

***Either: Negative Polarity  
Meets Focus Sensitivity***

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## 1. Introduction

### 1.1. The issues

When William A. Ladusaw wrote in his 1979 dissertation, “The literature on negation in linguistics is vast,” (Ladusaw 1980:78), he gave as accurate a prediction of the twenty years that would follow as he did a summary of the previous twenty. Studies in negation have ranged from the syntactic to the semantic to the pragmatic, going as far as Horn’s theories of “metalinguistic negation” (e.g. Horn 1985) which involve negation that can step entirely outside the bounds of traditional linguistic analysis. Horn’s *Natural History of Negation* (1989) discusses philosophical issues in negation as well as semantic approaches, and others have looked at negative concord and, of concern to this paper, negative polarity items (NPIs).

NPIs are words and expressions that occur in negative contexts—for some definition of “negative”—but never in positive ones, such as *any*, *ever*, *yet*, and (when not used literally) *lift a finger*, *eat a bite*, and so on.<sup>1</sup> Therefore contrasts such as those in (1) occur in the language, where the boldface word indicates the negative context.

- (1) a. I do **not** have *any* potatoes.  
a'. \*I have *any* potatoes.  
b. **No one** has *ever* been to Mars.  
b'. \*Someone has *ever* been to Mars.  
c. Mary has **not** arrived *yet*.  
c'. \*Mary has arrived *yet*.  
d. John **never** *lifts a finger* to help us.  
d'. \*John always *lifts a finger* to help us.  
e. I couldn't *eat another bite*.  
e'. \*I could *eat another bite*.

Formulating what qualifies as a “negative context,” however, is a non-trivial and much-discussed problem.

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<sup>1</sup> *Any* also has a so-called “free choice” usage, as in *Any owl hunts mice*. Traditionally the negative-polarity usage as seen in (1a) is distinct from this. Whether these can be combined into one lexical item is still being debated—see the discussion in §5.5 for more on this issue.

Indeed, if the negation literature is “vast,” the portion of that literature on negative polarity seems paradoxically to be just as vast. Studies have been done on negative polarity in Dutch (Zwarts 1997), Greek (Giannakidou 1998), Serbian/Croatian (Progovac 1994), and Hindi (Vasishth 1998), among others, and accounts have variously appealed to syntax, to semantic representation, to semantic entailment, and to semantic implicature. Certain NPIs have attracted particular attention, as is the case with negative-polarity vs. free-choice *any* (e.g. Kadmon and Landman 1993) or the scalar nature of NPI idioms like *lift a finger*. All the same, little has changed for some NPIs since Ladusaw’s comment at the beginning of his dissertation: “The account here works for the largest class of NPIs: *any, ever, yet...* Other NPIs like *either...* do not admit of this treatment” (Ladusaw 1980:4).

At first glance, there is no clear reason for Ladusaw to have claimed that an account of NPIs cannot explain *either*. Taking *ever* as a rather typical NPI, the following set of sentences seems to indicate that *either* has much the same distribution.<sup>2</sup> Again, the boldface word indicates the licenser for the NPI; removing a licenser or replacing it with its opposite removes the context which allows *ever* and *either* to appear.

- (2)
- a. John has **not** *ever* been to Spain.  
Mary has not been there, either.
  - b. John **rarely** *ever* goes to Spain.  
Mary rarely goes there, either.
  - c. **Few** Americans have *ever* been to Spain.  
Few Canadians have, either.
  - d. It’s **unlikely** that John has *ever* been to Spain.  
It’s unlikely that Mary has, either.
- (3)
- a. \*John has *ever* been to Spain. \*Mary has been there, either.
  - b. \*John **often** *ever* goes to Spain. \*Mary often goes there, either.
  - c. \***Many** Americans have *ever* been to Spain. \*Many Canadians have, either.
  - d. \*It’s **likely** that John has *ever* been to Spain. \*It’s likely that Mary has, either.

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<sup>2</sup> “Typical” is a difficult word here, if one accepts Zwarts’ (1997) theory that there are three different strengths of NPI with increasingly limited distribution. Nevertheless, insofar as *either* is an NPI, it has the same “strength” as *ever*; this will be discussed in §3.4 below.

If these contrasts held for *either* under all such negative polarity licensors, an account like Ladusaw's (or any other) would suffice. However, sentences like those in (4) show that the situation must be more complicated than that.

- (4) a. The police would want to talk to us **if** you'd ever met the victim.  
\*They'd want to talk to us if I had, either.  
b. I'm **surprised** that John has ever been to Spain.  
\*I'm surprised that Mary has either.

To complicate matters, the semantics of *either* must involve more than its status as a negative polarity item; it must also cover the meaning that *either* as a focus particle adds to a sentence. This will involve a discussion of *too*, just as no account of *any* can be given without a discussion of generalized quantifiers and the "positive" *some*, and no semantics of *ever* can entirely avoid certain issues of time and tense. The sentences in (5) are odd when given out-of-the-blue, showing that *too* and *either* add some meaning to a sentence, and are odd in the same way, suggesting that the semantics for *too* and *either* are related.

- (5) a. # Mary owns a cat, too.  
b. # I don't like tomatoes either.

This paper is an attempt to reconcile these two aspects of *either*: its negative polarity status and its focus requirement.

## 1.2. A sketch of the approach

Section 2 of the paper discusses Mats Rooth's theory of focus, and offers some refinements based on observations from other sources. Section 3 begins with an early theory of negative polarity and continues by outlining William Ladusaw's, after which come two modifications and strengthenings of the theory. The section concludes with a clarification of some syntactic assumptions and, from that basis, a discussion of two other attempts to explain negative polarity.

Section 4 then gives a preliminary semantics for *either*. Finally, section 5 contains directions for future research, including some unsolved puzzles, and section 6 presents conclusions.

## 2. A Theory of Focus

### 2.1. Focus and Focus Particles: Rooth's account

The standard theory of focus was first laid out in Mats Rooth's dissertation, *Association with Focus* (Rooth 1985), although the discussion here follows more directly from Rooth (1992).

Both works outline an "alternative semantics" (i.e. a semantics for alternatives) which postulates that the semantic result of putting phonological focus on a constituent is the introduction of a set of alternatives. That set comprises everything of the same semantic type as the constituent; the focus value of larger constituents is then built up compositionally.<sup>3</sup> The end result, in the words of Rooth (1992), is that "the focus semantic value for a phrase of category S is the set of propositions obtainable from the ordinary semantic value by making a substitution in the position corresponding to the focused phrase." In other words, the focus value for (6a), where [...]<sub>F</sub> corresponds to phonological focus, is given in (6b).

- (6) a. Marc likes [tomatoes]<sub>F</sub>.  
b. {like(tomatoes)(marc), like(cabbage)(marc), like(corn)(marc), ... }  
c. {like(x)(marc) | x ∈ E} (where E is the domain of individuals)

(6c) demonstrates a commonly-used shorthand. However, it is important to remember that the

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<sup>3</sup>See Rooth (1996), §4.1, for a quick and clear discussion of this compositionality.

The statement given in the text is, incidentally, not quite accurate: "everything" is too strong. A sentence like "I like [Mary]<sub>F</sub>" might imply a contrast with liking John (as "John" and "Mary" are both of type *e*), but not with liking *The Brothers Karamazov* (which, as an entity, is presumably also of type *e*). Rooth (1985) points out that this sort of domain restriction is pragmatic, and is needed independent of focus, as seen in (i) and (ii) (Rooth's (88), (89), ch. 3):

- (i) John moved into the Shady Manor Apartments with his German Shepherd and his two Great Danes. Everyone objected.  
(ii) The Queen of England did not object.

That (i) and (ii) are not inconsistent results from the same kind of domain restriction on "Everyone" to exclude "the Queen of England" that, above, restricted the alternatives to "Mary" to exclude "*The Brothers Karamazov*." This pragmatic issue is thus an independent problem, and will be ignored for the purposes of this paper.

focus value of a proposition is a set of closed propositions, and not the single open proposition “like(x)(marc).” The focus set of a proposition  $\alpha$  is often denoted as  $\|\alpha\|^f$ , and its base value (i.e. its meaning without the focus) as  $\|\alpha\|^o$ .

Rooth’s 1992 paper refines his earlier proposal by introducing a “focus interpretation operator,”  $\sim$ . Using the definition from Rooth (1996) [this is his (20)]:

- (7) Where  $\phi$  is a syntactic phrase and  $C$  is a syntactically covert semantic variable,  $\phi \sim C$  introduces the presupposition that  $C$  is a subset of  $\|\phi\|^f$  containing  $\|\phi\|^o$  and at least one other element.

This definition is particularly useful when looking at questions in discourse. For the purposes of this paper, it will be easier to use the modified definition in (7’), inspired by Rooth (1999).

- (7’) Where  $\phi$  is a syntactic phrase and  $C$  is a syntactically covert semantic variable,  $\phi \sim C$  introduces the presupposition that  $C$  is a member of  $\|\phi\|^f$  such that  $C \neq \|\phi\|^o$ .

That is to say,  $C$  is a variable over propositions, and as such it will occasionally be useful to coindex it with a previous sentence as seen in (8).

- (8) A: Did you say that [Mary left]<sub>*i*</sub>?  
 B: No, I said that [[Barry]<sub>F</sub> left  $\sim C_i$ ].

By (7’), the focus in B’s statement in (8) introduces the covert variable  $C$  with the presupposition that  $C$  is some member of the focus set of [Barry]<sub>F</sub> left, which is {Barry left, Mary left, Gary left, Harry left...}. The presupposition holds because  $C$  can pick up sentence *i*, which is in this focus set.

(9) is adapted from Rooth (1999).<sup>4</sup>

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<sup>4</sup> The semantics for *too* are not unlike those given by Karttunen and Peters (1979). That paper never gives an explicit semantics for *too* and is more concerned with how its implicatures filter up when embedded in *if...then* sentences and disjunctions. Nevertheless, Karttunen and Peters do offer a similar analysis, in which *too* preserves extensional meaning, and adds a presupposition—for instance, for the sentence *John drinks too*, that there is someone else under consideration besides John who drinks.

- (9) [Mary likes Fred.]<sub>*i*</sub> [[[Sue<sub>F</sub> likes Fred]<sub>*j*</sub> ~ *C*], too(*C*)  
 sentence *i*     like(*m*, *f*)  
 sentence *j*     like(*s*, *f*)  
 focus            *C* = like(*x*, *f*) for some *x* ≠ *s* (i.e. for a sentence ≠ *j*)  
*too*             *C* is presupposed to be true

In other words, the variable *C*, as defined in (7'), is looking to pick up a contextually salient member of the set of alternatives. The meaning that *too* adds to the sentence, Rooth suggests, is that the alternative that *C* takes as its meaning is true. Without the *too*, this is not necessarily true, as (8) illustrates. There, the proposition that *C* takes to be its antecedent is not at all stated to be true, and it can in fact be explicitly stated to be false without causing pragmatic problems (*B: No, Mary's still here. I said that [Barry]<sub>F</sub> left.*).

Let's refine this formulation by pulling apart the syntax and the semantics.

- (10) a. Mary likes Fred.     [Sue]<sub>F</sub> likes Fred, too.  
 b. [like(*m*, *f*)]<sub>*i*</sub>         [like(*s*, *f*) ~ *C*] ∧ too(*C*)<sup>5</sup>

The boldface in the logical form indicates the focused element, for reference. The “~ *C*” is, as above, showing where the focus “stops,” so to speak—at what point the compositionally-built alternative set is considered completed. As is suggested above, *C* will be given the index *i*, i.e. will pick up the meaning *like(m, f)*. (Note that *C* cannot take the meaning of just any sentence in the focus set, such as “John likes Fred.” The antecedent to *C* must be salient, just as the antecedent to the variable created by a pronoun like *he* must be.)

Georgia Green's 1968 paper on *too* and *either* suggests some refinements of this theory of focus, centering on what can serve as a focus set out of which *C* can take an antecedent. Before we look at that, however, other independent evidence from metalinguistic negation can serve to demonstrate that *either* interacts with *C* in ways that are less than typical.

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<sup>5</sup> Using ∧ to attach *too(C)* and, later, *either(C)*, is somewhat misleading because *too(C)* represents presuppositions as well as truth conditions. However, since *too* and *either* operate on *C*, which is part of the semantics and not the pragmatics, they need to be included in the semantic representation, so I will use ∧ to attach them.

## 2.2. Metalinguistic Negation

Metalinguistic negation, as developed in Horn (1985), can affect non-truth-conditional elements of utterances. Horn gives the example in (11) [his (18a), with a rougher phonological approximation], which demonstrates using *not* to indicate a phonological correction of the word *manage*.

(11) No, I didn't [mi<sup>y</sup>nIj] to solve the problem, I [mænIjd] to solve the problem.

He goes on to note that this sort of metalinguistic negation does not license negative polarity.

