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ORIGINAL PAPER

Speaker-oriented adverbs

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Abstract This paper presents an analysis of the ordering of speaker-oriented adverbs (SpOAs) with respect to each other and negation, arguing that SpOAs are positive polarity items, and therefore normally cannot follow negation. The adverbs represent a speaker's subjective commitment to the truth of the proposition represented by the adverb, which is incompatible with the falsity of the same proposition required by negation. This also accounts for the usual unacceptability of SpOAs in other contexts, such as questions and conditionals. The analysis extends to other contexts where SpOAs are acceptable, such as negative questions and negative counterfactual conditionals, in such a way as to contribute support for Giannakidou's (non)veridical theory of polarity over "strengthening" theories based on scalar implicatures. It is also shown that SpOAs' underlying semantic property of being subjective also helps predict their linear order with respect to each other.

Keywords Adverbs · Polarity · Nonveridicality · Modality · Subjectivity · Speaker orientation · Phrase structure

1 Introduction

1.1 Data and goals

Speaker-oriented adverbs, such as those illustrated in (1), are among the most commonly discussed types of adverbs:

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(1) a. Honestly, I don't know what you mean.
b. Karen is probably going to dance a tango.
c. Luckily, Aaron did not fall off his bicycle.

Honestly in (1a) is of the discourse-oriented (also sometimes known as "pragmatic" or "illocutionary") subtype that also includes *frankly* and *briefly* (in one of their uses), and can be paraphrased by "I say ADV that P," where P is the proposition modified by the adverb (in typical examples this proposition is the rest of the sentence). *Probably* in (1b) illustrates a modal adverb, which indicates, roughly speaking, a speaker's degree of commitment to the truth of P. Some writers include modals in a larger class of epistemic adverbs which also includes evidential adverbs like *obviously* and *clearly* on their sentential readings. Finally, *luckily* in (1c) belongs to the class of evaluatives, which represent a speaker's evaluation of the fact represented by P. Both epistemic and evaluative adverbs can be paraphrased with their corresponding adjectives, as shown in (2a–b) (for (1b–c)):[1]

(2) a. It is probable that Karen is going to dance a tango.
b. It is lucky that Aaron did not fall off his bicycle.

There are three goals in this paper. The first and main goal is to present a theory of the linear ordering of speaker-oriented adverbs (henceforth SpOAs) with respect to each other and to negation. Though there are exceptions and caveats, the basic order of SpOAs is as shown in (3):

(3) Evaluatives > Epistemics > Negation

Current analyses, such as Cinque (1999) and Ernst (2002), cannot account for the occasional instance of negation preceding an epistemic or evaluative adverb. They also wrongly predict, for example, that adverbs like *still* can never precede an epistemic adverb, as in (4). Thus, this paper aims to present a more empirically adequate explanation for this basic order.

(4) We are still probably short of our fund drive goal.

The other, more theoretically oriented goals of this paper relate to two questions about the syntax-semantics interface. First, what is the proper formulation of conditions on polarity phenomena? This paper will support the (non)veridicality approach to polarity developed by Giannakidou (1999, 2001, 2006, 2007) by showing that the analysis of SpOAs crucially depends on their being positive polarity items (following the basic idea of Nilsen 2004), and that the (non)veridicality theory accounts for the polarity patterns better than does the "strengthening" approach advocated by Nilsen.

[1] There are several classificatory schemes for adverbs, though most of them agree on the basic divisions. For discussion, see Quirk et al. (1972), Ramat and Ricca (1998), Cinque (1999), Delfitto (2000), and Ernst (2002). Lists of speaker-oriented adverbs can be found in Greenbaum (1969) (where they are part of the *attitudinal disjuncts* class) and Ernst (1984, 2002).

Specifically, (i) there is little evidence in the data for the scalarity that is the hallmark of strengthening analyses, while there is abundant evidence for the presence of (non)veridicality, and (ii) the (non)veridicality theory is able to predict naturally how SpOA subclasses differ in their polarity behavior, while the strengthening theory cannot.

Second, how can adverb order be conditioned, as much as possible, by the meanings of the adverbs involved? All current proposals in the Principles-and-Parameters tradition admit that semantics is a (if not the) fundamental determinant of adverb syntax. One view, espoused for example in Ernst (2002), Haider (2004), and Nilsen (2004), claims that the relationship is fairly direct, i.e. that adverbs' distribution is restricted by their individual semantic requirements that cannot be met in certain sentences, such as where some other adverb imposes an incompatible semantic requirement. This view is opposed to a more syntactically-based theory, exemplified by Alexiadou (1997), Cinque (1999), Haumann (2007); here, semantics indirectly helps to determine a rigidly ordered hierarchy of functional heads, which, in turn, license adverbs in their Spec positions. If the present analysis of SpOAs holds, it supports the semantically-based approach.

