

# Explaining leftward focus association with *even* but not *only*\*

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**Abstract.** The ability of English VP-*even* but not VP-*only* to associate with a leftward subject (Jackendoff, 1972) has been a long-standing puzzle for the theory of focus association, and runs counter to the generalization that focus-sensitive operators associate with a focused constituent in their scope. Here I argue that such backwards association is illusory. In cases of apparent leftward subject association, *even* is associating with the subject’s predicate-internal lower copy of movement, which is within the scope of *even*. The same configuration with *only* yields an uninterpretable structure, due to independent differences in the semantic contribution of *even* and *only*. I then show that this pattern of association extends to other cases of movement as well: in general, *even* but not *only* is able to associate with material which has moved out of the operator’s scope. Patterns of leftward focus association present a new argument against the scope theory of *even*.

**Keywords:** Association with Focus, subject association, Copy Theory of movement, *only*, *even* (scale reversal, lexical ambiguity theory, scope theory)

## 1. Introduction

Operators such as *only* and *even* are called *focus-sensitive* as the semantic contribution that they make is dependent upon a focused *associate* constituent in the structure. An important goal for the study of such focus-sensitive expressions has been to provide a compositional semantics for the effect of focus. The widely-adopted proposal in Rooth (1985, 1992) has the effect of limiting association to be with material in the operator’s arguments; in particular, in the case of in-situ focus association, the associate must be in the operator’s scope. An important apparent counterexample to this generalization is observed by Jackendoff (1972):

- (1) **VP-*even* can associate with leftward subject, but not VP-*only*:**<sup>1</sup>
- a. ✓ A [professor]<sub>F</sub> is *even* at the party.
  - b. \* A [professor]<sub>F</sub> is *only* at the party.

I propose that *even* in such cases is actually associating with the subject’s predicate-internal *lower copy of movement*, within the scope of *even*. I adopt the Copy Theory of movement and assume that the “trace” position includes an unpronounced copy of the moved material. There is therefore

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\*I thank Irene Heim, David Pesetsky, Maziar Toosarvandani, Hadas Kotek, Martin Hackl, Sabine Iatridou, Kai von Fintel, Danny Fox, Noam Chomsky, Chris Tancredi, Rick Nouwen, Isaac Gould, and audiences at Sinn und Bedeutung 18, the GLOW 35 workshop on Association with Focus, the 2014 meeting of the Linguistic Society of America, and MIT for helpful discussion. Errors are mine.

<sup>1</sup>Here I adopt the common labels “VP-*only*” and “VP-*even*” descriptively. I will assume in derivations later that these operators adjoin to vP, a projection with propositional type.

an instance of the focus-marked constituent “professor” within the scope of *even*, even though it is part of the copy of the subject which is unpronounced. *Even* in (1a’) is associating with this material in the lower copy of movement.

(1a’) ✓ A [professor]<sub>F</sub> is *even* [ a [professor]<sub>F</sub> at the party ].  


The same configuration (1b’) with *only* yields an uninterpretable structure, due to independent differences in the semantic contributions of *even* and *only*. The crucial difference will be that *even*’s semantic contribution is a projective inference that does not modify the assertion, whereas *only*’s semantic contribution modifies the assertion.

(1b’) \* A [professor]<sub>F</sub> is *only* [ a [professor]<sub>F</sub> at the party ].  


This proposal provides a principled solution to the puzzle of leftward subject association with *even* but not *only* (1), while preserving the generalization that focus-sensitive operators associate with material in their scope.<sup>2</sup>

I begin in the next section by reviewing the compositional semantics for focus pioneered by Rooth (1985, 1992) and discussing the subject association puzzle in more detail in section 3. I then present my proposal in section 4. This leads to a new argument for the lexical ambiguity theory of the scale-reversal of *even* in downward-entailing contexts, and against the scope theory of *even*, which I present in section 5.

Finally, in section 6, I show that this same logic extends to other movement configurations as well. *Even* but not *only* is able to associate with certain kinds of material which has moved out of the operator’s scope, as schematized in (2). This difference can be seen in simple minimal pairs such as the topicalization examples in (3). Previous work on association in this configuration has focused primarily on the behavior of *only*, and therefore incorrectly concluded that such association is in general not possible (Tancredi, 1990; Aoun and Li, 1993; Beaver and Clark, 2008).

(2) ***Even* can associate with material moved out of its scope, but not *only*:**

$\alpha_F$  ... [ \**only*/*even* [ ... \_\_\_ ... ] ]      (with  $\alpha$  interpreted as the associate of the operator)  


- (3) a. ✓ [Mary]<sub>F</sub>, John *even* saw \_\_\_ at the party.  
 b. \* [Mary]<sub>F</sub>, John *only* saw \_\_\_ at the party.

<sup>2</sup>See Krifka (1998) for discussion of related facts regarding *also*. As Krifka notes there, additive particles are able to associate with the (contrastive) topic of a sentence, in lieu of a focus in their scope. As the mechanisms and basic distribution of association are quite different with additive particles in this way, they will not be discussed here.

## 2. Background: the semantics of focus

In this section I present a brief introduction to the compositional semantics of focus. I follow Jackendoff (1972) and much subsequent work in modeling the effects of focus by the addition of a formal “F” feature to focused constituents in the narrow syntax. This abstract F-marking can be thought of as a syntactic annotation which mediates between the observed prosodic realization and its semantic consequences.

The semantic effect of focus is to introduce *alternatives* to the focused constituent into the semantic computation. F-marking of “Bill” in example (4) below thus conjures up other potential alternatives to Bill, based on the current discourse context. Each of these local alternatives then corresponds to alternative propositions, as shown in (4). The meaning of the proposition without the contribution of focus-sensitive operators is called the *prejacent*.