(12) I didn't [mi<sup>y</sup>nIj] to solve {\*any/some} of the problems, I [mænIjd] to solve some of the problems. [= Horn's (25)]

But when there are three options of which two are negated, such as someone at Cambridge correcting the pronunciation of Magdalene College, *either* is allowed:

(13) I don't attend [mægdalin] College, and I don't attend [mægdalIn] College either! I attend [mɑ:dIIn] College.

Similar observations can hold for other uses of metalinguistic negation such as choices of diction (*We didn't "have intercourse" and we didn't "make love," either—we fucked*). Most strikingly non-linguistic is the use of *either* in Barbara Abbott's observation (Horn 1985, footnote 12): a piano student plays a passage in manner  $\mu$ , and then (when told to try again) in  $\mu'$ , to which the teacher says, "It's not [plays passage in manner  $\mu$ ], and it's not [plays in manner  $\mu'$ ], either. It's [plays in manner  $\mu''$ ]." <sup>6</sup>

What's happening in these cases? The focus set of the focused item consists not of propositions but of alternate pronunciations such as {[mi<sup>y</sup>nIj], [mænIj], ...} or of diction choices such as {*make love, have intercourse, ...*}, or even of methods of playing a musical selection { $\mu$ ,

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<sup>6</sup> I thank Barbara Partee for this observation.

$\mu', \mu'', \dots$ }. The variable, accordingly, takes as its meaning one element of the set,<sup>7</sup> and the *either*, licensed by the *not*, adds the presupposition that that item represented by the variable is somehow not appropriate.

This is a very rough estimate of the issues here, and I do not in fact have a good explanation for why metalinguistic negation should license *either*, or how it operates on non-truth-conditional items. Instead, I include the discussion above to show that *C* has more license than most variables in its choice of antecedent, and that *either* has some of that same license. This motivation in mind, we can move on to Green (1968).

### 2.3. Green's Puzzles

Long before Rooth's theories of focus, Green (1968) examined "emphatic coordinate conjunction," which is conjunction involving *too* or *either*. To again illustrate by example (Green's (3) and (4), with the  $[\dots]_F$  notation replacing stress marks):

- (14) a. St. Louis is not in  $[\text{New York}]_F$ , and the Adirondacks are not in  $[\text{Kansas}]_F$ ,  
           $[\text{either}]_F$ .  
      b. I wouldn't have any  $[\text{money}]_F$ , and you'd have to lend me your  $[\text{key}]_F$ ,  $[\text{too}]_F$ .

Further sentences attempt to refine under what contexts *too* and *either* sound felicitous, with particular attention paid to phonological stress. Green proposes a deep structure that includes the clause "reciprocally relevant," a phrase which only gains any semantic rigor under Rooth's analysis. The way to state this under Rooth's account is discussed in a moment.

First, Green also presents sentences like (15) [= her (13)],

- (15) Ho Chi Minh has killed a lot of people, and  $[\text{LBJ}]_F$  lives in Texas too.

which she says "are ungrammatical unless, for example, *lives in Texas* is intended (and understood) to mean something implying 'has killed a lot of people.'" The other somewhat

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<sup>7</sup> Instead of picking up a sentence. See §3.5 for more discussion of focus operating on non-sentential elements.

unusual example appears in (16) [= Green's (37), from a 1965 paper by Lila Gleitman, and (38)]. She refers to (16a) as "grammatical but rather pointless" and (16b) as "something less than pointless."

- (16) a. I wrote my grandmother a letter yesterday, and six men can fit in the back seat of a Ford.  
b. I wrote my grandmother a letter yesterday, and six men can fit in the back seat of a Ford, too.

Green's use of "(un)grammatical" is misleading, under more current terminology; the problem is certainly not syntactic, nor is it a semantic violation on par with "John likes herself." It is, more accurately, "infelicitous." For Green, then, this is evidence that the particle *too* must be adding some semantic information; for us, it confirms that the presupposition supplied by *too* needs to be met. With a slight addition to Rooth's account of focus, we can make sense of (15) and (16).

#### 2.4. An Extension/Modification of *C*

The issue in Green's sentences above, and indeed in many of the sentences in her paper, is what can serve as the antecedent to *C* in a focused sentence. *C* does not work in quite the same manner as a referential pronoun like *he* or *they*. Such pronouns can pick up a non-linguistic antecedent, but generally not an implied one:

- (17) \*James became an orphan at age four, when they were killed by a rhinoceros.

*They* in (17) cannot refer to James's parents, even though they are suggested by the word "orphan."<sup>8</sup> This is not the case, however, with the variable introduced by focus.

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<sup>8</sup> Of course, it's not impossible for a pronoun of this sort to pick up an implied antecedent. Certainly (i) is comprehensible (sentences paraphrased from Heim's dissertation):

- (i) I had ten marbles, but now I have nine. It must be under the couch.  
(ii) I had ten marbles, but I lost one. It must be under the couch.

The key is that, on the one hand, (i) is far harder to make sense of than (ii) is, and on the other, (i) is far harder to make sense of than a sentence like (18) is.

(18) James is an orphan. [My]<sub>F</sub> parents are dead, too.

The alternative set for the second sentence of (18) is  $\{x\text{'s parents are dead} \mid x \in E\}$ , and the presuppositions that some other sentence  $C$  in this set is both salient and true are satisfied by letting  $C$  pick up the implicit proposition *James's parents are dead*. Exactly this sort of accommodation is needed to explain Green's sentences. Green claims that (15) works only when *lives in Texas* implies *has killed a lot of people*. If instead the converse is true—that killing a lot of people implies living in Texas—then (15) works exactly like (18):<sup>9</sup>

(15') Ho Chi Minh has killed a lot of people. *Therefore, Ho Chi Minh lives in Texas.*  
[LBJ]<sub>F</sub> lives in Texas, too.

(18') James is an orphan. *Therefore, James's parents are dead.* [My]<sub>F</sub> parents are dead, too.

The italicized sentences are implicit, but they nevertheless serve as antecedents for the variables created by the focus. Without the assumption that there's a relation between living in Texas and killing people, this sentence cannot be understood, and the presupposition of *too* fails.

Similarly, the fact that (16b) is “less than pointless” can be explained by the presupposition failure of *too*. Suppose that the focus in (16b) is on the entire proposition. Then (16b), like (15), can be repaired by setting up some focus set which includes both conjuncts, so that the focus variable introduced can pick up *I wrote my grandmother yesterday*. This is hardly easy, but a question like *So what's been going on that makes you think the world is coming to an end?* might

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<sup>9</sup> This does raise an interesting issue: can the  $\sim$  work on an implicit proposition? That is, supposing that living in Texas really does imply that you kill people, but not vice versa, can the  $\sim$  set up a variable on the implicit sentence [LBJ]<sub>F</sub> *has killed a lot of people*? I suspect not; consider (i) and (ii).

- (i) Mary had brussels sprouts, and [John]<sub>F</sub> ate a green vegetable too.
- (ii) John ate a green vegetable, and [Mary]<sub>F</sub> had brussels sprouts too.

(i) is perfectly fine, because having brussels sprouts entails eating a green vegetable, and the variable introduced by the second sentence picks up this implicit proposition. (ii) seems odd, unless brussels sprouts are the only green vegetable John and Mary can eat—that is, unless *ate a green vegetable* entails *had brussels sprouts*. My guess, then, is that Green accidentally reversed the implication. If, however, her intuition about (15) is correct, it merits more study.

have as its meaning a set of propositions that are true but that I thought never would be, such as {I wrote my grandmother a letter yesterday, Six men can fit in the back seat of a Ford, I just saw a pig fly past the window, ...}. In such a case (16b) is still odd but no longer quite as pointless. This sort of question to which either conjunct can be an answer is exactly what makes the *too* felicitous in (14b),

(14b) I wouldn't have any [money]<sub>F</sub>, and you'd have to lend me your [key]<sub>F</sub>, [too]<sub>F</sub>.

where an implied question like *Why can't you go pick up our Chinese takeout order?* is what unifies the two halves of the sentence and allows the first to be a legitimate alternative to the second.

This sort of accommodation is crucial to a study of focus in general and of *too* and *either* in particular. Of particular interest for the purposes of this paper is a certain type of accommodation that occurs in sentences like (19), which does not involve direct entailment of an implicit proposition.

(19) Becca likes corn. Marc likes [peas]<sub>F</sub>, too.<sup>10</sup>

By itself, the semantics of *too* will naturally go wrong, since there is no explicit alternative to the second sentence. Accommodation, however, will not quite help either, because the statement *Becca likes corn* does not entail or even by itself imply a proposition of the form “likes(marc, x)” (except under very particular circumstances—if, for instance, both speaker and hearer know that

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<sup>10</sup> There is another reading of (19) besides the one I consider in the discussion here, namely the reading where it is, for example, the answer to the question *None of the kids like vegetables, do they?* In this case, the sentence *Marc likes peas, too* will not suggest any accommodation at all. When (19) is considered in this fashion, the focus is actually on the whole sentence, not the NP constituent:

(i) *Becca likes corn. [Marc likes peas]<sub>F</sub>, too.*

which causes the focus set to be built differently—the set of alternatives to (19) is {like(marc, x)} whereas the set of alternatives in (i) is, perhaps, {Becca likes corn, Marc likes peas, the twins have been known to eat broccoli...}, alternative answers to the question mentioned above. The catch, of course, is that a sentence is focused by putting phonological focus on its final word; see Büring (1998) for a discussion of where focus is realized, as well as the use of focus in answers to questions.

Marc likes everything Becca does). Nevertheless, (19) is perfectly interpretable because the hearer tends to fill in a missing proposition:

(19') Becca likes corn. *And [Marc]<sub>F</sub> likes corn.* Marc likes [peas]<sub>F</sub>, too.

Here the focus in the second, implied sentence sets up a variable which can legitimately pick up the meaning of the first sentence, and the variable in the third sentence can pick up the meaning of the second. Removing the possibility of the second sentence being true makes (19) anomalous,

(19'') # Becca likes corn. Marc likes [peas]<sub>F</sub>, too, although he doesn't like corn.

again discounting the reading where (19'') has sentential focus (as discussed in footnote 10) and is thus analogous to the question/answer contexts in (14).

To work properly, (19) may need secondary stress on *Marc*. Alternately, its appearance in subject position may be enough, insofar as subjects are expected to contain familiar, not new, information. For *Marc* to be familiar information would require a sentence in which he had already been introduced such as the italicized sentence in (19'). Certainly a variation on (19) in which the object, not the subject, is contrasting does not allow this sort of accommodation and is therefore anomalous.

(20) # Becca likes corn. [Marc]<sub>F</sub> likes peas, too.  
(Not allowed: Becca likes corn. *And Becca likes [peas]<sub>F</sub>.* [Marc]<sub>F</sub> likes peas, too.)

One more vital fact is that, without the *too*, a very different accommodation happens. In fact, exactly the opposite bridge tends to be supplied.

(21) Becca likes corn. Marc likes [peas]<sub>F</sub>.

The implied proposition, if there is one at all, is *Marc doesn't like corn*. This use is one of the meanings of focus that dates back to Rooth (1985), where a sentence like *Marc likes [peas]<sub>F</sub>* on its own suggests that something else, perhaps everything else, in the focus set of *peas* may well

be something Marc does not like (to the best of the speaker's knowledge). If this is the case, then it is the *too* that forces the sort of accommodation seen in (19).

These facts will prove useful in §4, when an explanation is needed for a quirk in the distribution of *either* in negative polarity contexts. First, however, what exactly a negative polarity context is must be defined.

### 3. Theories of Negative Polarity

#### 3.1. An Early Account: Klima

The history of what is commonly called “polarity sensitivity” starts with Klima (1964), who gives perhaps the earliest attempt to account for the observation that certain words can only occur in so-called “negative” contexts, and others in “positive” ones. Therefore, many of his observations serve as a necessary starting point for an account of negative polarity. For instance, Klima gives a series of sentences with “a negative element.” The elements, as he gives them, are *not, never, hardly, rarely, none, few, unable, too,*<sup>11</sup> and *doubted*. The variety seen in this class of items—some with what is known as “overt” negation<sup>12</sup> and some not; comprising adverbs, adjectives, verbs, and determiners—demonstrates the challenge inherent in explaining the distribution of NPIs.

Klima also introduces the concept of “sentential negation.” He phrases his definition in terms of diagnostic tools, of which the most interesting is conjunction involving *either*. The definition and thus his list of tests appears in §19 of his paper: acceptability of *either*-clauses, of the “negative appositive tag” *not even*, and of a question tag without *not* (e.g. *do they?* as

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<sup>11</sup> As in his sentence *The students were too intelligent to believe it had happened*, which will allow an NPI like *ever* (e.g. *...to believe it had ever happened*).

<sup>12</sup> Which usually seems to refer to the letter *n*: *not, never, none, nobody, nothing, neither*, and so on.

opposed to *don't they?*). A fourth test distinguishes strong, as opposed to weak, sentential negation, namely the licensing of the *neither*-tag. These four constructions are best seen by the following illustration that *never* is an example of strong sentential negation, with the tests mentioned above given in italics (sentences adapted from Klima).