The analysis presented here has two main parts. First, SpOAs are positive polarity items (PPIs), which means that they are barred from occurring within the scope of negation and similar operators. This accounts directly for the rightmost (lowest) position of negation in (3), since in other orders, the adverbs' polarity requirement is violated. The exceptions to this generalization, as in the negative rhetorical question in (5), where the evaluative adverb *mysteriously* occurs to the right of *not*, are predicted by the (non)veridicality theory's allowance for cases where the sentence implicates the truth of P, despite P apparently being negated.

(5) Have they not mysteriously been refusing to answer questions about the budget?

In (5), the speaker assumes that they have been refusing to answer questions about the budget.

Second, by invoking and extending the notion of subjective vs. objective modification, the ordering between two SpOAs can be explained, on the assumption that subjective modification of this type is always structurally higher than objective. As a first formulation toward explaining (3), we may say that evaluatives are subjective modifiers while epistemics can be objective.

It can be seen that, if it is valid, both aspects of this analysis support the semantically-based theory of adverb distribution; the first, of course, supports the (non)veridicality theory of polarity.

1.2 Organization

This paper begins by laying out, in Sect. 2, the most basic facts to be discussed, followed by a review and brief critique of two existing analyses of the syntax of SpOAs. Section 3 presents the core proposals: a (non)veridicality theory of the positive polarity behavior of SpOAs, including (i) a characterization of their basic lexical semantics in terms of the strength of speakers' subjective commitment to a proposition,

(ii) licensing mechanisms drawn from the work of Giannakidou (1999, 2006), and (iii) a discussion of how these principles account for exceptional cases where SpOAs follow negation. In Sect. 4, I compare this approach to that of Nilsen (2004) and argue that the (non)veridicality approach is superior. Section 5 extends the earlier characterization of SpOAs' lexical meaning so as to account for their relative linear ordering, and discusses the implications of the proposals here for syntactic theories. Finally, Sect. 6 provides a summary and a discussion of the analysis' theoretical implications.

2 Data and problems

2.1 Adverb ordering

SpOAs modify propositions, and are usually identified by the paraphrases shown in (6a–b) (where facts are taken as true propositions):

(6) Speaker-Oriented Adverbs (SpOAs)
   a. Discourse-Oriented: *frankly, honestly, briefly*
      PARAPHRASE: I say ADV that P
   b. Evaluative: *unfortunately, amazingly, mysteriously, conveniently, oddly, appropriately*
      PARAPHRASES: Speaker evaluates the fact F as ADJ.
      It is ADJ that F.[2]
   c. Epistemic: *probably, definitely, possibly, clearly, apparently, obviously*
      PARAPHRASES: Speaker takes P's truth as ADJ.
      It is ADJ that P.

In what follows, I will spend little time on discourse-oriented adverbs, which are significantly different from the other two classes and pose fewer problems for syntactic analysis. It is generally agreed in the adverb literature that they modify the representation of speech acts, and that this fact determines their position at or close to the left edge of sentences, assuming that speech acts are represented close to this left edge. Specifically, I adopt the analysis of Ernst (2002:70ff.), by which Comp in essence contains a covert verb *E meaning roughly *express*, which these adverbs modify locally. Though there are certain caveats, this analysis makes the basic pre-

[2]Three evaluative adverbs (and only three, to my knowledge) do not quite fit this paraphrase, as they do not evaluate facts, but instead evaluate "potential facts:" *ideally, hopefully*, and *preferably*. In (i), for example, it is ideal/preferable/hoped-for that Ann will graduate with honors, though she may in fact not do so:

(i) {Ideally/Preferably/Hopefully}, Ann will graduate with honors.

This has no effect on the proposals made below. It does, however, affect alternative analyses for SpOAs based on factivity (e.g. Haumann 2007), by which negation clashes with the factivity of evaluative SpOAs. Since these three adverbs are non-factive, yet also show PPI patterning (e.g. **She will not ideally graduate with honors*), such a proposal would at best have to treat such cases separately.

diction that discourse-oriented adverbs normally occur in sentence-initial position, before all other speaker-oriented adverbs.[3]

As noted in (3), in the normal case SpOAs precede negation (see (7)) and evaluatives come before epistemic adverbs (see (8)):

(7) a. Karen luckily/probably has not left.
b. *Karen has not luckily/probably left.

