Not Only EVEN, but Even ONLY

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1 Preliminary Assumptions

The question of how to treat words like *even* and *only* is a question which has been around for quite some time, and has been addressed in a number of papers, most notably Kuroda (1969), Jackendoff (1972), Rooth (1985) and Kratzer (1989). It has been noted that these words appear to associate with focused elements which are in their c-command domain. One of the main questions I will be addressing in this paper is that of exactly what it means to say that *only* and *even* associate with a constituent. Rooth (1985) claims that what has been touted as a syntactic association is in reality a mere artifact. He claims instead that the apparent association between an operator like *even* or *only* and a focused constituent results from the combination of the semantics needed to interpret focused constituents on the one hand, and the semantics of the operators themselves on the other. Thus, in a sentence like (1), Rooth argues that there is no need for a formal association between *only* and *TOM*.

(1) John only introduced me to the girl who's dancing with TOM.

The apparence of such an association for him comes from an analysis of focus interpretation in which focusing of a constituent introduces a set of alternatives in the semantic interpretation of a sentence, and from an analysis of the operators *even* and *only* which makes crucial reference to this set of alternatives. Put intuitively, focusing of *TOM* in the above sentence introduces a (contextually relevant) set of possible alternatives, in this instance perhaps the set of men at a given party. If this set includes *Tom, Bill*, and *Harry*, then for Rooth, focusing *TOM* formally introduces this set of 3 individuals into the semantic representation of the sentence. The name which Rooth gives to this representation is the term p-set. The p-set for the focused constituent *TOM* is roughly the set {Tom, Bill, Harry}, the p-set for the PP *with TOM* the set {with Tom, with Bill, with Harry}, and the p-set for the entire sentence in (1) the set in (2) (ignoring for the moment the role of *only*).

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1 This is not an exhaustive description of the facts. As Jackendoff (1972) notes, for example, it is possible for *even* to associate with a subject NP as in the sentence *JOHN even failed the test*. The same is not true, however, of *only*: if we replace *even* with *only* in the above sentence it becomes impossible for *only* to associate with the subject NP. Thus the sentence *JOHN only failed the test* cannot be interpreted as *Only John failed the test*. In the remainder of this paper, I will ignore this complication, and deal exclusively with sentences in which *even* and *only* behave identically.
(2) 
John introduced me to the girl who's dancing with Tom.
John introduced me to the girl who's dancing with Bill.
John introduced me to the girl who's dancing with Harry.

The semantics for *only* as a propositional modifier is defined with respect to a proposition $Q$ and the p-set of that proposition $P$ which, irrelevant details aside, can be interpreted as follows: If a proposition $p$ in the p-set $P$ is true, then that proposition is the proposition $Q$ (i.e. $p = Q$). If we apply this (intuitive) semantic interpretation of *only* to (1) we get the following interpretation of that sentence: if a proposition in the p-set (2) is true, then that proposition is the proposition *John introduced me to the girl who's dancing with Tom.*

The purpose of this paper is to show that Rooth's treatment of so-called association with focus outlined above (i) is insufficient to account for the full range of interpretations of sentences in which the operators *even* and *only* occur, and (ii) generates for other sentences interpretations which are unavailable. I will show that the shortcomings of Rooth's analysis derive from his denial of any syntactically represented association between an operator like *even* or *only* and a focused constituent. I will concurrently develop an account of association with focus in which the association between an operator and a focused constituent must be represented syntactically, motivating such an analysis by showing this association to be subject to constraints which are purely syntactic in nature.

In this section, I will outline the basic assumptions I will be making regarding the scope properties of *even* and *only.* Some of the assumptions I make will differ in crucial ways from those which have been adopted in previous analyses. These assumptions will be addressed individually in the main body of the paper, where they will be motivated. The first assumption I will be making is that *only* and *even* are operators, in fact operators of a special type. Unlike quantifiers like *every,* for example, I will be assuming that *only* does not combine with an NP to form a (restricted) quantifier of any sort. This assumption is in agreement with Rooth's proposed semantics for *even* and *only,* though it contrasts with movement based analyses such as (Rooth's interpretation of) that found in Anderson (1972). Anderson assumes that *only* combines syntactically with the constituent it is associated with by the level at which semantic interpretation applies, this combination being an instantiation of movement in which the focused phrase raises to the operator. Under his
analysis, the representation at the level of semantic interpretation (which I will translate as the level of Logical Form (= LF)) for a simple sentence like (3a) (= Rooth's (6), p.31), would be (3b) (= Rooth's (7)).

(3)

a. \[ S \text{ John } [v_P \text{ only } [v_P \text{ introduced } \text{BILL} [p_P \text{ to Sue}]]] \]

b. \[ S \text{ John } [v_P \text{ only } [N_P, \text{ BILL}] [v_P \text{ introduced } t_1 [p_P \text{ to Sue}]]] \]

Rooth raises some serious objections to an analysis of this kind. He shows, for example, that adopting such an analysis, one would have to assume that the movement of a focused constituent to only at LF is not constrained in the ways in which movement rules are normally constrained. In (4), for example, movement of the focused HE to the S-structure position of only would violate subjacency,² while the corresponding movement of Sue in (5) would result in an ECP violation.

(4) John even has \[ N_P \text{ the idea } [s_i \text{ that HE is tall for a Watusi}] \]

(5) He only claims that SUE likes him.

The conclusion he draws from this observation which is relevant to the present discussion is that even and only must be interpretable as predicate (or perhaps propositional) modifiers in at least cases like (4) and (5). That is, since the focused constituents in these examples cannot move to the S-structure position of only at LF without violating restrictions on the form and/or derivation of LF representations, the operator must be interpretable at LF without combining first with the focused constituent to form a sort of restricted quantifier. Although I will have reason to doubt some of his specific assumptions about the restrictions on movement which apply at LF, I basically accept his argument that only and even must be allowed to modify a semantic proposition at LF and still be able to be associated with a focused element contained within that proposition. While Rooth assumes that only and even can minimally modify propositions at LF, however, in this paper I will argue for the stronger position that these operators can only modify propositions.

²There has been a rather large debate in the literature regarding the question of whether or not LF movement in general is subject to subjacency. Huang (1982), for example, argues that subjacency does not restrict LF movement, while Nishigauchi (1985) endeavors to show that it does. I will argue later on in this paper that Nishigauchi cannot be correct, i.e. that subjacency cannot be a constraint on LF movement, which will somewhat reduce the force of Rooth's objections. However, all current versions of the ECP hold that this principle does constrain LF movements, which makes (5) sufficient to establish the point Rooth wishes to make.
If one assumes an X-bar theory in which subjects are base-generated in the specifier position of VP (for sentences whose main predicate is a verb), claiming that only and even semantically modify propositions implies that they can syntactically modify a VP or IP (and possibly a CP) at LF, but that they cannot modify a non-propositional NP, PP, or AP at that level. 3 In a sentence like (6a), for example, it follows that the only positions in which only can be interpreted at LF are the positions which it occupies in the LF representations given in (6b), (6c) and (6d) (ignoring for the moment the question of what to do with the focused NP). 4 5

(6)

a. The professor made the students study only physics.
b. The professor made the students [VP only] [VP study physics]
c. The professor [VP only] [VP made the students study physics]
d. [IP only] [IP The professor made the students study physics]

One advantage of this approach is that it allows for a transparent (or at least translucent) account of the fact that all of the interpretations which are possible for a sentence in which an only is adjoined to a (non-subject) NP at S-structure correspond to sentences which are identical in every respect except that the only in question is syntactically adjoined at S-structure not to the NP but to a dominating VP. That is, it allows us to account for the fact that the two readings of the sentence (6a) correspond to readings of sentences whose S-structure is identical to the LF representations given in (6b) and (6c) and for the fact that these latter sentences in which only is adjoined to VP exhaust the possible interpretations of (6a) in which only is adjoined to a (non-propositional) NP.

In accord with the analysis I will be arguing for, I will be adopting some non-standard ways of talking about even and only. First, since I am assuming that only NP does not act as a quantifier, it makes no sense to talk about the scope of such a complex constituent. When I talk about scope-related properties, I will thus be talking about the scope of even and only themselves. Since the S-structure position of even and only can correspond to distinct LF positions, as I assume to be

3 Under the proposal just outlined, it is clearly expected that only and even should be able to modify propositional AP's, NP's etc. In this paper, however, I will restrict my focus to propositional VP's.
4 If one assumes that the entire embedded clause "the students study physics" is a single syntactic constituent which is semantically a proposition, then there will be an additional LF representation in which only is adjoined to this constituent. The interpretation of such an LF representation, however, will be truth-conditionally equivalent to that of the representation in (6b) in which only is adjoined to the VP, and hence I will ignore this possibility for the present.
5 Throughout the remainder of this paper, I will be adopting the convention of co-superscripting only's and even's with the constituents with which they are associated.
the case in the example in (6), and since it is the LF representation which is the input to semantic interpretation, I will use the term scope to refer exclusively to the c-command domain of these operators at LF.