- (22) a. Publishers will always reject suggestions, and writers never accept them *either*.  
 b. Writers will never accept suggestions, *not even good ones*.  
 c. Writers will never accept suggestions, {*will they/\*won't they*}?  
 d. Writers never accept suggestions, and *neither do publishers*.

Klima gives *seldom* as an example of weak sentential negation, since in contrast to (22d), “Writers seldom accept suggestions, and neither do publishers” is unacceptable (at least, he qualifies this, in some idiolects). The opposite judgments apply for other types of negation, such as those in (23) (adapted from Horn 1989, §3.3).

- (23) a. My friends are unhappy, and my enemies are unhappy {*too/\*either*}.  
 b. \*My friends are unhappy, *not even Melissa*.  
 [Compare: “My friends are not happy...”]  
 c. My friends are unhappy, {*\*are they/aren't they*}?  
 d. \*My friends are unhappy, *and neither are yours*.

Sentential negation, by this definition, is more a description of the phenomenon than an account for it, but the distinction is one that will arise again and it is therefore worth noting.

Klima ultimately gives an account using syntactic transformations in which the particle *Indef*(inite) is created by negation and incorporated into a quantifier of a certain type, labeled *Quant*<sup>1</sup>. In this manner, *any* is derived from *Indef* + *Quant*<sup>1</sup> and *no* from *Neg*(ative) + *Indef* + *Quant*<sup>1</sup>. The *Indef* is introduced by the “*Indef*-incorporation” rule, which Klima calls “obligatory in certain environments.”

- (24) S: [neg]<sub>PVP</sub> X-Quant → neg-X-Indef + Quant [= his (110a)]

The “ $\rightarrow$ ” indicates a rewrite rule,<sup>13</sup> the dashes are markers between words, and *PvP* indicates that *neg* is a pre-verbal particle. To illustrate this transformation, Klima gives the derivation of *That house doesn't have any roof* [his (111)].

- (25) i. That-house-*neg*-Tense-have-*Quant*<sup>1</sup>-roof  
 ii. That-house-*neg*-Tense-have-*Indef* + *Quant*<sup>1</sup>-roof [by (24)]  
 iii. That-house-*do*-Tense-*neg*-have-*Indef* + *Quant*<sup>1</sup> roof [by other transformational rules]

“*Do*-Tense” will combine to form *does*; *neg* will surface as *not*, having nothing else to attach to; and *Indef* + *Quant*<sup>1</sup> will, as noted above, combine to form *any*. The derivation would presumably then finish:

- (25) iv. That-house-[*do* + Tense]-[*neg*]-have-[*Indef* + *Quant*<sup>1</sup>]-roof  
 v. That-house-does-not-have-any-roof  
 vi. That house doesn't have any roof [by a contraction transformation]

A similar derivation would provide the sentence *That house has no roof*, using an optional rule of *neg*-incorporation that Klima gives. Line 3 of the transformation in (25) would more or less read

- (25') iii. That-house-Tense-have-*neg* + *Indef* + *Quant*<sup>1</sup> roof

with the remaining lines following in a similar pattern, with *neg* + *Indef* + *Quant*<sup>1</sup> combine to form *no* as noted above.

Following this analysis, Klima derives other negative polarity items from similar *Indef*-incorporation, such as *ever* from *Indef* + Time (where “Time” alone surfaces as, for instance, *sometimes* or *sometime*), and *never* by *neg*-incorporation into *ever*. Of more interest here is the claim that *either* and *neither* can derive from *too* in the same fashion, i.e. rewriting *Indef* + *too* as *either*, and *neg* + *Indef* + *too* as *neither*. In this fashion, he ensures that *either* and other NPIs

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<sup>13</sup> A word about notation: Klima uses  $\Rightarrow$  here, and in later sections some authors used  $\rightarrow$  to mean “entails.” For consistency, I use the double arrow throughout to signify entailment, and the single arrow for other uses.

can only occur with a *neg* in the sentence, since only the *neg* will create the *Indef* necessary to combine with *too* to create them in turn.

Later, Klima adapts the *neg*-incorporation rule to extend to constituents with “negative affixes,” which he marks with **neg aff**; these are affixes on adjectives and verbs such as *un-*, *in-*, *dis-*, and *-less*, which license negative quantifiers in their complements (for instance, Klima gives sentences like *He would be unwise to do any more* or *He disliked doing any more than necessary*). Using this **neg aff**, Klima accounts for words that “do not show any sign of *neg*” such as *doubt*, *forbid*, and *too*. That is to say, just as *unwise* derives from **neg aff**-*wise* and *dislike* from **neg aff**-*like*, Klima suggests that *doubt* and *too* derive from **neg aff**-*doubt* and **neg aff**-*too*, respectively, which include “a **neg**(ative) **aff**(ix), but without phonological shape” and which simply do not occur without their negative affixes (analogous to the adjectives *point* in *pointless* and *use* in *useful*).

Setting aside the question of whether this theory can be rephrased without the sort of rewrite rules that Klima uses, there is good reason to reject the idea that *doubt* and related words have a phonologically null lexical negative affix. With no other evidence to motivate the affix, this becomes no more than a “[+NPI-licensor]” feature on certain words, and the claim that the *neg* inserts a marker to change a positive polarity item to a negative one in the end seems no different. Such a theory cannot adequately explain why *doubt*, *forbid*, and by extension adjectives that license NPIs such as *sorry* should be marked in this way while *suspect*, *allow*, and *glad* do not. The fact that words like the former do license NPIs while others like the latter do not needs to follow from their semantics, which is exactly the claim that Ladusaw makes.

### 3.2. Negative Polarity: Ladusaw's account

Ladusaw's dissertation took an entirely different approach to the problem of negative polarity than Klima. Ladusaw (1996) states that “[i]t has been clear since Klima (1964) that the range of expressions which can license negative polarity items like *any* and *ever* is beyond syntactic characterization,” which is suggested by the range of words that do license, and which is made even more clear by the contrast in (26).

- (26) a. Every student who had ever been to Spain wrote a report.  
b. \*Every student who wrote a report had ever been to Spain.  
c. \*The student who had ever been to Spain wrote a report.

(26c) shows that it is *every* and not the relative clause which licenses the *ever* in (26a), but *every* only licenses NPIs within its first argument (the noun), not its second (the verb). Therefore, looking for a semantic explanation to unify these facts, Ladusaw introduced the concept “downward entailing.” He gives the following definition, or rather definition schema, as (37) in chapter 6 of Ladusaw (1980):

- (27) An expression  $\delta$  is *downward-entailing* iff  
 $\forall x \forall y \square [x \subseteq y \rightarrow [\delta'(y) \{ \subseteq / \Rightarrow \} \delta'(x) ]]$

where the choice between  $\subseteq$  and  $\Rightarrow$  depends on whether  $\delta'(y)$  and  $\delta'(x)$  are sets (in which case the former must be a subset of the latter) or propositions (in which case the former must entail the latter).

To take the case in (26) as an example, *every* would need to be shown to be downward entailing on its noun position but not on its verb position. According to (27), *every* is downward entailing on its noun position if for all predicates  $x$  and  $y$  for which  $x$  is a subset of  $y$ , *every*  $y$  will be a subset of *every*  $x$ , which is to say that *every*  $y$  [*verb phrase*] will necessarily entail *every*  $x$  [*verb phrase*]. For a concrete instance of this, take  $x$  to be “phonologist” and  $y$  to be “linguist,” so that  $x$  is a subset of  $y$  (but  $y$  is not a subset of  $x$ —all phonologists are linguists, but not all

linguists are phonologists). In this case, *every linguist* is a subset of *every phonologist*, or more precisely the set of propositions that hold for all linguists are a subset of those that hold for all phonologists. If for example every linguist likes brussels sprouts, every phonologist must; but if every phonologist likes brussels sprouts, it is not the case that every linguist must.

Similar argumentation shows that *every* is not downward entailing on the verb; if *x* and *y* are taken to be, to use Ladusaw's examples, "eat brussels sprouts at dinner" and "eat a green vegetable at dinner" respectively, so that again *x* is a subset of *y*, it is not the case that (to take "linguist" as an arbitrary noun phrase) if every linguist ate a green vegetable at dinner, then every linguist ate brussels sprouts at dinner.

These results are summarized in (28).

- (28) a. *phonologist*  $\subseteq$  *linguist*, and:  
       Every linguist likes brussels sprouts.  $\Rightarrow$   
       Every phonologist likes brussels sprouts.  
       (i.e. *every linguist*  $\subseteq$  *every phonologist*)  
 b. *ate brussels sprouts with dinner*  $\subseteq$  *ate a green vegetable with dinner* but:  
       Every linguist ate a green vegetable with dinner.  $\neq \Rightarrow$   
       Every linguist ate brussels sprouts with dinner.

Therefore, *every* is downward entailing on the noun phrase and should license NPIs there, but not on the verb phrase. This prediction is exactly borne out in (26).

Ladusaw works through a number of determiners and predicates which license negative polarity items, showing that they are in fact downward entailing. For instance, to take the licensors mentioned above in §1, and again using Ladusaw's favorite cases of eating brussels sprouts:

- (29) a. John did **not** eat a green vegetable with dinner.  $\Rightarrow$   
       John did **not** eat brussels sprouts with dinner.  
 b. John **rarely** eats a green vegetable with dinner.  $\Rightarrow$   
       John **rarely** eats brussels sprouts with dinner.  
 c. **Few** Americans eat green vegetables with dinner.  $\Rightarrow$   
       **Few** Americans eat brussels sprouts with dinner.

- d. It's **unlikely** that John will eat a green vegetable with dinner.  $\Rightarrow$   
It's **unlikely** that John will eat brussels sprouts with dinner.
- e. **If** John eats a green vegetable with dinner, he'll be healthier.  $\Rightarrow$   
**If** John eats brussels sprouts with dinner, he'll be healthier.
- f. I'm **surprised** John eats green vegetables with dinner.  $\Rightarrow$   
I'm **surprised** John eats brussels sprouts with dinner.

For each of the boldface predicates, the entailments of the propositions hold in a *downward* direction, from the more general case down to the less general case (hence “downward entailing”). For this reason, under Ladusaw’s theory, the boldface expressions license negative polarity items, as we saw in §1.

### 3.3. Refinement #1: Strawson-Entailment (and other patches)

Some critics such as Linebarger (1987, among others) have noted that entailments such as (29f) do not actually seem to hold. For instance, it is possible that the only green vegetables John eats are broccoli and kale, in which case I can still be surprised that he eats a green vegetable, but this certainly does not entail that I am surprised he eats brussels sprouts. A similar objection holds for other predicates like *doubt* and *regret*:

- (29) g. I **doubt** that John ate a green vegetable with dinner.  $=(?)\Rightarrow$   
I **doubt** that John ate brussels sprouts with dinner.
- h. John **regrets** that he ate a green vegetable with dinner.  $=(?)\Rightarrow$   
John **regrets** that he ate brussels sprouts with dinner.

Again, if John does not actually eat brussels sprouts, he can regret that he ate a green vegetable without regretting that he ate brussels sprouts. Since *doubt* suggests that a proposition is somehow under discussion, it’s easy to doubt that John ate a green vegetable without bothering to doubt that he ate brussels sprouts. Nevertheless, these predicates do license NPIs: *I doubt that John ever eats green vegetables; John regrets that he ever ate green vegetables*. How can Ladusaw’s proposal that NPIs occur only in downward entailing environments be salvaged, in

light of this?

One fact to note is that the reverse entailments do not hold at all:

- (30) a. I'm surprised John ate brussels sprouts with dinner.  $\neq \Rightarrow$   
I'm surprised John ate a green vegetable with dinner.  
b. I doubt that John ate brussels sprouts with dinner.  $\neq \Rightarrow$   
I doubt that John ate a green vegetable with dinner.  
c. John regrets that he ate brussels sprouts with dinner  $\neq \Rightarrow$   
John regrets that he ate a green vegetable with dinner.

While (30) does not itself show anything stronger than the fact that these predicates are not upward entailing (leaving open the possibility that they are neither upward nor downward entailing), the fact that judgments on the entailments in (29f-h), while not perfect, are overwhelmingly stronger than those in (30), suggests that these three predicates are indeed downward entailing. (As Ladusaw (1980:157) says on this subject, “The intuitions are clear, though what they are intuitions of is more controversial.”)

A thorough discussion of this problem is given in von Stechow (to appear). He introduces a concept he labels “Strawson Downward Entailingness,” or Strawson Entailment for short. This is “a notion of entailment that will only check whether an inference is truth-preserving under the assumption that all the implicatures and presuppositions or premises and conclusion are satisfied.” In technical terms [von Stechow's (14), underscoring his]:

- (31) A function  $f$  of type  $\langle \sigma, \tau \rangle$  is Strawson-DE iff  
for all  $x, y$ , of type  $\sigma$  such that  $x \Rightarrow y$  and  $f(x)$  is defined:  $f(y) \Rightarrow f(x)$ .

