Scope Principles that have been proposed in the literature can be regarded as basic components of such a theory.

We propose that LF-representations enriched with diacritic superscripts such as those in (50a & b) are interpreted by means of the Scope Principle (51)⁸.

⁸ Note, that our superscript diacritics are very much like Haïk's (1984) slash indices, and that our Scope Principle is identical to Haïk's. Haïk's allows the referential index of a wide scope NP to be added to the index of a narrow scope NP as a slash index; e.g. (50b) would take the form in (i).

(i) every man_i loves some woman_{j/i}

I have chosen not to adopt this mechanism, for two reasons. Firstly, to discourage the specious inference that Haïk's hypothesis and ours are identical; the differences lie in the operation of the Scope Marking mechanism, and in the further uses to which the scope marking diacritics are put. Secondly, because making the slash index part of the referential index is part of a unification of binding theory and scope theory which, I believe, is undesirable. We will return to both matters in section 3.5.4. below, and in chapter 4, section 4.1.4..

(51) **Scope Principle**

NP A is in the scope of B iff

- i) A is superscripted by B; or
- ii) A is superscripted by C, and C is in the scope of B (transitivity).

The rules that map LF-structures onto semantic representations will operate in such a way that, besides any other principles of LF', principle (51) is obeyed⁹.

Before we can turn to some examples, there is a technical matter to be settled with respect to (51). In most theories of syntactic scope assignment, scope is assigned only to quantificational NPs as units, not to the QP-specifiers of these NPs; the scope of the QP-specifier is derived from the scope of the NP. For example, in the framework of May (1977) (52a) would be assigned the LF (52b), not the LF (52c). Nevertheless, in the intended interpretation (52d) the universal quantifier (presumably the interpretation of the QP *every*) is assigned scope over the entire clause, although the QP c-commands only the N.

- (52) a. every boy loves a girl
 b. $[_S [_{NP} \text{every boy}]_i [_S [_{NP} \text{a girl}]_j [_S t_i \text{ loves } t_j]]]]$
 c. $[_S [_{QP} \text{every}]_k [_S [_{NP} t_k \text{ boy}]_i [_S [_{NP} \text{a girl}]_j [_S t_i \text{ loves } t_j]]]]]]$
 d. $\forall x (\text{boy}(x) \rightarrow \exists y (\text{girl}(y) \ \& \ \text{love}(x,y)))$

Of course (52d) does not represent the only possible way of interpreting quantified NPs; for example, the problem would not arise within a generalized quantifier perspective. In other approaches, however, some technical solution must be devised for this mismatch between logical and syntactic scope assignment. One possibility is to solve the problem in syntax by deriving LFs like (52c) instead of (52b); Heim (1982) is an example of this approach. Another possibility is to slightly complicate the mapping instructions from LF to LF' through an extension of the scope principle: we can simply define the scope of the interpretation of a QP as including the scope of the QNP it specifies.

It is not easy to devise evidence that might decide this question. There is little indication, however, that a syntactic operation which maps (52c) onto (52d) takes place. Consider the following examples from Chinese, cited from Huang (1982:Ch.4:(1),(10))

- (53) wo mai-le $[_{NP} [_{NP} \text{sange ren de }] [_{N'} \text{meiben shu }]]$
 I buy-ASP three man DE every book
 'for three men x, I bought every one of x's books'

⁹ Below, we will continue to refer to the level onto which LF is mapped as LF', simply for convenience.

- (54) wo mai-le [_{NP} meiben [_{N'} [_{NP} sange ren de] shu]]
 I buy-ASP every three men DE book
 'I bought every book that belongs to three men'

In these examples, if the possessive NP *sange ren de* is generated outside the c-command domain of the QP *meiben*, the NP must be interpreted outside the scope of the QP (see (53)); if the possessive NP is generated inside the c-command domain of the QP, it is interpreted internally (see (54)). If we adopted the syntactic solution to our problem described above, it would appear rather difficult to describe this state of affairs. If the QP were assigned its clausal scope syntactically, it would have to be adjoined to S (or, on May's (1985) assumptions, to NP) in either case. It then could not fail to c-command the possessive NP, which is also adjoined to S (or NP). If, on the other hand, the QP remains in situ, the single interpretation of (53) is exactly what we expect to find.

While this small piece of evidence is obviously far from conclusive, we will tentatively assume here, in the absence of evidence in favor of a syntactic QP-raising rule, that QPs are assigned their scope (partially) through the mapping from LF to LF'. As an addendum to the Scope Principle then, assume that when a QNP is associated through its interpretation with a quantifier, which interprets a QP or numeral or determiner that specifies the NP, the scope of the quantifier includes the scope of the NP.

Again taking (50) as an example, we may now suppose that (50b) will be assigned an interpretation equivalent to (55).

- (55) $\forall x:\text{man} \exists y:\text{woman love}(x,y)$

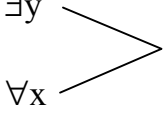
The interpretation of (50a) is less straightforward. According to (51), (50a) must be mapped onto a representation where (the interpretation of) neither quantified NP has scope over the other. This may of course be worked out in a number of different ways; we shall assume at this point that the interpretive component (LF') allows for formulae containing partially ordered sets of branching quantifiers. I will briefly illustrate this point, and then return to the Scope Principle and the Scope Marking mechanism.


In Hintikka (1974) it was argued that some sentences of English have interpretations which cannot be expressed by means of linear formulae of first order logic, but which can be expressed by means of first order formulae containing sequences of branching quantifiers. Thus, whereas e.g. the non-narrow scope reading for the object in (56) can be expressed either by (57a) or by (57b) (which are equivalent), the formula in (58) has no linear equivalent.¹⁰

¹⁰ A proof of this can be found in the appendix to Barwise; (1979); the reader is referred to Barwise;' work and references cited there for details on branching quantifiers.

(56) everyone loves someone

(57) a. $\exists y \forall x \text{ love}(x,y)$

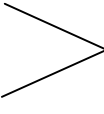
b. $\exists y$  $\forall x$ $\text{love}(x,y)$

(58) $\forall x \exists y$  $\forall z \exists w$ $R(x,y,z,w)$

(58) may be roughly paraphrased as: "for every x and every z , there are a y and a w , such that the choice of y depends only on (varies only with) the value of x , and the choice of w depends only on z , and such that $R(x,y,z,w)$ ". One of the English sentences Hintikka claimed does not have a linear equivalent is (59).

(59) some book by every author is referred to in some essay by every critic

In fact, Hintikka claimed that (59) is interpreted as in (60), a structure like (58) (with restricted quantification).

(60) $\forall x:\text{author } \exists y:\text{book by } x$  $\forall z:\text{critic } \exists w:\text{essay by } z$ y is referred to in w

The discussion in the literature regarding Hintikka's claim has focussed on the question whether (59) is really a case of what Barwise (1979) calls "essential branching quantification", or is interpreted in such a way that, although it is true in those cases in which (60) is true, it is also true in some cases where (60) is false. Thus it has been claimed by Fauconnier (1975) that whereas (59) is true in situations in which the choice for the book depends only on the author, and the choice for the essay depends only on the critic (as in (60)), it is also true in situations where books and essays do differ with the choices for both the author and the critic. If Fauconnier is correct, then we can represent the meaning of (59) with the linear structure in (61).

(61) $\forall x:\text{author } \forall z:\text{critic } \exists y:\text{book by } x \exists w:\text{essay by } z \quad y$ is referred to in w

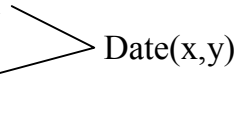
Fauconnier's (and Barwise's) objections to Hintikka's claim are thus aimed at Hintikka's intuitions regarding the meaning of (59) and similar examples. Intuitions are obscured here, first of all, by the fact that the branching and linear interpretations for (59) in (60) and (61) are not logically independent, but very much alike, so that we can distinguish them only by evaluating (59) with respect to very narrowly described and complex situations. Furthermore, any sentence containing four quantified expressions (the least number of existential and universal quantifiers which will give

essentially branching structures) can be expected to be very hard to interpret with respect to relative scopes, whatever its structure.

The discussion was given a new turn by the work of Barwise (1979). Barwise pointed out that by using non-logical quantifiers, it is possible to construct cases of essential branching quantification with only two quantified NPs. Consider (62) (Barwise' (22)).

- (62) Quite a few boys in my class and most girls in your class have all dated each other

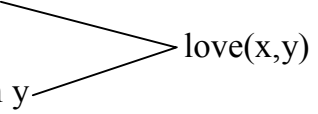
This sentence has an interpretation where *most girls in your class* is interpreted outside the scope of *quite a few boys in my class* and vice versa. This reading can be represented with the aid of branching quantifiers, as in (63), which is equivalent to the second order formula in (64) (both simplified).

- (63) Quite a few boys x 
 Most girls y
 (64) $\exists X \exists Y [\text{Quite_a_few boys } x(x \in X) \ \& \ \text{Most girls } y(y \in Y) \ \& \ \forall x \forall y ((x \in X) \ \& \ (y \in Y) \leftrightarrow \text{Date}(x,y))]$

Note that it is irrelevant to our present purposes whether LF is mapped onto formulae of the form (63) or of the form (64); it is sufficient if some such mapping seems feasible. We will return to this question in section 3.6..

As we noted in chapter 1, the scopal independence of the NPs in (62) can perhaps be attributed to the CSC. In fact, coordination is one way to introduce a branching configuration of two NPs into a tree structure without using diacritics but relying on May's Scope Principle. Therefore Barwise's examples are not of primary interest to us here, although his arguments for essential branching quantification may be invoked as a justification for using representations such as (63) or (64). We are interested rather in finding examples of *grammatically* essential branching quantification.¹¹

Suppose for the moment that LF is mapped onto formulae containing partially ordered structures of quantifiers. We can then give some examples to illustrate the working of the Scope Principle (51). First of all, (50a) will be interpreted as (65).

- (65) every man x 
 some woman y

¹¹ May; (1988) has argued that the branching reading of (62) is really due to the presence of the floated quantifier *all*. However, Barwise; gives some similar examples without *all*, which are no less convincing than (62).

The various readings of (66) may be represented as in (68a-c), if the superscripts are distributed as in (67a-c), respectively.

- (66) John gave three books to all but two girls
- (67) a. John gave three books_i to all but two girls_j
 b. John gave three books_j to all but two girls_j
 c. John gave three books_i to all but two girls_jⁱ
- (68) a. $\begin{array}{l} \text{three books } x \\ \text{all but two girls } y \end{array} \rightarrow \text{Gave(John, } x, y)$
 b. [all but two girls y [three books x [Gave(John, x, y)]]]
 c. [three books x [all but two girls y [Gave(John, x, y)]]]

This concludes our discussion of the Scope Principle (51). We will modify our assumptions regarding the properties of LF' formulae as the need arises, and return to them in section 3.6..

We now turn to the Scope Marking mechanism, stated in (69).

- (69) **Scope Marking**
 Assign to α_i the index of any c-commanding category as a superscript.

Note that we cannot adopt (69) instead of the QR-theory of Scope Assignment. Since we have concluded in chapter 1 that scope is restricted by conditions on movement, we must adopt Quantifier Raising as well as (69). A quantified NP having undergone QR can assign its index as a superscript to any NP it c-commands at LF. Consider example (70).

- (70) some woman_i loves every man_j
 (71) [_S every man_j [_S some woman_i [_S t_i loves t_j]]]

This example goes to illustrate that QR is still required next to (69). The object in (70) may be adjoined to S at LF, and subsequently scope-mark the subject with its index, yielding (71), hence the wide-scope reading for the object. Similarly, the reading for (66) represented by (68b) depends on the availability of the distribution of superscripts in (67b). This distribution of superscripts is possible only if the indirect object is Quantifier Raised to a position where it c-commands the direct object so that (69) can apply.

Note, furthermore, that (69) refers to c-commanding categories, rather than c-commanding NPs. In this way, we shall be able to make use of the generalization of 'referential' indices mentioned above, to explain the non-specific readings in (72) (= (2)) and (73).

(72) Melissa wants_i to buy a motorcycle_jⁱ

(73) Melissa wants_i a motorcycle_jⁱ

The object NPs can be scope-marked by the modal predicates, yielding the narrow-scope readings. Although it is far from clear, in general, how the narrow scope readings for cases such as (73) are to be analyzed semantically, our syntax correctly predicts that arguments can be interpreted inside the scope of their predicates.

Before turning to our account of relativized specificity, there are some technical details to be settled with respect to (69). First of all, we will assume that (69) applies to lexical elements, and that the foot and intermediary traces of a chain are scope-marked by the head of the chain by convention, so that structures where the foot of a chain does not carry the index of the A-bar binder as a superscript do not occur. Below, we shall sometimes omit these superscripts where they are irrelevant. Secondly, we must decide at which level of representation (69) should apply. The simplest assumption would be, of course, that we do not need to specify the level at which it applies. We shall adopt this minimal assumption here: (69) can apply at any level of representation.

An important question to be answered with respect to (69) is whether scope marking applies obligatorily or not. For reasons of simplicity, it appears preferable that (69), like other rules of grammar, should apply optionally, perhaps subject to general principles. The phenomenon of relativized specificity is evidence that this approach is correct. A weak NP can be interpreted outside the scope of a c-commanding element, without taking scope over that element, if we allow the weak NP to remain unmarked by that c-commanding element, and vice versa. We shall now review some of the examples which motivated our abandoning the QR-only hypothesis, to see how (69) can deal with them.

First of all, we saw in sections 3.2. and 3.3. that indefinite NPs can be interpreted outside the scope of non-local c-commanding elements in a way which cannot be attributed to QR. The Scope Marking mechanism (69) however can account for these data. For instance, the non-narrow scope readings for the objects in (72) and (73) as well as (74) can be explained by the absence of scope marking in the LFs (75) through (77).

(74) Melissa wants for John to decide that he will buy [a motorcycle that she is really fond of]_i (...but John doesn't like it_i)

(75) Melissa wants_i to buy a motorcycle_j

(76) Melissa wants_i a motorcycle_j

(77) Melissa wants_i for John to decide that he will buy a motorcycle_j

The specific reading for (74) of course cannot be attributed to QR. The same point can be made for the specific readings of indefinite NPs embedded under non-bridge verbs, as exemplified in (42).

Secondly, the weak NP objects in (78) and (79) can be interpreted specifically with respect to the strongly quantified subjects without being Quantifier Raised out of their c-command domains, as a result of the optional distribution of superscripts.

