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Focus association into copies and the scope of *even*[*]

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Abstract Nakanishi 2012 presents a novel argument for the so-called "scope theory" of English VP-*even*, based on examples with antecedent-contained deletion (ACD). Nakanishi's argument is based on the assumption that *even* cannot associate with a focus which has moved out of its scope. I show that this assumption is incorrect, defusing Nakanishi's argument. I propose that when *even* associates with a focus which has moved out of its scope, it actually associates with focused material in the lower copies of movement (trace positions). I show that a closer look at ACD examples of Nakanishi's type in fact forms a new argument *against* the scope theory. I conclude that English VP-*even* must always be interpreted in its pronounced position. The patterns of focus association with *even* presented here constitute a new argument for the copy theory of movement.

Keywords: *even*, association with focus, scope theory of *even*, backwards association, copy theory of movement, antecedent-contained deletion

1 Introduction

This paper argues that English VP-*even* is consistently interpreted in its surface position. This runs counter to the claims of the so-called *scope theory* of *even*.

Consider the scalar inference of *even* in (1), in contrast to the scalar inference in example (2). The addition of a downward-entailing operator—negation in (2)—intuitively leads to the reversal of *even*'s scalar inference (Karttunen & Peters 1979).

(1) Bill even read $[\textit{Syntactic Structures}]_F$.
$\rightsquigarrow$ For all alternatives x to *Syntactic Structures*:
$(\lambda w$. Bill read *Syntactic Structures* in $w) <_{likely} (\lambda w$. Bill read x in $w)$

(2) Bill didn't even read $[\textit{Syntactic Structures}]_F$.
$\rightsquigarrow$ For all alternatives x to *Syntactic Structures*:
$(\lambda w$. Bill read *Syntactic Structures* in $w) >_{likely} (\lambda w$. Bill read x in $w)$

[*]This paper expands on chapter six of my dissertation (Erlewine 2014b) and especially the appendix to chapter six. The core idea of *even* associating with focus in lower copies of movement is also reported in Erlewine 2014a. For valuable discussion and comments, I thank audiences at SALT 26 and the third Okinawa Semantics Workshop, Kai von Fintel, Martin Hackl, Hadas Kotek, David Pesetsky, Bernhard Schwarz, Gary Thoms, Michael Wagner, and especially Irene Heim.

Broadly two approaches have been proposed for the scale reversal of *even*. One family of proposals, called the "scope theory" of *even*, involves *even* taking wider scope at LF than its surface position indicates (Karttunen & Peters 1979; Wilkinson 1996; Guerzoni 2004; Nakanishi 2012; a.o.). (3b) below demonstrates how this higher scope of *even* leads to the observed scale-reversed inference in (2), using a simple formulation for *even*'s inference (3b) which also applies to (1). The alternative, *lexical ambiguity theory* assumes two different but related, polarity-sensitive lexical entries for *even*, introducing scalar inferences in opposite directions (Rooth 1985; von Stechow 1991; Rullmann 1997; Schwarz 2005; Giannakidou 2007; a.o.). Under the lexical ambiguity theory, *even* is then simply interpreted in its pronounced position.

(3) **Scope theory approach to (2):**

a. LF: *even* [$_{\alpha}$ Bill didn't read [*Syntactic Structures*]$_{\mathrm{F}}$]

b. [*even* α] $\rightsquigarrow$ $\forall \varphi \in [\![\alpha]\!]^{f} [[\![\alpha]\!]^{o} \setminus [\![\alpha]\!]^{o} <_{likely} \varphi]$

$\Longleftrightarrow$ For all alternatives x to *Syntactic Structures*:
$(\lambda w$. Bill didn't read *SS* in $w) <_{likely} (\lambda w$. Bill didn't read x in $w)$

$\Longleftrightarrow$ For all alternatives x to *Syntactic Structures*:
$(\lambda w$. Bill read *SS* in $w) >_{likely} (\lambda w$. Bill read x in $w)$ (=2)

The subject of this paper is the novel argument for the scope theory presented in Nakanishi 2012. The logic of Nakanishi's argument is roughly as follows: VP-*even* associates with a focused constituent, but we have reason to believe that this focus moves out of the surface scope of *even*. Assuming that *even* cannot associate with material which has moved out of its scope, the continued association of *even* with its intended focus—Nakanishi argues—necessitates that *even* also take scope higher than it is pronounced. As she herself highlights, this argument is noteworthy among arguments for the scope theory in not being based on the content of the inferences introduced by *even*, but from general considerations of focus association and scope.

In the following section, I present Nakanishi's argument and necessary background assumptions. In Section 3, I show that *even* systematically associates with focused material which has moved out of its scope, contrary to Nakanishi's assumption, thereby undermining her argument. I then present my proposal for focus association in such cases, where the focused constituent has moved out of the scope of *even*, from Erlewine 2014a,b. In brief, adopting the copy theory of movement and associated work on the interpretation of copy chains, I propose that *even* associates with focused material in the lower copies of movement (i.e. trace positions). In Section 4, I return to Nakanishi's evidence and show that a closer look at her ACD evidence while avoiding a confound in her contexts in fact results in a new argument against the scope theory of *even*.

2 Nakanishi's argument from ACD

Nakanishi's argument is based on examples with antecedent-contained deletion (ACD), a variety of VP ellipsis where the ellipsis gap is, on the surface, contained within its antecedent VP. Consider example (4) below.