Take, for instance,  $f$  to be the predicate *be-surprised* (of type  $\langle \langle s, t \rangle, \langle e, t \rangle \rangle$ ), as it should be fairly clear through the analysis below that the same analysis will hold for *doubt* and *regret*.

This definition says that *be-surprised* is Strawson downward entailing if for all propositions  $x$  and  $y$  (i.e. objects of type  $\langle s, t \rangle$ —technically, intensions of propositions), if  $x$  entails  $y$ , and  $f(x)$  is defined, then  $f(y)$  entails  $f(x)$ . Suppose that we again use  $x = \textit{John ate brussels sprouts with}$

*dinner* and  $y = \text{John ate a green vegetable with dinner}$ , so that  $x \Rightarrow y$ . Then as long as  $f(x)$  is defined—that is, as long as the presuppositions hold for the predicate *is surprised that John ate brussels sprouts for dinner*—we need to see that  $f(y) \Rightarrow f(x)$ . Strawson Entailment will indeed solve one of the objections raised at the beginning of this section, the one in which John eats only broccoli and kale. If that is the case, then the presuppositions of  $f(x)$  do not hold, and the definition in (31) is still satisfied. The same reasoning will show that *regret* is Strawson entailing, and similar reasoning involving the presuppositions of *doubt*, which are different from those of *regret* and *surprised*, will show that it, too, meets this definition.

There are other objections to the entailments in (29f-h) that von Fintel discusses, many of them following Heim (1984) and Kadmon and Landman (1993). One is that John may eat brussels sprouts, but I may not know what they are, or I may think they're something other than a green vegetable. Then I could be surprised (or doubt) that he eats a green vegetable, but would not thereby be surprised (or doubt) that he eats brussels sprouts. There is no perfect answer to this, except to state that the semantics assume a certain degree of complete world knowledge. This is related to von Fintel's note that "since attitude holders are not as a rule logically consistent, their belief systems will often not behave as they logically should. To avoid this problem, assume counterfactually that attitude holders are perfectly consistent."

Alternately, John may eat brussels sprouts, and while I expect that John would never eat a green vegetable, I at least admit that of any vegetable that he might eat, brussels sprouts are somehow the most likely. In that case, I might still doubt or be surprised that John eats green vegetables, but it would be odd to say that I doubt or am surprised he eats brussels sprouts. The bulk of von Fintel's paper handles these cases; here, it suffices to say that the context needs to be essentially kept constant, and in this scenario the surprise or doubt is context dependent: "I am

surprised that John ate a green vegetable; but *in the context of his eating a green vegetable* I am not surprised he ate brussels sprouts.”

Where this brings us is a restatement of Ladusaw’s basic proposal. Since expressions which satisfy Ladusaw’s definition of downward entailment are necessarily a subset of those which are Strawson Entailing, this new definition serves as a replacement for the old one. That is to say, instead of saying that NPIs occur only in downward entailing contexts, we now need to say that they occur only in Strawson Downward Entailing contexts. This broadens the range of licensors to include *doubt*, *regret*, and so on. Henceforth, however, for the sake of consistency with earlier and more familiar literature, I will continue to use “downward entailing” to mean “Strawson entailing” or “Strawson downward entailing,” assuming that von Stechow’s proposal for Strawson entailment is intended as a patch on the downward entailment restriction. There should be little or no confusion about the terminology.

Downward entailment, with this modification, remains the most coherent and reasonable explanation for the distribution of negative polarity items. The basic generalization also holds for *either*—that is, it somehow requires a downward entailing context. However, the data in (4) repeated below, along with the other cases given, show that the distribution of *either* is a little different than that of most NPIs. More specifically, it does not occur with every downward entailing (or even Strawson entailing) licensor that other NPIs do.

- (32) a. The police would want to talk to us if you’d ever met the victim.  
\*They’d want to talk to us if I had, either. [= (4a)]  
b. I’m surprised that John has ever been to Spain.  
\*I’m surprised that Mary has either. [= (4b)]  
c. Every linguist who has ever studied NPIs is confused by this data.  
\*Every linguist who has studied focus either is confused.

More needs to be said about the distribution of negative polarity items. The next two sections show two possible attempts, neither of which is sufficient in the case of *either*.

### 3.4. Zwarts' (first) refinement: NPI strength

One way to differentiate downward entailing contexts was proposed by Zwarts (1997). I do not wish to go into too much depth about this proposal, since in the end it will not explain the distribution of *either*, so I present here a summary from Vasishth (1998) of the work of Zwarts and of van der Wouden (1994).

Zwarts described three different classifications of negative context, based upon De Morgan's laws.

- (33) De Morgan's laws:  
a.  $\neg(p \vee q) \leftrightarrow (\neg p \wedge \neg q)$   
b.  $\neg(p \wedge q) \leftrightarrow (\neg p \vee \neg q)$

An operator which satisfies the forward implication of De Morgan's first law is called *monotone decreasing*, one which satisfies both implications (i.e. all of (33a)) is called *antiadditive*, and one which also satisfies the second law is called *antimorphic*. More precisely:

- (34) An operator  $O$  is *monotone decreasing* iff  
 $O(p \vee q) \Rightarrow (Op \wedge Oq)$   
An operator  $O$  is *antiadditive* iff it is monotone decreasing and additionally  
 $(Op \wedge Oq) \Rightarrow O(p \vee q)$   
An operator is *antimorphic* iff it is antiadditive and additionally  
 $O(p \wedge q) \Leftrightarrow (Op \vee Oq)$

Note the subset relation: all antimorphic relations are antiadditive, and all antiadditive relations are monotone decreasing. The facts in (35-36) show that *few people* is monotone decreasing and *no one* is antiadditive (and thus also monotone decreasing). (37) shows that *not* is antimorphic (and thus both antiadditive and monotone decreasing), which is unsurprising, since using  $\neg$  as the operator in (34) gives De Morgan's laws themselves.

- (35) a. Few people drink or smoke.  $\Rightarrow$  Few people drink and few people smoke.  
b. Few people drink and few people smoke.  $\neq \Rightarrow$  Few people drink or smoke.  
c. Few people drink and smoke.  $\Leftarrow \Rightarrow$  Few people smoke or few people drink.

- (36) a. No one drinks or smokes.  $\Rightarrow$  No one drinks and no one smokes.  
 b. No one drinks and no one smokes.  $\Rightarrow$  No one drinks or smokes.  
 c. No one drinks and smokes.  $\Leftarrow/\Rightarrow$  No one drinks or no one smokes.
- (37) a. I do not drink or smoke.  $\Rightarrow$  I do not drink and I do not smoke.  
 b. I do not drink and I do not smoke.  $\Rightarrow$  I do not drink or smoke.  
 c. I do not drink and smoke  $\Leftrightarrow$  I do not smoke or I do not drink.

The reason to set up this distinction is that, while all three are NPI licensors, they do not license the same NPIs:

- (38) a. Few people have *ever* been to Spain.  
 b. \*Few people are *a bit* happy about these facts.  
 c. \*Few people are *half bad* at linguistics.
- (39) a. No one I know has *ever* been to Spain.  
 b. No one I know is *a bit* happy about these facts.  
 c. \*No one I know is *half bad* at linguistics.
- (40) a. John has not *ever* been to Spain.  
 b. John is not *a bit* happy about these facts.  
 c. John is not *half bad* at linguistics.<sup>14</sup>

Zwarts therefore calls NPIs like *ever*, that require only a monotone decreasing context, “weak”; NPIs such as *a bit*, which require an antiadditive context, are “medium”; and *half-bad* and other NPIs requiring antimorphic contexts are “strong.”

Can *either* be explained by classifying it in this manner? Unfortunately, no. For instance, the antiadditive licensor *no one* does license *either* (*No one smokes, and no one [drinks]<sub>F</sub>, either*), whereas (32c) showed that *every*, which is antiadditive on its first argument (*Every man or woman drinks*  $\Leftrightarrow$  *Every man drinks and every woman drinks*, where “man or woman” is that set of individuals such that each one is a man or a woman), does not license *either* in that position. (See also §5.1 for a discussion of the difference between *only* and *nobody but*, which

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<sup>14</sup> *Half-bad* is a somewhat strange example, as it is “arguable” (in Vasisht’s word) whether it is an NPI at all, and the truth is that few if indeed any NPIs in English show this distribution. However, Vasisht gives NPIs with this distribution for Dutch (*mals zijn*, ‘be soft’) and Japanese (*dare mo*, ‘anyone’).

are both antiadditive and therefore license medium NPIs, but which do not both license *either*.) To make matters worse, (2c) showed that the determiner *few* [noun] does license *either*, so by Zwarts' criteria *either* would have to be a weak NPI that can occur with any downward entailing licenser, and thus any licenser at all. Again, we have seen that this is not at all the case. Therefore, appealing to polarity strength will not explain the distribution of *either*.

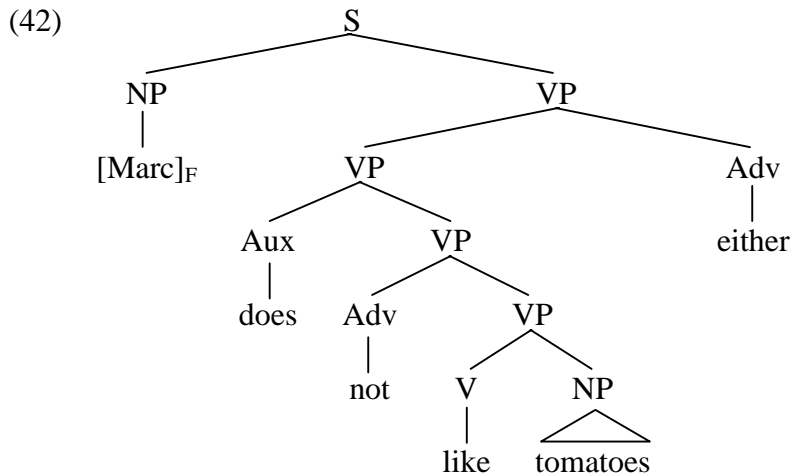
### 3.5. A Syntactic Excursion

In order to continue with the semantics, a syntactic assumption should be made explicit. Throughout this paper, I follow Klima (1964) in taking *too* and *either* to be sentential modifiers. This is clearly not the whole story, given sentences like:

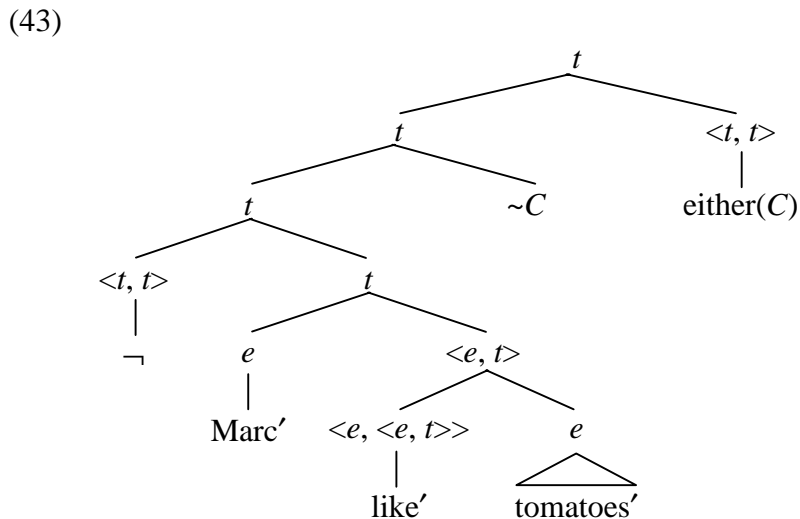
- (41) a. John left without meeting Rover, and without meeting [Fluffy]<sub>F</sub> either.  
 b. John read the book which I didn't like, and which [you]<sub>F</sub> didn't like, either.  
 c. [John]<sub>F</sub> likes corn. [Mary]<sub>F</sub>, too.

Under some views, *meeting Fluffy* and *which you didn't like* in (a) and (b) are closed propositions ("John met Fluffy," "you don't like the book"), and the second sentence of (c) contains the heavily-elided proposition "Mary likes corn." On the other hand, it may be more reasonable to consider the phrases in (a) and (b) as functions from individuals to propositions ("x met Fluffy," "you don't like y") or properties (" $\lambda x$ . [x met Fluffy]," " $\lambda y$ . [you don't like y]"), and (c) as a contrasting NP (as with the adjectives in Rooth's (1992) "An [American]<sub>F</sub> farmer met a [Canadian]<sub>F</sub> one").

It's quite probable, syntactically, that *too* and *either* are actually VP modifiers. If a sentence like *Marc doesn't like tomatoes*, *either* has the rough syntactic structure ("rough" meaning that complications like exact node labels and empty nodes are set aside) of (42),



some alteration must occur before this can be interpreted as the semantic tree seen, again roughly (i.e., without complications like intensionality), in (43).