(8) a. Luckily, the plan will probably work.
b. *Probably, the plan will luckily work.

(Note that clause-internal parenthetical readings with comma intonation are to be excluded, as is always the case in discussions of adverbs: most such cases may have a different scope from that indicated by linear order. However, sentence-initial comma intonation, as in (8b), need not be excluded, as it indicates the expected widest scope.) Further ordering facts are shown in (9). (10) shows that subject-oriented adverbs like *cleverly*, *intelligently, tactfully, willingly, calmly*, etc., follow SpOAs; (11) illustrates the fact that SpOAs must precede the aspectual auxiliaries *have* and *be* in their base positions:

(9) Evaluatives > Epistemics > Subject-Oriented > Neg > AspAux

(10) a. They obviously have cleverly been siphoning off little bits of cash.
b. *They cleverly have obviously been siphoning off little bits of cash.

(11) a. They will ideally be leaving.
b. *They will be ideally leaving.
c. *They will have been ideally leaving.

Note that, on the usual assumption that the finite auxiliary raises in English, *have* and *be* may precede a SpOA when they are finite, as in (12):[4]

(12) They are ideally leaving on June 5th.

Despite the fact that (3) holds most of the time, there is more to the story. (5), repeated below, illustrates the possibility of SpOAs following negation. Though finite auxiliaries raise to Comp in questions like this, *not* is immobile; and in any case, even when negation moves along with the auxiliary in contractions, as in (13), the

[3]This could also be encoded as a functional head dedicated to representing them, as in the "cartographic" approach of Rizzi (1997), Cinque (1999), and Haumann (2007); or by virtue of a system of ordered, bottom-up semantic rules, not tightly connected to syntactic structure, in which speech acts are represented near the end of a derivation that is eventually linearized in a corresponding right-to-left fashion. Any of these systems does the job of predicting the possible syntactic positions of discourse-oriented adverbs and the fact that they obligatorily precede other speaker-oriented adverbs.

[4]I assume that the part of the English clause traditionally corresponding to "Aux" or "Infl" is made up of the sequence of heads in (i), where *do* and familiar modals like *can*, *will*, and *must* occupy Modal, Perf represents *have*, and Prog and Pass represent the progressive and passive *be*, respectively:

interpretation—"Is it not the case that they mysteriously have been refusing to answer questions about the budget?"—shows that negation precedes *mysteriously* in base structure, assuming that the latter essentially determines interpretation in this instance:

(5) Have they not mysteriously been refusing to answer questions about the budget?
(13) Haven't they mysteriously been refusing to answer questions about the budget?

Moreover, there are cases where an epistemic adverb precedes an evaluative, as in (14a), and evidentials like *obviously* can both precede epistemics and follow negation (see (15b–c)):

(14) a. Probably, they have appropriately been more concerned with substance than with style.
b. Appropriately, they have probably been more concerned with substance than with style.

(15) a. Mysteriously, the officials had obviously missed some of the crucial evidence.
b. Obviously, the officials had mysteriously missed some of the crucial evidence.
c. The officials had not obviously missed any crucial evidence.

These facts show that a more nuanced approach is needed than one which predicts only the rigid ordering of (3).

2.2 Existing accounts of SpOA ordering

2.2.1 Cinque (1999)

Two current accounts in the Principles-and-Parameters literature attempt to account for the major SpOA ordering facts.[5] The first, that of Cinque (1999), posits a string of

(i) T–Modal–Perf–Prog–Pass

Following a common assumption, I take the first auxiliary among these to move obligatorily to T in tensed clauses. Also, I assume sentential *not* to be in the Spec position just below Tense (Ernst 1992), although everything discussed here would work if there is a NegP, with *not* in its Spec, between Tense and Modal. I take the *not* of constituent negation to be adjoined to the relevant projection as an adverb. Due to the raising of the first auxiliary, an adverb that immediately follows a modal may, in principle, take scope over that modal, because the adverb c-commands the modal's base position (see Ernst 1991, 2002 for discussion). Whether it actually takes wide or narrow scope depends on the lexical items involved, and the semantic and pragmatic context. Finally, I take adverbs to be adjoined to any projection—freely as far as syntax is concerned, though of course various semantic and pragmatic factors often reduce the actual range of positions for a given adverb (Ernst 2002).