2 Only and Even as Propositional Modifiers

2.1 VP-Deletion

In this section, I will attempt to demonstrate that even and only must be treated as propositional modifiers even when they surface at S-structure in a position adjoined to a non-propositional category. The facts I will be considering are related to facts about VP deletion which are discussed in Kratzer (1989). Consider first the sentence in (7) (= Kratzer's (14)):

(7) I laughed because you did.

In discussing sentences like (7), Kratzer follows Sag's (1976) and Williams' (1977) analyses of VP-deletion in which the missing VP is copied at LF by a process of reconstruction from an appropriate antecedent VP. The resulting LF structure derived from (7) is (8) (= Kratzer's (14')):

(8) I [n -ed [vP [vP laugh] because you did [vP laugh]]]

What is important for our purposes is that reconstruction applies to an entire VP, and not simply to a verb. In what follows, I will assume without argument that this analysis is essentially correct. Consider now what happens when the VP which is being reconstructed at LF contains an occurrence of only as in (9b&c):

(9)

a. John played chess after I taught him how to.

b. John only\textsuperscript{1} played chess\textsuperscript{1} after I taught him how to.

c. John played only\textsuperscript{1} chess\textsuperscript{1} after I taught him how to.

The sentences in (9b&c) are each three ways ambiguous, having the three readings in (10).

(10)

a. John only played chess after I taught him how to only play chess.

b. Only chess is an x such that John played x after I taught him how to play x.

c. Only chess is an x such that John played x after I taught him how to play chess.
Of particular interest is the interpretation given in (10c) (which is probably pragmatically the most salient reading for the sentences in (9b&c)). This reading is non-problematic for (9b) – play and chess are adjacent, making it possible and in this case quite natural to analyse play chess as a single constituent. If we assume that this constituent can be a VP (and not merely some non-maximal projection of V), then in (9b) this VP can be straightforwardly reconstructed into the empty VP position in the after clause. Significantly, if we assume that only in (9b) is outside of the VP, then it is in principle possible to reconstruct play chess without having to reconstruct only simultaneously, as illustrated in (11).

(11) John only [VP played chess] after I taught him how to [VP play chess]

Whether this (incomplete) LF representation will be interpreted as in (10b) or as in (10c) will depend on whether the after clause is within or outside of the scope of only.6 When the after clause is within the scope of only, both instances of the word chess will be associated7 with only. The net effect of this multiple association will be the interpretation given in (10b).8 When the after clause is outside the scope of only, the reconstructed copy of chess will not be in the scope of only either, and will hence not be able to associate with only. The resulting structure will thus be interpreted as in (10c).

When we turn our attention to (9c), it is not at all obvious how to construct an LF representation which will capture the reading depicted in (10c). At S-structure, there is no constituent in (9c) which contains play and chess but which excludes only. In order for the VP play chess to be reconstructed, it would appear that only will at some point have to be separated from chess and raised out of VP. To see more clearly why it is necessary to separate only from the NP, consider the LF representations which result if we do not separate them. Two such representations are shown in

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6This is true on both a Rooth style account of association with focus and on the account which will be developed in the following sections of this paper.

7I use the term associated loosely. Under Rooth’s analysis of the interpretation of only, there is no actual association involved. Rather, the appearance of association falls out from the interaction between the interpretation of focused elements and the interpretation of only. None-the-less, I will continue to use the term association to signify the relation between elements like only and elements like chess in the examples under discussion.

8This is not in fact an accurate statement of the interpretation assigned to the LF representation in (11) by Rooth. It does accord with the modification of Rooth’s analysis proposed in Kratzer (1983), however, in which focused constituents in the scope of (an operator like) only are replaced by designated variables. The details of the interpretation, however, are immaterial to the discussion at hand.
(12), one of which results from straightforwardly reconstructing the matrix VP directly from (9c), and the other of which results from first raising the NP only chess to a position outside of the VP and then reconstructing the VP.

(12)

a. John [\(v_P \text{ played only chess} \)] after I taught him how to [\(v_P \text{ play only chess} \)]

b. John [only chess]; [\(v_P \text{ played } t_i \)] after I taught him how to [\(v_P \text{ play } t_i \)]

While these LF representations do capture possible readings of (9c) (namely the readings given in (10a&b)), they clearly do not capture the reading given in (10c). One might wish to derive the desired reading from the representation given in (12b). However, this does not appear to be possible without overgenerating interpretations. In specific, suppose one were to claim that the relevant interpretive rule could optionally not interpret only in the position of a trace bound by the NP only chess. Such an interpretive rule would clearly generate the desired reading. However, it would also generate an additional reading which is clearly not available for this sentence, namely the reading in (13)

(13) Only chess is an x such that John played chess after I taught him how to play x.

The unavailability of (i) as a reading for (9c) poses, I believe, an insurmountable problem for any analysis which attempts to attribute the two readings given in (10b&c) to a single LF representation like (12b) in which only chess acts as a single constituent. It appears, then, that we should abandon the assumption that only chess necessarily forms a constituent at LF.

Once we abandon the assumption that an instance of only adjoined to NP at S-structure must remain adjoined to NP at LF, it becomes immediately possible to account for the possible readings for (9c). In fact, by assuming that only can raise independently at LF and adjoin to VP and/or to IP, we can directly assimilate the interpretation of (9c) to the interpretation of (9b) – (9c) will be directly interpretable onto any LF representation available for (9b).

By this point, the reader has no doubt noted that the readings which we have been considering in detail – specifically the readings represented in (10b&c) do not exhaust all of the possible readings for a sentence like (9c). In specific, we have not yet accounted for the readings in which only is interpreted as part of the reconstructed VP as well as being interpreted as part of the matrix VP,
i.e. the reading in (10a). This reading is hardly a salient one for the example we have been focusing on. However, it is a simple matter to construct sentences identical to (9c) in all relevant respects in which it is clearly necessary to allow only to be interpreted as part of the reconstructed VP. Consider, for example, (14):

(14) The senator voted only liberal after the president asked him to.

Under a natural reading of (14), what the president asked the senator to do was to vote only liberal. If this reading is to be captured, we must allow for the relation between only and its associated constituent to be maintained in the reconstructed VP as well as in the matrix VP.

If the analysis we have given for the non-reconstructed-only readings is correct, then the only possible analysis of the reading in which only is interpreted independently with the matrix VP and with the reconstructed VP will be one in which the reconstructed constituent contains a copy of only. This is of course perfectly natural. We have been assuming all along that reconstruction in VP-deletion sentences like the ones we have been considering inserts a copy of a VP into the VP-deletion site. If we allow for only to either adjoin to VP prior to reconstruction or raise after reconstruction, then producing an LF-representation with the desired interpretation is straightforward, one possible final LF-representation being that given in broad outline in (15).

(15) [The senator [vp only\(^1\) [vp voted liberal\(^1\)]] after the president asked him to [vp only\(^1\) [vp vote liberal\(^1\)]]]

The above discussion has shown I believe convincingly that an only which modifies an NP at S-structure must be allowed to raise out of that NP at LF to be interpreted. I have also argued that allowing such raising out of an NP gives us an account of all and only the available readings of VP-deletion structures in which only is adjoined to an NP inside the VP which is to be reconstructed. It would appear at this point that the simplest theory consistent with the facts we have been analysing is one in which movement of only from NP at LF is obligatory. The VP-deletion facts thus support our proposal that only and even are semantically propositional modifiers.
2.2 Scope Fixing

In the previous section, we have just seen an argument that an *only* (and by extension an *even*) which is adjoined at S-structure to an NP must be allowed to raise at LF independently of the NP to which it is adjoined. In this section, I will address the issue of whether this property generalizes to all instances of *only* and *even* or whether it is restricted to a subclass of occurrences of these words. The conclusion I will draw is that these operators are only allowed to raise when they are adjoined to a category which is non-propositional. This property suggests that raising of these operators is motivated by their semantic status as propositional modifiers, and that such movement is only allowed when the operator in question does not already have scope over the (smallest) propositional category containing the associate of the operator.