(4) **Antecedent-contained deletion:**
Bill lifted every box that Mary did △. △ = "lift"

I follow Nakanishi (2012) in adopting the common approach to the resolution of ACD, first introduced by Sag (1976) and May (1985) and more recently argued for by Kennedy (1997) and Fox (2002): ACD necessitates QR of a DP containing the ellipsis site, in order to construct an appropriate antecedent VP. Here I simplify the illustration, for example by not illustrating the movement of the subject from its VP-internal position. More detailed ACD derivations will be given in Section 4.

(5) **Undoing antecedent-containment in (4) via QR:**
LF: Bill PAST [[every box that Mary did △] [$_{\text{antecedent}}$ lift ___]]

An important baseline for Nakanishi's examples is example (6). Here, the ellipsis site is superficially contained within two possible antecedent VPs, but the perfect auxiliary *have* before the ellipsis site forces the ellipsis site to be interpreted as "fail to lift," corresponding to the VP labeled VP1 being the antecedent.[1] Following the approach illustrated above, this requires the DP *the box...* to QR out of VP1.

(6) **Auxiliary forcing larger VP ellipsis, higher QR:**
Bill has ... [$_{\text{VP1}}$ failed to [$_{\text{VP2}}$ lift [$_{\text{DP}}$ the box that Mary has △.
✓△ = "fail to lift"; *△ = "lifted"

With this background in place, I now turn to the crucial data presented in Nakanishi 2012. I will first concentrate on one example, reproduced here as (7) below. Nakanishi's argument is built on the structure and interpretation of the last sentence in (7).

(7) **Nakanishi's (2012) example (37): scale-reversed *even* with ACD**[2]
Mary tried to lift the piano, the desk, and the box, but couldn't lift any of them. Bill said that he can lift all of them. However, he has failed to lift the piano that Mary has failed to lift, and has also failed to lift the desk that she has failed to lift. Moreover, he has failed to even lift the [box]$_{\text{F}}$ that she has △.

[1] Some speakers accept the resolution of the ellipsis site with the lower VP, as in *lifted* in (6), even though it requires an interpreted change in verbal inflection. Hadas Kotek (p.c.) notes that this may be particularly true with focus on *has* before the ellipsis site.

Let's first consider the interpretation of *even* in the last sentence. The inference of *even* here is that boxes are *more* likely or easier to lift than other items under discussion, such as the piano and desk. This makes the use of *even* in the last sentence felicitous in the context. This is the scale-reversed interpretation of *even*, which is possible here because the sentence has an NPI-licensing main verb, *fail*. Under the lexical ambiguity view, the correct interpretation of *even* comes from the use of $even_{\text{NPI}}$, which must be in the scope of *fail*.

The problem comes from the QR step involved to construct the correct antecedent VP. The choice of auxiliary adjacent to the ellipsis gap in (7) forces the larger ACD resolution, "fail to (even) lift."[3] In order to undo the antecedent containment of the ellipsis gap, the object "the box...," including the focused constituent, must move out of the antecedent VP. This is schematized in (8) below.

(8) **Problematic LF for (7), using the lexical ambiguity view:**

(based on Nakanishi 2012: ex. 38b)

He has[PERF] [[the [box]$_{\text{F}}$ that she has[PERF] $\triangle$]

[$_{\text{antecedent}}$ fail to $even_{\text{NPI}}$ lift ___]]

Assuming that focus-sensitive operators take their focus associate in their scope (the "c-command requirement" below), Nakanishi (2012) argues that this and similar data pose a problem for the lexical ambiguity theory and its assumption that *even* is interpreted in its surface position:

> "The lexical theory would say that *even* in the last sentence in (7) is an NPI, in which case *even* has to stay in the scope of *fail* at LF, as in (8). However, in this LF *even* cannot c-command the focus, and thus we would have to abandon the c-command requirement."
>
> — Nakanishi 2012: 127 (example numbers modified)

The solution, according to Nakanishi, is to embrace the scope theory of *even*. *Even* in (7) is in the surface scope of a downward-entailing operator, *fail*, and therefore under the scope theory will have an independent need to be interpreted in a higher position at LF, outside of the scope of *fail*. With *even* interpreted outside of the VP headed by *fail*, QR of *the box...* to this VP edge results in the LF in (9)

[2] Nakanishi 2012 represents the F-marking in this example (her ex. 37) as on "the box," to the exclusion of the relative clause, which is not a constituent (see e.g. Partee 1973). I believe the correct representation of the intended example is with F-marking on the head noun "box" alone.

[3] Whether *even* is part of the interpreted ellipsis site is a separate issue here, which is empirically difficult to detect. I will assume here for discussion that the ellipsis resolution is "fail to *even* lift."

below. In this LF, the focused constituent *box* is in the scope of *even*,[4] and we have successfully undone antecedent-containment for the VP ellipsis.

(9) **LF for (7) using the scope theory:** (based on Nakanishi 2012: ex. 38a)
He has[PERF] [*even* [[the [box]$_F$ that she has[PERF] △]
[$_{\text{antecedent}}$ fail to lift ___]]]

I believe the logic of Nakanishi's argument is quite strong: assuming (a) that ACD indeed requires QR to different heights to create an appropriate antecedent and (b) that the focus of *even* is not allowed to move out of its scope, then the grammaticality of examples of the form in (7) forms a unique argument for the scope theory of *even*. Unfortunately, in the next section, I will show that assumption (b) does not hold up under closer scrutiny, undermining Nakanishi's entire argument.