[5] A third approach, exemplified by Frey and Pittner (1998) and Tenny (2000), mix characteristics of the other two, by using syntactic principles to establish broad zones for adverbs, but semantics to determine relative ordering within these zones. I do not examine here how this approach would handle speaker-oriented adverb ordering. Haumann (2007) offers a variant of Cinque's approach that shares most of the problems of the latter, though full consideration of it is beyond the scope of this paper.

functional heads, rigidly ordered by universal grammar (UG), each of which licenses one adverb in its Spec position. Thus, it is the UG-mandated ordering that determines adverb ordering; though Cinque allows that semantics is behind this in some way, he explicitly claims that the role of semantics is only indirect, and underdetermining. Here I will only briefly discuss this "F-Spec" account, since its problems have been documented in some detail elsewhere (Bobaljik 2000; Ernst 2002, 2007; Cormack and Smith 2002; Nilsen 2004), but a mention of four significant problems follows.

First, the F-Spec theory cannot handle the ordering of adverbs and auxiliaries without appealing to multiple head movements that both must be conditioned by ad hoc and unrestrictive triggers, and violate movement constraints. Auxiliaries are heads whose base order is rigidly determined, just as is that of the adverbs' licensing heads, and given the limited movement possibilities for adverbs (essentially, only topicalization or focalization processes that pull them to clause-initial position), the only way to change this order is for an auxiliary to raise. Thus, as Ernst (2002:115ff.) points out, (16) (a–b = his (3.76a–b), p. 117) shows that *luckily, seemingly, wisely*, and *never* would have to be licensed in this order before all auxiliaries (modals, *have*, progressive *be*, and passive *be*, in that order):

(16) a. Bill (quite) luckily has seemingly been wisely engaged in cleaning his desk when the boss walks in.
b. Bill wisely has never been involved in gambling.
c. Bill never would buy whiskey.

Now, since (17) (=Ernst's (3.78)) is also possible, at least three auxiliaries must be able to raise simultaneously over one adverb:

(17) Maureen could have been wisely getting involved in other pursuits.

However, since the movement of nonfinite auxiliaries must be blocked for SpOAs to account for examples like (11b), yet allowed to differing degrees for other types of adverbs, the conditions on which auxiliaries may raise to which positions in the presence of which adverbs quickly become quite complex. Moreover, if more than one auxiliary raises in this way, the lower auxiliary must pass through a head occupied by the trace (or copy) of the higher auxiliary, violating the Head Movement Constraint.

Second, there are numerous examples of adverbs that can occur in either order. Since the theory predicts this to be impossible if they have the same meanings, this puts the general validity of this theory in doubt. (18–20) provide examples.[6]

[6] A number of ways have been proposed for the F-Spec theory to account for such examples, but all seem problematic; see Ernst (2002, 2007) for discussion.

(18) a. Carol also had cleverly moved to the city.
b. Cleverly, Carol had also moved to the city.

(19) a. Max (only) occasionally would willingly relinquish the ball.
b. Max would willingly relinquish the ball occasionally.

(20) a. Similarly, Fred has sometimes been insistent that we fill out every form.
b. Sometimes, Fred has similarly been insistent that we fill out every form.

Third, the F-Spec account has nothing to say about why SpOAs are usually bad in questions and in the antecedents of conditionals:

(21) a. *Has she unfortunately found a scorpion in her boot?
b. *Has the dog probably been eating the cat's food?

(22) a. *If she has luckily been offered the job, I will be very happy.
b. *If Amanda is possibly injured, she will not be able to dance.

Such facts might be treated as a purely semantic matter (as for Bellert 1977; Nilsen 2004; Ernst 2007) but for the F-Spec approach a semantic explanation must be an add-on to the basic syntactic account; if the facts can be made to fall out from basic semantic mechanisms underlying a general account of SpOAs, this is to be preferred (see Ernst 2007 for discussion).

Finally, the syntactically-based approach cannot easily account for cases like (23a–b), where negation precedes speaker-oriented adverbs:

(23) a. Haven't they probably decided to resign?
b. If they hadn't mysteriously disappeared that day, no one would have noticed the missing funds.