Rooth cites the following examples (taken from Taglicht (1984)) in which *only* is scopally ambiguous when adjoined to an NP at S-structure, but scopally fixed when adjoined to VP.

(16)

\begin{enumerate}
\item a. I knew he had learnt only Spanish.
  \begin{enumerate}
  \item i. I knew he hadn’t learnt any other language.
  \item ii. I didn’t know he had learnt any other language.
  \end{enumerate}
  \item b. They were advised to learn only Spanish.
  \begin{enumerate}
  \item i. They were advised not to learn any other language.
  \item ii. They were not advised to learn any other language.
  \end{enumerate}
\end{enumerate}

(17)

\begin{enumerate}
\item a. I knew they had only learnt Spanish. (= (16a.i))
  \begin{enumerate}
  \item i. I only knew they had learnt Spanish. (= (16a.ii))
  \end{enumerate}
  \item b. They were advised to only learn Spanish. (= (16b.i))
  \begin{enumerate}
  \item i. They were only advised to learn Spanish. (= (16b.ii))
  \end{enumerate}
\end{enumerate}

Given our proposal in the previous section that *only* can be separated at LF from an NP to which it is adjoined at S-structure, the ambiguity of the sentences in (16) is perhaps not surprising. Recall that in the analysis of the previous section, the LF representations of a sentence in which *only* was adjoined to an NP were mapped directly onto the LF representations of a corresponding sentence in which *only* was adjoined at S-structure to VP.\(^9\) Since there are two dominating VP’s in the

\(^9\)Actually, I will have to allow below for the possibility that the structural position of an *only* which is string adjacent
sentences in (16) to which only could be raised, it is a natural expectation that either movement should be possible, with each giving rise to distinct scopal interpretations. What is on the surface surprising under the proposed analysis is the unambiguity of the (i) sentences in (17). If only were allowed to raise universally at LF regardless of what category it is adjoined to a: S-structure, then we would expect that at sentences in (17a.i) and (17b.i) should be able to be mapped onto the LF representations of (17a.ii) and (17b.ii) respectively. The fact that these sentences do not share any common reading indicates that either the proposed analysis is misguided, or one of the assumptions adopted is wrong. I will argue here that the proposal of the previous section is essentially correct, but that the assumption that only can raise from any position is mistaken.

The first thing to note regarding the ambiguity of the sentences in (16) is that the ambiguity is not limited to cases in which only is adjoined to an NP. In fact, as can be seen in the examples in (18), the same sort of ambiguity can arise when only is adjoined to a PP or to a CP (= S-bar) as well, and again the ambiguity can be resolved by adjoining only to VP instead, as in (19).

(18)

a. I knew he had talked only\(^1\) about Spanish\(^1\). (= (19a.i) or (19a.ii))

b. I knew he had said only\(^1\) that Mary speaks Spanish\(^1\). (= (19b.i) or (19b.ii))

(19)

a. i. I knew he had only\(^1\) talked about Spanish\(^1\). (unambiguous)

   ii. I only\(^1\) knew he had talked about Spanish\(^1\). (unambiguous)

b. i. I knew he had only\(^1\) said that Mary speaks Spanish\(^1\). (unambiguous)

   ii. I only\(^1\) knew he had said that Mary speaks Spanish\(^1\). (unambiguous)

As a first order approximation, one might take the above facts at their face value and claim that it is merely categorial identity of the category to which only is adjoined which determines whether or not only can raise independently at LF. However, consideration of the following examples indicates that this cannot be the case, and that in fact a far more interesting generalization can be made.

to VP is not necessarily a position adjoined to VP, although this will remain an optional structural representation. I will continue to informally characterize this position as a VP-adjoined position, however, for ease of exposition.
(20)  
   a. I said that John is from only Minnesota.
      i. I said that John is only from Minnesota.
      ii. I only said that John is from Minnesota.
   
b. John thinks I'm a student of only linguistics.
      i. John thinks I'm only a student of linguistics.
      ii. John only thinks I'm a student of linguistics.

In (20), we find a prepositional phrase which is being used predicatively and a noun phrase which is also being used predicatively. In each case, we find the same scope fixing effects that we found above for (predicational) VP’s, namely that when only is adjoined to a non-predicative element within the predicational phrase it is scopally ambiguous, but when it is adjoined to a predicational phrase its scope becomes fixed. Whether or not the scope of only is fixed by its S-structure position depends then not on the category of the constituent to which it is adjoined, but on the status of that category as predicational or non-predicational. As a working hypothesis, then, let’s assume the following:

(21)  
Only has a uniform semantic treatment as a predicational modifier.

Of course, (21) in itself does not lead us to predict the scope facts given in the examples in (16) – (20). However, these predictions will follow if we incorporate into the theory a notion of economy of derivations along the lines proposed in Chomsky (1989?). Suppose, for example, that movement in general only occurs when there is some independent motivation for movement. Such an assumption combined with our hypothesis in (21) leads directly to a prediction of the scope facts under discussion. The only situations in which only will raise at LF are situations in which it needs to raise. If only has a uniform semantical treatment as a predicational modifier, then whenever only is adjoined to a non-predicational category it will be forced to raise to a dominating predicational category at LF, and whenever it is already adjoined to a predicational category. LF raising will be blocked.

While the hypothesis given in (21) allows us to account for all the scope fixing facts under consideration, it suffers from one major problem: if we adopt this hypothesis, then the grammaticality of sentences in which only is adjoined to the matrix subject becomes a complete mystery. In a
sentence like (22), for example, there is no category which dominates the S-structure position of only whose semantic type is predicational.

(22) Only John went to the store.

Presupposing the results of section XX in which it is shown that only must c-command its associate at the level of LF, adopting the hypothesis in (21) will make it impossible to derive a well-formed LF representation for (22). The matrix sentence itself is propositional, not predicational, which precludes an analysis in which only raises at LF. Furthermore, if only lowers at LF to the matrix VP, then the subject will no longer be within its scope, and should not be able to associate with only as intuitively it must.

The above objections to the hypothesis proposed in (21) make it evident that this hypothesis is not quite correct. However, the fact that it allows us to account fairly naturally for the scope facts in (16) – (20) makes it attractive. Considering the scope fixing facts together with the need to be able to account for sentences in which only is adjoined at S-structure to the matrix subject, suppose we modify our hypothesis as follows:

(23) Only has a uniform semantic treatment as a propositional modifier.

Recall that our account of scope fixing facts depended crucially on our assuming some version of Chomsky’s principle of economy of derivations to hold and on assuming that the S-structure position of only in the sentences in which its scope is fixed is also a possible LF position as well. If we are to maintain this analysis, then it is necessary to analyse the predicates in the above sentences as being propositional in nature. This analysis is natural if one allows for VP-internal subjects (or more generally predicate phrase internal subjects). If subjects are base-generated within VP and moved out of VP at S-structure, then it the VP which is left behind is semantically an open proposition, and should (at least optionally) qualify as propositional. This, then, is the hypothesis which I will adopt throughout the remainder of this paper.

Further facts to be considered:

John didn’t only see Bill (NOT > ONLY (oblig.))
John only didn’t see Bill. (ONLY > NOT (oblig.))
John didn’t see only Bill. (ONLY >/< NOT)

John might not have seen Bill. (NOT < might (oblig.))
John might only ... (ONLY < might (oblig.))
John only might have seen Bill. (ONLY > might (oblig.))

John could not have seen Bill. (NOT >/< could)
" could only " " " . (ONLY >/< could)

John could have not seen Bill. (NOT < could (oblig.))
only (ONLY >/< < could?)

2.3 Embedded even’s and only’s and Focus

In this section, I will consider several questions related to the LF representation of sentences containing the operators only and even. In particular, I will be looking at the interaction of the scope of these operators with optional focus of the element they are associated with. We have just seen that an analysis can be given of focus interpretation in which all focused elements must be raised. In this section I will present an argument that such an account is not only possible but is in fact necessary. Consider the following two sentences:

(24) John even\textsuperscript{1} SAW\textsuperscript{1} only\textsuperscript{2} BILL\textsuperscript{2} (stress on SAW and on BILL)
 (= Only Bill is a person that John even SAW (and not merely heard or smelled).)

(25) John even\textsuperscript{1} SAW\textsuperscript{1} only\textsuperscript{2} Bill\textsuperscript{2}. (stress on SAW, but not on Bill)
 (= John heard only Bill, John smelled only Bill, in fact John even SAW only Bill.)