- (4) John met [Bill]<sub>F</sub>.  
Prejacent proposition: John met Bill  
Focused constituent: Bill  
Alternatives to “Bill”: Mary, Sue...  
Alternative propositions: John met *Mary*, John met *Sue*...

Different focus-sensitive operators then quantify over these alternatives in different ways. Horn (1969) analyzes *only* as presupposing the prejacent proposition and asserting the negation of each other alternative, as exemplified in (5). In contrast, *even* projects a non-assertive inference that the prejacent proposition is unlikely compared to its alternatives, and asserts its prejacent, as illustrated in (6).<sup>3,4</sup>

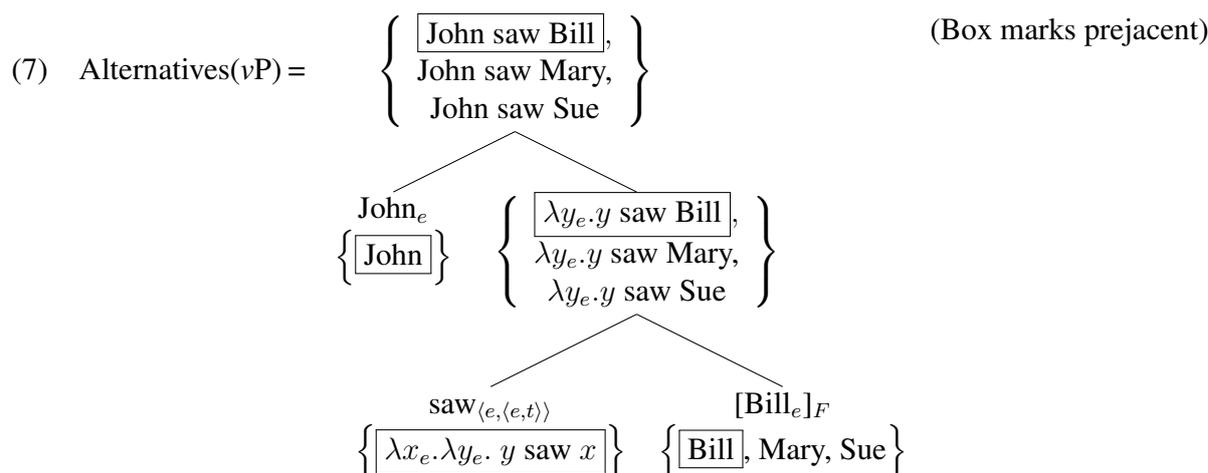
- (5) John *only* met [Bill]<sub>F</sub>.  
Presupposition: John met Bill.  
Assertion:  $\neg$  (John met Mary)  $\wedge$   $\neg$  (John met Sue)  $\wedge$  ...
- (6) John *even* met [Bill]<sub>F</sub>.  
 $\leadsto$  inference: ((John met Bill)  $\langle_{\text{likely}}$  (John met Mary))  $\wedge$   
 ((John met Bill)  $\langle_{\text{likely}}$  (John met Sue))  $\wedge$  ...  
Assertion: John met Bill.

The fact that *even* does not affect the assertive component of an utterance’s meaning—in contrast to *only* which uses focus alternatives to construct its assertion—will play a crucial role in explaining the difference between *even* and *only* later.

<sup>3</sup>In this section I take the entire proposition, including its proper name subject, to be within the scope of the focus-sensitive operators VP-*only* and VP-*even*. This is for demonstration purposes only. The status of subjects will be discussed in detail in the following section.

<sup>4</sup>The status of the scalar inference of *even* has been debated, often described in previous literature as an implicature or a presupposition. Here I will adopt the neutral term “inference” and use the arrow  $\leadsto$  to indicate this.

Here I adopt *Alternative Semantics*, a common approach to focus semantics put forward by Rooth (1985, 1992). In this approach, focused constituents are interpreted in-situ at LF via a process of *alternative computation*. Just as every syntactic node has an ordinary semantic value, we can similarly compute a node's *focus semantic value*, which is a set of alternative denotations for the node which we can derive by swapping out any F-marked constituents with their contextually-determined alternatives.<sup>5</sup> Here I represent the focus semantic value of node  $\alpha$  as  $\text{Alternatives}(\alpha)$ . This set of alternatives will always include the prejacent, which I will identify with a box.



A clause-adjoined focus-sensitive operator considers the focus-alternatives of the *complement* of the operator, thus F-marked constituents outside of that operator's scope naturally would not contribute to the evaluation of the operator. This principle seems true given the potential F-markings which can be associated with a VP-*only*:

- (8) **VP-*only* must c-command its associate:** (Jackendoff, 1972, pp. 248–250)
- a. \*  $[\text{John}]_F$  *only* gave his daughter a new bicycle.
  - b. John *only*  $[\text{gave}]_F$  his daughter a new bicycle.
  - c. John *only* gave  $[\text{his}]_F$  daughter a new bicycle.
  - d. John *only* gave his  $[\text{daughter}]_F$  a new bicycle.
  - e. John *only* gave his daughter a  $[\text{new}]_F$  bicycle.
  - f. John *only* gave his daughter a new  $[\text{bicycle}]_F$ .

However, as Jackendoff (1972) notes, these facts are slightly different with VP-*even*, in that *even* is able to associate leftward with a subject as in case (a). We now consider the puzzle of leftward subject association in detail.

<sup>5</sup>See Rooth (1985, 1992) for a formal definition of the focus semantic value denotation function. The model of Alternative Semantics sketched here differs from Rooth's in that it eschews the  $\sim$  focus interpretation operator. Here we are only looking at vP-level focus-sensitive operators, where we may take Rooth's  $\sim$  focus interpretation operator to have adjoined unambiguously to the complement of the focus-sensitive operator.