- (78) every professor_i kissed a redheaded girl_j
 (79) every professor_i said that John had kissed a redheaded girl_j

Complex NP islands present yet another example of the exceptional scopal behavior of indefinites.

- (80) John met [some men_i who_i had recently kissed a redheaded girl_j]
 (81) John overheard [the rumor_i that some of my students_j had been called before the dean]

In spite of the CNPC, the indefinites in (80) and (81) can be interpreted with either narrow or non-narrow scope. Again, we can account for the non-narrow scopes by leaving the indefinites unmarked. We might wonder how the narrow scope readings arise. One option would be to suppose that in (80) and (81) the indefinites should receive the superscript *i* under c-command to obtain these readings. We cannot decide at this point whether the indefinites would then be marked by the head nouns (*men*, *rumor*), by the relative pronoun (*who*), or perhaps, in some way, by the NP to which the relative clause is attached¹². A more interesting option, I believe, would be to assume that elements contained in a relative clause may be scope-marked by the numerical or quantificational specifier of the head Noun (*some* in (80)) or by the head of the DP (*the* in (81)), thus defining the restrictive clause of the associated quantifier. In addition, we may assume that head nouns with a modal interpretation in noun-complement constructions (*rumor* in (81)) also assign scope-indices. Nothing turns at present on the choice between these options. The complex NP data are not quite as innocent as they seem, however, and we shall return to them shortly.

We now turn to the adjunct island cases. We saw in sections 3.2. and 3.3. that indefinite NPs can take narrow or non-narrow scope with respect to containing adjunct CPs. Again, we must ask how the narrow scope reading can come about. Consider (82).

- (82) John will rejoice [if a redheaded student cheats on the exam]

Without any superscripts, the indefinite will be interpreted with non-narrow scope. The narrow scope reading can arise only if the indefinite is appropriately superscripted by some scopal operator. Two alternative approaches present themselves here. We might exploit the 'invisible' or empty necessity-operator that has been postulated e.g.

¹² The last option seems to arise if we assume that an NP with a relative clause can A-bind operators contained in the relative clause, as was argued by Chomsky; (1986b:85).

by Heim (1982) to account for donkey-anaphora of the conditional clause type, exemplified in (83).

- (83) [Nec]_i if a man_j comes in here, he_j will trip the switch

As we saw in chapter 2, section 2.3., Heim attributes the availability of Donkey-anaphora in (83) to the presence of the abstract necessity operator which functions as an unselective binder of the indefinite and the pronoun. Assuming that covert operators of this type exist, we can postulate the structure in (84) to account for the narrow-scope reading of the indefinite in (82).

- (84) John will rejoice [Nec]_i [if a redheaded student_jⁱ cheats on the exam]

Another possibility, which avoids having to postulate empty operators in cases like (82), is to assume that the indefinite can be superscripted by (the head of) the adjunct clause it is contained in; (82) will then look like (85).

- (85) John will rejoice [if_i a redheaded student_jⁱ cheats on the exam]

All that is required to make this approach work is the assumption that, in the mapping to LF', the complementizer *if* is interpreted as an operator, whose scope determines which elements are scopally restricted to (the interpretation of) the adjunct clause. This assumption does not seem very much out of the way, especially in view of examples such as (86), where the complementizer is overtly quantificational in nature.

- (86) John rejoices [whenever_i a redheaded student_j⁽ⁱ⁾ cheats on the exams]

We will discuss adjunct clauses in more detail shortly.

Let us now review some of the examples presented in section 3.4.1. as counterevidence to Fodor & Sag's [\pm referential] hypothesis. Consider again the Dutch example (41).

- (41) elke professor gelooft dat een student van hem de slimste van allemaal
is
'every professor believes that a student of his is the smartest of (them)
all'

The indefinite can take exceptionally non-narrow scope outside the matrix verb, while remaining within the scope of the matrix subject. This reading corresponds to the distribution of superscripts in (87).

- (87) elke professor_i gelooft_j dat [een student van hem]_kⁱ de slimste is

Narrow scope for the indefinite is obtained by giving it the superscript j ; wide scope is obtained by giving it no superscripts. A more complicated example was given in (39).

- (39) it seems _{i} that every politician _{j} will accept [a proposal endorsed by Ronald Reagan] _{k} ^{i}

The crucial reading, where the indefinite is outside the scope of the embedded subject but both remain within the scope of the matrix predicate, results from the superscripts indicated here.

Finally, we should reconsider the example presented as crucial evidence against QR by Fodor & Sag (1982). Recall that, according to F&S, example (88) (= F&S'(69)) does not have the intermediary scope reading for the indefinite.

- (88) every teacher _{i} overheard the rumor _{j} that [a student of mine] _{k} ^{i} had been called before the dean

Yet nothing so far forbids the distribution of superscripts indicated above, which would seem to yield exactly this reading. Consider, however, the (simplified) Branching Quantifier structure (89) onto which (88) would be mapped under our current assumptions.

- (89)
-

Clearly, the rules that map LF onto the LF', whatever their properties, should not be allowed to derive (89) from (88). The NP *a student of mine* has been interpreted here as a quantifier that does not bind a variable, since it does not have scope over the free variable z contained in the interpretation of the complex NP. Possibly, the condition on LF' that precludes (89) can be derived from the principle of Full Interpretation (Cf. Chomsky (1986b)) or a condition on Vacuous Quantification. No other interpretation is available for (88), however. The point is that, since the complex NP is an NP, it cannot be interpreted in the scope of the indefinite without bearing the superscript of the indefinite, which would require an LF that would violate the CNPC. Hence, although the distribution of superscripts in (88) is well-formed at LF, no LF like this can be interpreted, due to conditions on well-formedness governing the derivation of semantic representations.

This analysis of (88) leaves us with one further problem. We have seen that (88) does have a reading where the indefinite has completely wide scope. We can syntactically account for this reading by giving the indefinite no superscripts, so that it can be interpreted within the scope of no scoped operator. But we cannot interpret such an LF with an LF' where the indefinite is a quantifier that branches relative to the

strong quantified subject and relative to the complex NP, since the latter would involve a violation of the same condition that forbids (89). The Scope Principle (51) does allow for an alternative solution, however. We may assume that the rules that derive LF' can interpret indefinite NPs as 'referential expressions' in much the same way in which indefinites that are marked [+specific] are interpreted under Fodor & Sag's assumptions. Since referential expressions or constants are not affected by the scope of modal or quantificational expressions, it follows from the Scope Principle that this possibility can be exploited only if the indefinite in question does not bear any superscripts. This will allow us to maintain our present working assumptions about the properties of LF'. Ultimately, of course, the dividing line between what is grammatical in nature, and what belongs to semantics proper, must be drawn on the basis of empirical evidence. At this point, it appears preferable to refer the unavailability of the intermediate reading for (88) to LF'. Yet even the very natural and simple assumptions we have made about LF' regarding the interpretation of (88) just may turn out to be undesirable. We shall return to a different view of the matter in section 3.6..

In this subsection, we have presented a new grammatical mechanism of scope marking, which allows us syntactically to account for specificity phenomena as natural consequences of the theory of grammar, rather than as exceptional oddities which must be accounted for, for instance, by an ad hoc [\pm specific] ambiguity, for which there exists no independent evidence. We have also provided some sketchy remarks about the interpretation of LF, basically in order to illustrate the fact that our LFs are interpretable. In the following, short subsection we shall refine our theory of LF.

3.4.3. Indefinites and QR

In the previous section, we have addressed the well-known fact that indefinite NPs can take exceptional wide scope (or rather: 'independent scope') with respect to c-commanding elements. In the course of our discussion, we have also come across a relatively new observation: weak NPs cannot take scope over c-commanding elements, or if they can, such readings can only be obtained with great difficulty. This observation was exemplified in (28) and (33); we repeat (28).

- (28) op twee na alle mannen versloegen drie vrouwen
 'all but two men defeated three women'

Whereas the indefinite object in (28) can quite easily be interpreted specifically w.r.t. the subject, it is well nigh impossible to give the object scope over the subject. The first observation is problematic for a QR-only theory but unproblematic for our theory of Scope Marking. The second observation, on the other hand, presents the same problem for both theories; the object must be prevented from moving to a position where it c-commands the subject. In the previous sections, we have not yet needed to

propose any amendments to the theory of QR as such. In the light of (28), however, any theory of scope which makes use of QR will require adjustments.

Two different approaches to facts like (28) present themselves. One approach would be to point to the well-known fact that the tendency of an NP to take wide or narrow scope depends on the lexical choice of its quantificational specifier. For instance, NPs of the type [*each N'*] are more likely to take wide scope than NPs of the type [*every N'*], and these in turn take wide scope more easily than NPs of the [*all N'*] variety. We can account for (28) simply by placing *three* at the narrow-scope end of the scale. This is essentially the approach taken by Ioup (1975). There are some obvious drawbacks to this approach. First of all, it leaves as a mystery why all weak quantifiers are located at the same end of the scale. Nothing seems to prevent us, for example, from placing *three* at one end, and *four* at the other end of the scale. Furthermore, while it appears undeniable that quantificational specifiers are lexically marked for their propensity for taking wide or narrow scope, it is unclear in what way, or why they are so marked. This approach, although allowing us to describe the behavior of weak NPs, does not provide us with any insight into this behavior. In the absence of a grammatical theory of wide scope-propensity which refers to a lexically specified feature, it does not appear very enlightening to take this course.

There is a second possible approach which avoids some of the drawbacks of the first, which is to stipulate that weak NPs do not undergo QR at all. Since we know in what way undergoing QR influences the scope of an NP, we can understand in what way this stipulation can account for (28) and related facts. Moreover, this stipulation is not really a new one that must be added to the grammar, but a revision of a familiar stipulation that is independently required. The QR-hypothesis says that quantified NPs undergo move α at LF; referential NPs (such as proper names) are excluded from QR. All we need to do to account for (28), is to redraw the dividing line between NPs that do, and NPs that do not undergo QR. We shall assume from now on that only strong quantified NPs undergo QR.

It has been argued by Reinhart (1991) that the bifurcation between NPs that undergo QR and NPs that do not is mistaken. According to Reinhart, all NPs undergo QR. This assumption accounts for example for the unacceptability of (90a) as opposed to (90b).

- (90) a. * We have interrogated the burglar who stole the car already, but not the diamonds
 b. We have interrogated the burglar already, but not the fence

Reinhart argues that in Bare Argument ellipsis cases of this type, the bare argument's correlate is raised at LF to a position where the correlate and the bare argument can be interpreted as one constituent. Since this is the only way for the remnant to be interpreted at all, the sentence is ungrammatical if this operation is ruled out. In (90a), raising *the car* to the matrix IP violates the CNPC, hence the example is out; in (90b)

the burglar moves locally, and all is well. Reinhart identifies the movement operation in (90b) with QR, basically because no other LF movement rule seems appropriate. Since *the burglar* in (90b) is not a quantified NP, she concludes that all NPs can undergo QR.

There are some indications, however, that QR is not involved in the derivation of (90b). First of all, QR seems to obey stronger bounding conditions than Reinhart's treatment of Bare Argument ellipsis would allow. Consider (91).

- (91) Lucie will admit that she stole three diamonds, if you press her, but no paintings

If Reinhart is correct, then *three diamonds* in (91) is raised to the matrix IP at LF. We have seen, however, that finite complement clauses tend to be extraction islands for QR in general, and that indefinite NP objects cannot take scope over their own subjects, let alone over matrix subjects. Thus, (92) does not have a reading where for each of three diamonds, there is some girl who will admit to having stolen it.

- (92) some girl will admit that she stole three diamonds

Also, we can construct examples where the correlate to the bare argument is interpreted with narrow scope.

- (93) John believes there exist angels, when he's in church, but not unicorns

In (93), *angels* is interpreted in the scope of the modal matrix verb, so that (93) can be true if no angels exist. This cannot be accounted for if the NP is adjoined to the matrix IP at LF to form a constituent with the remnant on the right. The facts in (91) and (93) can be taken as evidence that, if Bare Argument ellipsis does involve an LF movement operation, this operation perhaps should not be identified with QR.

If Reinhart were correct in assuming that all NPs undergo QR, then our explanation of the exceptional narrow scope of the indefinite in (28) could not be correct. There are other facts, however, which clearly seem to indicate that referential NPs do not undergo QR (and, incidentally, that strong quantified NPs do). Consider first the familiar data in (94) and (95).

- (94) John loves his mother, and Peter does too
 (95) every pianist loves his instrument, and every violinist does too

(94) is ambiguous; the pronoun *his* can be 'sloppy', yielding the reading where Peter loves his own mother, or it can simply refer to John (be coreferential with *John*), yielding the interpretation where Peter loves John's mother. We may assume (following e.g. Partee 1978, Reinhart 1983, 1986) that the pronoun acts as a bound

variable in the first case, and as a 'referential expression' (perhaps a free variable) in the second case. Accordingly, (95) is not ambiguous, but only has the sloppy reading (there is nothing here for the pronoun to be coreferential with, since *every pianist* is not referential). Now consider (96) and (97).

- (96) John's mother loves him, and Peter's mother does too
- (97) every pianist's mother loves him, and every violinist's mother does too
- (98) every boy's mother loves him

Crucially, (96) is not ambiguous, but only has the non-sloppy reading where Peter's mother loves John. Example (97), on the other hand, still has the bound variable, 'sloppy' reading for the pronoun: it may be taken to imply that every violinist's mother loves him. This is in accordance with the more basic, well-known fact that the pronoun in (98) can be interpreted as a variable bound by *every boy*. It must be concluded that the specifier NPs in (96) and (97) differ in their ability to bind the pronoun as a variable; the quantified NP can, but the referential NP cannot do so. The obvious (and if I am not mistaken, the only) way to account for this distinction is to assume that the quantified NP in (97) is Quantifier Raised to a position where it c-commands the pronoun at LF, while the referential NP in (96) remains in situ. If we assume further that pronouns can only be variable-bound under c-command, the facts in (96) and (97) follow.

It seems then, that while it has been suggested that all NPs undergo QR, there is also evidence that not all NPs undergo QR. In order to account for data like (28), and data like (96)-(97), we shall assume that only strong quantified NPs are Quantifier Raised, and leave (90) as an unsolved problem. In the remainder of this section we will present some independent evidence that weak quantified NPs do not Quantifier Raise.