In both of these sentences, I will assume without argument that the S-structure representation is as in (26):

(26) [John [\_\_ F even [VF saw [NP only [NP Bill]]]]]
That is, I assume that *only* is directly in the c-command domain of *even* at S-structure. At this point I leave open the question of what the identity of XP is. I will only be considering analyses in which *even* is associated with *saw* and *only* is associated with *Bill*. On these analyses, the sentences in (24) and (25) display a rather surprising lack of ambiguity with respect to the relative scopes of the operators *even* and *only*. In (24), where *Bill* receives heavy stress, we find that the operator *only* must have wide scope with respect to *even*. Thus, the reading indicated below this example is the only reading possible (maintaining the associations indicated by the superscripts). Significantly, (24) cannot be felicitously uttered in a context like that given below (25). In (25), we also have a lack of ambiguity. In (25), however, we find that the relative scope of *only* and *even* is reversed; *even* necessarily takes wide scope with respect to *only*. This can be inferred from the impossibility of assigning (25) the same interpretation as (24), as well as from the naturalness with which (25) can be uttered in the context provided immediately below the example. In summary, in the examples in (24) and (25), focus on the constituent *Bill* necessarily results in a wide scope interpretation of the operator *only*, while a lack of focus on *Bill* necessarily results in a narrow scope interpretation of *only*. It is important to notice here that the interaction in question is inherently an indirect one. That is, we are looking at the question of how the focus/non-focus of one element – here *Bill* – affects the scope of another one – here *only*. I will attempt to explain the existence of this effect by reducing it to inherent properties of the operators in question and to the existence of an independent process of focus raising.

Perhaps the most significant fact about (24) and (25) is that these sentences share no common reading. Since the only characteristic that distinguishes the two sentences is whether or not the object NP *Bill* is focused, the obvious conclusion is that focusing this NP *obligatorily* changes the interpretation of the sentence. If it were otherwise, for example if focusing of *Bill* simply gave rise to additional possible readings for (24) beyond the reading already available for (25), we would expect these two sentences to minimally share one basic reading, though we would also expect (24) to have one or more additional readings. There are two possible causes to which one might attribute this difference in interpretation. One might argue, for instance, that the difference in meaning between these two sentences stems from a difference in semantic interpretation of focused and of
non-focused elements. If we adopt Rooth's semantics for the interpretation of focused elements, however, it would be difficult at best to derive an account along these lines — all interpretation of focused constituents is supposed to be possible in situ, as is the interpretation of operators like even and only. But interpretation of focused elements in situ does nothing to change the possible scope ordering of constituents, making such an approach appear to be highly implausible. Alternatively, and this is the approach I will be pursuing, one could argue that the difference in interpretation between these two sentences derives from the syntactic properties of focused elements. Rooth has already conceded that raising of a focused element at LF is possible, and that such raising can alter the meaning of a sentence. If raising of a focused element at LF is the sole cause of the present difference, however, then it must be concluded contra Rooth that focus raising is obligatory at LF.

Raising of a constituent automatically changes the scope relations between elements in a sentence. Consequently, deriving an account of the difference in scopal interpretations of the sentences in (24) and (25) based on the assumption that focusing an element necessarily results in raising that element looks like a more plausible approach.

Following Chomsky (1976), then, I will be assuming that focusing of a constituent results in that constituent's being raised at LF. For reasons that will become clear below, I assume that raising of a focused constituent is to a projection higher than VP, i.e. that the landing site for a focused constituent cannot be within or adjoined to VP. Semantically, raising of a focused element I assume to be equivalent to lambda abstraction. Whether or not there is more to the interpretation of a focused element I will leave at present as an open issue, noting that the semantics for interpreting focused constituents found in Rooth (1985) and in Kratzer (1989) are consistent with the treatment of syntactic raising of a focused element as lambda extraction.

An additional question arises here regarding the possibilities of movement from an underlying structure like (26). Relevant to our current considerations, two issues in particular must be addressed, one regarding the nature of the movement site, and the other the nature of the landing site. Taking the movement site into consideration first, the question is the following: in a structure like (27a), is it possible to move the inner XP without moving the outer XP? That is, can a D-structure of the form (27a) be mapped onto an S-structure of the form (27b)?
(27)  
 a. \([XP \ Y [XP \ Y \ ... \ ]]\)  
 b. \([\ [XP \ Y \ ... \ iy \ ... \ [XP \ Y \ t_i \ ] \ ]]\)

Chomsky (1986) assumes a highly restricted theory of movement in which the only elements which can be moved are heads (i.e. \(X^0\)'s) and maximal projections (i.e. \(XP\)'s). Adopting such a theory of movement, the question of whether the movement described above is legitimate reduces to the question of whether or not the inner XP qualifies as a maximal projection in the relevant sense. That is, is a base-generated adjunction structure like (27a) to be treated as a single maximal projection, or as two maximal projections? Largely for purposes of exposition, I will be assuming the former to be the case, and hence will not be considering derivations involving the kind of movement depicted in (27). This somewhat arbitrary decision is essentially inconsequential for the range of examples I will be considering in this paper, though it will clearly have greater ramifications for the theory of movement as a whole.

The second general question regarding the nature of proper movement is similar to the first in that it again involves base-generated adjunction structures, and can be put as follows: In a structure like (28a), is adjunction to the inner \(XP\) as in (28b) legitimate?

(28)  
 a. \([XP \ Y [XP \ Y \ ... \ ZP \ ]]\)  
 b. \([XP \ Y [XP \ ZP_i \ [XP \ Y \ t_i \ ] \ ]]\)

Again I will be assuming Chomsky's (1986) restricted theory of movement, in which adjunction of a maximal projection must be to another maximal projection. If we assume again as we did above that the inner \(XP\) does not constitute an independent maximal projection, then we are forced to conclude that the adjunction represented in (28) is illegitimate, as I will henceforth assume. With these assumptions out of the way, let us turn now to our original question regarding the interaction between focus of a constituent and scope of an operator which is associated with that constituent.

Let us start our investigation with a detailed analysis of (24). Ignoring for the moment the question of what to do with the focused verb \textit{say}, mechanically applying our analysis of focus raising to the NP [only \textit{Bill}] will yield one of the following representations:

(29)  
 a. \([IP \ John [XP [NP, only^2 \textit{BILL}^2] [XP even^1 [VP SAW^1 t_i]]]]\)  
 b. \([IP [NP, only^2 \textit{BILL}^2] [IP \ John [XP even^1 [VP SAW^1 t_i]]]]\)

If these were possible final LF representation of (24), then our investigation of the scope/focus interaction for this sentence could stop here. However, we have been presupposing that \textit{even} and
only are propositional modifiers, which entails that these operators must move to a position at LF where they have scope over a proposition. Granting this supposition, the question we must now address is: What restricts the derivation of LF-representations from (29a) and (29b) in such a way that only will unambiguously have wide scope over even? In other words, why can’t even raise across only resulting in the LF representations in (30)?

(30)

a. \([IP \text{ even}] [IP \text{ John} [XP \text{ only}_i^2 [XP [NP_j t_k \text{ BILL}_2] [XP t_i [VP \text{ SAW}_i^1 t_j]]]]

b. \([IP \text{ John} [XP \text{ even}_j^2 [XP \text{ only}_i^2 [XP [NP_j t_k \text{ BILL}_2] [XP t_i [VP \text{ SAW}_i^1 t_j]]]]

c. \([IP \text{ even}_j^2 [IP \text{ only}_i^2 [IP [NP_j t_k \text{ BILL}_2] [IP \text{ John} [XP t_i [VP \text{ SAW}_i^1 t_j]]]]

A simple solution to this problem is to extend Rizzi’s (1989) Relativized Minimality constraint to non-specifier A'-positions. If we assume that operator movement leaves a trace and that this trace must satisfy the ECP, then in sentences like the one under consideration it will never be possible for one occurrence of even or only to move across another via operator raising. Thus, by extending Relativized Minimality in this way (let us call the new principle Extended Relativized Minimality, or ERM), in each of the examples in (30), raising of even over only will result in a straightforward violation of this principle – even is unable to govern its trace because of the presence of a more local typical potential antecedent governor, namely only.