3 Association with *even* and the copy theory of movement

Since Jackendoff 1972, focus-sensitive operators have been described as needing to c-command their focus associate. This c-command requirement receives a natural explanation from the consideration of focus semantics (e.g. Rooth 1985): focus-sensitive operators quantify over the set of focus alternatives (focus semantic value) of their complement, and therefore the meaning introduced by focus-sensitive operators should only be sensitive to the placement of focus within their scope.

However, Jackendoff himself observed a wrinkle to this generalization: English adverb *even*, unlike *only*, is able to associate with a leftward subject, as in (10). Jackendoff only discusses this complication with subjects, but the same contrast is observed with leftward topics, as in (11). I refer to such configurations where *even* associates with a constituent outside of its surface scope as *backwards association*.

(10) ***Even* but not *only* can associate with a leftward subject:**
(based on Jackendoff 1972:248–250)

a. * [John]$_F$ will only give his daughter a new bicycle.

b. ✓ [John]$_F$ will even give his daughter a new bicycle.

(11) ***Even* but not *only* can associate with a leftward topic:**

a. * [John]$_F$, they only consider ___ intelligent.

b. ✓ [John]$_F$, they even consider ___ intelligent. (Kayne 1998: fn. 75)

[4]Not all presentations of the scope theory of *even* claim that *even* can associate with focused constituents in *even*'s LF scope which are not in its surface scope. See for example Wilkinson 1996:199. Here I will concentrate on Nakanishi's conception of the scope theory.

At the same time, it's not the case that focus association with *even* is completely unrestricted. Nakanishi 2012 gives example (12) as an illustration that *even* cannot generally associate with a focus outside of its surface scope—here the subject of a higher clause.

(12) **Association with *even* is not unconstrained:** (Nakanishi 2012: ex. 21)
* [John]$_F$ said that Bill even read *Syntactic Structures*.

In Erlewine 2014a,b, I argued for the following descriptive generalization, which accounts for the observed contrasts:

(13) **Generalization: Backwards association with *even***
Even can associate with a focused constituent α which is outside of *even*'s scope if and only if α originated within *even*'s scope and then moved out.

Even in (10–11) successfully associates with the leftward focus because the focus was moved out of *even*'s scope. For example (10), the relevant movement is from the VP-internal base position of the subject. In contrast, the intended association with *even* is impossible in (12) because the matrix subject *John* was base-generated in the matrix clause, outside of the scope of the embedded *even*. There is no point in the derivation where *John* is in the scope of *even*.[5]

The relevance of this generalization in (13) for Nakanishi's argument is clear. Her argument for the scope theory of *even*, reviewed in the previous section, explicitly assumes as a premise that *even* is unable to associate with material which has moved out of its scope. A more careful look at the distribution of association with *even*, however, shows that *even* can in fact associate with material outside of its surface scope, precisely in cases where the focus has moved out of the scope of *even*.

Here I refer the reader to Erlewine 2014a,b for detailed evidence showing that (a) backwards association requires the focus to have originated within the surface scope of *even* and (b) backwards association is not being made possible by forcing syntactic reconstruction of the moved phrase to a lower position within *even*'s scope.

The core intuition of my account of backwards focus association in Erlewine 2014a,b is that movement involves copying of syntactic objects (the copy theory of movement; Chomsky 1993; a.o.) and that lower copies of F-marked material contribute to the computation of focus alternatives. In cases of apparent backwards association, *even* actually associates with the lower copy of focus, within the scope of *even*, even if this copy is unpronounced. This is illustrated schematically below:

[5]Reference to the derivational history here and in (13) is simply a helpful conceptual device: what ultimately matters, I argue, is the LF representation.

(14) **Backwards association by copying F-marking:**

a. Narrow syntax: [... α_F ...] ... [*even* [... [... α_F ...] ...]]

b. LF: [... α_F ...] ... [*even* [... [... α_F ...] ...]] *even* associates with circled F

c. PF: [... α_F ...] ... [*even* [... ~~[... α_F ...]~~ ...]] (for overt movement)

The phenomenon of "backwards association" is, then, a sort of illusion. There is nothing special about the mechanism of focus association with *even*: *even* straightforwardly quantifies over the focus alternatives computed for its complement, just as any other focus-sensitive operator does.[6]

I furthermore propose that English adverb *even* is always interpreted in its pronounced position. This is an explicit rejection of the scope theory as applied to English adverb *even*. For the scale reversal behavior of *even* in downward-entailing environments, I adopt the lexical ambiguity view. *Even*s in downward-entailing environments are interpreted as the scale-reversed $even_{NPI}$, whereas other *even*s are the PPI $even_{PPI}$.[7]

I will illustrate this proposal through the basic example of backwards association in (15) below. I assume the subject *no student* is base-generated in a VP-internal position, within the scope of *even*, and then moves to its surface position (15a). When movement is thought of as copying, the resulting copy-chain must be modified to be interpretable. I adopt the mechanism of Trace Conversion (TC; Rullmann & Beck 1998; Sauerland 1998; Fox 2002) whereby lower copies of DP copy-chains are turned into bound variable definite descriptions. The resulting LF is given in (15b). Because *even* does not affect truth conditions, the at-issue content of (15) will be computed straightforwardly from (15b).

(15) **A simple example of backwards association:**

"No [student]$_F$ will even come to the party."

a. Narrow syntax:

[No [student]$_F$] FUT even [no [student]$_F$] come to the party

b. LF after Trace Conversion:

[No [student]$_F$] λx FUT $even_{NPI}$ [[the [student]$_F$ x] come to the party]

[6]This characterization then raises the question of why *only* cannot associate backwards as *even* can, as we saw in (10–11). See footnote 9 below.