First of all, if weak NPs do not undergo QR, we expect them to pattern with referential expressions, not with strong QNPs, with respect to the opposition in (96)-(97). This prediction seems to be borne out.

- (99) some pianist's mother loves him, and some violinist's mother does too

(99) cannot be taken to mean that there is some violinist whose mother loves him, but only that some violinist's mother (also) loves the pianist in question. There is no variable binding of the pronoun by the weak specifier NP in (99), therefore, which indicates that the specifier NP does not undergo QR. Note that although the pronoun in (99) can be taken to refer to the pianist under discussion, this is no indication that the pronoun is bound. While the pronouns cannot be 'coreferential' with the strong quantified NPs in (97) and (98), this option is available with weak quantified NPs, as we established in our discussion of cross-sentence anaphora (chapter 2, section 2.3.) and cross-over attenuation with weak NPs (chapter 2, section 2.5.).

Our second source of independent evidence is the Across-the-Board analysis of the CSC-exceptions discussed in section 1.2.7.. There, we attributed the well-formedness of (100a) to the availability of LF (100b).

- (100)a. Felix kissed every woman_i and invited her_i to dance
 b. [every woman_i [Felix kissed t_i and invited her_i to dance]]

We assumed that the pronoun in (100) can be reinterpreted as a resumptive pronoun at LF, thereby becoming part of the A-bar chain headed by *every woman* and turning it into an ATB chain. We took this analysis as evidence that scope assignment is mediated by a movement operation.

We have also observed, in sections 1.2.7. and 2.2., that weak NP objects do not take scope over coordinated VPs. This is the case not only in (101a), where there is no pronoun in the coordinated VP for the quantifier to A-bar bind at LF, but also in (101b), where there is such a pronoun.

- (101)a. Felix kissed few women and danced all the way home
 b. Felix kissed few women and gave them a flower

The same observation holds for monotone increasing weak NP objects. We saw in 2.2. that the pronoun in (102) must be considered a donkey- or E-type pronoun, not a bound variable pronoun.

- (102) Felix kissed some women and brought them home

The observed difference between (100) on the one hand, and (101) and (102) on the other, makes it necessary for us to postulate some grammatical difference between weakly and strongly quantified NPs. As we have seen that the strong object in (100) can take scope over the coordinated VP only by virtue of the fact that it undergoes move α to create an A-bar chain, we can fully account for these data by assuming that weak NPs, unlike strong NPs, do not move at LF. This seems to be the only way to exclude the LF in (103b) for (101b), while allowing the LF (103a) for (100).

- (103)a. [every woman_i [Felix kissed t_iⁱ and invited her_iⁱ to dance]] (= (100b))
 b. * [few women_i [Felix kissed t_iⁱ and gave them_iⁱ a flower]]

Finally, consider the data in (104) and (105).

- (104)a. someone in every city hates it
 b. someone in three cities hates them
 (105)a. some people from every walk of life like jazz
 b. some people from three walks of life like jazz

There are clear oppositions between the a.- and b.-variants here. The pronoun in (104a) can be bound by *every city*, the pronoun in (104b) cannot be bound by *three cities*. The latter example can perhaps be taken to mean that there is a set of three cities such that someone who is in all three of them hates them (although this reading is pragmatically implausible), but it cannot be taken to mean that for each of three cities it is the case that someone in it hates it (although this reading would be more plausible). Similarly, (105a) has a wide scope reading for *every walk of life*, but (105b) does not have a wide scope reading for *three walks of life*. Contrary to what one would expect on pragmatic grounds, (105b) can only mean that there are some people who are 'from three walks of life', and who like jazz.

In this subsection, we have considered again some of the structures which we produced in chapter 1 as basic evidence in favor of QR. We have seen that there is no evidence of Quantifier Raising of weak NPs in any of these structures. We conclude, therefore, that weak NPs do not undergo QR. We shall content ourselves here with the traditional stipulation that some NPs are quantificational (in the syntactic sense), and some are not. Our grammar would seem to gain in explanatory value, however, if we could somehow make it express the insight that the exceptional scopal properties of weak NPs that we have so far encountered are in some sense related. The ability of weak NPs to take scope independently from c-commanding operators, and their inability to take scope over c-commanding operators, both appear to be the expressions of one more basic property of weak NPs: these NPs do not (necessarily) take part in scopal operations in general¹³. Whereas strong NPs cannot usually be interpreted specifically, weak NPs do not need to take the indices of c-commanding operators as superscripts. Similarly, whereas strong quantified NPs must move to an adjoined position, there is no need for weak NPs to do so. We may further assume that, if move α is a last resort operation, as argued by Chomsky (1986b), then if weak NPs do not need to undergo QR, they cannot do so. We can now express the basic opposition between strong and weak quantified NPs by means of the following principle.

- (106) An NP in adjoined position must be scope-marked in that position.

We may doubt, however, whether (106) is in fact a principle of grammar, since we might suppose instead that it can be derived from the principle of Full Interpretation; the A-bar adjoined position to which the strong quantifier moves may be licensed only if the sentence is interpreted in such a way that this position is interpreted as the determinant of the relative scope of the quantifier. It is not clear, what type of

¹³ Our treatment of weak NPs is reminiscent of Hornstein's treatment of his Type I quantifiers, which do not undergo QR, and may be interpreted by means of branching quantifier structures. Hornstein's Type I class, however, does not include all weak quantifiers, but only *a certain*. Furthermore, Type I quantifiers always take wide scope; we have seen that weak NPs can take narrow scope quite easily (including, in fact, *a certain*: see footnote 4).

evidence can be brought to bear on these speculations, and we shall not further pursue them here.

This concludes our discussion of Relativized Specificity phenomena. In this section we have presented evidence that specificity cannot be accounted for by assuming a binary ambiguity of weak NPs, such as the $[\pm\text{specific}]$ ambiguity proposed by Fodor & Sag (1982); we have proposed a new Scope Marking mechanism and a Scope Principle with which its output can be interpreted; and we have argued, in the present subsection, that weak NPs do not undergo QR, identifying the various scopal peculiarities of weak NPs as a general disengagement w.r.t. operations having to do with the determination of scope. We shall return to some problems surrounding the interpretation of scope-marked Logical Forms in section 3.6.. In the next section, we shall consider some consequences of our proposal for the theory of scope.

3.5. On Scope Assignment

In this section, we shall look beyond specificity phenomena and investigate the consequences of our scope marking hypothesis for some other issues in the theory of scope. At the same time, we shall compare our approach with some other recent proposals to deal with these issues. First, we shall discuss the revised view of LF presented in May (1985), and briefly consider some differences between May's approach and our own. We shall then proceed, in section 3.5.2., to present some independent evidence for our Scope Marking hypothesis, comparing our analysis of scopal reconstruction phenomena with a variety of competing analyses, including May's. In section 3.5.3. we shall discuss Williams' proposal to eliminate both Quantifier Raising and the level of Logical Form, in view of the data discussed here. Finally, in section 3.5.4., we shall compare our proposal with Haik's (1984).

3.5.1. May (1985)

In 1985, May revised his (1977) statement of the structure and derivation of LF. May's new work presented a conceptual shift with respect to the traditional view of LF. Whereas in (1977) May conceived of LF-representations as disambiguated with respect to relative Quantifier Scope, May (1985) takes the position that representations at LF can be ambiguous in this respect. In general, May's view is that an LF representation delimits the class of interpretations that the grammar allows a sentence to have, in the sense that a sentence can only be assigned interpretations which are compatible with its LF-structure. This view is actually very close to our own; in chapter 1 we took the position that the LF representations associated with a sentence determine those aspects of the interpretation of the sentence that are grammatically conditioned. This position allows for LF representations to remain ambiguous with respect to any semantic feature that is not grammatically conditioned. But we have assumed furthermore, that Logical Forms are not ambiguous with respect to relative Quantifier Scope, the empirical claim being that relative scope is completely

determined by grammatical factors. Thus, an LF structure can be mapped onto a set of interpretations, but these interpretations will not differ with respect to relative scope. The difference between the approach advocated by May (1985) and the view defended here is empirical in nature, but the difference is slight. May claims that although relative quantifier scope is restricted by grammatical factors, Logical Forms can still be ambiguous w.r.t. relative scope, in the sense that one LF representation can be associated with a number of interpretations, which may differ in the relative scopes of the quantifier interpretations they contain. This leaves room, in principle, for further restrictions on possible relative scopes to be formulated in semantic terms. Such a move would imply the empirical claim that some generalizations that govern possible quantifier scopes can be more fruitfully formulated with reference to semantic terms than in terms of grammatical restrictions. May (1985) does not actually exploit this option, however, so that we cannot ascertain the empirical validity of this aspect of his approach. There are further differences, of course, between May's approach and ours which do allow of empirical investigation. We shall now review May's (1985) proposal on the derivation of LF and his revised Scope Principle, pointing out empirical differences with our own approach as we go along.

In May (1977), the ambiguous example (107a) was assigned the LFs in (107b) and (107c) to account for its ambiguity.

- (107)a. someone loves everyone
- b. [someone_i [everyone_j [t_i loves t_j]]]
- c. [everyone_j [someone_i [t_i loves t_j]]]

Developments in bounding theory, however, caused May to revise his position in 1985. In view of parallel superiority examples with Wh-in-situ, (107b) must be considered a violation of the ECP, since *someone* cannot properly govern its trace with *everyone* intervening. May (1985) proposed accordingly, that only (107c) is a well-formed LF structure. To account for the ambiguity of (107a), he formulated a new Scope Principle, which rules the LF in (107c) ambiguous:

"Let us call a class of occurrences of operators Ψ a Σ -sequence if and only if for any $O_i, O_j \in \Psi$, O_i governs O_j , where "operator" means "phrases in A-bar-positions at LF," and let us propose that members of a Σ -sequence are free to take on any type of relative scope relation." [May 1985:34].

It is understood, furthermore, that scope-relations mirror c-command relations between quantifiers that are not members of the same Sigma-sequence. According to this Scope Principle, {*everyone*, *someone*} is a Sigma-sequence in (107c), hence (107c) may be assigned readings where *everyone* is in the scope of *someone*, or where *someone* is in the scope of *everyone*, or where the two quantifiers are interpreted independently. The latter option is, of course, especially relevant to our concerns, and we shall return to it below.

May found further evidence for his revised scope principle in Quantifier-Wh interactions. Consider (108) and (109).

(108) Who_i t_i bought everything for Max

(109) What_i did everyone buy t_i for Max

Example (109) is ambiguous. It can felicitously be answered either by a specification of the single thing that was bought, by everyone, for Max ("*a car*"), or by a list of persons, paired with the items each person bought ("*John bought a book, Mary a bronzed copy of the Venus de Milo, ...*"). We can account for the ambiguity of (109) if we assume that *everyone* can take scope over the Wh-word, yielding the latter reading, or can fail to do so, yielding the former. Example (108), on the other hand, is not ambiguous, but can only be interpreted as a query for the identity of the person who did all the buying. Hence, the structure where the quantified object has wide scope must be unavailable. May proposes the following LF structures (ignoring the auxiliary).

(110)a. * [_S Who_i [_S everything_j [_S t_i bought t_j for Max]]]

b. [_S Who_i [_S t_i [_{VP} everything_j [_{VP} bought t_j for Max]]]]

(111) [_S What_i [_S everyone_j [_S t_j buy t_i for Max]]]

Both readings for (109) can be obtained by deriving (111), where {*what, everyone*} is a Sigma-sequence, and the two operators can take on any scopal order. Both readings for (108) would be obtained by deriving (110a); but this LF violates the ECP, since *everything* blocks antecedent government by *who* of its trace. The only well-formed LF that can be derived for (108) is (110b), which does not contain a Sigma-sequence, and in which *everything* cannot take scope over the question word.

There are some drawbacks to the Sigma-sequence account of the opposition in (108)-(109). First of all, it depends on the assumption that quantified NPs can adjoin to VP at LF, not just to S. Otherwise, there would be no well-formed LF for (108) at all. There is quite some evidence that this assumption (which we have also adopted) is correct, e.g. from VP-deletion data; the reader is referred to May (1985) and references cited there for details on this evidence. Note however, that this assumption voids the argument for Sigma-sequences based on (107a). The narrow-scope reading for the object in (107a) can be obtained by adjoining it to the VP, allowing (107c) to have only the wide-scope reading for the object.

Secondly, it should be noted that May's ECP-account of the ill-formedness of (110a) can no longer be maintained if we adopt the gamma-marking mechanism proposed by Lasnik & Saito (1984) and further developed in Chomsky (1986a)¹⁴. Since *who* in (110a) is an argument, its trace is gamma-marked at S-Structure.

¹⁴ The following argument is taken from v.d. Koot; (1988).

Because at S-Structure the quantifier is still in situ, the subject trace will be marked [+gamma]. The fact that the object intervenes at LF is irrelevant, since gamma marking, once assigned, is permanent. Hence, (110a) is ruled in and we expect (108) to present the same ambiguity as (109). These objections do not hold, however, if we adopt a path containment account of these data, as does May in later chapters of his book, or if we attribute these data to a Superiority condition of the sort proposed in Lasnik & Saito (1989). There are further data which argue strongly, I believe, against May's treatment of the quantifier-Wh interactions; we shall return to these in section 3.5.2.2..

In section 3.4.2. we noted that May's (1977) Scope Principle allowed of at most two possible distinct scopal relations obtaining between two quantified phrases in a sentence. We argued that this was insufficient, briefly because the proper treatment of weak NPs requires distinct configurations for wide scope, narrow scope and independent scope. May's (1985) revised scope principle allows for exactly these options. If two quantified phrases make up a Sigma sequence, three distinct scopal relations may obtain between them. Nevertheless, we do not believe that the principles governing the derivation of LF-structures proposed by May (1985) allow us to derive the appropriate structural distinctions with which to differentiate available and unavailable readings.

Basically, our objection to May's proposal is this. Since independent construals are available only to quantifiers making up a Sigma-sequence, and since quantifiers making up a Sigma-sequence can also be construed dependently, there is no syntactic way of specifying structures which allow independent construals, but disallow some dependent construal. Such a specification however is exactly what is required for the syntactic account of specificity phenomena. Thus, as we have seen, the weak objects in for instance (112a & b) can be interpreted specifically w.r.t. the subject, but can take scope over the subject with great difficulty, or not at all.