### 3. The subject association puzzle

We now consider in detail the ability of English VP-*even* but not VP-*only* to associate with a leftward subject. Jackendoff (1972) originally observed this contrast with the examples in (9). An auxiliary is added in (10) to show that the *even* in question is indeed a VP-*even* and not simply a post-nominal constituent *even*.

(9) **VP-*even* but not VP-*only* can associate with a leftward subject:**

a. \* [John]<sub>F</sub> *only* gave his daughter a new bicycle. (Jackendoff, 1972, p. 250)

b. ✓ [John]<sub>F</sub> *even* gave his daughter a new bicycle. (*Ibid*, p. 248)

(10) ✓ [John]<sub>F</sub> will *even* give his daughter a new bicycle.

Given the compositional semantics for focus introduced in the previous section, the ability of VP-*even* to associate with material outside of its c-command domain as in (9b,10) is surprising. Assuming that *vP*-adjoining focus operators compute their semantic contribution using the alternatives in their complement, only the choice of F-marking *within* the operator's complement should contribute to the operator's semantics.

I propose that *even* in such cases is associating with the subject's predicate-internal *lower copy of movement*, assuming the *vP*-internal subject hypothesis. This proposal will be presented in detail in the following section. The importance of the movement chain and its "trace" position for this pattern of association is demonstrated through the following contrast between subjects of raising and control verbs:

(11) **Subject association across raising vs control:**

a. ✓ A [professor]<sub>F</sub> seems to *even* [\_\_\_ be at the party].

b. \* A [professor]<sub>F</sub> wants to *even* [PRO be at the party].

In (11a) the DP containing F-marking, "a professor", has raised out of the nonfinite embedding, where it originally was below the surface position of *even*. In (11b) "a professor" is base-generated in the matrix subject position as the embedding verb is a control verb, "want". The ability of *even* to associate with a leftward subject, then, depends on the intended focus associate originating within the scope of *even*.



## 4. Proposal

### 4.1. Background: the Copy Theory of movement

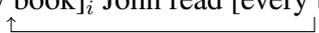
I will begin by giving some background on the Copy Theory of movement which I adopt. Under the Copy Theory of movement, movement does not replace its target with a new object, a “trace”, but instead simply merges another “copy” of the targeted object elsewhere in the structure (Chomsky, 1993). At PF one copy in each movement chain is chosen for pronunciation: in cases of overt movement, the head of the chain is pronounced while in cases of covert movement, a lower copy is chosen for pronunciation. See Chomsky (1993); Fox (1999); Sauerland (1998) for syntactic arguments for the Copy Theory of movement.

This Copy Theory approach to movement must be reconciled with our understanding of the semantic consequences of movement. Having multiple (coindexed) instances of objects at LF does not compositionally yield the expected truth conditions. Trace positions are crucial in the interpretation of movement, in particular as a variable bound by the predicate abstraction step of movement (Heim and Kratzer, 1998). A solution that has been proposed is to tweak the lower copy at LF in order to interpret these copy-based movement chains. The lower copy is converted into a definite description with the restriction that it be equal to the variable in question through a process of *Trace Conversion* (Rullmann and Beck, 1998; Fox, 2002).

Consider example (15), which has a quantifier in object position. I assume that the quantificational DP undergoes Quantifier Raising through copying, resulting in a narrow syntax output with a chain of coindexed “every book” DPs.<sup>8</sup> At LF the lower copy of “every book” will undergo Trace Conversion, resulting in the definite description “the book  $x$ ”—formally  $\iota y.(y \text{ is a book and } y = x)$ .

(15) **An example of interpreting copies:**

“John read every book.”

- a. Quantifier Raising as copying: [every book]<sub>i</sub> John read [every book]<sub>i</sub>  

- b. LF after Trace Conversion: [every book]  $\lambda x$  John read [the book  $x$ ]

With this background on the Copy Theory of movement and the interpretation of copy-chains, we now turn to the cases of apparent leftward subject association, beginning with the grammatical cases with VP-*even*.

<sup>8</sup>I assume that quantifiers (type  $\langle\langle e, t \rangle, t \rangle$ ) in non-subject position must covertly move (Quantifier-Raise) to a position of (extensional) propositional type  $t$ , in order to resolve a type mismatch. Predicate Abstraction will turn the landing site into the necessary type  $\langle e, t \rangle$  expression (see Heim and Kratzer, 1998).

#### 4.2. *Even* can associate with the lower copy of movement

The core idea of this proposal is that, when a constituent containing F-marking is moved via the Copy Theory, both copies retain their F-marking. In cases where an operator seemingly associates with F-marked material which has moved out of its scope, I propose that the operator is in fact associating with the F-marked predicate in the *lower copy* of the movement chain, within the operator’s scope. In this section I will demonstrate how this yields a grammatical result when the operator is *even*.

I will demonstrate this approach using example (16), which is interpreted with *even* associating with the predicate “professor” in the subject. Because “a professor” was generated in Spec,νP position and then moved to the surface Spec,TP position, there is a lower copy of the subject within the scope of *even*. After the lower copy undergoes Trace Conversion (TC), we yield the LF representation in (16b). *Even* associates with the F-marked “professor” in the lower copy.