Before going on, it is necessary to point out a hidden assumption that I have been making. In all of the derivations considered above, I have assumed without argument that the position to which the focused element raises is structurally higher than the base-generated position of even. Notice that this assumption is in no way a necessary consequence of any other aspect of the theory. Since

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The formulation of Relativized Minimality given in Rizzi (1989) (ch.1, p.15) is:

(31)

Relativized Minimality: X α-governs Y only if there is no Z such that
(i) Z is a Typical Potential α-governor for Y, and
(ii) Z c-commands Y and does not c-command X.

Only antecedent government will be of importance in the cases we will be considering in this paper. The definition of Typical Potential antecedent-governor for Y is given in (32)

(32)

a. Z is a typical potential antecedent governor for Y, Y in an A-chain = Z is an A-specifier c-commanding Y.

b. Z is a typical potential antecedent governor for Y, Y in an A'-chain = Z is an A'-specifier c-commanding Y.

c. Z is a typical potential antecedent governor for Y, Y in an X0-chain = Z is a head c-commanding Y.

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we have been allowing for the possibility of *even* being base-generated as an adjunct to a projection higher than VP (leaving open the question of what the identity of this projection might be), it is *a priori* possible that the landing site for a focused constituent raising at LF could be a position between the VP and the base-generated position of *even*. However, if this were a possibility, then the non-ambiguity of (24) would be completely unexplainable – focus raising would do nothing to change the scopal relations between *even* and *only* under such a derivation. There are two possible ways in which this possibility could be excluded. The first would be to simply stipulate that *even* and *only* cannot be base-generated on any node which structurally dominates the landing site for focus raising, and hope that further investigation into X-bar theory could perhaps account for this stipulation in a more principled manner. The second approach would be to assume that there is something inherent in the nature of operators like *even* and *only* which prevents any such derivation from being possible.

Along this second line of attack, suppose that in addition to the requirements placed on the trace of operator movement by ERM there is a further constraint on operators of this type which requires them to be sufficiently close to the constituent they are associated with at LF. If we take “sufficiently close” to mean that no other operator of the same type can intervene between an *even* or *only* and the constituent it is associated with, then we would have an immediate explanation of why focus raising would have to be to a position hierarchically higher than the position occupied by *even* at D-structure. If focus raising resulted in the object [only Bill] intervening between *even* and *saw*, then raising of *only* out of the NP *only* Bill and adjoining it to a node whose semantic interpretation is propositional would result in an ill-formed LF representation. If *only* moved to a position higher than *even*, then *even* would block the association between *only* and Bill and the trace of *only* would lead to an ERM violation. If *only* raised to a position lower than *even*, it would block the association of *even* with its associate *saw*. These two derivations are given schematically in (33), where (a) gives the D-structure representation, and (b) and (c) the illicit LF representations.

(33)

a. ... [ even ... [ saw [ only Bill ] ] ]

b. *... [ only? [ even? ... [ [ t_i Bill^2 ] ... [ saw^1 t ] ] ] ]

c. *... [ even^1 ... [ only? [ [ t_i Bill^2 ] ... [ saw^1 t ] ] ] ]
Let me formally propose, then, that the association between an operator like *even* or *only* and its associate must satisfy the Local Association Convention (henceforth the LAC) given in (34).

(34) **Local Association Convention:** If an operator $O$ is associated with a constituent $C$, then  
   i. $O$ must c-command $C$, and  
   ii. for any other operator $P$, if $P$ c-commands $C$ then $P$ is not c-commanded by $O$.

As mentioned above, the LAC is intended to be a constraint on LF representations and not a global constraint on the relation between operators and their associated constituents.\textsuperscript{11}

In the preceding discussion, I have ignored the question of how to deal with the focus on the verb *saw*. If raising of focused constituents is obligatory at LF, then presumably the verb too, or perhaps the VP of which the verb is the head, must raise at this level. To make the discussion concrete, let us assume that the following constraining on focus raising obtains:

(35) **Focus raising applies only to maximal projections.**

Given (35), when the head of a maximal projection is focused, as in (24) and (25), the entire maximal projection will be subject to focus raising. In (24), then, the two constituents which raise because of focus are the NP *only Bill* and the VP *even saw [NP ]*, where [NP ] is the full NP *only Bill* if this latter NP hasn’t raised, or the trace $t$ if it has. Adopting (35) allows us to maintain our previous analyses completely intact for the following reason: If raising of the VP were to reverse the relative scope relation between *even* and *only*, then the VP would have to raise to a position in which it c-commanded *only*. However, since *only* must according to the LAC c-command *Bill*, the resulting representation would violate proper binding – the variable left behind by raising of the object NP would fail to be bound. This is shown in rough outline in (36):

\textsuperscript{11}The primary reason for assuming that the LAC applies only at LF is that it appears to be possible to violate this constraint at S-structure. The following sentence (pointed out to me by Jim Higginbotham (personal communication)) illustrates the point.

i. John only even SAW BILL.

In (i), it is perfectly possible for *only* to be associated with *BILL* and for *even* to be associated with *SAW*. (In fact, this appears to be the only possible pair of associations.) On this reading, *only* appears to obligatorily take wide scope. I leave it to the reader to verify that this is consistent with the analysis developed so far to account for scope/focus interactions.
(36) \[ [\text{even saw } x_i]_j [\text{John} [\text{only} [\text{Bill} [t_j]]]] \]

No matter how (36) is generated, \( x_i \) will not be bound by \( \text{Bill}_i \). And although (36) merely shows one concrete case in which raising of the VP to reverse the scope relations between \textit{even} and \textit{only} is illicit, it is a trivial matter to see that any such attempt is doomed to fail for the same reason – moving the VP to a position higher than the NP \textit{Bill} will result in the trace of \textit{Bill} being unbound.

To summarize the discussion so far, under the assumption in (35) that only maximal projections raise for purposes of focus, any grammatical LF representation for (24) will be hierarchically non-distinct from (37).

(37) \[ [\ldots [\text{only}_i [t_i \text{Bill}]_j [\text{even} [\text{saw } t_j]]_k [\ldots t_k]]]] \]

This hierarchical ordering among the adjoined constituents is completely determined by ERM, the LAC and the Projection Principle, the last of these requiring that the trace of the raised object be present at LF.

Finally, we are ready to turn our attention to (25), repeated below.

(25) John even SAW only Bill. (stress on SAW, but not on Bill)

(= John heard only Bill, John smelled only Bill, in fact John even SAW only Bill.)

Let's digress for a moment to consider Rooth's (1985) theory of so-called association with focus. One of the advantages Rooth claims for his theory is that what appears to be an association with focus can be accounted for without actually stipulating any such association. However, crucial to this analysis is the unstated assumption that operators like \textit{even} and \textit{only} cannot be associated with non-focused elements. In fact, if one applies the semantics Rooth supplies for \textit{only} to a phrase which contains no focused element at all, the interpretation one would generate would be a tautology. Putting aside interpretation of \textit{even} in the above sentence, the reading one derives for this sentence under Rooth's theory is roughly the following: If a proposition in the set \{John even saw Bill\} is
true, then it is the proposition John even saw Bill. Not only does Rooth's theory fail to generate the correct reading for this sentence, the reading it does generate is patently unavailable. If our theory of semantics is to derive all and only the available readings for sentences like (25), then it would appear that the association of an operator like even or only with another constituent will have to be made explicit at least by the level of LF. Focus alone cannot be responsible for picking out the associate of such an operator, directly or indirectly.

One might object to the above argument against Rooth's analysis on the basis that it rests on an assumption that it is phonological stress alone which determines whether or not a constituent is focused. Assuming that it is the presence of some feature [+F] which is responsible for a constituent being treated in the semantic component as a focused element, then the above argument would appear to only go through if one further assumes that there is a direct correlation between presence of the feature [+F] and phonological heavy stress. Suppose, however, that the (semantically interpreted) feature [+F] was at least optionally independent of phonological stress. Then we could account for the interpretation of (25) simply by assuming that our mechanism of [+F] assignment assigns this feature to the NP Bill. Several objections could be made to this solution, not least of which is the fact that it is no more than a stipulation of the facts. However, in addition to the objection of lack of theoretical elegance, a much stronger empirical objection to such a solution can be launched. Recall the argument made above that focusing a constituent obligatorily results in that constituent's being raised at LF. If we were to assign the feature [+F] to Bill in (25), then we would expect this constituent to raise just as it had to in the counterpart to (25) in which it was phonologically stressed, i.e. (24). Such raising in (25), however, would lead us to predict that (25) and its counterpart (24) should have identical interpretations, and that specifically the relative scope of even and only should be identical for the two sentences. The fact that this prediction is not borne out indicates that the analysis under consideration need no longer be.