- (112)a. two boys have kissed three girls
- b. two boys have overheard the rumor that the dean had kissed three girls

May's scope principle does not allow for the former readings to obtain without the latter readings also being available. In fact, the LF-structure derivable for (112a) under May's assumptions will contain the Sigma-sequence *{two boys, three girls}*, hence be interpretable with a specific object, whereas the LF for (112b) will not contain this Sigma-sequence, hence lack the specific reading for the weak object. These results are clearly incorrect.

Actually, the point is more general. In his (1989) paper on the interpretation of LF, May discusses sentences such as (113).

- (113) Two detectives solved two crimes

(113) can be true in case there are two detectives, and two crimes, and one detective solved one crime, and the other detective solved the other. This involves an independent construal for both NPs, since on the dependent interpretation (the subject taking scope over the object) each detective is required to have solved two crimes for (113) to be true. May proposes to analyze the semantics of these facts by means of a resumptive quantifier TWO which quantifies over pairs of detectives and crimes, as in (114) (= May 1989:(49)).

(114) $TWO_{x,y} (\text{detective}(x) \ \& \ \text{crime}(y)) \ x \ \text{solved} \ y$

(114) is true iff there are two distinct assignments of values to x and y such that detective x solved crime y ; two assignments are "distinct", in these cases, iff no variable is assigned the same value in both assignments. This seems to give the correct truth conditions for (113); however I do not believe that May's approach to the semantics of these sentences is sufficiently general. What we seem to be dealing with here, is cumulative quantification in the sense of Scha (1981). A well-known example by Scha is (115).

(115) 600 Dutch firms have 5000 American computers

(115) has a reading similar to the reading for (113) discussed above, where there are 600 companies, and 5000 computers, each of the companies owning some computers, and the number of computers owned totalling 5000. Any semantic analysis for (115) will probably apply to (113) as well. But the resumptive quantifier analysis which works for (113) does not work for (115), since the numerals happen to be different.

We are not interested here, however, in finding the correct semantic analyses for different types of independent quantifier interpretations. What is of interest to us, is that (113) and (115), whatever their proper semantic representation, are to be considered instances of independent quantifier interpretation. If we assume, as does May, and as we have done, that LF representations differentiate between dependent and independent quantifier interpretations, but do not further differentiate various types of independent quantifier interpretations, then we expect all types of independent interpretations to be syntactically available under the same syntactic conditions. The readings of (113) and (115) under discussion should be syntactically allowed in those instances in which e.g. specific readings are syntactically allowed. Thus, May (1985) allows two NPs to be interpreted by a resumptive quantifier only if they are members of the same Sigma-sequence. We will allow cumulative quantification to obtain only if the two quantified NPs involved are not within each other's scopes by way of superscripting. It appears, that the latter approach is more nearly correct. Consider (116a & b).

- (116)a. two detectives claimed that they had solved two crimes
 b. In 1989, 500 Dutch firms reported that they had succeeded in selling 3000 personal computers

Both examples have the cumulative interpretation. Yet it would be undesirable to assume that the two weak NPs in (116a) form a Sigma-sequence, since the wide scope reading for the embedded object should then also be available; this is even more unlikely in the case of (116b).

It should be noted, that we have not presented a proposal for the semantic analysis of cumulativity; nor shall we attempt to do so. Cumulativity certainly cannot be captured by means of branching quantifiers. What is of interest to us is that we can syntactically characterize the conditions under which cumulativity can arise by means of the mechanics proposed in the previous sections.

In the next subsection, we shall present some scope related data which we consider independent evidence for our proposal; we shall discuss May's view of these facts as we get to them.

3.5.2. Scopal Reconstruction

In section 3.4.2. above we have assumed that for reasons of simplicity, and in the absence of any immediate and motivated evidence to the contrary, the Scope Marking mechanism (69) should be taken to apply at any grammatical level of representation. This assumption implies that we expect other levels of representation than LF to influence scopal relations. In other words, we expect to find Scopal Reconstruction phenomena. In fact, such a powerful apparatus as our Scope Marking diacritics, which enables us to store information on structural configurations at one level of representation for use at later levels, would become very suspect if this part of its descriptive power remained unused.

At least two examples of scopal reconstruction are known from the literature. We shall first discuss reconstruction from A-movement in section 3.5.2.1., and then turn to reconstruction from A-bar movement in 3.5.2.2., comparing our approach with May's (1985) and Aoun & Li's (1989) as we go along.

3.5.2.1. Raising to Subject

Ioup (1975) discusses the opposition between (117) and (118).

- (117) a senator is likely to speak
 (118) a senator is anxious to speak

Ignoring generic readings, (118) is not ambiguous, but (117) is. It can either be interpreted as (119a) or as (119b).

- (119)a. $\exists x$ [senator(x) & likely (speak(x))]
 b. likely ($\exists x$ [senator(x) & speak(x)])

The truth of the latter does not imply the existence of senators, the truth of the former does. It appears, that the subject in (117) can be interpreted inside the scope of the predicate. Similar facts are cited by May (1985):

- (120)a. no agent is believed by Philby to be a spy
 b. no agent believes Philby to be a spy

Although the same modal verb occurs in both examples, only (120a) can be interpreted with narrow scope for the matrix subject; in (120b) *no agent* cannot be construed inside the modality of *believe*.

What seems to be relevant here is the D-Structure position of the matrix subject. In (117) and (120a), the subjects can be interpreted in the position where they are generated at D-Structure; in (118) and (120b) this of course does not lead to ambiguity. Hence, we seem to be dealing with a case of scopal reconstruction.

A number of different ways of dealing with scopal reconstruction phenomena (in fact: of dealing with reconstruction in general) present themselves. All but one of these options have at one time been proposed in the literature. First of all, we might decide that interpretation takes place at D-Structure. This is more or less the position taken by Ioup (1975). Given the model of grammar we have adopted in chapter 1, this option is not open to us, and we shall not discuss it further. The second possible approach would be to 'physically' reconstruct or lower the quantifier to a position inside the c-command domain of the matrix verb at LF. This is argued for by May (1977) and May (1985). The third possibility is to define scope not over operators, but over operator-headed chains, so that the D-Structure traces of the subjects in (117) and (120a) can play a role in determining the relative scopal positions of the operators. This has been proposed for instance by Aoun & Li (1989). Finally, we can use a diacritic system that allows scopal relations to be marked at any level of representation.

One of the primary goals of May's (1977) dissertation was to present empirical support for LF as the level of semantic interpretation. In Ioup (1975) however, facts like (117) had been cited in evidence of the role of D-Structure in quantifier interpretation. May proposed instead that the LFs for (121a) would be (121b) (narrow scope subject) and (121c) (wide scope subject).

- (121)a. $[_s \text{ some politician}_i \text{ is likely } [_s t_i \text{ to address John's constituency }]]$
 b. $[_s t_i \text{ is likely } [_s \text{ some politician}_i [_s t_i \text{ to address John's constituency }]]]$
 c. $[_s \text{ some politician}_i [_s t_i \text{ is likely } [_s t_i \text{ to address John's constituency }]]]$

- (122)a. $[_S \text{ some politician}_i \text{ promised } [_S \text{ PRO}_i \text{ to address John's constituency }]]$
 b. * $[_S t_i \text{ promised } [_S \text{ some politician}_i [_S \text{ PRO}_i \text{ to address John's constituency }]]]$
 c. $[_S \text{ some politician}_i [_S t_i \text{ promised } [_S \text{ PRO}_i \text{ to address John's constituency }]]]$

May proposed to account for the opposition between (121b) and (122b) on the basis of the status of the matrix subject empty category at LF. In (122b), this trace is in an argument position, hence a variable, and should therefore be properly bound. The matrix subject position in (121b) on the other hand is not an argument position, hence no such condition applies. Consequently, scopal reconstruction is admissible only in raising to subject constructions.

The analysis advocated in May (1985) is basically the same. Relying on the functional determination of empty categories proposed by Chomsky (1982), May argues that the matrix subject in (121a) can be lowered to its LF position in (121b), turning the embedded subject from an A-bound anaphor into an A-bar bound variable. The matrix subject empty category must have the features [-anaphor, +pronominal], since it is governed and free, and it must be an expletive, as it does not bear a theta-role.

Since we have chosen to adopt the *Barriers*-framework, and the properties of empty categories are determined derivationally, not functionally, in this framework (Cf. Chomsky 1986a:16), the lowering analysis is not an available option to us. Not only will the D-Structure trace of the subject NP (an anaphor) be improperly bound at LF, the trace left by Quantifier Lowering will violate the ECP. But even if we accept Chomsky's (1982) view, May's proposal does not seem to us to be entirely convincing. Our objections focus on the status of the matrix subject empty category. May claims that the upstairs empty category in (121b) is an expletive small *pro*. Available evidence indicates, however, that at S-Structure such an empty category cannot be used in English, presumably due to the absence of a strong agreement system.

- (123) it / **pro* is raining
 (124) there / **pro* is a man in the garden

It does not seem entirely self-evident that *pro* will be licensed at LF, if languages are allowed to differ at that level. But even if we suppose that *pro* is available at LF in English, a further problem arises, since this will undermine May's account of (122b). May argues, that the matrix subject in (122b) cannot be PRO, since it is governed, nor an empty expletive, as it is an argument, and that consequently there is no well-formed LF (122b). But if English has *pro* at LF, the upstairs empty category in (122b) can be non-expletive *pro*, and the structure should be in. Thus, we would have to assume that expletive *pro* is licensed at LF, but non-expletive *pro* is not (or that (122b) is ruled out as a consequence of the Projection Principle). But this brings us to a further problem:

the notion of (empty) expletives being present at LF seems questionable in itself. Chomsky (1986b) argued, that expletives may not be present at LF, or the principle of Full Interpretation will be violated. But if the matrix subject in (121b) is deleted, the remaining chain has no case position, and the matrix VP cannot be interpreted as a predicate because there is no subject (an EPP violation). Expletive replacement at LF cannot solve the problem either, since this will defeat the purpose of the lowering movement operation. If the lowered QNP replaces the expletive, it is again moved out of the c-command domain of the matrix predicate. And if any other element of the QNP's chain replaces the expletive, then the QNP itself must also move to the matrix clause, or it will not head its chain and the matrix subject will contain a variable that is not properly bound. Of course, a solution might be devised to many of these problems (see, e.g., Hornstein 1991). As things stand, however, it appears preferable not to adopt the lowering analysis for scopal reconstruction under our present assumptions; we will present an empirical argument against the lowering analysis shortly.

In the context of an analysis of Chinese scope phenomena (which we shall not discuss), Aoun & Li (1989) propose the following Scope Principle (= Aoun & Li 1989:(II)):

- (125) A quantifier A has scope over a quantifier B in case A c-commands a member of the chain containing B.

This principle allows Aoun & Li to account for the ambiguity of SS (126a) by deriving the LF (126b) while maintaining that "Variables must be bound by the most local potential A-bar-binder" (a Relativized Minimality-type condition dubbed the Minimal Binding Requirement).

- (126)a. $[_{IP} \text{ someone}_i [_{VP} t_i [_{VP} \text{ loves everyone}]]]$
 b. $[_{IP} \text{ someone}_i [_{IP} t_i [_{VP} \text{ everyone}_j [_{VP} t_j [_{VP} \text{ loves } t_j]]]]]$

Since Aoun & Li assume that the subject is generated VP-internally, the object can take scope over the subject if it adjoins to VP, where it c-commands the subject's D-Structure trace. We are not presently concerned with the merits of this condition, but merely note that, given some slight adjustments, (125) will account for the scopal reconstruction phenomena discussed. Suppose we reformulate (125) as (127).

- (127) A node A has scope over a quantifier B only if A c-commands a member of the chain containing B

If we now derive (121c) as the only LF for (121a), both readings are accounted for.

- (121)a. $[_s \text{ some politician}_i \text{ is likely } [_s t_i \text{ to address John's constituency}]]$
 c. $[_s \text{ some politician}_i [_s t_i \text{ is likely } [_s t_i \text{ to address John's constituency}]]]$

In (121c), the modal predicate *likely* c-commands a member of the chain headed by *some politician*; on the basis of the Scope Principle (127), the reading where the predicate has scope over the subject is therefore allowed. But note that (127) allows for ambiguous LF structures: the wide scope reading for the subject is also compatible with (121c). The reconstructed reading is not available in control structures, however, since PRO is not a member of the chain of its controller.

Finally, the scope reconstruction data can naturally be accounted for by our Scope Marking mechanism.

- (121)d. $[_S e \text{ is likely } [_S \text{ some politician}_i \text{ to address John's constituency}]]$
 e. $[_S \text{ some politician}_i \text{ is likely } [_S t_i \text{ to address John's constituency}]]$

During the mapping from D-Structure to S-Structure, the modal predicate can assign its superscript to *some politician* under c-command, as in (121d). The subject then moves to the matrix, yielding SS (121e) and eventually LF (121e); since there is no need to remove the superscript at later levels, the narrow scope reading for the subject becomes available. As Scope Marking is optional, however, an LF where the subject has not been marked inside the scope of the predicate can also be derived. No such analysis is available for the control structure, however. Consider (128).

- (128) $\text{een senator}_i \text{ gelooft } [_ \text{PRO}_i \text{ intelligent te zijn }]$
 'a senator believes that he is intelligent'

Even if PRO is superscripted by the matrix predicate, *een senator* cannot be, as it is not c-commanded by the predicate at any level. Hence, the matrix subject cannot be construed inside the scope of the modal.

Above, we argued that given a diacritic Scope Marking Mechanism, we expect relative scope to show reconstruction effects. The fact that such effects do indeed occur constitutes independent evidence in favor of this mechanism. This is true regardless of the feasibility of alternative approaches, such as the adapted Scope Principle (127). Alternative approaches, demanding further empirical research, can nearly always be formulated. We will provide strong evidence against (127) in the next subsection; we will need to examine some more complicated examples to find some evidence as to which approach is best equipped to deal with Raising-to-Subject reconstruction.

In various publications, including Ioup (1975), May (1977) and Aoun & Li (1989), data like the following have been presented as evidence for Quantifier Lowering or the scopal relevance of DS positions.