[7]Note however that the discussion in this current paper does not universally dismiss the possible application of the scope theory for other languages, nor do I discuss the behavior of English constituent-marking *even*s.

In brief, Trace Conversion involves the replacement of the lower copy's quantificational material with the definite determiner *the* and modification of the lower copy's restriction with a predicate of being equal to the variable that is then abstracted; see Fox 2002 for a more detailed presentation. Note here that there are two instances of the NP restrictor *student* in the LF representation. I assume that the syntactic annotation of F-marking (Jackendoff 1972) is preserved on both copies.

Now consider the interpretation of *even* in (15b). Because it is in a downward-entailing environment—the scope of *no student*—it will be the scale-reversed $even_{\text{NPI}}$. Let's assume that the only contextually-relevant alternative to the F-marked predicate *student* is *professor*: $[\![[\text{student}]_{\text{F}}]\!]^f = \{\lambda x\,.\,x \text{ is a student}, \lambda x\,.\,x \text{ is a professor}\}$. The focus semantic value of the complement of $even_{\text{NPI}}$, $[\![\text{VP}]\!]^f$, is then as in (16), with the first alternative being the prejacent value, $[\![\text{VP}]\!]^o$. Note that the definite description of the form *the NP x* has the same referent as *x* but with the presupposition that *x* satisfies *NP*; we unpack this presupposition properly in the second line of (16).

(16) **Focus alternatives in the scope of $even_{\text{NPI}}$:**

$$[\![\text{VP}]\!]^f = \left\{ \begin{array}{l} \lambda w\,.\ \text{the student } x \text{ comes to the party in } w, \\ \lambda w\,.\ \text{the professor } x \text{ comes to the party in } w \end{array} \right\}$$

$$= \left\{ \begin{array}{l} \lambda w : x \text{ is a student}\,.\,x \text{ comes to the party in } w, \\ \lambda w : x \text{ is a professor}\,.\,x \text{ comes to the party in } w \end{array} \right\}$$

Two features of this set of alternatives deserve mention. First, we see that the two alternatives in $[\![\text{VP}]\!]^f$ differ only in the presuppositions that they carry—namely, *x* being a student or *x* being a professor—but express the same at-issue content, the proposition that *x* comes to the party. Intuitively, we want these presuppositional contents to count towards the scalar inference of *even*. I propose that, within the evaluation of *even*, each alternative is modified using local accommodation (Heim 1983)—or the A-operator of Beaver & Krahmer 2001—converting their presuppositional content to be part of their truth conditions:[8]

(17) **Local accommodation (LA):**

$\text{LA}(\varphi) \equiv \lambda w\,.\,\varphi$ is defined (its presup.'s are satisfied) in w and $\varphi(w)$ is true

(18) a. $[even_{\text{PPI}}\ \alpha] \rightsquigarrow \forall \varphi \in [\![\alpha]\!]^f \setminus [\![\alpha]\!]^o\,(\text{LA}([\![\alpha]\!]^o) <_{likely} \text{LA}(\varphi))$

b. $[even_{\text{NPI}}\ \alpha] \rightsquigarrow \forall \varphi \in [\![\alpha]\!]^f \setminus [\![\alpha]\!]^o\,(\text{LA}([\![\alpha]\!]^o) >_{likely} \text{LA}(\varphi))$

[8] Alternatively, we could clarify the definitions of $<_{likely}$ and $>_{likely}$ in the denotations of *even* as comparing likelihoods of being defined (having presuppositions satisfied) and being true, instead of simply the the likelihoods of being true. I choose to describe this as an application of local accommodation, however, in order to make this aspect of the proposal more explicit.

Second, we note that each alternative in $[\![\text{VP}]\!]^f$ includes an unbound variable (x). The corresponding variable in the at-issue content will be bound by the λ-binder corresponding to the movement of the subject, but the scalar inference of *even* does not compose with material above it.[9] The scalar inference of *even* in (15)—using the scale-reversed $even_{\text{NPI}}$, as we are in a downward-entailing environment—is predicted to be as in (19). This resulting scalar inference then also includes the unbound variable x:

(19) **Scalar inference computed by $even_{\text{NPI}}$ (18b):**

$$[even_{\text{NPI}}\ \text{VP}] \rightsquigarrow (\lambda w\,.\,x \text{ is a student and comes to the party in } w) >_{likely} (\lambda w\,.\,x \text{ is a professor and comes to the party in } w)$$

The question of how such a meaning is interpreted globally is the concern of the so-called *projection problem* of non-truth-conditional content in quantificational contexts. This problem has been discussed extensively; see for example discussion in Karttunen & Peters 1979; Cooper 1983; Heim 1983; van der Sandt 1992; Beaver & Krahmer 2001. See also Sudo 2014 for a recent review. Our concern here is the projection behavior when the variable is bound by a negative existential—in this case *no professor*. In such cases, Cooper (1983) argues that non-truth-conditional content projects universally over the relevant domain, and this has been verified experimentally by Chemla (2009). This predicts the global effect of the scalar inference introduced by $even_{\text{NPI}}$ to be as in (20).