Some mechanism is evidently required under Rooth's analysis of only for treating a non-focused constituent which is associated with only as if it were focused. We have seen that allowing arbitrary assignment of a feature [+F] to such a constituent leads to incorrect predictions about the assignment of scope to only in sentences like (59). In the absence of any other solution which is

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independent of stipulating an association to hold between only and another constituent, I propose that the association be taken as primitive, and the interpretation of the associated constituent be derived from this association.

Returning now to our analysis of (25), as observed above, the object Bill is not focused, and the only interpretation available is one in which even has wide scope over only. The obvious question to ask is whether or not the analysis developed above can account for this example, and the answer appears to be that it can. In (25), Bill does not receive stress, and is consequently not subject to focus raising. Only, being a propositional operator, must still raise at LF, but its potential landing sites are limited. It cannot raise over even, or the association between only and Bill would violate the LAC. If we assume that the association between even and saw is formally an association between an operator and an X^0 head, then we also eliminate the possibility of raising only to a position structurally between these two, including eliminating the possibility of adjunction to VP. In fact, if we make this assumption about the association between even and saw we eliminate the possibility of generating any well-formed LF representation for (25) – only will not be able to adjoin to a category which is semantically propositional without violating ERM and/or the LAC.

Recall that in deriving an LF representation for (24) we assumed that focus on the head verb saw of the VP resulted in the entire VP's being raised at LF. If we generalize from this assumption and assume further that the associate of an operator like even or only must be a maximal projection, then a solution to our problem becomes possible. In (25), only could adjoin to the VP without blocking the association between even and saw. The final LF representation of (25) would then be (38), XP representing the category to which focused elements are adjoined at LF.

\[(38) \quad \ldots [XP\ even^1 [XP\ [VP_1\ only^2 [VP\ saw^{(1)} Bill^2]] [XP\ \ldots\ t_i]]] \]

One consequence of this analysis, if correct, is that even must be allowed to be base-generated in a position external to the VP. Otherwise, adjoining only to VP would again result in a violation of either ERM or the LAC.

Note in passing that, as was the case with (24), raising of the VP at LF for reasons of focus in no way alters the arguments we have been making regarding this sentence. Since Bill is not focused, it cannot raise outside of the VP. Even if only were to do so, in order to c-command Bill
at LF, it would have to c-command the VP at LF as well. However, there is no way in which only can c-command the VP that will not result in a violation the LAC. The analysis developed so far, then, accounts for the unavailability of a wide scope reading of only in (25) and for the availability of a narrow scope reading of only in this sentence.

In (24) and (25), we have only dealt with one possible ordering of the operators, that in which even is associated with the verb saw and only with the noun Bill. If we interchange the two operators, however, we find that the scope facts remain entirely unchanged. In (39), as in (24), where the object is focused, the operator which is more deeply embedded at S-structure has wider scope at LF. In (40), like (25), the object is not focused and the operator which is more deeply embedded at S-structure remains so at LF as well.

(39) John only SAW even BILL.
(= Even Bill is a person that John only saw (and didn’t hear or smell).)

(40) John only SAW even Bill.
(A: John saw even Bill, he heard even Bill, and he smelled even Bill.
B: That’s not true. John only SAW even Bill.
(e.g. John heard Sue and Mary, and he smelled Sue and Mary, but only seeing did he do to (Sue, Mary, and) even Bill.))

The two operators even and only thus behave identically with respect to the scope facts we have been dealing with – interchanging the two does not introduce any differences which could be attributed to idiosyncratic lexical properties.

2.4 Even NP/Only NP

In the preceeding section, we have been considering sentences with two occurrences of even/only, one of which c-commands the other. From that discussion, it was concluded that focusing of a constituent results in the raising of that constituent obligatorily at LF. This property, combined with the principle of Extended Relativized Minimality (ERM) and the Local Association Convention (LAC), gave us an analysis which was consistent with the facts considered there. In this section, I will extend the analysis developed above to a class of sentences containing multiple occurrences of even and only, neither of which c-commands the other at S-structure.

Consider first the sentences in (41):
(41) Only$^1$ JOHN$^1$ saw even$^2$ BILL$^2$.
(Only has scope over even)

(24) John even$^1$ SAW$^1$ only$^2$ BILL$^2$ (from section 3)

In (41), both the subject John and the object Bill are focused. In direct contrast with (24)
(considered in detail in section 3), the surface order of the operators corresponds directly with their
relative scope at LF. The only available interpretation of (41) is “Only John is a person who saw
(Mary, Alison, and) even Bill”. It is impossible for even (associated with the object) to get wide
scope over only (associated with the subject). Why should this be so? Under the analysis adopted
in section 3 for sentences like (24), it was assumed that the focused object Bill could and in fact
had to raise over the focused verb saw. Why, then, can’t Bill in (41) raise over the focused subject
John in a similar fashion? The answer, I believe, lies in the fact that John and Bill are both NP’s,
either of which contains the other, while saw in (24) is a verb which heads the VP that contains
Bill. Descriptively, it appears as if a focused NP constitutes a barricade beyond which another
focused NP cannot raise.

This descriptive statement has a very natural interpretation in the framework I’ve been adopting
so far. As was argued for above, I am assuming that all focused constituents obligatorily raise at
LF. In (41) this means that both the subject and the object will have to raise. Assuming as we
have been that focus raising results in conjunction to a dominating XP, the subject will have to
adjoin to IP, there being no other dominating node to which it could adjoin. The question, then, is
where the object NP can adjoin to. For our purposes, the question can be put even more precisely
as follows: Can the object adjoin to IP? If we abstract away for the moment from the question of
where only and even appear in the structures, this question comes down to one of whether either
of the structures in (42) is grammatical.

(42)

a. [IP Bill, [IP John, [IP t$_j$ [VP saw t$_i$]]]]
b. [IP John, [IP Bill, [IP t$_j$ [VP saw t$_i$]]]]

If we adopt Rizzi’s (1989) conjunctive definition of the ECP, i.e. if we assume that all traces must
be both lexically and antecedently governed, then neither of the representations in (42) will be
well-formed. In (42a), John is an ERM barrier to antecedent government of \( t_i \) by Bill, while in (42b) it is Bill which is an ERM barrier to antecedent government of \( t_j \) by John.

Although the fact that (42) is ungrammatical under the analysis developed in the previous section may not on the surface appear to be significant, once we re-introduce only and even back into the picture, the significance of this result becomes apparent. If we were to allow (42a) as a legitimate LF representation of a sentence with two syntactic foci, then (41) should, on our assumptions about the semantics of only and even, allow for a wide scope reading for even. If this LF representation were licit, it would be a straightforward matter to generate the LF-representation in (43) from (41).

\[
\begin{align*}
[IP \text{ even}^2] & \cdot [IP \text{ [NP, } t_j \text{ Bill]}^2] \cdot [IP \text{ only}] \cdot [IP \text{ [NP, } t_i \text{ John]}^2] \cdot [IP \text{ t}_k \cdot [VP \text{ saw } t_i]]]
\end{align*}
\]

In (43), only c-commands and hence by assumption has scope over even. Allowing (43) as a possible LF-representation would thus lead us to the incorrect prediction that (41) should allow for a wide scope reading of only. If focus raising of the object over the subject as in (42) is excluded in principle, however, the unavailability of (43) as an LF-representation of (41) is unproblematic. On an analysis in which (42) were not excluded, on the other hand, it is difficult to see how the LF-representation in (43) could possibly be excluded.

Having dispensed with the possibility of adjoining the object in (41) to IP by focus raising, the only other option we have is to assume, as I will, that focus raising adjoins the object to some other projection inside of IP as in (44) (again ignoring for the moment the placement of even and only).  

\[
\begin{align*}
[IP \text{ John}_j] & \cdot [IP \text{ t}_j \cdot [XP \text{ Billi}] [XP \text{ ... [VP \text{ saw } t_i]]]]
\end{align*}
\]

If we continue to assume that the association between an even/only and its associated constituent requires c-command at every level of representation and that this association must satisfy the LAC, then if the c-command relation between the focused elements is restricted to being as it is depicted in (44), the relative scope facts of the operators even and only fall out without further ado. Even must adjoin to a maximal projection within IP since adjunction to any higher node would violate

\[12\text{Recall from the previous section that focus raising must not be analysable as adjunction to VP.}\]
ERM and/or the LAC. Only, on the other hand, can adjoin no lower than to IP, since adjunction to any lower node would result in a structure in which only did not c-command its associate John.\textsuperscript{13} The only possible LF representation of (41) corresponding to (44), then, is (45):

\begin{equation}
(45) \quad [IP \quad \text{only}\textsuperscript{2} \quad [IP \quad \text{John}]] \quad [IP \quad t_j \quad [XP \quad \text{even}\textsuperscript{2} \quad [XP \quad [t_i \quad \text{Bill}\textsuperscript{2}]] \quad [XP \quad [vP \quad \text{saw} \quad t_i]]]]]
\end{equation}

(46) would be excluded since in (46) only blocks the association of even with Bill by the LAC. The only well-formed LF representation thus yields the scope facts we observed for (41).