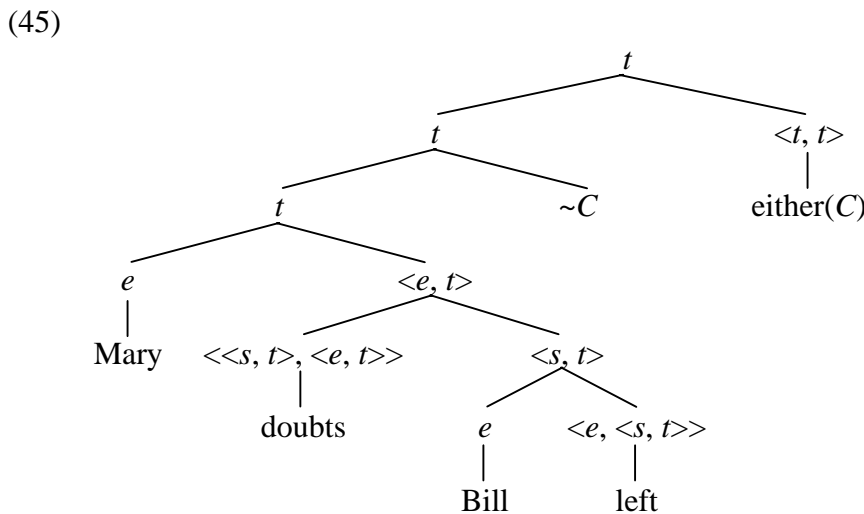
The VP modifier *not* must scope over the entire sentence. The *C* must attach at the level of the entire sentence, or else it would not be looking for a proper contrasting sentence—say, *Becca doesn't like tomatoes*, or some similar sentence of the form “ $\neg$ like(tomatoes)(*x*),” which suggests that the focus set which *C*'s antecedent is in comprises alternatives to  $\neg$ like(tomatoes)(*marc*). Meanwhile, the *either*, if it is to operate on *C*, must have a higher scope than *C* or it will never be able to access the variable. Getting the *either* to the right level can be achieved by movement at

LF, or by a lexical shift, but the details will not matter for this paper. Instead, for the purposes of exposition, it is easiest to assume that the *either* simply attaches to a sentence. This will then generalize without problems to smaller constituents.

How will this work in relation to Ladusaw’s proposal for negative polarity? The claim here is that regardless of where *either* attaches syntactically, it will need to take scope over the entire sentence so that it can read the focus value. If this is the case, it can *never* be within the scope of a downward entailing licenser. The situation is made worse by the unacceptability of (44a) compared to (44b).

- (44) a. \*Sue doubts Bill left. [Mary]<sub>F</sub> doubts Bill left either.  
 b. Mary doubts John left. Mary doubts [Bill]<sub>F</sub> left either.

Even if it is postulated that the *either* in (44b) attaches to the embedded sentence, which would put it within the scope of the *doubt*, whereas in (44a) it attaches to the matrix sentence and is therefore outside the downward entailment, in both cases the *either* will have to raise to the highest position and will no longer be within the scope, i.e. the trees in (45).



(Note that I have included intension only for the complement of *doubt*, although a more accurate tree would include it throughout.) For a discussion of why the *either* needs to see the focus on

the entire sentence, see §4.2. For the time being, it suffices to say that, although the building of the focus set is not shown in the tree in (45), the *either* will need to attach at the highest level, outside the scope of the *doubt*, for either (45a) or (45b).

The solution to these problems gives the first piece of an explanation of the distribution of *either*. Instead of the word itself, as with most NPIs, appearing in the downward entailing context (i.e. within the scope of the downward entailing item), it is the *focus* that must appear there. This is exactly the difference between (44a) and (44b). The remainder of this paper will make use of this fact, given for reference in (46).

- (46) **Downward Entailing Restriction:** For *either* to be licensed, the focused item must be within the scope of a downward entailing operator.<sup>15</sup>

There is a caveat to be mentioned here, which is that the converse of (46) does not hold—it is marginally possible to get *too* when the focus is in a downward entailing context. A sentence such as (47):

- (47) Marc doesn't like tomatoes, and he doesn't like [corn]<sub>F</sub>, too.

is a little stranger than the perfectly acceptable version with *either*, but is nevertheless not entirely unacceptable. As long as the Downward Entailing Restriction is given as is, instead of following from the deeper semantics of *either* just as its counterpart for traditional NPIs may follow from their meaning, this is not a problem.

### 3.6. Two Counterproposals: Lexical Decomposition and Implicature

One alternate suggestion to the above proposals of NPI licensing more or less follows Klima's argument for a negative affix, but refines it by suggesting that an explicit negative marker which appears at some level licenses NPIs, though that marker may incorporate into

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<sup>15</sup> Again, more precisely this would read "Strawson downward entailing."

another word at surface form. Thus, *not* is explicitly negative, and *no one* and *never* transparently derive from *not anyone* and *not ever*; *few* and *doubt* on the surface indicate a deeper structure of *not many* and *think...not*.

There are a number of reasons, however, to believe that this account will not work in general, and in particular cannot explain the distribution of *either*. To begin, the account is in many ways no less stipulative than Klima's, as it must still claim that *few* derives from *not many* but that, for instance, *many* cannot derive from *not few*, in which case the underlying *not* licenses the NPI (i.e. underlying *not-few people ever visit Spain*, with the *not* licensing the *ever*, rewrites to surface form *Many people ever visit Spain*). The same problem extends even more clearly to open class items like adjectives and verbs, where even if an explanation could be given as to why *many* is a better primitive than *few*, it will be hard to explain why *surprised* derives more naturally from, say, *expect...not* than *expect* derives from *surprised...not*. To make matters worse, *unsurprised* does not license NPIs:

(48) \*I'm unsurprised that John has ever been to Spain.

It seems impossible to justify *unsurprised* deriving directly from *expect*; if it derives from anything, it derives from *not-surprised*, i.e. *not expect...not*, which predicts that it should license NPIs. One last problem with this account is that the presuppositions of many of these words are not preserved by the decomposition. Thus, *I am surprised that John left* carries the presupposition that John did indeed leave, which *I expected that John would not leave* does not.

Linebarger (1987), following Baker (1970), offers an entirely different approach, which she explicitly notes does not rely on lexical decomposition. She claims, again following Klima, that most NPIs are licensed because "the sentence containing the NPI must contain an overt negation c-commanding the NPI," and that a sentence without this overt negation which contains an NPI

has a “negative implicatum” (or “NI”), another sentence with an overt negation which is entailed or even implicated by the host sentence. Her precise formulation of this relationship is as follows:

- (49) **Expectation of negative implicatum is itself a conventional implicature.** A negative polarity item contributes to a sentence *S* expressing a proposition *P* the conventional implicature that the following two conditions are satisfied.  
**Availability of negative implicatum.** There is some proposition NI (which may be identical to *P*) which is implicated or entailed by *S* and which is part of what the speaker is attempting to convey in uttering *S*. In the LF of some sentence *S'* expressing NI, the lexical representation of the NPI occurs in the immediate scope of negation. In the event that *S* is distinct from *S'*, we may say that in uttering *S* the speaker is making an *allusion* to *S'*.  
**NI strengthens P.** The truth of NI, in the context of the utterance, virtually guarantees the truth of *P*.

Linebarger herself provides the first problem here: (49) predicts that *any* sentence *S* should license a negative polarity item because it has the NI *It is not the case that not S*. She has no means of excluding this case except by stipulation. However, there are other such sentences which also should be ruled out as possible NIs. For instance, recall a favorite example of Klima's, *Publishers will always reject suggestions*. This does not allow *either* to be added at the end (regardless of focus or of a contrasting proposition like *Writers will never accept suggestions*), yet it has the NI *Publishers will never accept suggestions*, which will accept *either* at the end, and which is not the sort of double negative that Linebarger specifically excludes. This sort of problem extends to other, more traditional NPIs as well, such as *yet*: the sentence *Every publisher has rejected my manuscript yet* has the NI *No publisher has accepted my manuscript yet*, which is entailed by *S* and has the NPI *yet* within the scope of the negation.

Moreover, in many cases that Linebarger does accept, the NI is even more of a stretch than these. For instance, she claims that *a damn thing* is licensed in *Everyone who knows a damn thing about English knows that it's an SVO language* because of the NI *Everyone who doesn't*

know that English is an SVO language doesn't know a damn thing about English. This implication is certainly not obvious,<sup>16</sup> and Linebarger seems to want the NI to be reachable by conversational implicature.

The additional challenge faced by either lexical decomposition or a Linebargeresque implicature proposal is presented by *either*. The Downward Entailing Restriction in (46) is an attempt to preserve the fundamental observation behind Ladusaw's proposal. It is not clear how either of the two accounts just discussed could account for the difference in acceptability of the sentences in (44), where the same lexical item and the same syntactic structure are used.

Moreover, consider the contrast in (50).

- (50) [Marc must avoid caffeine, on his doctor's orders.]  
a. [Deborah]<sub>F</sub> needs no caffeine {too/\*either}.  
[Allen has had enough caffeine today.]  
b. [Deborah]<sub>F</sub> needs no caffeine {\*too/either}.

(50a) and (50b) have the same structure, but one licenses the *either* and the other does not. (The same contrast holds with other modals, and some people find it easier to see with *want*.)<sup>17</sup>

The contrast in (50) cannot be captured by lexical decomposition, because the *no* is an overt negative item even at surface level. Linebarger's proposal will not work, as (50a) has the obvious negative implicatum *Deborah must not have caffeine, either* (or perhaps *Deborah is not allowed to have caffeine, either*). The explanation for the differences in (50) follow from the

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<sup>16</sup> I am not at all certain what Linebarger would do for many of the "donkey-anaphora" sentences used to motivate Discourse Representation Theory. For instance, I'm not sure that *Every woman who has ever bought a sage plant here bought eight others along with it* can legitimately be transformed into *Every woman who didn't buy eight other sage plants here didn't ever buy one*. Even if it can, the latter sentence is hardly likely to be "highlighted" by the former, which is what Linebarger claims about the English/SVO example.

<sup>17</sup> Nor is the effect caused by the modal itself, as demonstrated in the following sentence (taken from an anonymously-written email about the horrors of college life), which follows a discussion of the effects of sleep deprivation on your sense of humor—the focus can therefore be understood to fall on "eating habits."

- (i) No sleep really fucks with your eating habits too.

*Too* is required instead of *either* for this sentence in spite of the overt negative *no* in the subject, which is usually a licenser (*No student likes corn, and no student likes tomatoes either*).

difference in the scope of *no*, as seen in the very rough approximation of the semantic representation in (51).

- (51) a. need(no-caffeine)(deborah)  
 “The thing that Deborah needs is ‘no-caffeine.’”  
 b.  $\neg\exists x.[\text{caffeine}(x) \wedge \text{need}(x)(\text{deborah})]$   
 “There does not exist caffeine, such that Deborah needs it.”

In (50a), because *no caffeine* is treated as a unit, the word *no* is not being treated as the sort of downward-entailing negative marker that it is in (50b). (Compare the ironically positive force of *Yes, we have no bananas.*) Therefore the focused *Deborah* in (51a) is not occurring within the scope of anything downward entailing and the *either* is therefore not licensed.

Of course, this still cannot be the whole story. The focus in the sentences in (32) all occurred within the scope of the downward entailing item, but *either* was still not licensed. Something more needs to be said.

#### 4. Toward a Semantics of *Either*

##### 4.1. Zwarts’ (second) refinement: Veridicality

*Doubt* and *regret* were shown in §3.2 to be downward entailing predicates<sup>18</sup> which generally license NPIs. Also discussed, however, was the contrast in the licensing of *either*, exemplified in (52).

- (52) a. Mary didn’t leave. John doubts that [Bill]<sub>F</sub> left, either.  
 b. Mary didn’t leave. \*John regrets that [Bill]<sub>F</sub> left, either.

Looking at the logical forms of the second sentences in (52a) and (52b) without the *either*, we see again what it means for *doubt* and *regret* to be of type  $\langle\langle s,t \rangle, \langle e,t \rangle\rangle$ .

- (53) a. doubt( <sup>^</sup>bill-left )(j)  
 b. regret( <sup>^</sup>bill-left )(j)

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<sup>18</sup> And shown in §3.3 to both be Strawson downward entailing.

In plain English, both *regret* and *doubt* express a relation between an individual and a possible world, or rather the set of possible worlds in which the proposition is true—in both (53a) and (53b), the intension of the proposition “Bill left” is a set of possible worlds with which John is in the *doubt*-relation or *regret*-relation, respectively. There is of course a crucial difference between the set of worlds in (53a), on the one hand, and (53b) on the other, namely that in (53b) our own world must be in the set of worlds that John stands in the *regret* relation to, but the forms in (53) can’t reflect that.