- (16) ✓ A [professor]<sub>F</sub> *even* came to the party.  
 a. Narrow syntax: [A [professor]<sub>F</sub>]<sub>i</sub> *even* [a [professor]<sub>F</sub>]<sub>i</sub> came to the party  
 b. LF after TC: [A [professor]<sub>F</sub>] λ*x even* [<sub>νP</sub> [the [professor]<sub>F</sub> *x*] came to the party]

The scalar inference introduced by *even* will be computed based on the ordinary and focus-semantic value of its complement, νP. In a context where the F-marked predicate “professor” contrasts with the predicate “student”, we yield the following alternatives at νP:

$$(17) \text{ Alternatives}(\nu\text{P}) = \left\{ \begin{array}{l} \boxed{\text{the professor } x \text{ came to the party}}, \\ \text{the student } x \text{ came to the party} \end{array} \right\}$$

We are now ready to evaluate the semantic contribution of *even*. We note, however, that the propositions in (17) include the free variables *x*, because the λ-binder for *x* is not within the scope of *even*’s evaluation. I propose that these alternative propositions with free variables undergo existential closure. This yields the expected scalar inference of (16), which is satisfied in a context where it is more likely for a student than a professor to come to the party:<sup>9</sup>

- (18) **Scalar inference of (16):**  
 $\leadsto (\exists x. \text{the professor } x \text{ came to the party}) <_{\text{likely}} (\exists x. \text{the student } x \text{ came to the party})$

<sup>9</sup>Here the original quantifier was also existential, but the interpretation of *even* in such cases with different quantifiers will be discussed in the following section.

As is assumed, the scalar inference of *even* projects without composing with additional material above it. The ordinary semantic value of *vP* will be unchanged by *even* and will continue to compose with material above it, including the higher copy of the quantificational subject “a professor”. This yields the following assertion for the clause:

$$(19) \quad \begin{aligned} \llbracket (16) \rrbracket &= \exists x. (x \text{ professor} \wedge (\lambda x. \text{the professor } x \text{ came to the party}) (x)) \\ &= \exists x. (x \text{ professor} \wedge x \text{ came to the party}) \end{aligned}$$

Notice that *even* uses the focus-alternatives only for the computation of its projective scalar inference and does not affect the truth-conditions of its assertion at all. The importance of this property of *even* will be made clear when compared to *only*.

#### 4.3. The associate of *only* cannot move out

As noted by Jackendoff (1972), *VP-even* has the ability to associate with F-marking in a leftward subject, but not *VP-only*. In the previous section I proposed that *even* associates with the lower copy of movement in such cases. In this section I show how this same configuration with *only* yields an uninterpretable structure.

I will illustrate this using example (20). As with the previous case with *even*, copying the subject will yield two instances of the F-marked predicate “professor”, with one being in the scope of *only* (20a). Following Trace Conversion, we will have the LF in (20b). In order to evaluate *only*, we compute the ordinary and focus-semantic denotations of the complement of *only*, *vP* (20c). Here I again assume that the focus-semantic value of the F-marked “professor” is  $\{\textit{professor}, \textit{student}\}$ .

- (20) \* A  $[\textit{professor}]_F$  *only* came to the party.
- Narrow syntax:  $[A [\textit{professor}]_F]_i \textit{only} [a [\textit{professor}]_F]_i \textit{came to the party}$
  - LF after TC:  $[A [\textit{professor}]_F] \lambda x \textit{only} [{}_{vP} [\textit{the} [\textit{professor}]_F] x] \textit{came to the party}$
  - Alternatives(*vP*) =  $\left\{ \begin{array}{l} \boxed{\textit{the professor } x \textit{ came to the party}}, \\ \textit{the student } x \textit{ came to the party} \end{array} \right\}$

Following Horn (1969), the assertion of  $[{}_{\textit{only}} \textit{vP}]$  is the conjunction of the negations of the non-prejacent alternatives. Here there is only one such alternative, “the student *x* came to the party”:

$$(21) \quad \llbracket [{}_{\textit{only}} \textit{vP}] \rrbracket = \neg(\textit{the student } x \textit{ came to the party})$$

This step is the crucial difference between *even* and *only*. Whereas *even* uses the alternatives in its complement only for the computation of its projective scalar inference, *only* uses these alternatives in the computation of its assertive content, which will then compose with material above it. In this case,  $x$  will be bound by the moved quantifier, “a professor”:

$$(22) \quad \llbracket (20) \rrbracket = \exists x. (x \text{ professor} \wedge \neg(\text{the student } x \text{ came to the party}))$$

This utterance introduces contradictory requirements on the variable  $x$ . Specifically, the explicit restriction of the quantifier “a professor” requires that  $x$  be a professor, but the lower definite description, introduced by Trace Conversion, requires that  $x$  be a student. The predicates “professor” and “student” are disjoint, and therefore these two requirements on  $x$  cannot be satisfied at the same time. I propose that (22) is therefore uninterpretable, making (20) ungrammatical with the intended choice of focus association.

One crucial assumption in the discussion above is that the alternatives, *student* and *professor* in the example above, are disjoint. While the traditional Roothian conception is for alternatives to be contextually salient entities of the same semantic type (in this case, predicates), recent literature has shown that this characterization is too inclusive. Wagner (2005, et seq) proposes that alternatives must form a partition and therefore must be pairwise disjoint. Evidence for this comes from Wagner’s “convertibles” sentences. Wagner notes that the sentence with *only* in (23) does not assert that Mary does not like high-end convertibles, “unless the context is such that it made salient a partition of convertibles into red ones and high-end ones” (Wagner, 2005, p. 249).<sup>10</sup>

- (23) Context: Mary’s uncle, who produces high-end convertibles, is coming to her wedding.  
 “Mary *only* likes RED convertibles.”  
 $\not\Rightarrow$  Mary does not like high-end convertibles.  
 $\Rightarrow$  Mary does not like blue convertibles, etc.

The issue observed in the semantic interpretation of (20) will therefore occur generally in any example of attempted leftward subject association with *only*. This proposal derives the difference between VP-*even* and VP-*only* in the (in)ability to associate with a leftward subject, first observed in Jackendoff (1972), from independent differences in the semantic contribution of *even* and *only*.<sup>11</sup>

<sup>10</sup>See Katzir (2013) for further discussion of Wagner’s approach and an alternative.