To summarize, in this section we have extended the analysis of the scope interactions between even and only to cases in which neither instance of even/only c-commands the other at S-structure. We have seen that the analysis presented in section 3 accounts for these examples without further modification. In our account of these facts, we have had to make appeal to Rizzi's (1989) conjunctive formulation of the ECP in order to prevent multiple adjunction of (non-embedded) focused phrases to a single IP. Having ruled this possibility out, the only remaining multiple-focus LF representation available was seen to give us exactly the scope facts observed to hold for (41).

Without going into a detailed analysis of the relevant structures, let me simply note that these assumptions allow us to account for a fairly wide range of scope facts similar to those of (41). (47a) is structurally parallel to (41) and not surprisingly shows the exact same non-ambiguity that (41) did. (47b&c) indicate that the D-structure position of the arguments is irrelevant to determining the scope facts; a passivized subject shows the exact same scope properties as an active subject, indicating that the scope of the operators even and only cannot be interpreted in a reconstructed position at LF.\textsuperscript{14}

\textsuperscript{13}For an argument that c-command at LF is necessary, see section 6.

\textsuperscript{14}That only and even adjoined to the head NP of an A-chain at S-structure quite generally cannot be interpreted scopally in a reconstructed position at LF is indicated by the following raising structures:

(i): It seems that only JOHN loves Mary.
(ii): Only JOHN seems to love Mary.

Sentence (ii) is scopally unambiguously, only having wide scope with respect to seem. The possibility of having a narrow scope interpretation for only in (i) indicates that the reason that no such reading is available for (ii) cannot
(47)
   a. Even JOHN saw only BILL.
      (Even has scope over only)

   b. Even BILL was seen by only JOHN.
      (Even has scope over only)

   c. Only BILL was seen by even JOHN.
      (Only has scope over even)

Before leaving the topic, a quick note is in order regarding what happens in sentences like the ones we have been considering if one of the NP’s associated with even/only is destressed. In particular, I would like to consider what happens when the subject NP in (41) is destressed, as in (48):

(48) Only John saw even BILL.

Judgements on this sentence tend to vary somewhat, but the consensus opinion seems to be that the sentence is ambiguous. This can be seen in the following two examples, the first of which favors a wide scope reading of even, and the second of which favors a narrow scope reading.

(49) Only JOHN saw Mary, and only John saw Sue.
     In fact, only John saw even BILL.

(50) Only JOHN can be relied upon as a witness.
     (because) Only John saw even BILL (at the scene of the crime).

This is a welcome conclusion. In the discussion surrounding (44) above, we concluded that focus raising had to be allowed to adjoin a focused constituent to some maximal projection higher than VP but lower than IP in order to account for the scope facts of (41). We have also, however, been assuming throughout this paper that adjunction to IP of a single focused constituent is in general

be one of semantic uninterpretability. Given the ambiguity exhibited by quantifiers like every in the near parallel sentence in (iii), the non-ambiguity of (ii) is puzzling.

(iii): Every man seems to love Mary.

If we assume, however, that only and every are distinct in that only must raise out of the NP only John in (i) and (ii) while every combines with the noun man to form a quantificational NP in (iii), then every man will act as a single syntactic unit at LF, while only and John will be separate syntactic units at this level. Technically, we could handle the facts exhibited in (i) - (iii) by assuming that the ambiguity in (iii) results from reconstruction of the quantifier every man into the embedded subject position. Since only and John do not form a single constituent at LF, a similar derivation for (ii) would not be possible.
an available option. We thus expect (48) to be ambiguous – when the focused object adjoins to IP, *even* will have wide scope, while when it adjoins to VP, *even* can have narrow scope. The fact that this expectation is indeed borne out offers a modicum of support for the analysis we have developed in the previous sections.

3 Antecedent Contained Deletion

We saw in section V that it was possible and in some cases necessary to assume that an operator such as *even* or *only* can move out of an S-structure NP-adjointed position and raise at LF, adjoining to a dominating VP or IP. In this section, I will extend the analysis developed so far to cases of antecedent contained deletion,\(^\text{16}\) where we find further cases where *even* and *only* must be syntactically raised at LF from their S-structure positions.

Consider first a simple case of antecedent contained deletion like that given in (51) below.

(51) I saw one man you did _

This example is similar to the VP-deletion sentences considered in section V, with one important difference. In (51), the reconstruction site is contained within the VP which presumably has to be reconstructed. If we were to simply proceed directly with VP reconstruction as we did in section V, then it would be impossible to generate a legitimate LF representation for (51). Since the matrix VP contains the reconstruction site, reconstruction of the VP into this site would leave us with a copy of the empty VP position, which would have to be filled by reconstruction, which would leave us with a copy of the empty VP position, and so on *ad infinitum*. Straightforward reconstruction thus leads to a straightforward infinite regress. In order to circumvent this problem, May (1985), drawing on insights from Sag (1976) and Williams (1977), proposes that in generating the LF representation of a sentence like (51) one must first QR the quantified expression *one man you did*, yielding the intermediate structure in (52).

(52) [ one man you did _ [ I Past see t ]]

\(^{16}\)I use the term *antecedent contained deletion* merely as a label for the class of data dealt with in this section. I do not intend to imply that these data actually involve deletions of any special sort.
From (52), the matrix VP can be reconstructed directly into the empty VP position, giving the structure in (53).

(53)  
[ one man you did (see t) [ I Past see t ] ]

In the remainder of this section, I will be assuming that this account of antecedent contained deletion is essentially correct. The question I will be addressing is that of how antecedent contained deletion interacts with operators like only and even.

To make the discussion concrete, let us consider the following sentence:

(54)  
I saw only one man you did _.

(54) is identical to (51) except for the presence in (54) of the word only. How does this only affect the interpretation of the sentence? From our discussion of normal VP-deletion sentences in section V, we might at first expect a sentence like (54) to be up to three ways ambiguous. That is, we might expect each of the LF representations in (55) to be possible, each one with its own distinct interpretation.

(55)  
a. [ one man you did (only see t) [ I only saw t ] ]  
b. [ one man you did (see t) [ I only saw t ] ]  
c. [ only one man you did (see t) [ I saw t ] ]

The fact of the matter, however, is that (54) is unambiguous in the relevant respects, having only the reading There is a group of (possibly many) men that you saw, and I saw only one member of that group. It appears, then, that either all of the LF-representations in (55) will have to yield exactly this reading and no other, or that not all of the LF representations given in (55) are well-formed. Let's turn, then, to consideration of these representations to see how they are derived and what readings we expect them to generate.

In (55a), first only raises to VP, then QR raises the object NP, and finally the matrix VP is reconstructed. If we assume that each occurrence of the word only at LF must be independently interpreted, then the only reading which could conceivably correspond to the LF representation of (55a) is something like One man x such that you only saw x, I only saw x. That is, only would restrict not only the people I saw, but it would also restrict the people you saw, so that we would each
have seen exactly one man. The fact that this reading is completely unavailable indicates that the LF representation in question is not well-formed. Since this is the only LF-representation in which only gets reconstructed and the reading which corresponds to this representation is unavailable, it follows that only itself cannot be reconstructed. That is, it must raise outside the VP prior to reconstruction. At first blush, this fact appears somewhat mysterious. After all, we have argued throughout this paper that only can legitimately be adjoined to VP at LF as it is in this example. We have also argued that association between only and its associated constituent must satisfy the Local Association Convention, but if the traces of the QR’ed phrase count as associates of only this condition too is satisfied. We must, however, preclude (55a) as a possible LF representation. To do so, I propose that an operator like only cannot be associated directly with a trace at LF. There are several ways we could implement this suggestion. For concreteness I will assume that the principle at work is the Principle of Lexical Association (the PLA) stated in (56).