While Cinque (1999:120 ff.) does allow several alternative positions for negation, none of them is high enough to occur above a SpOA. Moreover, if an additional, higher position were posited, the theory would then have to exclude its use most of the time, i.e. find a way to correctly predict the very limited circumstances where SpOAs occur so low in clausal structure.[7] (This issue will be addressed again in Sect. 5.)

2.2.2 *Ernst (2002)*

Although Ernst (2002) avoids some of the difficulties of the syntactically-based approach, his analysis is also problematic. His account of SpOA ordering rests on the idea that these adverbs, and negation, select for the truth value of the proposition they combine with, and that since SpOAs represent a speaker's strong commitment to the truth of what s/he is saying, the combination [ADV + P] itself represents a fact, i.e. a

[7] See also Cormack and Smith (2002), Ernst (2007) for further discussion of Cinque's proposals for negation.

proposition with the truth value of 1. Thus, for example, (24a) is explained in terms of a semantic representation given schematically in (24b) and the lexically-encoded conditions in (24c):

(24) a. *She hasn't probably left.
b. NOT [$_{\text{PROP}}$ PROB [$_{\text{PROP}}$ [$_{\text{EVENT}}$ Leave (e) & Agt (e, she)]]]
c. (i) For any speaker-oriented adverb A, A(P) is a P with a truth-value of 1
(ii) NOT must combine with a P of truth-value 0.

The subscripted brackets indicate that the phrases in question denote events or propositions; events and propositions can be built up by modifiers, and one can take an event and make a proposition out of it (as shown between "Leave" and "PROB"), but not the reverse. According to (24c(i)), the proposition to the right of NOT must have the truth value 1, and by (24c(ii)) NOT itself must combine with a proposition with the value 0: thus (24a) violates NOT's requirement and the sentence is ungrammatical.

This proposal requires theoretically objectionable truth-value sorting that errs in mixing two types of knowledge that should be kept separate: knowledge about meanings (i.e. of language) with knowledge about facts (of the world). It is not a property of a proposition itself that it is true or false (save tautologies and logical contradictions); it is only so in a particular context, given what is known about the world. While the idea of a speaker's commitment to the truth of a proposition is widely accepted, this attempt to encode it is a dubious foundation for a semantically-based theory.

Second and third, Ernst's account shares with Cinque's the problems shown by (21–23): it has no good account for (i) why SpOAs are usually bad in questions and the antecedents of conditionals, while occasionally being acceptable there; and (ii) instances where negation precedes the SpOA. In the latter case, once again, it would be possible to posit a separate type of negation with different lexical requirements, but any elaboration that would correctly condition its appearance would be a mere stipulation.

Fourth, this account based on adverbs' selecting semantically for what follows runs into problems when SpOAs interact with entities that, in Ernst's system, must be categorized as events. As noted earlier, this analysis allows events to be modified to produce a (larger) event, and for events to be "converted" to propositions, but not for the reverse. This is schematized as the FEO Hierarchy in (25) (slightly modified here for clarity):

(25) FEO Hierarchy: Proposition > Event > Manner

This being so, sentences like (26a–b) are problematic:

(26) a. We are still probably north of Princeton.
b. The Lewinsky affair will always unfortunately stain Clinton's legacy.

Aspectual adverbs such as *still* and *already* combine with events to yield events, in this analysis, and thus ought to violate the FEO Hierarchy, because once the SpOAs *probably* and *unfortunately* have been added to the sentence we have a proposition,

so *still* and *already* cannot modify it further. Ernst (2002) recognizes this problem, but the proposed solutions are awkward, amounting to lexical exceptions to (25) for aspectual adverbs, with no principled basis for them.[8] These difficulties show that we need an improved theory of SpOA distribution.

3 SpOAs as positive polarity items

3.1 Basic patterns

Nilsen (2004) pointed out that beyond the well-known and obvious interaction with negation, SpOAs display other behavior that makes them look like positive polarity items (PPIs). Drawing in part on data first highlighted in Bellert (1977), he provides evidence to show that they do not normally occur in questions, the antecedents of conditionals, or in the scope of downward-entailing operators such as *rarely*. Moreover, as expected if they are PPIs, they should occur in complementary distribution with negative polarity items (NPIs) like *yet*, *ever*, and *any*. These facts are illustrated in (27–33), with sentential negation in (27–28), questions in (29–30), conditionals in (31–32), and *rarely* in (33).[9]

(27) a. Karen luckily has not left.
b. *Karen has not luckily left.

(28) a. *Karen has left yet.
b. Karen has not left yet.

(29) a. *They ever withdrew their funds.
b. Did they ever withdraw their funds?