<sup>11</sup>Note that the possibility of reconstructing the subject into its predicate-internal position, as in (i), does not feed “backwards” subject association with *only* (ii). See Erlewine (in preparation) for discussion.

- (i) Every professor didn’t [ \_\_\_ come to the party].  $\checkmark \forall > \text{Neg}, \checkmark \text{Neg} > \forall$   
Neg >  $\forall$  LF: Neg [every professor came to the party] (*every professor* reconstructed into vP-internal position)
- (ii) \* Every [professor]<sub>F</sub> will *only* [ \_\_\_ come to the party].  
Intended LF: *only* [every [professor]<sub>F</sub> come to the party]

## 5. Scale reversal of *even* and an argument for the lexical ambiguity theory

In the previous section I presented my analysis for cases of apparent backwards association of *even* with a leftward subject. In this section I will extend this approach to clauses which include downward-entailing operators. I will show that the interpretation of *even* in such cases can be easily explained by adopting the lexical ambiguity theory of *even* (Rooth, 1985; von Stechow, 1991; Rullmann, 1997; Giannakidou, 2007, a.o.; also called the polarity theory), and then present a new argument against the scope theory of *even* (Karttunen and Peters, 1979; Wilkinson, 1996; Nakanishi, 2012, a.o.).

Karttunen and Peters (1979) observed that the scalar inference introduced by *even* is different in downward-entailing (DE) contexts. Specifically, the direction of the scalar inference seems to be reversed. This is observed with the pair of sentences in (24): *even* in (24a) reflects how relatively *unlikely* it is for Bill to read Syntactic Structures, whereas *even* in (24b) reflects how *likely* it is for Bill to read Syntactic Structures. (DE operators are bolded here.)

- (24) **The scalar inference of *even* is reversed in a downward-entailing environment:**
- a. Bill *even* read [Syntactic Structures]<sub>F</sub>.  
 $\leadsto$  (Bill read Syntactic Structures)  $<_{\text{likely}}$  (Bill read  $\langle \dots \text{alternatives} \dots \rangle$ )
  - b. Bill **didn't** *even* read [Syntactic Structures]<sub>F</sub>.  
 $\leadsto$  (Bill read Syntactic Structures)  $>_{\text{likely}}$  (Bill read  $\langle \dots \text{alternatives} \dots \rangle$ )

The lexical ambiguity theory of *even*, first laid out in Rooth (1985), proposes that there are two variants of English *even*, whose distribution depends on their environment. The standard *even* which introduces an inference of the relative *unlikelyness* of the prejacent is a positive polarity item (here *even*<sub>PPI</sub>) and there is also a reverse scale *even* (here *even*<sub>NPI</sub>) which introduces an inference of the relative *likeliness* of the prejacent and is a negative polarity item.<sup>12</sup> English VP-*even* is then interpreted in its pronounced position.

I will now show how the lexical theory can account for the behavior of *even* associating with material which has moved outside of its scope, in a downward-entailing context. Let us consider example (25), which involves a raising embedding, in a context where “student” contrasts with “professor”. The sentence is grammatical with the intended association of “student” with *even*, with a scalar inference that it is considered more likely for a student to be to the party than for a professor to be there.

- (25) ✓ **No** [student]<sub>F</sub> seems to *even* be at the party. (cf 11a, 14)

<sup>12</sup>The existence of these two types of *evens* is additionally supported by the fact that some languages lexicalize these two items differently. See König (1991); von Stechow (1991); Rullmann (1997) and others for German, Giannakidou (2007) for Greek, Lahiri (2008) for Spanish, etc.

Under my proposal, *even* associates with F-marking in the subject’s lower copy of movement. As the lower copy of movement undergoes Trace Conversion—illustrated in (26b)—its quantificational part is overwritten. *Even* will then associate with the F-marked “student” in “the student *x*” in the complement of *even*. Because *even* is within the scope of a downward-entailing operator “no”, it will be interpreted as *even*<sub>NPI</sub>. This results in the correct inference in (26c).<sup>13</sup>

(26) **Interpreting (25) using the lexical ambiguity theory of *even*:**

- a. Narrow syntax: [No [student]<sub>F</sub>]<sub>i</sub> seems to *even* [no [student]<sub>F</sub>]<sub>i</sub> be at the party  
 $\uparrow$   $\downarrow$
- b. LF after TC: [No [student]<sub>F</sub>]  $\lambda x$  seems to *even* [<sub>VP</sub> [the [student]<sub>F</sub> *x*] be at the party]
- c. *even*<sub>NPI</sub>:  $\sim (\exists x. \text{the student } x \text{ is at the party}) >_{\text{likely}} (\exists x. \text{the professor } x \text{ is at the party})$

If instead *even*<sub>PPI</sub> is used here, we yield the wrong inference for (25): that it is *less* likely for a student to come to the party than for a professor to be there:

(27) **Using *even*<sub>PPI</sub> for (25) yields an incorrect inference:**

- $\sim (\exists x. \text{the student } x \text{ is at the party}) <_{\text{likely}} (\exists x. \text{the professor } x \text{ is at the party})$

I now turn to the alternative theory for the scale-reversing nature of *even* in such environments, called the scope theory of *even*, first proposed by Karttunen and Peters (1979). Under this view, *even* covertly moves to a higher position to take scope over the downward-entailing operator. Including the downward-entailing quantifier in propositions used to construct the scalar inference results in the apparent scale reversal, without the need for multiple homophonous *evens*. I will show that the scope theory is able to account for the interpretation of *even* in (25), but it makes incorrect predictions regarding leftward association with *even*, which ultimately makes it untenable.