(56) **Principle of Lexical Association**: An operator like only must be associated with a lexical constituent in its c-command domain.

Given this principle, we can straightforwardly account for the ungrammaticality of the LF representation in (55a), since neither occurrence of only is associated with a lexical constituent in its c-command domain. More generally, in antecedent contained deletion structures like the ones we have been considering, if only is associated with (an element contained in) the quantified phrase which contains the reconstruction site, only itself will never be able to be reconstructed. The quantified expression itself cannot be reconstructed, as we saw at the beginning of this section, without leading to an infinite regress. Consequently, there will never be more than one copy of the associated constituent present at LF. Since the PLA requires that every occurrence of only must be associated with a lexical constituent at LF and the LAC requires that such an association be local, it is impossible for there to be more than one occurrence of only at LF associated with the constituent in question. Copying only, then, will necessarily result in the violation of either the PLA or the LAC, and should thus never be possible in antecedent contained deletion structures like (54)

This leaves us with the two candidate LF representations in (55a&b) to consider, each of which contains a single, non-reconstructed occurrence of only. In (55b), only raises with the quantified
phrase, from which it in turn raises and adjoins to the matrix IP, after which the matrix VP is reconstructed into the empty VP position within the quantified expression. In (55c), only raises first, and then the quantified phrase raises to IP, from which it is not c-commanded by only. Given our conclusions above regarding (55a) that the (lexical) associate of only must be in the c-command domain of only, it follows that only (55c) is a grammatical LF representation, and not (55b). According to our assumptions about the interpretation of LF representations, this representation gives us exactly the reading that we find to be available for (54).

The requirement that there be an associated lexical element in the scope of an operator like only was shown to hold of LF representations, since without such a requirement we are without an account for the unavailability of the LF representation in (55a) for the sentence in (54). If we look at other structures, we find that a similar requirement seems to hold at S-structure as well.

(57)

a. i. John only seems t to be happy. ii. It only seems that JOHN is happy.
   b. i. JOHN, I only saw t. ii. I only saw JOHN.
   c. i. Who do you only like t? ii. You only like WHO?

The interesting thing about the (i) sentences is that while they are all grammatical on one reading, in none of them can only be associated with the NP which has been raised, despite the fact that in all three sentences only c-commands the trace left behind by movement of the NP. In (57a.i), only c-commands the trace of NP-movement, but not the moved NP itself. In (57b.i), it is the trace of a raised focused NP and in (57c.i) the trace of WH-movement which is c-commanded by only. Yet in none of these examples is c-command of the trace of movement sufficient to establish an association between only and the raised NP. That association between only and an overt NP in the positions of the traces in (57a.i-c.i) is in general possible can be seen by considering the (ii) examples, all of which allow for such an association. It would appear from these examples, then, that in order for only to be associated with a given constituent, it must c-command at S-structure that constituent itself, and not merely a trace left behind by movement of that constituent.

Notice that this requirement of S-structure c-command is inherently a syntactic requirement. On the assumptions we have been adopting in this paper, only is an operator which can raise at LF. Thus, it should be possible in (57) to generate LF representations which satisfy the semantic scopal requirements argued to be necessary above simply by raising only to sentence initial position, at
least for (57a) and possibly for (57b&c) as well. The fact that association between only and the raised NP is impossible in all three examples indicates that the principle which is responsible for the aberrance of these sentences cannot be the same principle which requires there to be an associated lexical element within the scope of an operator like only at LF — the principle responsible for the deviance of the examples in (57) must apply at S-structure. The simplest way to formulate this requirement would be to assume that the Principle of Lexical Association holds not only at LF but at S-structure as well. This, then, is the analysis I will adopt.

4 Implications for a Semantic Treatment of Even and Only

In this paper, I have argued for the following treatment of even and only:

(58)  

a. Semantically, even and only are universally interpreted as propositional modifiers.  
b. Syntactically, even and only are operators which must be associated with some constituent by the level of S-structure.  
c. The association between an operator like even or only and a constituent must be local in the sense that no other operator like even or only can structurally intervene between the two (= the LAC of section 3).  
d. At the levels of S-structure and LF, such an operator must c-command the constituent it is associated with.

The treatment of even and only argued for in this paper differs in several important ways from the treatment given in Rooth (1985). The two most important respects in which Rooth’s treatment differs from that given here are (i) for Rooth, the apparent association between only or even and a focused constituent in its scope does not need to be stipulated, while in the account provided in this paper such “stipulation” is unavoidable; and (ii) Rooth analyses even and only as cross-categorial modifiers, while I argue for a more restricted semantic analysis in which these operators are universally treated as propositional modifiers. The difference given in (i) might be considered to be a drawback of the theory developed in this paper. However, there are several reasons why this theory is to be preferred to that argued for in Rooth (1985).

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14 One might argue that such raising can only adjoin only to IP, and not to CP, in which case one might not expect to be able to derive a well-formed LF representation from (57c). One might similarly object that adjunction of only to IP in (57b) is illicit either because of a general ban on double adjunctions, or perhaps because such movement would violate subcyclicity (assuming subcyclicity to hold at LF, and assuming the formulation of this principle given in Lasnik and Saito (1989)). However, no such objection can be raised regarding (57a).
The first reason to prefer the present theory over Rooth's derives from the fact that it is possible, as seen in sections 3 and 4, for an operator like even or only to associate with a constituent which is not phonologically stressed. If phonological stressing is a necessary condition for assignment of the feature [+F] to a constituent, then applying Rooth's semantics for only or even to a constituent which lacks such a feature results in an incorrect interpretation of such a constituent. In the case of only, the interpretation derived is a tautology, while in the case of even it turns out to lead to a contradiction.\(^\text{17}\) Rooth takes this to be a positive result within his theory since he claims that only and even must always have a focused constituent in their scope. However, in examples like (25) from section 2 and repeated below, we saw that this claim is false, i.e. that it is possible for an operator like even or only to associate with a non-focused constituent in its scope.

\[(59)\quad \text{John even}^1 \text{ SAW}^i \text{ only}^2 \text{ Bill}^2. \quad (= \text{(25), section 3})\]

Suppose we adopt Rooth's general semantic analysis of (propositional) even and only as operators over a proposition and over the p-set of the proposition. If we are to derive the proper interpretation of a sentence like (25), then at the point at which only gets interpreted, the p-set of the constituent which it modifies must contain more than one element. In fact, to get the correct interpretation, not only must the p-set contain more than one element, but the elements in the p-set must differ precisely in the position of the constituent with which only is associated, i.e. the position occupied by Bill. It would appear that such a p-set must be able to be generated in a way which does not depend on the associated constituent's being focused.

At this point, one might wish to object to our original assumption that assignment of the feature [+F] to a constituent requires that the constituent be phonologically stressed. Suppose, for example, that we were to allow the (semantically interpreted) feature [+F] to be assigned independently of phonological stress. Then we could account for the interpretation of (59) simply by assuming that our mechanism of [+F] assignment assigns this feature to the NP Bill. Several objections could be made to this solution, not least of which is the fact that it is no more than a stipulation of the facts. However, in addition to the objection of lack of theoretical elegance, a much stronger empirical objection to such a solution can be launched. Recall the argument made in section 3

\(^{17}\)See Rooth (p.127 ff.) for discussion.
that focus on a constituent obligatorily results in that constituent's being raised at LF. If we were to assign the feature [+F] to *Bill* in (59), then we would expect this constituent to raise just as it had to in the counterpart to (59) in which it was phonologically stressed, i.e. (24) from section 3. Such raising in (59), however, would lead us to predict that (59) and its counterpart (24) should have identical interpretations, and that specifically the relative scope of *even* and *only* should be identical for the two sentences. The fact that this prediction is not borne out indicates that the analysis under consideration need no longer be.

Some mechanism is evidently required under Rooth's analysis of *only* for treating a non-focused constituent which is associated with *only* as if it were focused. We have seen that allowing arbitrary assignment of a feature [+F] to such a constituent leads to incorrect predictions about the assignment of scope to *only* in sentences like (59). In the absence of any other solution which is independent of stipulating an association to hold between *only* and another constituent, I propose that the association be taken to be primitive, and the interpretation of the associated constituent to be derived from this association. Specifically, assuming Kratzer's modifications to Rooth’s semantic treatment of focus, I propose the following:

(60) In the interpretation of LF structures, the constituent(s) associated with an operator like *even* and *only* are replaced by designated variables for the purpose of generating p-sets.

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