(20) **The projected scalar inference of $even_{\text{NPI}}$ for (15):**

$$\rightsquigarrow \forall x \left(\begin{array}{c} (\lambda w\,.\,x \text{ is a student and comes to the party in } w) >_{likely} \\ (\lambda w\,.\,x \text{ is a professor and comes to the party in } w) \end{array} \right)$$

If we think about the likelihood ordering $>_{likely}$ as reflecting probabilities associated with these propositions, we can simplify the content of (20):[10]

(21) **The scalar inference in (20) in probabilistic terms:**

$$\begin{aligned} &\rightsquigarrow \forall x\,(P(x \text{ is a student and comes...}) > P(x \text{ is a professor and comes...})) \\ &\iff \forall x \left(\begin{array}{c} P(x \text{ is a student} \mid x \text{ comes...}) \times P(x \text{ comes...}) > \\ P(x \text{ is a professor} \mid x \text{ comes...}) \times P(x \text{ comes...}) \end{array} \right) \\ &\iff \forall x\,(P(x \text{ is a student} \mid x \text{ comes...}) > P(x \text{ is a professor} \mid x \text{ comes...})) \\ &\iff \forall x\,(x \text{ comes to the party} \rightarrow P(x \text{ is a student}) > P(x \text{ is a professor})) \end{aligned}$$

[9] Here lies the key difference between *even* and *only*, resulting in the inability of *only* to associate "backwards" as *even* does. *Only* uses focus alternatives to generate at-issue content, and therefore such variables in the truth conditions introduced by *only* will be bound by their higher copies. I show in Erlewine 2014b that this configuration with *only* necessarily results in a logical tautology or contradiction, and is therefore not a contingent and useful semantic object. See section 4.3 of Erlewine 2014b for a detailed presentation.

[10] The notation $P(A \mid B)$ is the conditional probability of event A given event B. $P(A \mid B) = \frac{P(A \text{ and } B)}{P(B)}$.

In other words, the content of the project scalar inference of (20) can be paraphrased as follows: for any individual x, if they come to the party, they are more likely to be a student than to be a professor. This reflects the observed inference of *even* in (15), that it is more likely for students to come to parties than for professors to.

The discussion of example (15) in this section demonstrates that the ability of *even* to associate "backwards" falls out as a natural consequence of the adoption of the copy theory of movement and associated work on the interpretation of copy-chains. In particular, this approach derives the generalization in (13) above: when *even* appears to associate with material outside of its surface scope, it is actually associating with a lower copy of the focus within its scope; backwards association is thus impossible if the focus did not originate within the surface scope of *even*.

I furthermore proposed that English adverb *even* is consistently interpreted in its pronounced position and adopt the lexical ambiguity theory for the scale-reversal behavior of *even*. This was demonstrated in the discussion of example (15), where *even* was the scale-reversed $even_{\text{NPI}}$, resulting in the correct scalar inference.

4 ACD and the scope of *even*

I now return to Nakanishi's (2012) argument from antecedent-contained deletion (ACD) for the scope theory of *even*. Nakanishi's argument is logically sound but assumes as a premise that *even* is unable to associate with a focus which has moved out of its scope. I have already shown in Erlewine 2014a,b that this assumption is empirically incorrect. In this section I will show that my own proposal for focus association in such configurations, together with the copy-theoretic approach to ACD from Fox 2002, can correctly account for focus association with *even* in Nakanishi's crucial examples without invoking the scope theory.

Consider again the basic ACD example in (4), repeated below as (22):

(22) **Antecedent-contained deletion:** (=4)
Bill lifted every box that Mary did △. △ = "lift"

Fox (2002) proposes that the DP hosting the relative clause with ACD—here, *every box*—is base-generated alone and then QRed, and then the relative clause containing the ellipsis site is late-adjoined to this DP (Lebeaux 1988; Fox & Nissenbaum 1999), outside of the antecedent VP. This derivation is illustrated here for example (22):[11]

[11] Movement of the subject *Bill* out of its VP-internal position is not shown here.

(23) **Apparent ACD in (22) through late-adjunction of the relative (Fox 2002):**

a. QR of the object "every box":
Bill PAST [[every box] [$_{VP}$ lift [every box]]]

b. Late merger of relative clause (adjunct):
Bill PAST [[every box [that Mary did Δ]] [$_{VP}$ lift [every box]]]

c. PF pronouncing lower copy of DP and eliding VP in the relative clause:[12]
Bill PAST [[$_{VP}$ lift [every box]] [~~every box~~ [that Mary did Δ]]]

d. LF after Trace Conversion:
Bill PAST [[every box [that Mary did Δ]] λx [$_{VP}$ lift [the box x]]]

Under this approach, illustrated in (23), there is in fact no antecedent-containment: the elided VP is introduced by late-adjunction of the relative clause, outside of the antecedent VP.

I now revisit Nakanishi's argument against the lexical ambiguity theory. One of her crucial examples is repeated here from (7) above:

(24) **Nakanishi 2012's example (37):** (=7)
He has failed to even lift the [box]$_F$ that she has △.