Therefore, I turn to Zwarts (1995), who introduces a definition of *veridicality*, following the categorization in Karttunen (1970) of “factive,” “implicative,” and “negative implicative” verbs and extending the distinction to other operators. Basically, a veridical operator is one that preserves truth—i.e. which is both factive and implicative—and a non-veridical operator is one that fails to; an averidical operator, similar to a downward entailing context, is one that reverses the factuality. More precisely, Zwarts gives the definitions [his (2) and, paraphrased, (4)]:

- (54) a. Let  $O$  be a monadic sentential operator.  $O$  is said to be *veridical* just in case  $Op \Rightarrow p$  is logically valid. If  $O$  is not veridical, then  $O$  is *nonveridical*. A non-veridical operator  $O$  is called *averidical* iff  $Op \Rightarrow \neg p$  is logically valid.
- b. Let  $C$  be a dyadic truth-functional connective.
- (i)  $C$  is said to be *veridical* with respect to  $p$  just in case  $pCq \Rightarrow p$  is logically valid. If  $C$  is not veridical with respect to  $p$ , then  $C$  is *nonveridical* with respect to  $p$ . A nonveridical connective  $C$  is called *averidical* with respect to  $p$  iff  $pCq \Rightarrow \neg p$  is logically valid.
- (ii)  $C$  is said to be *veridical* with respect to  $q$  just in case  $pCq \Rightarrow q$  is logically valid. If  $C$  is not veridical with respect to  $q$ , then  $C$  is *nonveridical* with respect to  $q$ . A nonveridical connective  $C$  is called *averidical* with respect to  $q$  iff  $pCq \Rightarrow \neg q$  is logically valid.

For instance, *manage* is a veridical monadic operator: *John managed to leave* entails *John left* (or, to make more explicit the operator status, “ $\text{manage}(\text{leave}(j)) \Rightarrow \text{leave}(j)$ ”). The sentence connector *and* is veridical on both positions; *or* is nonveridical on both, as neither conjunct is necessarily true; and *without* (as in *He left without saying goodbye*) is veridical on the first

position and averidical on the second (i.e., he did leave; he didn't say goodbye). Note, too, that under this definition, averidical operators are a subset of nonveridical operators.

Turning this analysis to the sentences in (52), we see that *doubt* is nonveridical, i.e. if John doubts that Bill left, we cannot assume that it is or is not the case that Bill actually left. *Regret*, however, is veridical: if John regrets that Bill left, then it must be true that Bill has left. We can therefore postulate the additional restriction on *either* in (55):

(55) **The Nonveridicality Restriction:** *Either* cannot appear in a veridical context.

When we combine this with the Downward Entailing Restriction given above, we get results as summarized on the following charts, where (56) shows some typical monadic operators and (57) dyadic:

(56)

Operator	Downward Entailing?	Nonveridical?	License for <i>either</i> ?
Be surprised that <i>p</i>	Yes	No	No
doubt that <i>p</i>	Yes	Yes	Yes
manage to <i>p</i>	No	No	No
regret that <i>p</i>	Yes	No	No
$\neg p$	Yes	Yes	Yes

(57)

Operator	on <i>p</i>			on <i>q</i>		
	DE?	NonV?	<i>either</i> ?	DE?	NonV?	<i>either</i> ?
<i>p</i> and <i>q</i>	No	No	No	No	No	No
<i>p</i> without <i>q</i>	No	No	No	Yes	Yes	Yes
<i>p</i> unless <i>q</i>	No	Yes	No	No	Yes	No
<i>p</i> if <i>q</i>	No	No	No	Yes	Yes	<b>(no)</b>

With the exception of *p if q*, the simple generalization holds that, for *either* to be licensed, the focused element must occur in a location that is both downward entailing and non-veridical.

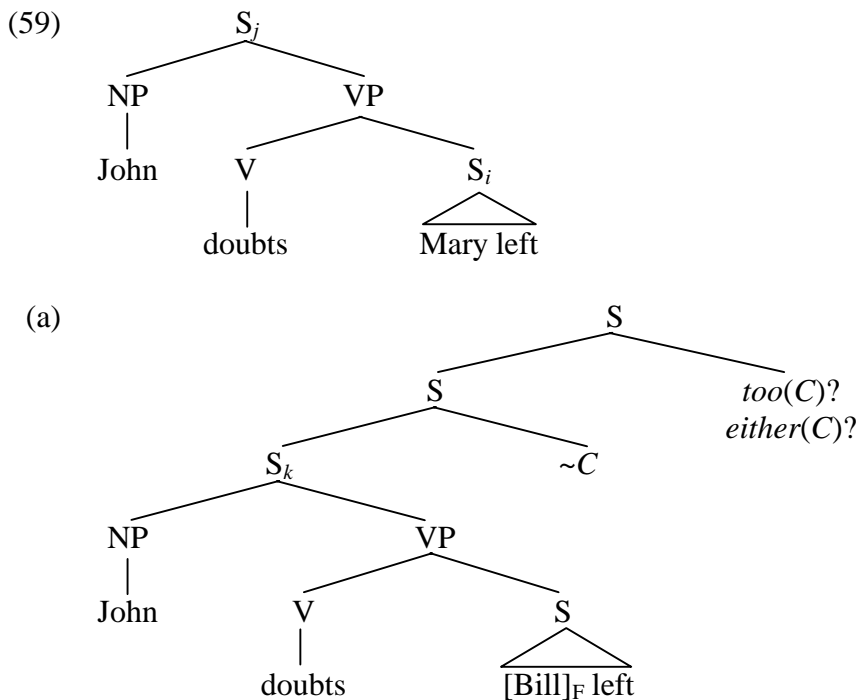
(*Doubt* shows that averidicality is too strong a restriction.) For the moment, set aside the exception, which will be discussed as a problem for future research in §5.3. The question that remains is whether (55) follows from anything else.

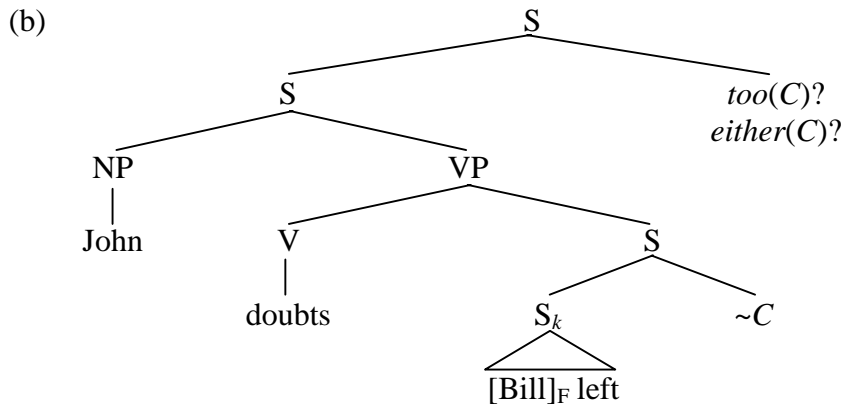
#### 4.2. A Semantics for *Either*

To find the semantics of *either*, remember the semantics for *too* from §2.1, where Rooth suggested that *too* takes the variable  $C$  created by the  $\sim$  operator and adds the presupposition that  $C$  is true. Now consider the following sentences, perhaps uttered at a party.

- (58) a. John doubts that Mary left.                    He doubts that [Bill]<sub>F</sub> left, too.  
       b. John doubts that Mary left.                    He doubts that [Bill]<sub>F</sub> left, either.

Note that this is not the same dual acceptability noted earlier for a sentence like (47), which sounded better with *either* but could more or less occur with *too*. Here (58a) is impeccable, and on a first pass, most hearers seem to consider (58b) basically acceptable, if perhaps a little odd. This suggests that there are two different structures, one for *too* and one for *either*. At a first guess, the semantics would look something like (59), where either *too* or *either* occurs at the highest S node, depending on whether we decide to assign (59a) as the semantics of (58a) and (59b) to (58b) or vice versa. Both will have the same context sentence, given first.





Note that the focus variable may attach at either the embedded sentence or the matrix sentence, representing two different points at which the focus stops being computed and a salient alternative is looked for. In (59a),  $C$  thus represents a member of the set of alternatives to sentence  $k$ . That set is  $\{\text{doubts}(x \text{ left})(j) \mid x \in E\}$ , or somewhat less formally the set of sentences of the form “John doubts that  $x$  left.” The  $C$  will therefore pick up the value of the only salient alternative to sentence  $k$ , namely sentence  $j$ . Sentence  $j$ , moreover, is true—or is asserted to be true by the previous statement—and thus the presupposition of *too* (i.e. that  $C$  is true) will be satisfied. Therefore (59a) is the meaning of (58a), and *too*, not *either*, attaches at the top of the tree.

What does that leave for (59b)? Again  $C$  needs to take as its meaning some salient member of the set of alternatives to  $k$ , which here is the set  $\{x \text{ left} \mid x \in E\}$ . The alternative it will pick up must be sentence  $i$ . At this point, however, we run into a problem: because *doubt* is nonveridical, that sentence is neither necessarily true nor necessarily false! If the particle in (59b) is *either*, it is no longer clear what it could mean.

However, this can be determined by altering the context for (58b) somewhat.

- (60a) [We're at John's party, and it's about 11:30 p.m. Bill and Mary were here when it started, and they promised John they'd stay until midnight, but they got tired and left around 9. John, however, has been in the kitchen talking to other people since 8:30, and doesn't know they left. In other words, Bill and Mary left, but John thinks they're still here. Therefore...]  
John doubts Bill left. \*And he doubts [Mary]<sub>F</sub> left either.

The final sentence in (60a) is generally considered unacceptable. In contrast, the final sentence in (60b), while somewhat odd—comparable to (58b)—is far better.

- (60b) [We're at John's party, and it's about 11:30 p.m. Bill and Mary have been here since it started, and because they promised John they'd stay until midnight, they haven't left yet. John, however, has been in the kitchen talking to other people since 8:30, and doesn't know for certain that they're here. Nevertheless...]  
John doubts Bill left. And he doubts [Mary]<sub>F</sub> left either.

What can account for the difference in acceptability between (60a) and (60b)? The only difference between the two is the context—specifically, the truth or falsity of Bill and Mary having actually left. This can be refined even further. In the two sentences in (61), I've substituted “you” for “Mary,” to sharpen the distinction by making the sentence *you didn't leave* clearly true and *you've left* clearly false.

- (61) [Bill and Mary came to John's party together, and promised John they'd stay until midnight. Unfortunately, Bill got tired and left around 9. John's been in the kitchen talking to other people since 8:30, and thus hasn't seen them since they arrived. At this point, a mutual friend emerges from the kitchen, where John mentioned to her that he's going to come find Bill and Mary soon. She looks around, sees Mary, notices that Bill isn't around, comes up to Mary, and says:]  
a. Oh, drat—Bill left. \*You know, John doubts [you]<sub>F</sub> left, either.  
b. Oh, good—you didn't leave. You know, John doubts [Bill]<sub>F</sub> left, either.

Again, (61a) and (61b) elicit sharp differences in judgment; and the relevant difference between the two is that, in (61a), the embedded sentence is false and the apparent antecedent is true, whereas in (61b) the embedded sentence is true and its antecedent is false.

(60a) and (61a) differ in the truth value of the embedded sentence, but in both the sentence with which it's contrasted it true. (60b) and (61b) similarly differ in the truth value of the

embedded sentence, but in both the antecedent sentence is false. This leads to the following tentative definition of *either*:

- (62) **Semantics of *either*, first pass** (for embedded sentences): if  $\alpha$  is a sentence containing a focus variable  $C$ , and  $C$  occurs in a downward entailing context, then  $\|\alpha \text{ either}\| = \|\alpha\| \wedge \neg\text{too}(C)$ —that is, “ $\alpha \text{ either}$ ” asserts  $\alpha$  and presupposes that some alternative to the focused sentence within  $\alpha$  is not true.<sup>19</sup>

It will be shown in a moment how this applies to (60)-(61).

One temptation would be to say that the original syntactic assumption made in §3.5 was wrong, and that *either* attaches to the embedded sentence and is therefore looking at truth and falsity, not in the real world, but in the *doubt*-world. (Note that if the *either* attaches to the matrix sentence, it will have no access to the *doubt*-world and thus no way of evaluating the truth or falsity of a sentence within it.) This is where the accommodation of §2.4 becomes crucial.

Consider again the sentence:

- (52) Mary didn't leave. John doubts  $[\text{Bill}]_F$  left, either.

The accommodation used in (52) is seen in (52'). Its necessity is highlighted in (52'') by the addition of a clause that disallows it, analogous to (19'').

- (52') Mary didn't leave. *John doubts Mary left.* John doubts  $[\text{Bill}]_F$  left, either.  
(52'') # Mary didn't leave, and John doesn't doubt it. John doubts  $[\text{Bill}]_F$  left, either.  
(19'') # Becca likes corn. Marc likes  $[\text{peas}]_F$ , too, although he doesn't like corn.

For the accommodation to work in (52), the *either* will need to simultaneously look for an alternative to  $[\text{Bill}]_F$  left which is false, and an alternative to *John doubts  $[\text{Bill}]_F$  left* which is true. Remember from the discussion in §2.4 that without the focus sensitive particle, the opposite sort of accommodation will occur. If *either* is attaching only to the embedded sentences here and not to the matrix sentence, the accommodation will supply a sentence of the form *John*

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<sup>19</sup> “Not true” rather than “false,” to allow for (58b), where the alternative is merely not discussed outside of the *doubt*-worlds, as opposed to being actively asserted as not true.