Consider the derivation of (25) under the scope theory, illustrated in (28) below. At LF, *even* covertly moves to a position above the downward-entailing operator (28a). Unlike in (26), then, where *even* does not move and only the lower copy of the subject (converted into a definite description) was in the scope of *even*, in (28) the quantificational material of the subject (*no*) is in the scope of *even*.<sup>14</sup>

(28) **Interpreting (25) using the scope theory of *even*:**

- a. *Even* moves at LF: *even* [no [student]<sub>F</sub> seems to      be at the party]  
 $\uparrow$   $\downarrow$
- b.  $\sim (\text{no student seems to be at the party}) <_{\text{likely}} (\text{no professor seems to be at the party})$   
 $\iff (\text{some student seems to be at the party}) >_{\text{likely}} (\text{some professor seems to be...})$

<sup>13</sup>I thank Irene Heim for bringing such examples with downward-entailing contexts to my attention and also Martin Hackl for further discussion.

<sup>14</sup>For simplicity, I do not illustrate the raising movement of the subject in (28).

The scalar inference introduced by *even* is then as in (28b), expressing the relative *unlikeliness* that no student seems to be at the party. This can be restated, however, by factoring out the negation, as expressing the relative *likeliness* that some student seems to be at the party. This reflects the scale-reversing behavior due to the presence of the downward-entailing operator. The result in (28b) accords with our intuitions about the felicity of this expression.<sup>15</sup>

However, the scope theory makes incorrect predictions regarding the distribution of leftward subject association with *even*. The hypothesized covert movement step of *even* in (28) leads us to predict the availability of the parallel covert movement in the control embedding counterpart (29) below. In this LF, the overt F-marked “student” is now within the scope of *even*, and we therefore predict *even* to be able to associate with the predicate “student” in the subject, contrary to fact.

- (29) **Scope theory incorrectly predicts similar structures with control to be grammatical:**  
 \* **No** [student]<sub>F</sub> wants to *even* be at the party. (cf 11b)  
 Expected LF: *even* [**no** [student]<sub>F</sub> wants to \_\_\_ be at the party]

Note further that the contrast between (28) and (29) cannot be due to the covert movement step of *even* being possible across a raising embedding but not across a control embedding. Under a scope theory of *even*, *even* would have to move in the exact same configuration as in the expected LF for (29) to explain the scale reversal of *even* in other, grammatical examples with control embeddings:

- (30) ✓ **Noone** wants to *even* read the [abstract]<sub>F</sub> of this terrible paper.  
 Scope theory LF: *even* [**noone** wants to \_\_\_ read the [abstract]<sub>F</sub> of this terrible paper]

The contrast in grammaticality between the raising example (25) and the control example (29) therefore acts as an argument against the scope theory of *even*, as the scope theory is unable to predict this contrast. This contrast is explained by my proposal together with the lexical theory of *even*. Examples with leftward subject association are uniformly interpreted with *even* associating with F-marking in the subject’s lower copy of movement, within the scope of *even*. *Even* is interpreted in its surface position, and the scale reversal of *even* is due to the polarity-sensitivity of *even*. The example with the control structure in (29) is ungrammatical because there is no lower copy of the subject within the scope of *even*.

<sup>15</sup>The inference predicted by this view in (28), that it is more likely for a student to seem to be at the party than for a professor to seem to be there, is not identical to what is produced in (26), but they are in the same direction—that is, the relative likelihood of being at the party is positively correlated with the relative likelihood of *seeming* to be there. Judgements regarding these inferences are therefore hard to tease apart.

Note, however, that the scope theory predicts that the scalar inference introduced by “no [student]<sub>F</sub> seems to *even* be at the party” (25) will be equivalent to the inference introduced by “no [student]<sub>F</sub> *even* seems to be at the party”, as their LFs after movement of *even* are predicted to be identical. To the extent that speakers can detect a difference in the felicity conditions of these two utterances and in similar pairs, their difference offers an additional argument for the lexical ambiguity theory, which predicts a difference in the scalar inferences introduced, and against the scope theory of *even*.

## 6. A broader pattern of leftward association: only *even* and not *only*

Thus far in this paper I have focused on the possibility of association with subjects which have A-moved out of the scope of a focus operator, explaining the puzzling contrast between *even* and *only* first observed in Jackendoff (1972). In this section I show that this contrast between *only* and *even* extends to other forms of movement as well: that is, *even* can associate with a constituent which has moved out of its scope, but *only* cannot.

- (31) ***Even* can associate with material moved out of its scope, but not *only*: (=2)**  
 $\alpha_F \dots [ *only/{}^{\checkmark}even [ \dots \underline{\quad} \dots ] ]$  (with  $\alpha$  interpreted as the associate of the operator)

We begin with a classic case of  $\bar{A}$ -movement: *wh*-movement. We see in example (32a) that *even* is able to associate with the restrictor of the fronted *wh*-phrase, “president”. In contrast, the same configuration with *only* in (32b) is ungrammatical with the intended pattern of association.<sup>16</sup>

- (32) ***Even* can associate with a moved *wh*’s restrictor, but not *only*:**  
 a.  $\checkmark$  Which [president]<sub>F</sub> did you *even* meet \_\_\_?  
 $\rightsquigarrow$  it is unlikely for you to meet presidents, as opposed to other types of people.  
 b. \* Which [president]<sub>F</sub> did you *only* meet \_\_\_?

Consider next the case of topicalization. The examples in (33) are repeated from (3) above. Here too we observe a contrast between *even* and *only*, where *even* is able to associate with the proper name *Mary* moved out of its scope, but *only* cannot. Example (34) from Kayne (1998) also shows that this pattern of association is possible with *even*.