Her argument is again as follows: The DP *the box...* must QR out of the antecedent VP *fail to...*, and this means the F-marked constituent *box* will be outside of the surface scope of *even*; see (8) above. But Nakanishi's challenge is easily resolved by adoption of the derivation of ACD argued for by Fox (2002), which leaves a copy of the head DP *the box* in its base position. This derivation of example (24) under Fox's (2002) approach is illustrated here:

(25) **Derivation of (7) using Fox 2002's copy-theoretic approach to ACD:**

a. QR of the object "the box":
Bill has[PERF] [[the [box]$_F$] [$_{VP}$ failed to *even*$_{NPI}$ [PRO lift [the [box]$_F$]]]]

b. Late merger of the relative clause (adjunct):
Bill has[PERF] [[the [box]$_F$ [that Mary has[PERF] △]]
[$_{VP}$ failed to *even*$_{NPI}$ [PRO lift [the [box]$_F$]]]]

c. LF after Trace Conversion:
Bill has[PERF] [[the [box]$_F$ [that Mary has[PERF] △]]
λx [$_{VP}$ failed to *even*$_{NPI}$ [$_\alpha$ PRO lift [the [box]$_F$ x]]]]

[12]Following Fox & Nissenbaum 1999, Fox 2002 conceives of the original QR step in (23a) as rightward movement. Late-adjunction of the relative clause to this position will then be naturally linearized to the right of the VP, rather than its left. Here I illustrate all movements as to the left, but then illustrate just this PF representation with ~~*every box*~~ *that Mary...* linearized to the right.

As I proposed in Erlewine 2014a,b, reviewed in section 3, *even* is able to safely associate with a focus in a lower copy of movement, computing its scalar inference using the focus alternatives in its scope. Here assume that the alternatives to *box* are *piano* and *desk*, as supported by the context given in (7): $[\![\text{box}]\!]^f = \{\text{box, piano, desk}\}$. Here the alternatives in the scope of $even_{\text{NPI}}$ are as in (26), where the first alternative is the prejacent value $[\![\alpha]\!]^o$. The PRO subject of the control embedding is represented by the variable y below.

(26) **Focus alternatives in the scope of $even_{\text{NPI}}$ (α) in (25):**

$$[\![\alpha]\!]^f = \left\{ \begin{array}{l} \lambda w\,.\,y \text{ lifts the box } x \text{ in } w, \\ \lambda w\,.\,y \text{ lifts the desk } x \text{ in } w, \\ \lambda w\,.\,y \text{ lifts the piano } x \text{ in } w \end{array} \right\} = \left\{ \begin{array}{l} \lambda w : x \text{ box}\,.\,y \text{ lifts } x \text{ in } w, \\ \lambda w : x \text{ desk}\,.\,y \text{ lifts } x \text{ in } w, \\ \lambda w : x \text{ piano}\,.\,y \text{ lifts } x \text{ in } w \end{array} \right\}$$

$Even_{\text{NPI}}$ will have access to these ordinary and focus semantic values at α, applying local accommodation (17) and resulting in the local scalar inference in (27b). This inference includes the open variables x and y, so we must again consider the projection behavior of this not-at-issue meaning. Following the discussion in section 3, I assume that both variables project universally, yielding the inference in (**??**).

(27) **Computing the scalar inference of $even_{\text{NPI}}$ in (24):**

a. The scalar inference at α in (25c):

$$[even_{\text{NPI}}\ \alpha] \rightsquigarrow \forall \varphi \in [\![\alpha]\!]^f \setminus [\![\alpha]\!]^o\,(\text{LA}([\![\alpha]\!]^o) >_{likely} \text{LA}(\varphi)) \qquad (=18b)$$
$$\Longleftrightarrow (\lambda w\,.\,x \text{ box and } y \text{ lifts } x \text{ in } w) >_{likely} (\lambda w\,.\,x \text{ desk and } y \text{ lifts } x \text{ in } w) \wedge$$
$$(\lambda w\,.\,x \text{ box and } y \text{ lifts } x \text{ in } w) >_{likely} (\lambda w\,.\,x \text{ piano and } y \text{ lifts } x \text{ in } w)$$

b. The projected inference of $even_{\text{NPI}}$:

$$\rightsquigarrow \forall x, y \left(\begin{array}{l} (\lambda w\,.\,x \text{ box and } y \text{ lifts } x \text{ in } w) >_{likely} (\lambda w\,.\,x \text{ desk and } y \text{ lifts } x \text{ in } w) \wedge \\ (\lambda w\,.\,x \text{ box and } y \text{ lifts } x \text{ in } w) >_{likely} (\lambda w\,.\,x \text{ piano and } y \text{ lifts } x \text{ in } w) \end{array} \right)$$

This gives us the correct, scale-reversed inference of *even* in (24): it is more likely for boxes to be picked up than for desks or pianos to be picked up. My proposal for *even* associating with lower copies of focus is able to explain the behavior of *even* using the LF in (25), without invoking the scope theory of *even*. Nakanishi's argument from ACD for the scope theory of *even* has been successfully defused.

This copy-theoretic solution to Nakanishi's challenge makes a further prediction. Under my approach, focus association of *box* with *even* was possible in example (24) above because the focused constituent is the *restrictor* of the DP *the box* and therefore there is a lower copy of the F-marked *box* within the surface scope of *even* (25). However, following Fox 2002, the relative clause hosting the ACD ellipsis site is late-adjoined to the higher copy of the DP, outside of the antecedent VP for ellipsis and therefore outside of the surface scope of *even*. It follows that, under the copy-theoretic approach to such examples, *even* can associate with part of the restrictor of the QRed DP but not with focus in the relative clause itself:

(28) **A prediction of the copy-theoretic account to *even* and ACD:**

a. Focus in the restrictor of the DP:
✓ ... [$_{VP1}$ ... *even* [$_{VP2}$ ... [$_{DP}$ ... XP_F ... [$_{RC}$ ... Δ (= VP1)

b. Focus in the ellipsis-hosting relative clause:
* ... [$_{VP1}$ ... *even* [$_{VP2}$ ... [$_{DP}$ ... [$_{RC}$ ... XP_F ... Δ (= VP1)

In contrast, Nakanishi's scope theory account would predict no difference in focus association between (28a) and (28b). In both cases, *even* would be interpreted above VP1 at LF, taking scope above the LF position of the DP and its relative clause.