*doesn't doubt that x left*, just as the supplied bridge in (21)

(21) Becca likes corn. Marc likes [peas]<sub>F</sub>.

was *Marc doesn't like corn*. But exactly that form of sentence prevents the accommodation from happening in (62'') instead of facilitating it. Therefore *either* must attach to the matrix sentence, so that it can cause this accommodation.

Nevertheless, accommodation will not be able to explain the requirement that the alternative to the embedded sentence be, in the matrix world, false. The following pair demonstrates this.

(63) a. Sally doubts Bill left. Mary doubts [John]<sub>F</sub> left, either.  
b. Bill left, though Sally doubts he did. \*Mary doubts [John]<sub>F</sub> left either.

Accommodation makes (63a) possible by supplying the sentence *Mary doubts Bill left*.

However, this accommodation is impossible in (63b), where the same two sentences need bridging; the only difference is that in (63b) the alternative to *John left* is given as true. This requirement—that the alternative not be true—must therefore be part of the semantics itself and not accessed via accommodation.

However, the above discussion does mean that *either* must operate on two different focus values at once: the *C* created when the focus is built up to the embedded sentence, and another one, call it *D*, at the matrix level. In terms of compositionality, the hardest part is passing the *C* up the tree for *either* to operate on it, but part of the assumption of alternative semantics is that the focus set is built compositionally and passed from stage to stage along with the regular semantics being built. This merely requires the addition of another element, *D*, being passed along with it. There is no reason that *C* cannot continue to be built up at the same time.

We can now give a new semantics for *either*, altered to account for the multiple focus elements and with a clause added to explain non-embedded sentences.

- (64) **Semantics of *either*, refined:** if  $\alpha$  is a sentence containing focus, and the focus occurs in a downward entailing context, then

$$\|\alpha \text{ either}\| = \|\alpha\| \wedge \text{too}(D) \wedge \neg \text{too}(C)$$

where  $D$  is the focus variable at the highest sentential node and  $C$  is the focus variable created at the embedded sentence, if any. That is, “ $\alpha$  *either*” asserts  $\alpha$ , and presupposes that some alternative to  $\alpha$  is true and that the focused sentence within  $\alpha$ , if any, is not true.<sup>20</sup>

For sentences without embedding, the  $C$  clause is ignored and *either* acts as a negative polarity *too*, appearing in downward entailing contexts but otherwise carrying the same presuppositions.

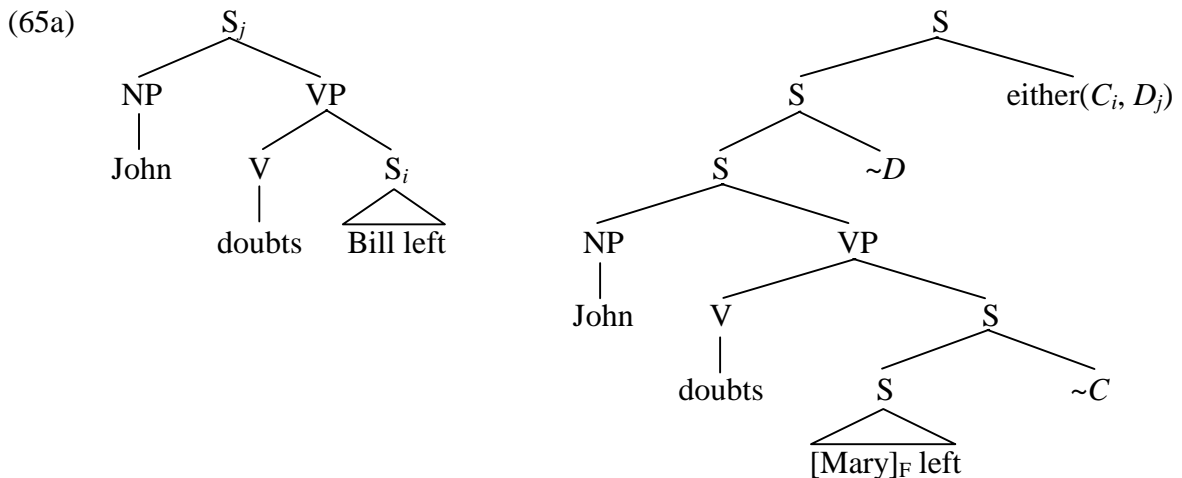
In other words, the sentence *Marc doesn't like [tomatoes]<sub>F</sub>*, *either* will not have an embedded sentence to create a  $C$  variable and will therefore satisfy (64) if the presupposition is satisfied

that  $D$ , an alternative in the set  $\{\neg \text{like}(\text{marc}, x) \mid x \in E\}$ , is true. For embedded sentences,

however, both focus values are examined. We can now use this semantics, along with

accommodation, to explain the judgments on the three sentences in (60) and (61). (65a) shows

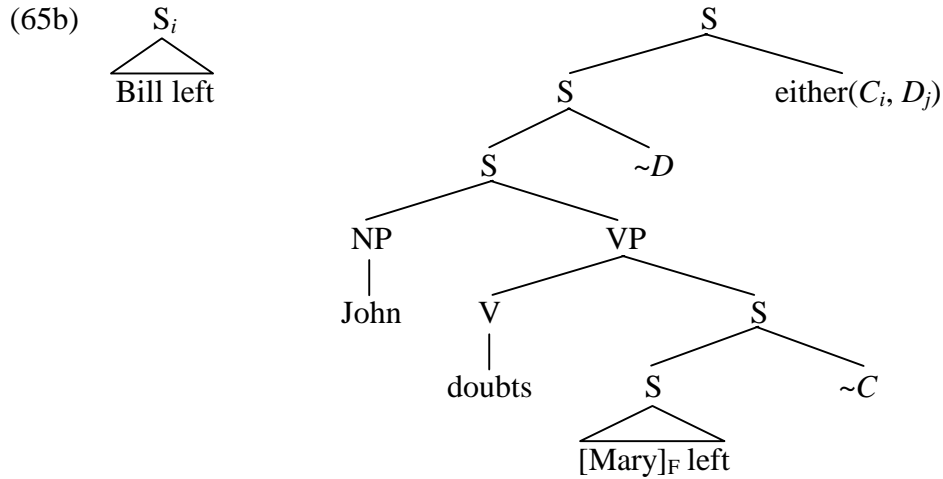
the structure for the sentence in (60).



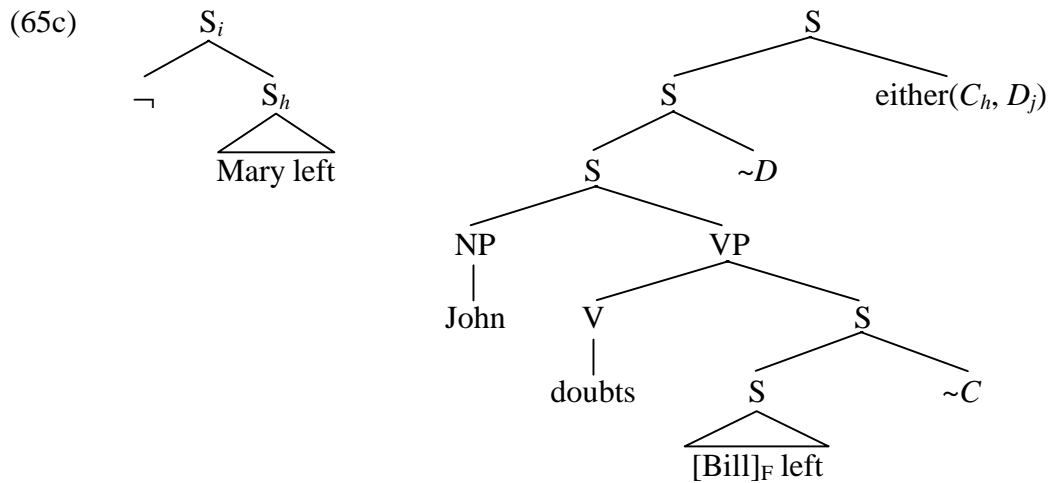
In (65a),  $C$  takes on the value *Bill left*, the only salient alternative, and  $D$  of course is *John doubts Bill left*. Since in (60a),  $C$  would be true, the presupposition of *either* fails; whereas in (60b),  $C$  is false, and therefore the presupposition is satisfied and *either* is acceptable. Similarly, in (65b),

<sup>20</sup> I am setting aside the question of multiple embeddings for future research.

which gives the structure for (61a) with “Mary” substituted back in for “you,”  $C$  again takes the value *Bill left* and  $D$  picks up by accommodation the sentence *John doubts Bill left*. However,  $C$  is not false, making the presupposition fail.



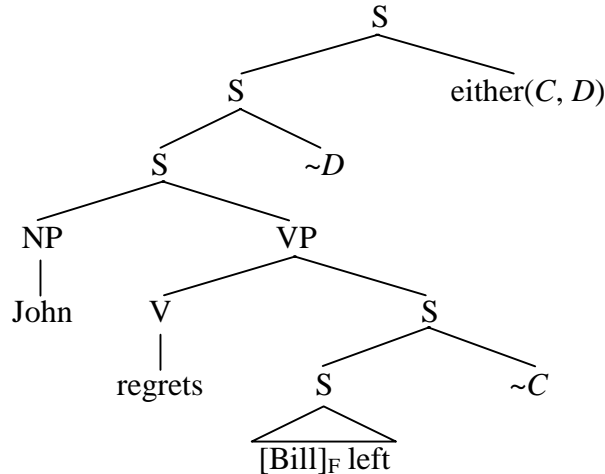
In (65c), the semantics for (61b),  $C$  must be an alternative to *Bill left* and therefore must be *Mary left* (and not, say, sentence  $i$ , *Mary didn't leave*), and it's false that Mary left, thereby satisfying the presupposition.  $D$  again picks up the implicit proposition *John doubts Mary left*.



What has been gained by this reformulation? The so-called Downward Entailing Restriction in (46) still needs to be postulated as part of the distribution in (64). However, the Nonveridicality Restriction in (55) can be shown to follow directly from this formulation of the

distribution of *either*, thereby removing what would otherwise simply be a stipulative addition to the distribution. Remember that the restriction was postulated to cover the ungrammaticality of sentences like (66a), regardless of whether a positive or negative sentence is used as context.

- (66) a. \*Mary {left/didn't leave}. John regrets that [Bill]<sub>F</sub> left, either.  
 b.



The proof that (66b) does not work, i.e. that the presupposition of *either* (that *C* is false) fails, runs as follows. *C* needs a salient alternative to *Bill left*, which will necessarily be *Mary left*. At the same time, *D* needs to pick up an alternative to *John regrets that Bill left*, which by accommodation will be *John regrets that Mary left*. Since *regret* is veridical, the proposition *Mary left* must be true. Therefore *C* is true—but this violates the presupposition of *either*. The same argument holds for any other veridical predicate such as *be surprised*.

The definition of *either* given in (66) is perhaps a little inelegant, using as it does two different focus variables. I nevertheless feel that it properly captures both the intuitions about how *either* works and the facts about focus accommodation.

## 5. Future Puzzles

### 5.1 *Only NP and Nobody but NP*

Perhaps the largest puzzle facing anyone who wants to give a formal semantic definition for

*either* is the following. *Only NP*, when used as a subject, is downward entailing, and licenses negative polarity items.

- (67) Only John eats green vegetables.  $\Rightarrow$  Only John eats brussels sprouts.
- (68) Only John *ever* eats green vegetables.

*Nobody*, in a subject, is downward entailing on the VP as well, which is a familiar fact. It is a brief step from there to see that *Nobody but NP* is also downward entailing on the verb, and therefore licenses negative polarity items as well.

- (69) Nobody but John eats green vegetables.  $\Rightarrow$  Nobody but John eats brussels sprouts.
- (70) Nobody but John *ever* eats green vegetables.

The sentences in (67) and (69), and in (68) and (70), are in fact synonymous—they have the same truth conditions. This in and of itself says nothing about the acceptability of negative polarity in those sentences; Klima (1964) noted the licensing difference between the synonymous sentences “Writers always accept suggestions” and “Writers never reject suggestions.”

The synonymy becomes an issue for the sentences in (71). Note that, like any sentences with *either*, the focus is crucial here; if *John* were focused instead of *tomatoes*, both sentences would sound bad for pragmatic reasons, i.e. there is no way for John being the only person who likes tomatoes to contrast with the proposition that someone else is the only person to.

- (71) [John is the one person I know who likes broccoli.]
  - a. Nobody but John likes [tomatoes]<sub>F</sub>, either.
  - b. \*Only John likes [tomatoes]<sub>F</sub>, either.

Some speakers report that (71a) doesn't sound quite perfect. There is unanimous agreement, however, that it is at worst marginal, whereas (71b) is entirely unacceptable. Why this should be, however, is far from clear. As noted above, the two sentences without the word *either* have the same truth conditions, something along the lines of (72), where *E* is again the set of individuals (or individuals under discussion; see footnote 3, above).