- (129) A senator_i is likely t_i to speak at every rally
 (130) A senator_i is anxious PRO_i to speak at every rally

The basic observation is that it is easier for the prepositional object in (129) to take scope over the matrix subject, than it is for the prepositional object in (130). In view of the usual clause-boundedness of QR, the wide scope reading for (129), which Ioup (1975) gives as in (131) (simplified), is considered exceptional.

$$(131) \quad \forall x:\text{rally likely}(\exists y:\text{senator speak_at}(y,x))$$

May (1977,1985) provides the following LF for (129).

$$(132) \quad e_i \text{ is likely } [_S \text{ every rally}_j [_S \text{ a senator}_i [_S t_i \text{ to speak at } t_j]]]$$

Due to the lowering option, the object can move to a position where it c-commands the subject without leaving the embedded clause. Aoun & Li can propose the LF (133).

$$(133) \quad [_{IP} \text{ a senator}_i [_{IP} t_i \text{ is likely } [_{IP} t_i [_{VP} \text{ every rally}_j [_{VP} t_i [_{VP} \text{ speak at } t_j]]]]]]]$$

Here, *every rally* c-commands the D-structure trace of *a senator*, and can therefore take scope over it by (127).

Our proposal does not seem to allow the object to take scope over the subject without being extracted from the embedded IP. Consider the LF (134).

$$(134) \quad [_{IP} \text{ a senator}_i [_{IP} t_i \text{ is likely}_k [_{IP} \text{ every rally}_{j^k} [_{IP} t_i^j [_{VP} \text{ speak at } t_j]]]]]]$$

In (134) the D-Structure trace of *a senator* has been given the superscript of *every rally*. Even if this is possible, it does not alter the fact that *a senator* does not bear the superscript of *every rally*; only the opposite scopal order between the two operators is allowed. If the superscript *j* on the trace has any meaning at all, it will be that the variable bound by the interpretation of *a senator* must be in the scope of the interpretation of *every rally*, but this would also be the case without the superscript. The only way for us to give the object scope over the subject is by deriving LF (135).

$$(135) \quad [_{IP} \text{ every rally}_j [_{IP} \text{ a senator}_i^j [_{IP} t_i \text{ is likely } [_{IP} t_i [_{VP} \text{ speak at } t_j]]]]]]$$

Of course, if we allow (135), some alternative explanation for the opposition between (129) and (130) must be found. And in fact, the status of the embedded subject e.c. is not the only difference between the two structures. (129) is an S-bar deletion structure; the embedded sentence is an IP, whereas (130) contains a CP dominating an IP. Now note, that (129) displays none of the properties we identified in chapter 1 as contributing to scope-islandhood; it has an L-marked, tenseless IP complement, and it does not contain a single Blocking Category for the embedded object. If any clause can be expected not to be an island for QR, it is the embedded IP in (129). Of course,

as we noted in chapter 1, the exact bounding conditions governing QR still remain to be worked out in the *Barriers*-framework, and we do not as yet have anything definitive to say about (135). It does not seem very much out of the way, however, to speculate that this structure will be ruled in.

It seems then, that we have found an empirical difference between Aoun & Li's proposal (and May's) and our own, in the case of (129). The former proposal predicts that the universally quantified object can take scope over the subject while remaining within the embedded clause, as in (133). Our proposal predicts that the object can only take scope over the subject if it moves to the matrix clause, as in (135). This means that the two proposals differ in the predicted relative scope between the object and the modal matrix predicate. Now consider again what Ioup (1975) considered the preferred reading of (129).

(131) $\forall x:\text{rally likely}(\exists y:\text{senator speak_at}(y,x))$

In (131), the universal quantifier has scope outside the modal predicate, as predicted by our proposal. Also note that, quite independently from reconstruction effects, the availability of reading (131) for (129) would indicate that the embedded IP can not be an island for Quantifier Raising. However, it is not clear on what grounds Ioup has chosen to consider (131) the preferred reading of (129). It appears all but impossible to truth-conditionally distinguish (131) from (136), which is the reading predicted by Aoun & Li's proposal.

(136) $\text{likely}(\forall x:\text{rally} \exists y:\text{senator speak_at}(y,x))$

We should rather consider the following example.

- (137)a. some politician is unlikely to address every meeting
 b. + $\forall y:\text{meeting} \exists x:\text{politician unlikely}(\text{address}(x,y))$
 c. - $\text{unlikely}(\forall y:\text{meeting} \exists x:\text{politician address}(x,y))$

The two readings for (137a) given in (137b & c) differ substantially in their truth-conditions. The reading in (137c), which Aoun & Li's approach would predict to be readily available, cannot be obtained; the reading in (137b) can. Note again that, independently from reconstruction effects, the availability of reading (137b) for (137a) indicates that the embedded IP can not be an island for Quantifier Raising. Note further that the data in (137) also argue against May's Quantifier Lowering analysis. We conclude that, although intuitions are somewhat insecure in these cases, available evidence indicates that the Scope Marking mechanism accounts for scopal reconstruction phenomena in a way that is to be preferred over other feasible options.

3.5.2.2. Quantifier-Wh Interactions

Let us turn now to our second example of scopal reconstruction. In section 3.5.1. we discussed the ambiguity of (109) and the non-ambiguity of (108).

(108) Who_i t_i bought everything for Max

(109) What_i did everyone buy t_i for Max

We saw that May's treatment of these facts is not compatible with Chomsky's (1986a) view of the ECP, which we have adopted. The alternative account we will propose runs as follows. The LF for (108) is (138).

(138) [_{CP} who_i [_{IP} everything_j [_{IP} t_i [bought t_j for Max]]]]

In (138), *who* is not c-commanded by *everything*; at least the C' node intervenes. Nor is the Wh-word c-commanded by the quantifier at any other level of representation. Hence, the question word cannot be scope-marked by the quantifier, and the only available reading is the one where the Wh-phrase is outside the scope of the quantified NP. Of course, adjoining the QNP to VP will yield the same result.

The ambiguity of (109) can be accounted for by deriving (139a) or (139b) from its DS, eventually yielding the SSs (140a) and (140b), respectively.

(139)a. did everyone_j buy what_j for Max

b. did everyone_j buy what_i for Max

(140)a. [_{CP} what_j [_{IP} did everyone_j buy t_i for Max]]

b. [_{CP} what_i [_{IP} did everyone_j buy t_i for Max]]

The only difference between the two derivations is that in the a-case the Wh-word has been superscripted by the quantified subject at DS under c-command, while in the b-case the Wh-phrase has not picked up a scope mark. At S-Structure the object is moved to [Spec,CP]; if it is scope-marked at DS, it remains scope-marked at SS and at LF. Since the quantifier can take scope over the Wh-word only by virtue of the fact that it c-commands the Wh-word at DS, these data must be considered cases of scopal reconstruction under our analysis.

There is clear evidence that these Wh-quantifier interaction data indeed involve scopal reconstruction in the sense that the D-Structure position of the Wh-phrase is involved in the determination of its relative scopal position. Consider first of all example (141).

(141) what_i does Peter think everyone bought t_i for Max

(141), like (109), has the family of questions reading, which allows for an answer like

"*Peter thinks that John bought a book, that Mary bought a statue, ...*". We can account for this reading quite naturally since, no matter how far the Wh-phrase is moved to the left at S-Structure, it can be construed in the scope of the quantifier since at D-Structure it is c-commanded by the quantifier and can receive its superscript. May (1985) does not analyze these facts as reconstruction data, but assumes instead that the quantifier moves to a position c-commanding the Wh-phrase at LF. Thus, the LF for (141) must be (142).

- (142) what_i everyone_j does Peter think t_j bought t_i for Max

In May's view, the preposed phrases in (142) constitute a Sigma-sequence, so that the family of questions reading is one of the available interpretations. It is not very likely, however, that (142) is a possible LF for (141). We have seen that tensed complement phrases tend to block extraction of quantified NPs at LF. Even if we allow (142), however, no such analysis is available for (143).

- (143) what_i do you think Peter said everyone bought t_i for Max

(143) is quite as ambiguous as (141) and (109), which is what we expect if the Wh-phrase's scope is determined by its D-Structural position. If we take the position, however, that the wide scope reading for the quantifier is due to its moving to a c-commanding position at LF, (143) must have the LF (144).

- (144) what_i everyone_j do you think Peter said t_j bought t_i for Max
 (145)a. John thought some girls said everyone bought Max a book
 b. everyone_j John thought some girls_i said t_j bought Max a book

In (144), the quantified NP has crossed two tensed sentence boundaries, which is highly unlikely to yield a grammatical result. For example, if (144) could be derived from (143), (145b) could be derived from (145a), giving the reading that for every person *x*, John thought there are some girls *y* such that *y* said that *x* bought Max a book. Note that more complicated examples than (144) can easily be constructed which further strengthen this point. More generally, a non-reconstruction approach to these data will probably force us to assume that quantified subject NPs can always move at least as far at LF as their Wh direct objects can move at S-structure. Such a generalization clearly seems to miss the point.

There are further data to indicate that Wh-phrases are scopally reconstructed. I cite (146) and (147) from May (1985).

- (146) who_i t_i saw them_j at the Wimbledon finals
 (147) who_i did they_j see t_i at the Wimbledon finals

As May points out, (146) is not ambiguous, but (147) is: only (147) has the reading where *they* takes scope over the Wh-phrase. There does not seem to be any way for May to explain these facts, however. We take it that pronouns do not undergo QR at LF. If this is so, then the derivations for (146) and (147) will be roughly as in (148) and (149), respectively.

- (148)DS $[_{IP} \text{ who}_i \text{ saw them}_j \text{ at the Wimbledon finals }]$
 SS $[_{CP} \text{ who}_i [_{IP} t_i \text{ saw them}_j \text{ at the Wimbledon finals }]]$
 LF $[_{CP} \text{ who}_i [_{IP} t_i \text{ saw them}_j \text{ at the Wimbledon finals }]]$
 (149)DS $\text{did they}_j \text{ see who}_i \text{ at the Wimbledon finals}$
 SS $[_{CP} \text{ who}_i [_{IP} \text{ did they}_j \text{ see } t_i \text{ at the Wimbledon finals }]]$
 LF $[_{CP} \text{ who}_i [_{IP} \text{ did they}_j \text{ see } t_i \text{ at the Wimbledon finals }]]$

The S-Structures and Logical Forms are identical; the only level at which (148) and (149) differ with respect to the order of the pronoun and the Wh-phrase is D-Structure. This means that, since (148) and (149) differ with respect to the relative scopes of the pronoun and the Wh-phrase, this difference must be traceable to D-Structure. This pleads very strongly in favor of a reconstruction approach to quantifier-Wh interactions. The family of questions reading of (149) can be accounted for by assigning the index of *they* to the Wh-object as a superscript at DS, or, for that matter, by invoking a scope principle like (127) which refers to the D-structure trace of the Wh-word. Any non-reconstruction approach, on the other hand, would appear problematic.

The reconstruction analysis of the data presented in this subsection constitutes independent evidence for our Scope Marking mechanism. But again, the evidence would be strengthened if we succeeded in showing that Scope Marking is to be preferred over other approaches to reconstruction phenomena. It is interesting to note, therefore, that Aoun & Li's (1989) Scope Principle (125), and our adaptation of it in (127), cannot cope with the Quantifier-Wh interaction data. It is, in general, not easy to find empirical differences between an approach which refers to positions at D-Structure, and an approach which refers to D-Structure traces at other levels. Consider, however, (150), where linear order left to right is meant to represent c-command.

- (150)a. $Q_1 \quad \dots \quad t_1 \quad Q_2$
 b. $Q_1 \quad Q_2 \quad t_1 \quad t_2$
 c. $Q_2 \quad Q_1 \quad \dots \quad t_1 \quad t_2$

Q_1 in (150a) represents an operator which has moved to an A-bar position from its D-structure position t_1 . Now the Scope Marking mechanism and the Scope Principle (127) differ in the movement which they require Q_2 to undergo for Q_2 to take scope over Q_1 . If we adopt (127), it is sufficient for Q_2 to move to the position indicated in

(150b), where it c-commands the trace of Q_1 . If we adopt our Scope Marking mechanism, on the other hand, Q_2 must move at least to the position indicated in (150c) for it to be able to take scope over Q_1 . One structure which allows us to check these predictions is given in (151) and (152).

(151) what_i did you give t_i to everyone

(152) who_i did you give everything to t_i

(152) is ambiguous, which can be explained on both accounts: *everything* in (152) c-commands *who* asymmetrically at D-Structure, and c-commands the trace of *who* asymmetrically at S-Structure and LF¹⁵. The non-ambiguity of (151) however can be explained if we adopt Scope Marking, but not if we assume (127). Scope Marking says that for *everyone* in (151) to take scope over the question word, it must move to a position c-commanding [Spec,CP], as in (150c). But the highest node to which the quantifier can adjoin is IP, which is not a position from which it can take scope over the Wh-phrase, as we have seen in the case of (138). (127) on the other hand says that for *everyone* to take scope over the Wh-word, it must move to a position c-commanding the direct object position, as in (150b). It is enough, therefore, for the quantifier to adjoin to VP at LF. It seems impossible to prevent such an LF from being derived¹⁶.

(153) what_i did you [_{VP} everyone_j [_{VP} give t_i to t_j]]

In fact, we can hardly imagine the quantifier being adjoined to a node still lower than this; yet it must be adjoined to some node since, whatever its interpretation, (151) must have some well-formed LF, or it would be ungrammatical. The only possible alternative seems to be to adjoin the QNP to the dative PP, but even from this position it will c-command the trace of the Wh-phrase. In other words, if we succeed in excluding an LF for (151) where the QNP c-commands the trace of *what*, we will most probably wind up excluding (151) altogether.

We are interested here in the general properties of Scope Principles such as (127), rather than in the specific analysis proposed by Aoun & Li (1989). We merely note,

¹⁵ As argued by Larson; (1988).

¹⁶ Certain variants of Minimal Binding or Relativized Minimality (but not, for instance, the proposal in Rizzi; (1990)) might conceivably be invoked to rule out (153) on the grounds that the variable t_i is not bound here by the most local potential A-bar binder. But consider (i).

- (i) a. what was given to everyone by Max
- b. what_i t_i was [_{VP} everyone_j [given t_i to t_j]] by Max

In (ia), *everyone* cannot take scope over *what*. Nevertheless, the QNP c-commands the (D-Structure) trace of the Wh-operator in the LF (ib), in compliance with Aoun; & Li's Scope Principle. And (ib) is not excluded by Minimal Binding, since the trace that might offend this condition is an NP-trace, not a variable.

therefore, that Aoun & Li, who employ an adapted Larson-type analysis of double object constructions, do not in fact exclude the equivalent of LF (153) for (151). Nor indeed would it be desirable for a theory which employs some version of (127) to exclude LF structures where PP-contained indirect objects c-command the direct object traces. For if it did, it would also incorrectly exclude the wide-scope reading for the indirect object in (154).