I constructed the context in (29) below to test this prediction. The crucial test sentence is (29a), which differs from Nakanishi's example (24) minimally in the position of focus and the replacement of the pronoun *she* with *Mary*. The given context supports the intended scalar inference of *even* associating with focus on *Mary*, within the relative clause hosting the ACD ellipsis site.

(29) **The box-lifting competition:**

At the box-lifting competition, Sue first lifted the 25kg box and then failed to lift the 30kg box. John lifted the 20kg box but failed to lift the 25kg box. Mary was disqualified immediately, failing to lift the 15kg box.

15kg box	20kg box	25kg box	30kg box
		Sue ◯	Sue ×
	John ◯	John ×	
Mary ×			

And now it's Bill's turn. He normally does quite well, but somehow he did terribly. Today...

a. * he has failed to even lift [$_{DP}$ the box [$_{RC}$ that [Mary]$_F$ has △]]. (cf 24)

b. ✓ he has even failed to lift [$_{DP}$ the box [$_{RC}$ that [Mary]$_F$ has △]].

All speakers I have consulted report a clear contrast between the two variants in (29), judging (29a) as ungrammatical and (29b) as grammatical. Notice that variant (29b) differs only in the surface position of *even*, above the verb *fail* instead of below it.

The contrast in (29) is predicted by my own proposal. Under my approach, *even* is interpreted in its surface scope. Under the copy-theoretic approach to ACD which I adopt, *the box* must QR to the edge of the higher *failed* VP and the relative clause is late-adjoined there. The intended focus *Mary* is in this relative clause. The complement of *even* in (29a) therefore does not contain *Mary*, and *even* is thus unable to associate with *Mary* here. In contrast, late-adjunction of the relative clause can take place right at the edge of the *failed* VP, within the surface scope of *even* in (29b). This allows the intended association in (29b).

This contrast forms a strong argument against the scope theory. As discussed by Nakanishi (2012), the scope theory of *even* predicts *even* in (24) to be interpreted at LF outside of the scope of *fail*, which is a downward-entailing operator. Following Nakanishi, this derivation predicts that *even* will be in the same position at LF in (29a) as it is in (29b), from which position it should be able to associate with *Mary* in the relative clause in both cases. The robust contrast in (29) shows that *even* in (29a) does not move over downward-entailing operators.

I note that Nakanishi 2012 does in fact present examples of the form in (29), with focus in the relative clause and ACD predicted to force the relative clause outside of the surface scope of *even*, with the judgment that they are grammatical. One such example of hers is in (30) below, where the sentence of interest is the last one. See also her examples (34) and (40).

(30) **Nakanishi's example (36), which I would predict to be ungrammatical:**
Joe always tries to solve every problem that other people try to solve. He is trying to solve every problem that his classmate is trying to solve, and he is also trying to solve every problem that his tutor is trying to solve. Moreover, he$_i$ is trying to even solve every problem that [his$_i$ supervisor]$_F$ is Δ.

These examples of Nakanishi's do indeed seem to be grammatical with *even* associating with the intending focus associates. This runs counter to the prediction of my own copy-theoretic proposal (28) as well as the contrast observed in (29) above. What accounts for the grammaticality of these examples of Nakanishi's?

I suggest that the examples such as (30) are in fact *not* examples of ACD. Instead, the ellipsis is resolved cross-sententially, just as in (31):

(31) **Cross-sentential ellipsis:**
Our kids Sarah and Max love checking new books out of the library. We have a tradition where they will try reading the books they checked out first by themselves, and then reading them aloud to share with the family. Unfortunately this week, they both picked books which are too difficult for them. After they struggled for some time, we took over. In the end...
[I]$_F$ read the book that our [son]$_F$ was trying to read, and [my wife]$_F$ read the book that our [daughter]$_F$ was Δ. Δ = "trying to read"

The ellipsis in (31) is judged as grammatical. Here the intended antecedent, *trying to read*, must be resolved cross-sententially using the underlined antecedents: there is no local instance of *trying to read* to form an appropriate antecedent. In the same way, I suggest that the ellipsis in example (30) is actually resolved by the preceding underlined antecedents, rather than by moving the DP *every problem...* outside of the surface scope of *even*. Notice that my own test example constructed in (29) does

not have this confound—i.e. there is no previous use of the VP *fail to read t*—and we therefore can be sure that the ellipsis resolution in (29) is ACD.

When this potential confound is controlled for so that cross-sentential, non-ACD ellipsis resolution is not possible, we can verify that Nakanishi's examples such as (30) are indeed ungrammatical as predicted by my account. Example (32) below minimally tweaks the test sentence in (30) and adds a new context, in order to avoid this confound.

(32) **The math team (cf 30):**

During the math competition's Team Event, the team must complete as many problems as possible during thirty minutes. In order to make sure all the problems are being worked on, the team writes each problem number on the board, and different team members mark the problems that they are currently trying to solve. Here is the board:

	Ali	Barb	Carl	Dan
1		×	×	×
2	×		×	
3				
4		×	×	×
5	×		×	×

Ali and Barb have cautiously claimed just two problems each, while the star of the team, Dan, has started to work on three. Carl has a tendency to try to solve many problems that others are also working on. Today...

a. * Carl is trying to *even* solve every problem that $[\text{Dan}]_F$ is Δ.

b. ✓ Carl is *even* trying to solve every problem that $[\text{Dan}]_F$ is Δ.