(72) like(tomatoes)(j)  $\wedge$   $\forall x[\neg\text{like}(\text{tomatoes})(x)]$  where  $x \in E - \{j\}$

The difference between the acceptability of (71a) and (71b) can not be a result of their truth conditions. This same contrast occurs with other determiners of equivalent truth conditions:

- (73) [Of the twenty people coming to the dinner party, I'd guess that at most a handful like broccoli.]  
a. Few of them like [tomatoes]<sub>F</sub>, either.  
b. \*At most three of them like [tomatoes]<sub>F</sub>, either.
- (74) [Of all the students on this campus, perhaps a quarter, if that many, like broccoli.]  
a. No more than 25% like [tomatoes]<sub>F</sub>, either.  
b. \*At most 25% like [tomatoes]<sub>F</sub>, either.

(73) serves as a reminder that overt negation cannot be the answer, since *few* is no more overtly negative than *at most three*; nor will lexical decomposition or implication help, since deriving *few* from *not many* (lexically or by implication) is not clearly any more legitimate than deriving *at most three* from *no more than three*. I have no clear answer about the difference of acceptability here, but I can offer certain false starts that can be avoided and other promising leads that might be explored.

Many authors have discussed the possibility that (72) does not represent the meaning of sentence (71b); that, in fact, the first conjunct may not be asserted by (71b) at all but may only be a conventional implicature or a presupposition. Horn (1992) offers a discussion of both sides of the issue and other papers have gone into further depth, none of which I review here insofar as I do not need to take a stand on either side. Instead, I will note that Horn cites a number of authors, most from this century but who follow a treatise by the thirteenth-century Peter of Spain, who are “advocates of a Petrine conjunction analysis for sentences with *only* or an ‘exceptive’ like *nothing but*,” where the “Petrine” analysis is that the positive conjunct (here, *John likes tomatoes*) is indeed asserted. The reason I quote this is not to imply that there is more support for one analysis than the other, but to note that conventional wisdom, or at the very least

Horn's, is to group *only* and *nobody but* together on this question.

Even more to the point, I think, is the fact that even if the positive “assertion” is demoted to being an implicature, the negative part of the statement is still being asserted, and it is this negative assertion that will be downward-entailing and thus license NPIs. Nor does this weaken the downward-entailing nature of *only NP*, which already needed von Stechow's idea of Strawson-downward-entailment (see §3.3 above). Since *Only John likes tomatoes* entails *Only John likes green tomatoes* only if John actually does like green tomatoes, we need to supply the presupposition *John likes tomatoes* (which is an entailment of the necessarily supplied fact *John likes green tomatoes*) to reach Strawson-DEness at all. Again, see von Stechow (to appear) for a lengthy discussion of the naturalness of using Strawson-entailment; in particular §1 (especially 1.2) discusses *only*. Using Strawson-entailment should remove any doubt that the contrast in (71) is due to the possibility of presupposition/implicature.

Another possibility, which I will mention only briefly as it is easy for the reader to check the falsity of, is that the licensors may have different strengths under the Zwarts (1997) definitions discussed in §3.4. Remember, however, that *either* can occur even with the weakest licensors, so the comparative strengths of *only* and *nobody but* are unlikely to be relevant in any case. Nevertheless, they have the same strength. I will present a few quick sentences with varying strengths of NPIs to show that they both license medium NPIs, but sitting with pencil and paper and working out the antiadditivity of both and the antimorphism of neither is not difficult.<sup>21</sup>

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<sup>21</sup> Thanks go to Martin Jansche, Chris Potts, and Shravan Vasishth for discussion and clarification on this topic.

- (75) Weak NPIs  
 a. Nobody but John has *ever* eaten *any* tomatoes.  
 b. Only John has *ever* eaten *any* tomatoes.
- (76) Medium NPIs  
 a. Nobody but John was *a bit* happy about eating tomatoes.  
 b. Only John was *a bit* happy about eating tomatoes.
- (77) Strong NPIs  
 a. \*Nobody but John was *half bad* at juggling tomatoes.  
 b. \*Only John was *half bad* at juggling tomatoes.

(76b) may not seem perfect, but it is certainly much better than it would be without the *only*, i.e.

\**John was a bit happy about eating tomatoes*, and it is far better than (71b).

Finally, Peter Culicover (p.c.) suggested that the difference is again one of sentential negation—evoking Klima (1964). The two determiners do differ in this respect, but almost in a trivial way; recall that licensing *either* was one of Klima’s tests for sentential negation. The other tests work as well, certainly—*nobody but* takes a positive tag-question and *only* takes a negative; *nobody* allows both “not even” and “neither” tags, whereas *only* does not—but what is less clear is what this shows.

- (78) a. Nobody but John likes tomatoes, *do they?*  
 b. Only John likes tomatoes, *doesn’t he?*
- (79) a. Nobody but John likes tomatoes, *not even on pizza.*  
 b. \*Only John likes tomatoes, *not even on pizza.*
- (80) a. Mary likes nobody but John, *and neither does Sue.*  
 b. \*Mary likes only John, *and neither does Sue.*

This corresponds to my intuition, confirmed by a number of non-linguist friends, that the (a) sentences in (71) and (78)-(80) seem to be asserting something negative about everybody who isn’t John, whereas the (b) sentences feel as if they’re saying something positive about John.

The same facts about sentential negation, and the same intuitions, hold for the sentences in (73) and (74) as well. These intuitions are hard to codify in the semantics—especially when considering the above discussion of the fact that the positive half of the (b) sentences may be exactly what *isn’t* asserted! Even so, it seems like the most reasonable starting point for an

explanation of the data.

## 5.2 “I could care less.”

I argued above against a purely syntactic or morphological explanation of the distribution of *either*. There is some small evidence that in fact this is exactly what’s happening.

- (81) I have no interest in this discussion.  
a. John couldn’t care less, either.  
b. \*John could care less, either.

Even more clearly than with *only* and *nobody but*, there is no difference in truth conditions between (81a) and (81b). A number of speakers who use *could care less* (I am not one) have informed me that (81b) sounds wrong to them. It’s hard to see what could be causing the difference here except for the presence of the negative “not” in the surface form of (81a), missing in (81b).

Unfortunately, it’s almost impossible to tell how robust this is. For one thing, the agreement on the facts in (81) are not unanimous. For another, *could care less* is a very particular idiom, and I know of very few others case where the same expression occurs in positive and negative form with the same meaning. (I have heard *I could give a damn* with much the same meaning—already strange, in that *give a damn* is usually considered an NPI—but it should yield to the same analysis.)

In fact, only two similar expressions come to mind at all. The first is the dialect spoken in parts of southern New England, where “and so don’t I” means the same as “and so do I,” as in (82).

- (82) a. She wants to win the game, and so don't I.  
 b. She thinks she's special because she can run a mile in ten minutes. But hey, so can't everyone.  
 c. "The Colts Want This One? So Don't The Pats!" [*Boston Globe* headline cited by Horn (1978)]

I am assured, however, by a native speaker of this dialect, that adding *too* to the end of sentences like those in (82) makes them a little odd, since the *so* and *too* are redundant, but not nearly as jarring as adding *either*:

- (83) a. She wants to win, and so don't I too!  
 b. \*She wants to win, and so don't I either!

In other words, the effects are exactly the opposite of the *could care less* case: the negative and the positive idioms mean the same thing, but while the negative-meaning but positive-form *could care less* doesn't license *either*, neither does the negative-form but positive-meaning *so don't I*.

Similar effects are seen in the other construction, the phrase *Why don't you...* when used rhetorically (as opposed to literally meaning "Why is it not the case that you...").

- (84) a. We really need to reach Mary. Why don't I call her tonight, and, hm, why don't [you]<sub>F</sub> call her tonight, {too/\*either}, just to be safe.  
 b. We really need to reach John and Mary. Why don't you call John tonight, and hm, since I'm busy, why don't you call [Mary]<sub>F</sub>, {too/\*either}?

Again, the negative surface form with the positive meaning ("You should call Mary tonight") licenses *too*, not *either*. This, along with the evidence cited in §3.6, suggests that the presence or absence of a negative marker in surface form cannot be what licenses *either*, even in (81). That sentence remains a mystery.

### 5.3. Conditionals

In §4.1 I set aside the question of conditionals, an exception to the rule that focus occurs in downward entailing, nonveridical contexts. I still have no explanation of why this is, although

there is a possibility that von Fintel’s notion of Strawson entailment may cover this. Research into the nature of conditionals is outside the scope of this paper, but von Fintel (to appear) discusses conditionals in §3.3, suggesting in part that one reason conditionals do not always license negative polarity items and are not always downward entailing (as noted in Heim 1984) is that the context must remain constant with respect to base assumptions, which certain types of “strengthening the antecedent” such as that in (85) violates:

- (85) If I strike this match, it will light  $\Rightarrow$   
If I dip this match in water and strike it, it will light.

I believe that the same problem holds for using *either* in a conditional. Because *either* requires introducing a relevant new piece of information, any use of *either* in a conditional would involve this sort of strengthening the antecedent, which will no longer maintain downward entailment. Given a pair of sentences as in (86a), the second sentence adds a piece of context that the first sentence didn’t contain; compare (86b), a rough paraphrase of (85).

- (86) a. \*If you eat the pastrami, you’ll get heartburn. If you eat the horseradish either, you’ll be even more sick.  
b. \*If I strike this match, it will light. But if I dip it in water either, it won’t.

More would need to be said, but I think this starting point shows promise as a way of explaining conditionals.

#### 5.4. A few other contexts

There are a few other problematic contexts involving the licensing of *either*, and I present them here with only a minimum of commentary. First, questions are clearly a case where *either* is not licensed, although most NPIs can occur in them.

- (87) A: Have you ever been to Spain?  
 B: Yes, I have.  
 a. A: Then have you ever been to France?  
 b. A: \*Then have you been to France, either?

Although the NPI *ever* is allowed in the question, *either* is not. Nevertheless, Barbara Partee (p.c.) pointed out that a sufficiently negatively rhetorical question does allow the *either*; she offered the example that, even out of the blue, the question *Would the [Democrats]<sub>F</sub> really have given Clinton an unbiased trial either?* sounds fine insofar as it expects the answer “no” (and contrasts with the statement “The Republicans didn’t give Clinton an unbiased trial”). Rhetorical questions aside, even questions with a negative bias may license *either*.

*Either* can often occur in elided sentences when it might not otherwise be licensed. Recall (4a), where *either* sounds odd, in contrast with (88), which is much better.

- (4a) The police would want to talk to us if you’d ever met the victim.  
 \*They’d want to talk to us if I had, either.  
 (88) The police would want to talk to us if you’d ever met the victim. If I had, either.

The addition of *or* before the elided material improves the context. Along these lines, Larry Horn (p.c.) offered the following excerpt from an Ed McBain novel (emphasis added):

- (89) ...the man had since separated from [Sonny’s cousin] and Sonny was now trying to find out where he’d moved, *or his cousin either* for that matter...

For this, too, I have no clear explanation yet.

## 5.5. Other future directions

From the beginning of this research it was clear that other uses of *either*, such as *Either John left or Mary did*, would be outside the scope since they are, presumably, unrelated. Nevertheless, attempts have been made to unify the meaning of free choice *any* and negative polarity *any*, and Barbara Partee (p.c.) pointed out that superlatives show the same contrast as *any* (*The slightest*

*noise will wake him* contrasted with *I didn't hear the slightest noise*). That both *any* and superlatives show this behavior implies a similarity at some level between free choice counterparts to negative polarity words. The *either* in *either...or* is in some ways a free choice *either*, and it too will require an alternative set (i.e. *Either [John]<sub>F</sub> left or [Mary]<sub>F</sub> did*). Other uses of *either* seem similarly free-choice based, such as *My friends sat on either side of me*—that is, both sides, but also meaning that whichever side you choose, friends were sitting there. In time, the negative polarity *either* and free choice *either* may be unified.

Another interesting track along these lines worth investigating is cross-linguistic data. This is again something I have not had the time nor the resources to do, but looking at other languages might provide insight into how many of the facts given here about *either* are accidental to English. A French dictionary provides *non plus* as a translation of *not...either*, but I believe its distribution is not quite the same as *either*'s in English. Additionally, Maria Bittner (p.c.) suggested that the link between negative polarity *either* and “free choice” *either* may not be accidental to English, as the Greenlandic word for *or*, used for *either* in *either...or* (as French uses *ou...ou* for *either...or*), is also the word used for negative *either*.

## 6. Conclusions

Whatever the final decision on the semantics of *either* may turn out to be, this paper has made clear that they are not as simple as those of most negative polarity items. Because of its status as a focus sensitive particle, it must—unlike most NPIs—operate over the entire sentence and not merely within the scope of a downward entailing item itself. Nevertheless it retains the basic distribution of an NPI, albeit somewhat different in places. One can only hope that future explorations of the subject reveal as much about conditionals, focus, and even pragmatic accommodations as it does about the word *either* itself.

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