- (33) ***Even* can associate with a proper name topicalized out of its scope, but not *only*: (=3)**  
 a.  $\checkmark$  [Mary]<sub>F</sub>, John *even* saw \_\_\_ at the party.  
 b. \* [Mary]<sub>F</sub>, John *only* saw \_\_\_ at the party. (based on Tancredi, 1990, ex. 57b)  
 Intended:  $\approx$  speaking of  $Mary_i$ , John saw only [her<sub>i</sub>]<sub>F</sub> at the party.

- (34) [John]<sub>F</sub>, they *even* consider \_\_\_ intelligent. (Kayne, 1998, fn. 75)

<sup>16</sup>Note, however, that focus association with the entire fronted *wh*-phrase is not grammatical:

- (i) \* [Which president]<sub>F</sub> did you *even* meet \_\_\_? (cf 32a)  
 Intended: Which president  $x$  is such that you met  $x$ ?  
 $\rightsquigarrow$  it is unlikely for you to meet  $x$ , as opposed to other people.  
 (ii) \* [Who]<sub>F</sub> did you *even* meet \_\_\_?  
 Intended: Who  $x$  is such that you met  $x$ ?  
 $\rightsquigarrow$  it is unlikely for you to meet  $x$ , as opposed to other people.

The generalization is that apparent backwards association by *even* can only target F-marking in the *restrictor* of the moved DP, not an entire F-marked DP. Backwards association with proper names, as in (33) below, is possible because proper names are definite descriptions (Elbourne, 2002), as reflected by the cross-linguistically common use of definite determiners with names (Matushansky, 2006, a.o.). See Erlewine (in preparation) for further discussion.

Similar interactions can be observed with covert movement, through the effect of focus association on quantifier scope-taking. I assume that QR, a covert movement operation, is required for the inverse scope (every boy > someone) interpretation in the following baseline example:<sup>17</sup>

- (35) Someone wants to meet every boy in the room.  $\checkmark \exists > \forall, \checkmark \forall > \exists$   
 LF for  $\forall > \exists$ : [every boy] someone wants [ PRO meet \_\_\_ ]

The addition of *only* associating with “boy” has the effect of blocking the inverse scope reading, as discussed in Aoun and Li (1993), building on Tancredi (1990). This is explained by *only* being unable to associate with “boy” if “every boy” QRs out of *only*’s scope. However, the scope of *every boy* is not restricted in the same way when “boy” is associated with *even*:

- (36) **Only restricts QR height, but not *even*:**
- a. Someone wants to *even* meet every [boy]<sub>F</sub> in the room.  $\checkmark \exists > \forall, \checkmark \forall > \exists$   
 b. Someone wants to *only* meet every [boy]<sub>F</sub> in the room.  $\checkmark \exists > \forall, * \forall > \exists$

Additional contrasts of this form are presented in detail in Erlewine (in preparation). In all of the cases presented in this section, the pattern of association can be explained with the same logic I presented for leftward subject association in section 4. *Even* is able to associate with F-marking in the lower copy of movement, within the scope of *even*. The same configuration with *only* yields an uninterpretable structure, due to the differing semantics of *only*.

Previous work looking at focus association with material which has moved out of the operator’s scope (Tancredi, 1990; Aoun and Li, 1993; Beaver and Clark, 2008) has looked primarily at *only* and has therefore come to the conclusion that association in this configuration is always impossible.<sup>18</sup> These proposals have the effect of banning all association with the configuration in (31), not just with *only*. As we have seen in this section, association in precisely this configuration is possible with *even*, though it is indeed impossible with *only*. Wholesale bans of focus association in this configuration therefore cannot be maintained.<sup>19</sup>

<sup>17</sup>In particular, note that there is no option for *someone* to reconstruct into a lower position in order to derive this inverse scope reading, due to the control embedding.

<sup>18</sup>A notable exception is Barbiers (1995), who argues that focus operators can generally associate with trace positions. This is based on movement to the left periphery in Dutch and German, which *does* allow association in the configuration (31) with both *only* and *even*. However, for the English facts described here, the proposal in Barbiers (1995) fails to distinguish between different operators and incorrectly predicts that *only* can also associate with material which has moved out of its scope. I discuss these facts and the difference between Germanic and English-type languages in Erlewine (in preparation).

<sup>19</sup>Beaver and Clark (2008, chapter 7) explains Tancredi’s (1990) proposed ban on association in this configuration by appealing to the fact that F-marking affects the phonological realization of its bearer and proposing that trace positions therefore cannot contain F-marking. The data and proposal here therefore also constitute an argument against such a general ban on F-marking on unpronounced material.

## 7. Conclusion

The ability of VP-*even* but not VP-*only* to associate with a leftward subject was first observed in Jackendoff (1972). Under the Alternative Semantics approach to focus semantics (Rooth, 1985, 1992) focus-sensitive operators consider the alternative propositions computed in their complement, and therefore must have an F-marked constituent in their c-command domain. This apparent “backwards” association with a focus associate outside of the scope of the focus operator has therefore been a long-standing puzzle for theories of focus association.

Following the Copy Theory of movement, I propose that *even* is able to associate with F-marked material in the lower copy of a movement chain, inside its scope. Such cases of apparent backwards association with *even* are therefore illusory, and do not counterexemplify the principle that focus-sensitive operators associate with material in their scope. The same configuration with *only* leads to an uninterpretable structure. This difference derives from independent semantic differences between *even* and *only*: *even* uses the alternatives in its complement to introduce a projective inference, while *only* modifies the assertion. I presented evidence for this view from contrasts between raising and control embeddings, and showed that this pattern of association does not rely on reconstruction.