Δ = "trying to solve"

The test sentence in (32a)—equivalent to Nakanishi's (36) in (30) above, except for the use of proper names, and without cross-sentential antecedents of the form *trying to solve*—is judged as ungrammatical, whereas the same structure with *even* above the higher VP headed by *trying* is judged as grammatical (32b). This contrast in (32) reproduces the pattern of contrast observed above with (29), predicted by my copy-theoretic approach to ACD in Nakanishi's examples.

5 The scope theory doesn't help with backwards association

Finally I return to the problem of backwards association. In Erlewine 2014a,b, I have argued that *even* can associate with material which has moved out of its scope because of the presence of semantically-contentful lower copies of movement. But an alternative account might be to take advantage of the scope theory of *even*: if *even* can take higher scope at LF, apparent cases of "backwards" association may be less puzzling. In this section I argue against such an application of the scope theory for *even*'s ability to associate backwards.

Consider the simple example of backwards association in (33). Using the scope theory as presented in Nakanishi 2012, we assume that *even* can be interpreted in a higher position at LF and can associate with any focus in this LF scope. The LF in (33b) then allows for the grammatical association of *even* with the focus *professor* which is outside of its surface scope (33a).

(33) **Backwards association via the scope theory:**

a. PF: A [professor]$_F$ will even come to the party.

b. LF: *even* [[a [professor]$_F$] will come to the party]

The primary problem with such an approach is that it does not predict the sensitivity to the presence or absence of a trace position for the focus within the surface scope of *even* (generalization (13)). Consider for example the contrast in (34) below. The head of the matrix subject is *no*, whose nuclear scope is downward-entailing and therefore licenses the scale reversal of *even*. Under the scope theory, *even* is predicted to be interpreted outside of the scope of *no* at LF, as illustrated for each example in (34). This predicts that *even* will take the focus *student* in its scope at LF in the grammatical example (34a), but also in the ungrammatical (34b).

(34) **Scope theory incorrectly predicts no contrast b/w raising and control:**

a. ✓ No [student]$_F$ seems to even be at the party.
Scope theory LF: *even* [no [student]$_F$ λx seems [x to be at the party]]

b. * No [student]$_F$ wants to even be at the party.
Scope theory LF: *even* [no [st.]$_F$ λx . x wants [PRO$_x$ to be at the party]]

In reality, however, backwards association of *even* with *student* is judged as impossible in (34b). This is explained under my account because the embedding in (34b) is a control embedding and therefore does not include a lower copy of the subject *no student* within its surface scope.

The scope theory advocate might push back by claiming that the examples in (34) are not parallel. For example, one could imagine claiming that *even* cannot take wide scope using the scope theory out of a control embedding, although it can out

of a raising embedding. We can verify that the wide scope of *even* hypothesized in (34b) is independently predicted to be possible by the scope theory, by checking for scale reversal behavior in similar configurations. Consider example (35), where *even* is similarly pronounced at PF at the edge of a control embedding, with a matrix negative quantificational subject. The inference of *even* in (35) is the scale-reversed inference that it is *more likely* to read the abstract of a terrible paper than its other parts. Under the scope theory, this must be because *even* is interpreted above the matrix subject, as illustrated in (35).

(35) ✓ No one wants to *even* read the [abstract]$_F$ of this terrible paper.
Scope theory LF: *even* [no one λx . x wants [PRO$_x$ to read the [abstract]$_F$ of this terrible paper]]

The grammatical, scale-reversed interpretation in (35) thus shows that the scope theory LF illustrated in (34b) should hypothetically be possible under the scope theory. The contrast between the raising example (34a) and the control example (34b) therefore acts as an additional argument against the scope theory of *even*.

I conclude that the scope theory of *even*—the proposed ability for *even* to be interpreted higher than its pronounced position—cannot be the source of backwards association with *even*. This approach fails to predict the empirical generalization in (13): that backwards association requires the focused material to originate within the *surface scope* of *even*. Nakanishi's conception of the scope theory, where *even* is able to associate with any constituent in its interpreted scope at LF, would systematically overgenerate instances of backwards association.

6 Conclusion

Nakanishi 2012 presented a unique argument for the scope theory of *even*, based on the interaction of focus association with *even* and antecedent-contained deletion (ACD). I have shown that one important premise in Nakanishi's argument—the assumption that *even* cannot associate with a focus which has moved out of its scope—is clearly false, thus defusing her argument. I also pointed out a methodological issue with Nakanishi's examples: namely, the possibility of cross-sentential antecedents creating the illusion of ACD. Controlling for this confound, I showed that ACD examples in fact form a new argument against the scope theory of *even*. Nakanishi's scope theory of *even*—allowing *even* to take scope higher than its pronounced position at LF and associate with material from that position—would overgenerate many cases of focus association with *even*. English VP-*even* must instead always be interpreted in its pronounced position. In addition, I showed that the scope theory itself cannot be the source of *even*'s ability to associate "backwards" with foci outside of its surface scope.

The discussion here provides novel empirical support for the idea that syntactic movement takes the form of copying (Chomsky 1993; a.o.). Copies in a copy chain may be modified for interpretation through Trace Conversion (Rullmann & Beck 1998; Sauerland 1998; Fox 2002; a.o.). Patterns of focus association with *even* are best accounted for by positing semantically contentful, rich trace positions.

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