(154) John gave a book to every girl

In (154), as opposed to (151), the indirect object can take scope over the direct object. Since the D-Structure positions are the same, there is no way for a theory which defines scope with reference to trace positions, to distinguish between (151) and (154) in this manner. A theory which refers to operator positions however, such as our Scope Marking, can differentiate between the two structures. Whereas the Wh-operator in (151) has been raised to an extremely high position, we may suppose that the object in (154) will move no further than VP at LF (or will perhaps not move at all, being a weak NP), allowing the indirect object to gain c-command over it at LF.

A second structure with respect to which we can compare (127) and Scope Marking is given in (155) and (156).

(155) who t_i loves everyone

(156) someone loves everyone

As we have seen, examples like (155) do not allow the direct object to take scope over the subject. It is well-known, however, that this is possible in the case of (156). Note that the D-Structural positions, hence the D-Structure traces, of the subjects in (155) and (156) are identical. Now assume the Scope Principle (127) is correct. Since the object can take scope over the subject in (156), it c-commands at least the D-Structure trace of the subject of (156) at LF. But if this is the case, the object can also c-command the D-Structure trace of the subject of (155) at LF, as the structures are identical in this respect. Hence we expect (155) to be ambiguous. A theory which incorporates some statement like (127) and nothing further, cannot differentiate between (155) and (156); in fact, Aoun & Li (1989) predict both examples to be ambiguous. Our Scope Marking mechanism on the other hand can account for the opposition between (155) and (156). The object in (156) can adjoin to IP and scope-mark the subject NP at LF under c-command (whether the latter has moved or not). The object in (155) can not be raised high enough at LF to scope-mark the Wh-operator.

We conclude, first of all, that Wh-quantifier interactions show unmistakable reconstruction effects, which supports our Scope Marking hypothesis. We conclude furthermore, that the Scope Marking approach of scopal reconstruction is to be preferred over alternative approaches in these cases. Note, incidentally, that the

counterexamples to (127) that we have just discussed also argue against a 'physical reconstruction' or lowering account of Wh-quantifier reconstruction. Together with the A-movement reconstruction effects discussed in the previous subsection, the analysis presented in the present subsection shows that our Scope Marking hypothesis, besides offering an account of specificity, can help us gain insight into some hitherto ill-understood relative scope phenomena.

3.5.3. Williams (1988)

The discussion so far has given us occasion to review, by way of example, some previous proposals for the treatment of relative scope, but has left some other interesting approaches unaddressed. In this subsection we will take a brief look at the notion Q-superiority, which was put forward by Williams (1988), and in the next subsection we will discuss Haik (1984).

Williams (1988) elaborates on the sketchy discussion of quantifier scope in Williams (1986). He proposes to mark the scope of an operator by attaching the index of the operator to some node as a Scope Mark. While operators undergoing overt movement (such as Wh-phrases in English) Scope-mark the node to which they are adjoined, other operators do not undergo movement at all, but may attach their index to any dominating node. Thus, Quantifier Raising and Logical Form are eliminated. For example, in the 'Scoped S-Structure Representations' (157a & b) the direct objects take scope over the embedded Ss.

- (157)a. I wonder [_{S'} what_i [_{S_i} John [_{VP} wrote t_i]]]
 b. I believe [_{S'} that [_{S_i} John [_{VP} wrote everything_i]]]

In case two operators are assigned identical scopes, their relative scope is considered undetermined by the rules of grammar.

In order to account for the locality of quantifier scope, the output of the rule of Scope Assignment which attaches scope indices is required to obey the principle of Q-superiority.

- (158) *Q-Superiority* (= Williams 1988:(21))
 If the scope of Q_i includes the scope of Q_j , then Q_i c-commands the variable of Q_j .

This condition is similar to the Scope Principles (125) and (127) discussed in 3.5.2., in that c-command over an operator's trace, rather than c-command over the operator itself, is the condition to be met for taking scope over an operator. As a consequence of this similarity, (158) fails to fully account for the A-movement reconstruction data reviewed in section 3.5.2.1. in the same way (125) and (127) fail to account for them. The proposal by Williams differs from Aoun & Li's, however, in that it does not allow QR. Consequently, a QNP A can take scope over an operator B only if A c-commands

the trace of B at S-Structure. This results in slightly different predictions with respect to Quantifier-Wh interactions, which is why Williams' proposal is of interest to us here.

Unlike Aoun & Li (1989), Williams (1988) correctly predicts that the Quantified NPs in (159a & b) cannot take scope over the Wh-phrases.

- (159)a. $[_{S'} \text{ who}_i [_{S:i} t_i [_{VP:j} \text{ saw everybody}_j]]]$
 b. $[_{S'} \text{ what}_i \text{ did } [_{S:i} \text{ you } [_{VP:j} \text{ give } t_i \text{ to everyone}_j]]]$

For the quantifiers to take scope over the Wh-phrases, the index j should be attached at least to the S-nodes. But this would violate Q-superiority, since the quantifiers do not c-command the variables bound by the Wh-phrases (nor can they gain c-command over them through QR). Hence, the scopes of the quantifiers are restricted to the VPs.

Williams' advantage in these cases is balanced off, however, by his failure to account for the quantificational counterparts to (159a & b) in (160).

- (160)a. someone saw everybody
 b. John gave a book to every girl

Here, the universal quantifiers can take wide scope. These facts, in turn, are predicted by Aoun & Li (1989) but not by Williams, since the quantifiers on the right do not c-command the variables of the quantifiers on the left (in the case of QNPs, which do not move to an A-bar position, the function of 'variable' in the sense of (158) is filled by the position of the quantifier itself). More generally, any theory which, like Aoun & Li's, and like Williams's, allows an operator to take scope over another operator if it c-commands the other operator's D-Structure position will fail to differentiate between (159) and (160), since these data differ only in the A-bar positions of the operators, not in the trace positions. This distinguishes these two proposals from our own, in which relative scope does depend on the c-command relations between the operators themselves, and which therefore requires a diacritic system to account for scopal reconstruction phenomena.

The facts in (160) indicate that Quantified NPs, at least in English, do undergo QR. This brings us to a more general weakness in Williams' account. As we have seen in chapter 1, there is ample evidence that quantifiers undergo QR in English. Williams appears to be unconvinced by the evidence. In reference to traditional examples like (160a), he states that "it is necessary to heavily stress the object in order for it to receive wide scope" (1988:143). This statement does not appear to us convincingly to disprove the evidence for QR. Looking just at the facts at hand, the indirect object in (160b) does not appear to require heavy stress at all for it to take scope over the direct object. Furthermore, if it is true that QNPs can appear to take wide scope in violation of Q-superiority if they are heavily stressed, this raises the question why the quantified NPs in (159) cannot take scope over the Wh-phrases even when they are stressed.

We will not repeat the entire range of arguments in favor of QR here. It is interesting to note, however, that Williams' Scoped S-Structure Representations cannot be made to explain the CSC restrictions on Quantifier Scope noted in chapter 1, section 1.2.7.. Recall, that the universally quantified NP in (161) can take scope over the weak NP in the coordinated VP only if the coindexed pronoun is present.

- (161) $[_{S,i}$ Felix kissed every woman_i and gave her_i a flower]

We might try to account for this, in Williams' framework, by extending the CSC with the condition that a node may bear a scope mark that is associated with a variable position contained in a conjunct, only if the scope mark is associated with a variable position in every conjunct, by way of Across-The-Board structure. This will not do, however, for if a bound pronoun is visible to the CSC in the sense that it can license an ATB structure by being the foot of an ATB 'fork', then we also expect bound pronouns to be visible to the CSC in that they can induce CSC violations. This is not the case, as witnessed by the well-formedness of (162).

- (162) $[_{S,i}$ every soldier_i [[kissed his_i mother goodbye] and [departed]]]

We might also consider the following, more sophisticated approach. Williams (1986) presents some evidence that a quantified NP in-situ, which functions as a variable position, may actually be considered A-bar bound by the associated scope mark affixed to a dominating node. Thus, in (161), *every woman* is A-bar bound by the index *i* affixed to the S-node. We can now formulate the CSC, including the ATB exception, as follows:

- (163) A variable contained in a conjunction structure may be A-bar bound by a category α not contained in the conjunction structure iff α A-bar binds a variable in every conjunct.

This appears to be a fair statement of the CSC. It correctly allows (162), since the pronoun is not (locally) A-bar bound by the scope mark but A-bound by the subject. It also correctly allows (161), since both the universal QNP and the pronoun are A-bar bound by the scope mark on the dominating S, which makes this an ATB structure. Again, however, we can construct examples which show that bound pronouns do not in themselves cause CSC violations. Consider (164a & b).

- (164)a. $[_{S,i}$ someone in every city_i [[hates its_i climate] and [longs for a change]]]
 b. $[_{S,i}$ every soldier's_i mother prayed for him_i and went to church a lot]

The facts in (164) are Bijection Principle exceptions of a familiar type. In these

examples, the pronouns function as bound variables without being A-bound by the coindexed operators. Instead, a QR analysis will say they are A-bar bound by the operators at LF; Williams' proposal implies that they are A-bar bound by the indices attached to the S-nodes. Consequently, (164a & b) should be CSC violations by (163). They do not, however, appear to be any worse than their counterparts without VP-conjunction. Pronouns simply do not appear to be visible to the CSC if they are merely operator-bound or A-bar bound, but only if they are incorporated into an A-bar chain, so that (161) can only be explained on a movement analysis of Quantifier Scope Assignment.¹⁷

3.5.4. Haïk (1984)

We finally turn to Haïk's (1984) 'Indirect Binding'. Haïk's paper is of special interest to us since, as noted above (footnote 1), the Scope Indexing notation proposed by Haïk appears very similar to our Scope Marking mechanism (69). In this section, we shall investigate how far the similarity goes, by comparing both the motivation for Scope Indexing offered by Haïk with the motivation for Scope Marking presented above, and the empirical predictions of the two mechanisms. We shall first look at the conditions governing the assignment of Scope Marks, and then examine the properties of Scope Marks.

Consider (165) and (166) (= Haïk 1984:(45) & (46)).

(165) *Scope Indexing*

- a. If NP_i is to be interpreted as in the scope of NP_j , then append $/j$ to the index of NP_i ; that is, a structure containing NP_{ij} is unambiguously interpreted with NP_i as in the scope of NP_j . i/j is a referential index.
- b. Scope is transitive; therefore, if NP_i is construed as in the scope of NP_j (NP_{ij}) and NP_j as in the scope of NP_k (NP_{jk}), then $NP_{ij/k}$.

- (166) Scope indexing applies freely when NPs belong to the same minimal S. Otherwise, to obtain $NP_{2/1}$, NP_1 must c-command NP_2 .

Comparing the two proposals with respect to the data presented in the previous sections is not completely straightforward. Haïk's interest was in explaining the following observation. A pronoun can be coreferential with a weak NP that does not c-command it at S-Structure, but only if the weak NP is not interpreted in the scope of some other NP. For this generalization to be storable as a grammatical condition, it is necessary that information on both S-Structure c-command relations and relative scope be available at the same time. Toward this, Haïk proposed to replace QR by rule

¹⁷ Note incidentally, that (161) and (164) are problematic to Williams' approach for more trivial reasons too. In (161) the strong Quantified NP takes scope over the weak NP without c-commanding it at S-Structure; likewise in structures like (164a & b).

(165), which derives Scope-indexed S-Structures from S-Structure representations. The interpretation of bound pronouns is in fact the only use to which Haïk's slash-indices are put. Haïk presents no evidence that relative scope phenomena can be dealt with more fruitfully by means of Scope Indexing than through QR¹⁸. We do not believe that Haïk's treatment of bound pronoun interpretation is entirely satisfactory. We shall not discuss this matter here, however, but return to it in the next chapter. Here, we shall focus on the possibility of using Haïk's Scope Indexing to deal with relative scope phenomena.

First of all, (165) does not account for relativized specificity, since it does not differentiate between strong and weak NPs. Although there is no mention of specificity at all in Haïk's paper, she does mention the possibility of leaving quantifiers unindexed, to allow for branching quantification data as argued for by Hintikka (1974). As we have seen, the branching status of these examples is questionable; if they did involve branching, however, they could not be treated by any mechanism which must also account for specificity since Hintikka's examples putatively feature strong branching quantifiers. The examples in Barwise (1979), on the other hand, may be essentially branching in a semantic sense, but do not require any special syntactic treatment.

Some of the A-movement reconstruction facts discussed in 3.5.2.1. could be accounted for in Haïk's framework, if we reformulated (165) to include the scope of modal verbs, but only along the lines of the proposal by Aoun & Li. Since Scope Indexing takes place at S-Structure, reconstruction facts must be explained with reference to the trace positions visible at this level. This means that examples like (137) will be as problematic for a Haïk type analysis as they are for Aoun & Li (1989), Williams (1988) and May (1985). By restricting the operation of Scope Indexing to S-Structure, Haïk misses out on one of the most striking advantages of a diacritic Scope Marking approach, namely the possibility to generalize over c-command relations at different levels of representation.

The situation with respect to quantifier-Wh interactions is similar. According to Haïk's proposal, an operator can take scope over some other operator if it can take scope over its trace. If NP₁ and a trace of NP₂ obey (166), then the trace of NP₂ may be Scope Indexed. Since the slash-index is a referential index, it is then automatically shared by NP₂ itself; hence, NP₁ takes scope over NP₂. This implies again that Haïk's proposal is equivalent to Aoun & Li's (1989) with respect to scopal reconstruction data. We have established in the previous sections that it is not sufficient that a quantifier c-commands the trace of a Wh-phrase (or, alternatively, belongs to the same

¹⁸ The indirect binding referred to in the title of Haïk's paper does not make use of slash indices, but of the reverse marking: the index of an NP in scope, affixed, between parentheses, to the index of the wide scope NP. These indices, which are used to account for Donkey-anaphora, do not crucially depend for their operation on the presence of slash indices. See chapter 4 Section 4.2.3. for a discussion of Haïk's treatment of Donkey-anaphora.

minimal S), for it to take scope over the Wh-phrase. Haïk's analysis thus incorrectly predicts that (108) and (151) allow for a family-of-questions reading.