The facts from leftward subject association also form a new argument for the lexical ambiguity theory for *even*'s interpretation in downward-entailing contexts. Under the competing scope theory of *even*, *even* has the ability to move covertly and be interpreted with higher scope, and must do so in order to outscope downward-entailing operators. I showed that the scope theory is unable to account for differences in leftward association between raising and control embeddings, incorrectly predicting leftward association to be possible with control embeddings. I showed how my proposal—together with the lexical ambiguity theory of *even* and the assumption that VP-*even* is interpreted in its surface position—is able to accurately model the distribution of leftward association, while also accurately modeling the scale reversal behavior of *even*.

Finally, I discussed the more general question of focus-sensitive operators associating with material which has moved outside of their scope. Previous work on this question looked primarily at *only*, and suggested a general ban on focus association in such configurations (Tancredi, 1990; Aoun and Li, 1993; Beaver and Clark, 2008). I showed instead that focus association in this configuration is indeed impossible with *only*, but is possible with *even*. I showed that the proposal put forth in this paper for the puzzle of leftward subject association also extends to other movement configurations and is able to explain the distribution patterns of the data.

## References

- Aoun, J. and Y.-h. A. Li (1993). Wh-elements in situ: Syntax or LF? *Linguistic Inquiry* 24(2), 199–238.
- Barbiers, S. (1995). *The syntax of interpretation*. Ph. D. thesis, Leiden University.
- Beaver, D. and B. Clark (2008). *Sense and Sensitivity: How Focus Determines Meaning*. Wiley-Blackwell.
- Chomsky, N. (1993). A minimalist program for linguistic inquiry. In K. Hale and S. J. Keyser (Eds.), *The view from Building 20*, pp. 1–52. MIT Press.
- Elbourne, P. (2002). *Situations and individuals*. Ph. D. thesis, Massachusetts Institute of Technology.
- Erlewine, M. Y. (in preparation). *How to associate with focus* [working title]. Ph. D. thesis, Massachusetts Institute of Technology.
- Fox, D. (1999). Reconstruction, binding theory, and the interpretation of chains. *Linguistic Inquiry* 30(2), 157–196.
- Fox, D. (2002). Antecedent-contained deletion and the copy theory of movement. *Linguistic Inquiry* 33(1), 63–96.
- Giannakidou, A. (2007). The landscape of even. *Natural Language & Linguistic Theory* 25, 39–81.
- Heim, I. and A. Kratzer (1998). *Semantics in Generative Grammar*. Blackwell.
- Horn, L. R. (1969). A presuppositional analysis of *only* and *even*. In R. Binnick, A. Davison, G. M. Green, and J. Morgan (Eds.), *Papers from the Fifth Regional Meeting*, pp. 98–107. Chicago Linguistic Society.
- Iatridou, S. and I. Sichel (2011). Negative DPs, A-movement, and scope diminishment. *Linguistic Inquiry* 42(4), 595–629.
- Jackendoff, R. (1972). *Semantic Interpretation in Generative Grammar*. MIT Press.
- Karttunen, L. and S. Peters (1979). Conventional implicature. In C.-K. Oh and D. A. Dinneen (Eds.), *Syntax and Semantics, Volume 11: Presupposition*, pp. 1–56. Academic Press.
- Katzir, R. (2013). On the roles of markedness and contradiction in the use of alternatives. Manuscript, Tel Aviv University.
- Kayne, R. (1998). Overt vs. covert movement. *Syntax* 1(2), 128–191.
- König, E. (1991). *The Meaning of Focus Particles*. Routledge.

- Krifka, M. (1998). Additive particles under stress. In D. Strolovitch and A. Lawson (Eds.), *SALT VIII*, pp. 111–129. Cornell University.
- Lahiri, U. (2008). The semantics and pragmatics of some scalar expressions in Spanish. *Anuario del Seminario de Filología Vasca Julio de Urquijo* 42(2), 359–389.
- Matushansky, O. (2006). Why Rose is the Rose: on the use of definite articles in proper names. In O. Bonami and P. Cabredo Hofherr (Eds.), *Empirical Issues in Syntax and Semantics 6*, pp. 285–307. Colloque de syntaxe et sémantique à Paris.
- Nakanishi, K. (2012). The scope of *even* and quantifier raising. *Natural Language Semantics* 20(2), 115–136.
- Rooth, M. (1985). *Association with Focus*. Ph. D. thesis, University of Massachusetts, Amherst.
- Rooth, M. (1992). A theory of focus interpretation. *Natural Language Semantics* 1, 75–116.
- Rullmann, H. (1997). *Even*, polarity, and scope. In M. Gibson, G. Wiebe, and G. Libben (Eds.), *Papers in Experimental and Theoretical Linguistics*, Volume 4, pp. 40–64. Department of Linguistics, University of Alberta, Edmonton, Canada.
- Rullmann, H. and S. Beck (1998). Reconstruction and the interpretation of *which*-phrases. In G. Katz, S.-S. Kim, and H. Winhart (Eds.), *Reconstruction: Proceedings of the 1997 Tübingen Workshop*, Number 127 in Arbeitspapiere des Sonderforschungsbereichs 340, pp. 223–256. Universities of Tübingen and Stuttgart.
- Sauerland, U. (1998). *The meaning of chains*. Ph. D. thesis, Massachusetts Institute of Technology.
- Tancredi, C. (1990). Not only EVEN, but even ONLY. Manuscript, Massachusetts Institute of Technology.
- von Stechow, A. (1991). Current issues in the theory of focus. In A. von Stechow and D. Wunderlich (Eds.), *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung*, pp. 804–824. Walter de Gruyter.
- Wagner, M. (2005). *Prosody and recursion*. Ph. D. thesis, Massachusetts Institute of Technology.
- Wilkinson, K. (1996). The scope of *even*. *Natural Language Semantics* 4, 193–215.