It appears then, that Haïk (1984) fares no better in the face of the reconstruction data discussed above than the other proposals reviewed so far. More importantly, however, (166) is not a sufficient substitute for QR as an account of relative quantifier scope in general. But note that the abrogation of QR in favor of a restriction on Scope Indexing is an essential part of Haïk's proposal, since without this the basic facts she sets out to describe (viz. the binding of pronouns by NPs in scope) no longer follow. Our main objection to (166) is of a conceptual nature: there simply does not appear to be any reason why Scope Indexing should obey exactly this condition, and why there is a different condition for clause-mates than for non-clause mates. Haïk presents no independent evidence for a condition of this kind, nor is there any other grammatical condition which makes use of the same notions. (166) seems to laboriously express roughly the generalization that simply follows if we adopt QR, and this is most striking in the cases where QR and (166) do diverge in their predictions: in those cases, (166) fails. This brings us to our empirical objections to (166).

Again, we do not intend to repeat the arguments we have presented in chapter 1 in favor of QR. Recall, however, that Scope Assignment is not always clause-bound. In particular, universal quantifiers can sometimes take scope outside matrix verbs like *believe*, and even outside non-tensed adjunct clauses. Furthermore, we have seen in chapter 1, section 1.2.7. and 1.2.4., that quantified NPs can be prevented from taking scope over quantifiers in the same minimal clause by the CSC or the definiteness restriction, while ATB exceptions further argue for a movement analysis of scope. Matters are even worse in the case of (167) and (168).

- (167)a. on every occasion John smoked a cigarette
- b. on every occasion John went out to smoke a cigarette
- (168)a. ...dat Peter aan ieder meisje een verhaal vertelde
- '...that Peter to every girl a story told'
- b. ...dat Peter aan ieder meisje vertelde dat hij een boek had gekocht'
- '...that Peter to every girl told that he had bought a book'

In these examples, a quantified NP is embedded in a PP so that it c-commands no other category in the structure. Consequently, on Haïk's analysis, we expect to find an opposition between the a-cases and the b-cases: in (167a) *a cigarette* is clause-mate to *every occasion*, hence can be scope-marked without c-command, whereas in (167b) the strong quantifier should not be able to take scope over the embedded NP. Of course, it would not be difficult to further complicate (166) in such a way that these facts are covered, but this would not seem to further our insight in these matters.

Koster (1987) improves on the formulation of Haïk's Scope Indexing. Koster proposes that there is no QR, and that a quantified NP has scope over the minimal S that contains it (S-command). This condition has the advantage that there is no

predicted opposition between (167a) and (167b) or between (168a) and (168b); it is also somewhat more elegant than Haik's. But as we noted in chapter 1, it does not account for the fact that quantifier scope sometimes is not clause-bound, and is sometimes restricted to smaller constituents than S (CSC).¹⁹

We conclude, that the assignment of scope indices proceeds quite differently in Haik's proposal than in our own. It appears, furthermore, that the latter is to be preferred over the former. This leaves the scope indices themselves as an apparent point of similarity between the two approaches. It is not accidental that we have chosen not to adopt slash indexing, but to use a superscript notation instead. The point of Haik's slash indices is that, as stated in (165a), indices with slash indices attached are referential indices. This implies that the properties of slash indices can be expected to show some similarity with the properties of referential indices in general, and that scope phenomena will be akin to binding phenomena. Haik has presented no evidence that this is so²⁰.

There are some clear predictions which follow from Haik's position, however. First of all, as we discussed above, it follows that a Wh-phrase can be interpreted in the scope of operators which belong to the same minimal S as its trace, since a slash index assigned to the trace will be shared by the entire chain, as is normally the case with referential indices. Therefore, the incorrect predictions this proposal makes with respect to Wh-quantifier interactions is not one that can be remedied by dropping an infelicitous assumption on the role of traces in scope determination, but follows instead from the properties of the proposed Scope Indices.

Secondly, consider (169).

(169) some woman_{i/j} denied that every man_j had kissed her_{i/j}

In (169), *every man* has Scope Indexed the pronoun *her* under c-command, and as a result of the coindexing relation between this pronoun and *some woman*, the matrix subject should be interpretable in the scope of the embedded quantifier in this structure. This result is evidently undesirable, and Haik (1984) has formulated a stipulation to the effect that pronouns may not be Scope Indexed. This stipulation serves no other purpose than to prevent Scope Indexed structures such as (169) from being derived, and to effectively void Haik's identification of referential and scopal indices of its consequences.

¹⁹ As regards the quantifier-Wh interactions discussed above, Koster's formulation implies that a QNP can never take scope over a Wh-phrase (unless it is in situ or in a subordinate clause). When coupled to a mechanism that 'transfers' properties from traces to antecedents (which Koster; adopts), however, it will predict that a QNP can take scope over any Wh-phrase whose trace it S-commands, which is an equally incorrect result. In view of the fact that Koster; (1987) expresses the scope of a Wh-phrase, not through its S-structure position, but through a coindexed covert question operator, the transfer option probably does not apply in this case, so that his hypothesis errs on the less liberal side.

²⁰ Cf. note 18.

A similar problem (also noted by Haïk herself) is posed by examples like (170):

- (170) [some woman who_{i/j} every man_j loves t_{i/j}]_{i/j} is happy

The QNP *every man* can assign its slash-index to the (trace of) the relative pronoun. Since the relative pronoun is coindexed with the complex NP, we expect the indexing relations indicated in (170) to be possible, hence we expect *every man* to take wide matrix scope, contrary to fact. Note that the coindexing between complex NP and relative pronoun must proceed in this manner, or Haïk's treatment of donkey anaphora (see chapter 4, section 4.2.3.) cannot go through. Haïk attributes the unavailability of the wide scope reading in (170) to "restrictions [in English] that prevent an NP from being interpreted as being in the scope of an internal NP", citing some examples with definite NPs, and claiming that these restrictions are not operative in French (see Haïk 1984:204:fn.20). While such restrictions indeed exist in English in case the containing NP is definite (see chapter 1, section 1.2.4.), internal NPs are free to take wide scope otherwise (as witness many examples of inverse linking discussed by May (1977) and others). Since the containing NP in (170) is not definite, Haïk is left without an explanation of its non-ambiguity.

Also, Haïk's claim that in French, unlike English, internal NPs may take scope over containing NPs in apparent violation of the CNPC is not accurate. Consider (171).

- (171)a. j'ai rencontré une femme que chaque homme aimera
'I've met a woman who each man will love'

The wide scope reading and the narrow scope reading for *chaque homme* in (171) differ distinctly (which is not the case in all of Haïk's examples). The wide scope reading is completely unavailable.

In conclusion, not only the assignment of Scope Indices, but also their properties are substantially different in Haïk's proposal and our own. In both respects, available evidence indicates that the Scope Marking mechanism (69) is to be preferred over (165)-(166). The similarities between the proposals have proven to be of a superficial nature, and stem from their common use of the indexical marking of categories to express relationships between nodes in a tree structure, a notational mechanism which has become familiar through its use in the theory of binding. There is one important exception, however. Haïk's proposal was among the first to treat the scope of a given node α in a syntactic structure not as a partial tree structure, to be equated e.g. with the c-command domain of α , but as a set of nodes in the structure with which α has entered into a grammatical relation²¹. This view of syntactic scope has been adopted at least partially by May (1985), whose notion of Sigma-sequence also defines the

²¹ But see Kerstens; (1983:178) for a proposal with similar properties.

relative scopes of quantified expressions in terms of the structural relations obtaining between these expressions, not in terms of their absolute scope domains. In this respect, our syntactic treatment of quantifier scope phenomena is certainly to be considered a continuation of Haïk's work.

3.6. Elaborations and conclusions

In this final section, we will first consider a possible refinement of our summary remarks on the interpretation of LF in section 3.4.2. and discuss some remaining problems, and then summarize the conclusions of this chapter.

In sections 3.2. and 3.4. we discussed the following examples.

- (18) every professor will rejoice if a student of his cheats on the exam
 (88) every teacher_i overheard the rumor_jⁱ that [a student of mine]_kⁱ had been called before the dean

While Fodor & Sag (1982) have claimed that *a student of mine* in (88) cannot take intermediary scope (outside the scope of *the rumor*, but inside the scope of *every professor*), we found that it does not seem entirely impossible for *a student of his* in (18) to take scope between the matrix subject and the conditional operator. The situation with respect to (18) is actually somewhat more complicated, however, than we suggested above. Compare (18) with (172).

- (172) every professor will rejoice if three students of his cheat on the exam

In (172) it is not possible for the embedded subject to take scope over the conditional clause. There is no reading for (172) where for every professor there are three students such that if any one of these students should cheat, the professor will rejoice. There is a reading parallel to the one we attributed to (18), however, where for every professor there are three students such that if these three students (all) cheat on the exam, the professor will rejoice. This situation appears quite familiar by now. The NP *three students of his* can be interpreted outside the scope of the conditional clause (i.e. specific relative to (the head of) the conditional clause), but can not be interpreted with scope over the conditional clause. The way to account for this distinction, is to reformulate our Scope Principle (51) as under (173).

- (173) **Scope Principle**
 A is in the scope of B iff
 i) A is superscripted by B; or
 ii) A is superscripted by C, and C is in the scope of B (transitivity).

From (173) we have omitted the restriction that A should be a Noun Phrase, implying

that, if *three students* in (172) cannot assign a superscript to the adjunct CP (which it cannot), it can only be interpreted specifically w.r.t. the adjunct, not with scope over the adjunct.

In itself, this generalization of (51), and its resultant refinement of our treatment of (18) and (172), can be considered an improvement. It does leave us with two problems, however.

Firstly, we showed in section 3.4.2. that LF' as we have outlined it so far, does not allow for an operator to be interpreted specifically (i.e. to branch) with respect to a constituent it is contained in at LF, since this would leave an improper free variable in the containing constituent. Consequently, we must revise our view of LF' to accommodate the branching reading of the embedded subject in (172) with respect to its containing CP. Below, we will work our way through some possible alternatives. Let us suppose that LF representations that we have translated into branching structures up till now will instead be interpreted with higher order translations. Thus, next to representations like (174a) we will allow (174b), which we will consider equivalent to (174c)²².

- (174)a. three girls $x(\text{arrive}(x))$
- b. $\exists X [\text{three girls } x(x \in X) \ \& \ \text{arrive}(X)]$
- c. $\exists X [\text{three girls } x(x \in X) \ \& \ \forall y (y \in X \rightarrow \text{arrive}(y))]$

(174) might interpret *three girls arrived* (which, of course, does not require branching, and is merely used here as an example for convenience). The interpretation of the NP itself is to the left of the conjunction in (174b & c); let us call this part the NP-interpretation. The conditions governing the derivation of LF' will now include roughly the following. The universal quantifier in (174c) will take scope over (the interpretations of) those constituents which are marked in the scope of *three girls*. *Three girls* can thereby be interpreted distributively with respect to just these constituents. The position of the NP-interpretation (the existential quantifier binding the second order variable, and the accompanying clause), must be such that it is in the scope of just those operators which have scope over *three girls* by (173). Any operators relative to which the weak NP is specific, take scope over the right conjunct in (174b & c) (i.e. over the universal quantifier in (174c)). The result will be that *three girls* will be interpreted as specific with respect to the operators which are outside the scope of the universal, but inside the scope of the existential. The intermediary scope reading for (172), for example, will now take the shape of (175).

- (175) Every professor $y [\exists X [\text{three students of } y \ x(x \in X) \ \& \ [\text{cheat on the exam}(X) \rightarrow \text{rejoice}(y)]]]$

²² Note again that we are not attempting to construct an interesting theory of LF' here, but that we merely want to give some indication of the feasibility of interpreting our LFs.

The higher order representations obtained in this manner are of the kind proposed by Barwise (1979) as higher order interpretations of branching quantifier structures. These representations yield the same results as branching quantification, except that the condition which prohibits branching w.r.t. containing constituents no longer holds, since the variable in the containing constituent will now be bound by the existential. The reader is referred to Barwise (1979) for details on these representations and the use of restricted quantification therein.

There are two reasons why the position we have now arrived at is not quite correct. Firstly, the formula in (175) is slightly inaccurate as a representation of (172). This formula will be true if for every professor there is some set which contains at least three students (and an unknown number of further individuals) such that if they all cheat, he will rejoice. Such a set will exist for every professor if he can find three students, and one individual who will not cheat on his exam (e.g. himself, or the pope), since then there will be a set (namely: a set containing three students, plus this person) such that if they would cheat (which they won't) then he would have to rejoice. This indicates that the higher order representations that we have copied from the work of Barwise cannot be used to account for complex branching structures in exactly this way. Secondly, the method of interpretation illustrated in (174) works only for monotone increasing quantifiers (as noted in section 2.3.). We will attempt a slightly different approach, which we illustrate in (176).

- (176)a. three girls arrived
 b. $\exists X [|X| \geq 3 \ \& \ X = \text{Max } Y [Y \subseteq \{y | \text{girl}(y)\} \ \& \ \forall y [y \in Y \rightarrow \text{arrive}(y)]]]$

The Max-operator introduced here selects the maximally large set which verifies the clause it takes scope over (a formal definition of the (revised) Max-operator is given in chapter 4, section 4.3.). Thus, (176b) can be read as: there is a set, which is the maximal set of girls that arrived, and it has at least three members (again, anything taking scope over the weak NP takes scope over the existential, anything in the scope of the weak NP is in the scope of the universal; we will give a slightly more precise description of the interpretive procedure in chapter 4, section 4.2.4.). For one thing, the use of the Max-operator allows us to treat other than monotone increasing quantifiers correctly, in a manner reminiscent of Verkuyl & v.d. Does (1991); Cf. (177).

- (177)a. less than three girls arrived
 b. $\exists X [|X| < 3 \ \& \ X = \text{Max } Y [Y \subseteq \{y | \text{girl}(y)\} \ \& \ \forall y [y \in Y \rightarrow \text{arrive}(y)]]]$

Secondly, this approach allows us to describe the correct truth conditions for at least

some cases of branching weak NPs contained in embedded clauses; (172) will be interpreted as (178):

$$(178) \quad \forall x [\text{professor}(x) \rightarrow \exists Y [|Y| \geq 3 \ \& \ Y = \text{Max } Z [Z \subseteq \{z | \text{student_of}(z, x)\} \ \& \ [\forall y [y \in Y \rightarrow \text{arrive}(y)] \rightarrow \text{rejoice}(x)]]]]$$

As a semantic theory of weak NP interpretation, the position we have now arrived at, and our use of the Max-operator, are far from interesting, I believe. Also, syntactic contexts are certain to exist in which this approach will give incorrect results (we will discuss one such context below, and consider an alternative to the Max-operator which may be fruitful in further research). It does, however, to my mind give an indication of the possibility of interpreting structures featuring Relativized Specificity.

This revision of our assumptions regarding LF' has a further advantage, besides accounting for the interpretation of (18) and (172). Recall that (88) has an apparent wide scope reading for the embedded subject, which is attributed to its referential use by Fodor & Sag (1982). We have proposed that the embedded subject is specific with respect to all c-commanding operators in this case. Because of the restriction on branching w.r.t. containing constituents, we have assumed in section 3.4.2. that quantified NPs which are specific relative to all c-commanding operators may be interpreted as referential expressions at LF', thereby circumventing the 'containing constituent' restriction in these cases, and effectively predicting the same interpretation for (88) as proposed by Fodor & Sag. Given our revised view of LF', however, this assumption is no longer required. We can simply say that, if the weak NP in (88) bears no superscripts, it will yield a second order representation in which its NP-interpretation will have widest scope.

This brings us to the second problem in connection with our treatment of (172). If the embedded weak NPs in (18) and (172) can be interpreted specifically relative to the containing adjunct CPs, while staying in the scope of the matrix subject, then why cannot the embedded subject in (88) be interpreted specifically relative to the containing complex NP, but in the scope of the matrix subject? Given our revision of LF', we can no longer account for the absence of the intermediary scope reading for (88), since the 'containing constituent' restriction no longer holds. We can offer some indications that this is not quite the problem it appears to be. Consider (179).

$$(179) \quad \text{every teacher}_i \text{ overheard the rumor}_j \text{ that } [\text{three students of mine}]_k \text{ had been called before the dean}$$

In the case of (179) we can distinguish between two different intermediary scope readings for the embedded subject, since here it is plural. There might potentially be a reading where for every teacher there are three students such that he overheard one rumor per student (let us call this the distributive reading). There might also be a reading where for every teacher there are three students such that he heard one

common rumor about them (the non-distributive reading). If one wants to argue, as do Fodor & Sag, that the embedded subject in examples like (88) and (179) cannot take intermediary scope over the complex NP, then example (179) is the more compelling case. (179) offers stronger evidence against a QR analysis for the specific reading of the indefinite than (88), since it allows for more secure intuitions: the distributive intermediary reading is certainly unavailable.

If it were the case that the embedded subject in (179) could be interpreted outside the scope of the complex NP as a result of QR moving it to the matrix sentence, then we would expect the distributive reading to be available. Moreover, we would expect this reading to be available exactly as easily, or as difficultly, as the non-distributive reading, since both readings would result from the same movement operation. But this does not appear to be the case; the intermediary distributive reading is even more difficult to obtain than the intermediary non-distributive reading. Hence, QR cannot account for the specific reading of the indefinite, and Fodor & Sag's argument to this effect holds.

But not only do these observations provide an argument against a QR analysis, they also argue against Fodor & Sag's approach. Their proposal forbids both the distributive and the non-distributive intermediary readings in the same way: for the indefinite to take non-narrow scope, it must either become referential (which makes the reading non-intermediary), or be moved out of the complex NP, which violates the CNPC. But if both readings are ruled out in the same way, we would expect them to be equally unavailable, contrary to fact.

Our proposal, on the other hand, does differentiate the two intermediary readings. The distributive reading requires the embedded NP to scope-mark the complex NP, which is possible only if the CNPC is violated. The non-distributive reading, on the other hand, would result from specificity of the embedded subject relative to the complex NP; we have just seen that we cannot exclude this reading while allowing the intermediary non-distributive reading for the adjunct island case (172). The situation therefore adds up to this: our approach can differentiate between the two intermediary readings for (179), whereas Fodor & Sag's cannot. Furthermore, our proposal cannot distinguish properly between Complex NP and Adjunct Island cases, but neither can Fodor & Sag's (which disallows the intermediary reading in both cases). It is our suggestion that Fodor & Sag's basic argument should be based on the absence of the distributive intermediary reading for (179), and that, of the Complex NP and Adjunct Island cases, the latter, which confirm the Relativized Specificity approach, should be considered the more representative. This is in accordance with Fodor & Sag's suggestion that "some readers may perhaps find [the relative unavailability of the intermediary reading in (88), EGR] less than compelling..." (Fodor & Sag 1982:375). In this context it should be noted, finally, that we have pragmatically strengthened the intermediary reading in the Adjunct Island case (18) by placing a pronoun bound by the matrix subject in the embedded subject, thereby excluding the wide-scope reading

for the latter. Perhaps the intermediary reading can also be made more easily obtainable in the Complex NP cases in this way; cf. (180).

- (180) every teacher overheard the rumor that [a student of his] had been called before the dean

It seems to us that the intermediary reading may not be quite as implausible, here, as one would expect on Fodor & Sag's account. But again, as in all these cases, intuitions are very insecure. Intuitions are less insecure, however, if the 'special circumstances' described in section 3.4.1. above are introduced:

- (181)a. every teacher overheard the rumor that a certain student of his had been called before the dean
 b. every professor heard the rumor that a different student had been called before the dean
 c. elke professor hoorde (weer) het gerucht dat een andere student voor de decaan was geroepen
 d. every professor_i heard the rumor that an other_i professor had been called before the dean
 e. elke professor_i hoorde het gerucht dat een andere_i professor voor de decaan was geroepen

The Dutch example (181c) (which translates (181b)) in particular appears quite acceptable to me. We will present some clearer examples yet in the chapter 4, section 4.2.4..

There is one further matter which must be addressed, however briefly, before we can conclude this chapter. We noted in section 3.4.3. that strong quantificational determiners show considerable lexical variation in their propensity for taking wide scope. A similar variation can also be observed among weak determiners, with respect to their propensity for taking on a specific reading. For example, whereas NPs such as [*a N'*], [*some N'*], [*numeral N'*] can be interpreted specifically quite easily, some other NPs, such as [*several N'*], are not quite so likely to give a specific interpretation, while monotone decreasing [*fewer than three N'*], [*noone*] take a specific reading only with great difficulty, or not at all. Now we clearly would not want the individual differences among strong determiners to be incorporated into the theory of grammar in such a way that the principles governing QR, or even move α in general, be made dependent upon whatever lexical idiosyncrasies can be observed among them. The more fruitful strategy, which in fact has been adopted since May (1977), appears to be to investigate the properties of the grammatical mechanism underlying Quantifier Raising on the basis of the behavior of a given set of QNPs which can be shown to undergo QR, and to leave lexical variation as a feature to be explained, perhaps, in terms of peripheral or non-grammatical constraints, or simply to leave it for further

research. Similarly, we have been interested here in establishing the fact that some NPs can be interpreted specifically, and in determining what conditions govern this phenomenon, and how specificity can be explained from the properties of the model of grammar we have adopted. This simply seems to be a more interesting and rewarding enterprise, which is more likely to further our understanding of natural language grammar, than trying to unravel the idiosyncrasies of the lexical categories which may play a role in this grammatical phenomenon.

Nevertheless, we would like to give some indication of what directions research into these matters might take. We shall concentrate here on the monotone decreasing NPs, which, as a clearly defined class, are the most interesting; we can see (at least) two possible approaches here, both of which may be valid in different cases. The first approach is to postulate a pragmatic effect: consider (182a & b).

- (182) a. every boy has kissed three girls
 b. every boy has kissed less than three girls

The question is why (182a) can mean there is a set of three or more girls that have been kissed by every boy, while (182b) cannot mean that there is a set of less than three girls, who are the girls who have been kissed by every boy. Now recall that the specific reading of (182a) has the pragmatic effect of suggesting that the speaker has in mind a specific set of three girls who obey this condition, and who he chooses to describe as three girls, in such a way that, in the words of Higginbotham (1987:65), "...we have the right to expect the speaker, or someone connected to the speaker, to provide an *instance* [of such a set, EGR]".

This brings us close to the pragmatic effect we have in mind here. If the speaker of (182b) has in mind a set of girls who obey the given condition, then why doesn't he simply state how many girls are involved, or omit any reference to the number of girls, instead of laboriously stating that, whatever the number of girls involved, they were less than three. Unless there is some particular reason for using this circumlocution, the speaker seems to be giving less information than he might, in an overly complicated manner. This would seem to begin to explain why the non-specific, narrow scope reading for the object in (182b), which exhibits no such pragmatic anomaly, will be heavily favored.

Now consider (183).

- (183) John read a book about exactly three girls

This is one context where the interpretive approach using the Max-operator sketched above gives an incorrect result. If the non-monotone expression *exactly three girls* is used specifically here, (183) means that there is a group of exactly three girls, such that John read a book about this group of girls. (183) on this reading does not exclude that John read other books dealing with smaller or larger groups of girls; but the latter

possibility is excluded on our present assumptions, since we predict that the specific reading of (183) implies that the largest group of girls John read about has exactly three members. Note that the true reading of (183) we are discussing here can be derived simply by interpreting *exactly three girls* non-specifically, and giving it the narrowest possible scope; in (183) we cannot differentiate between the narrow and non-narrow scope readings. We can be certain however that a non-narrow scope (specific) reading is involved, if we embed (183) in a context of donkey-anaphora:

(184) every farmer who read a book about exactly three girls hates them

Assuming that a donkey antecedent may not be scopally embedded (as we will argue in chapter 4, section 4.2.4.), *exactly three girls* in (184) is used specifically relative to the containing NP. But our Max-operator approach would give incorrect results here, since (184) is not only about farmers who have read a book about precisely three girls, but no books about larger or smaller sets of girls; it is about all farmers who have read at least one book about exactly three girls, irrespective of their further reading activities. Thus it would appear that the use of a specific weak NP (as in (183) and (184)) does not so much produce a statement about the maximal set of individuals who obey certain conditions, it rather claims the existence of at least one set (John in (183) may have one or more than one set of exactly three girls that he read a book about) of a certain size (given by the numeric information in the NP) which obeys a certain condition. We may well look upon such a set as a complex, possibly plural individual²³: (183) then says that there is at least one plurality which can be described as "exactly three girls", such that John read a book about that plurality. (183) then does not quantify over girls, it quantifies over sets of exactly three girls, saying that there is at least one such set which verifies the remainder of the clause. We might make this explicit by assuming that, just in case a weak NP is interpreted specifically relative to an operator associated with a containing NP or CP, it will be interpreted in this way, as illustrated in (185) for (183) (where we represent such plural entities as sets, for convenience).

(185) $\exists X [|X| \geq 1 \ \& \ X = \{Y \mid |Y|=3 \ \& \ Y \subseteq \{z \mid \text{girl}(z)\} \ \& \ \exists w [\text{book_about}(w,Y) \ \& \ \text{read}(j,w)] \ \}]$

(The use of the $\langle\langle e,t \rangle, t \rangle$ type variable is required in connection with the proportion problem in donkey-anaphora contexts; see section 4.2.5. for a brief discussion.)

Although I believe that the approach sketched here may be more nearly on the right track than the Max-operator approach, at least in the indicated contexts, we will not have occasion to further develop it here. We have presented it here mainly to point out the possibility that specific NPs may be taken to existentially quantify over

²³ See Link; (1983) for an analysis of plurals along these lines; see also Scha; (1981).

pluralities of some kind, which are introduced by means of a description that contains a statement of their numeric size. We can now attribute the absence of specific readings for monotone decreasing NPs to the pragmatic infelicity of giving a monotone decreasing numeric description of an individual whose existence is claimed, since such a description leaves open the possibility that the set in question is empty, making it a non-entity at least for normal pragmatic purposes. The result would be pragmatically odd, since by using a monotone decreasing NP specifically in the contexts indicated, one would claim the existence of an individual, and simultaneously forgo the claim that it exists.

There is one further obvious approach to the unavailability of relativized specificity with some weak NPs. In section 3.4.3. we drew the line dividing QR-sensitive NPs from QR-insensitive NPs between the strongly quantified NPs on the one hand, and the weakly quantified and non-quantificational (referential) NPs on the other. This bifurcation criterion just may turn out to be too rough. We may suppose instead that some NPs, although weak, are nevertheless quantifiers in the syntactic sense of undergoing QR. These NPs will hence obey (106) and will have no specific readings. The weak quantifier *noone*, which has no specific readings, appears a prime candidate for syntactic quantifierhood in this sense. Unfortunately, being a decreasing quantifier, we do not expect it to take wide scope very easily, either (compare the strong decreasing [*neither N'*]), so that it is not easy to test this statement. However, we expect it to be able to bind pronouns (giving sloppy readings with VP-deletion) from a non-c-commanding position, and this prediction is borne out.

- (186) noone's father loves him, but then, noone's mother does either

This example is perfectly all right with *him* bound by *noone's*.

We can now summarize the findings of this chapter. Starting from the assumption that Quantifier Raising is involved in the assignment of relative scope to quantified NPs, we reviewed, in section 3.2., Fodor & Sag's (1982) argument that QR alone is not enough to account for the scopal properties of weak NPs, and added a new argument to this effect in section 3.3.. In 3.4.1. we argued that Fodor & Sag's lexical ambiguity approach to the problematic data presented in the foregoing sections is insufficient. In 3.4.2. we presented an alternative approach which attributes these data to a syntactic ambiguity which follows naturally from the grammatical system that accounts for quantifier scope. This system incorporates both QR, and a system of diacritic scope marking. In 3.4.3. we further extended this system, so as to account not only for the exceptional wide scope (specific) readings of weak NPs, but also for their exceptional non-wide scope. This extension also accounts for the absence of specificity with strong NPs. In section 3.5. we presented independent evidence for our Scope Marking mechanism, finding that the combination of QR and Scope Marking proposed is crucial if we want to account for Scopal Reconstruction, as well as for

data which require a 'traditional' QR analysis. In section 3.6, we (re)examined some interpretively complex examples of specific NPs, which led us to a revision of the Scope Principle, and to two successive revisions of our assumptions regarding the interpretation of LF.