(30) a. They unfortunately withdrew their funds.
b. *Did they unfortunately withdraw their funds?

[8] Nilsen (2004:14ff.), makes a similar criticism of Ernst's analysis, involving interactions of SpOAs with Tense, pointing to the same underlying problem: some event-taking operators can occur higher than proposition-taking operators, which goes against the predictions of Ernst's system. Cinque (2004:688, note 13) (cf. also Haumann 2007:356) makes a similar point: Ernst's proposals incorrectly allow the order evidential > evaluative (e.g. *obviously* > *unfortunately*), since the former class is classified as event-taking, and the latter as proposition-taking. This case is more complicated, though, since such sequences are in fact allowed with some SpOAs; see below for discussion.

[9] All data in this paper relating to SpOAs, including the French, Chinese, and Dutch data, were gathered by interview or questionnaire, using 5–10 native speakers (except where otherwise specified). There is some variation among speakers, so that, for example, some people accept evaluative adverbs like *unfortunately* in weaker contexts like conditional sentences (despite the fact that the analysis here rules them out). However, the relative judgments hold in all cases. One must be careful in using print sources, useful as they are (as for Nilsen 2004; Haumann 2007), as some such sources, such as internet blog entries, may contain performance mistakes in sentences that are generally rejected by native speakers upon consideration; or else they do not faithfully record comma intonation.

(31) a. *They have decided to buy anything expensive.
b. If they have decided to buy anything expensive, I'm going to take away their credit cards.

(32) a. They have possibly decided to buy a Ferrari.
b. *If they have possibly decided to buy a Ferrari, I'm going to stay off the road.

(33) a. His pronouncements rarely had any effect on his workers.
b. *His pronouncements rarely possibly had an effect on his workers.

These data constitute strong *prima facie* evidence for SpOAs as PPIs.

Patterns such as those above are not restricted to English. The fact that SpOAs generally precede negation has been shown for many languages, including Italian (Cinque 1999). Fuller patterns including questions and conditionals are shown in the sampling below from French (34–36), Mandarin Chinese (37–39), and Dutch (40–42):

(34) *Il n' est pas {probablement / certainement / malheureusement} parti.
he not is not probably / certainly / unfortunately left
'He did not {probably /certainly /unfortunately} leave.'

(35) Est-il {*probablement /*certainement / ?malheureusement} parti?
is he probably / certainly unfortunately left
'Did he {probably /certainly /unfortunately leave?'

(36) S'il est {*probablement / *certainement / ?malheureusement} parti,
if he is probably / certainly / unfortunately left
ce serait encore plus difficile pour nous.
this would-be still more difficult for us
'If he has {probably /certainly /unfortunately} left, it would be even more difficult for us.'

(37) *Zhangsan meiyou {dagai / yiding / buxing} hui jia.
Zhangsan not-PRF probably/ definitely/ unfortunately return home
'Zhangsan did not {probably/definitely/unfortunately} return home.'

(38) *Zhangsan {dagai / yiding / buxing} hui jia-le mei-you?
Zhangsan probably/ definitely/ unfortunately return home-PRF not?
'Did Zhangsan probably/definitely/unfortunately return home?'

(39) Zhangsan ruguo {*dagai / *yiding / OKbuxing} hui jia-le,
Zhangsan if probably / definitely / unfortunately return home-PRF
jiu zaogao-le.
then mess
'If Zhangsan {probably/definitely/unfortunately} went home, that's a real problem.'

(40) Jan heeft niet {*waarschijnlijk/ *jammer genoeg/ *mysterieus genoeg /
Jan has not probably / unfortunately / mysteriously /
*duidelijk} besloten om de auto te kopen.
clearly decided COMP the car to buy
"Jan has not {probably / unfortunately / mysteriously / clearly} decided to buy the car."

(41) Heeft Jan {*waarschijnlijk/ *jammer genoeg/ mysterieus genoeg / duidelijk}
has Jan probably / unfortunately / mysteriously / clearly
besloten om de auto te kopen?
decided COMP the car to buy
"Has Jan {probably / unfortunately / mysteriously / clearly} decided to buy the car?"

(42) Als Jan {*waarschijnlijk/ jammer genoeg/ mysterieus genoeg / duidelijk}
if Jan probably / unfortunately / mysteriously / clearly
heeft besloten om de auto te kopen, dan kunnen we stoppen
has decided COMP the car to buy then can we stop
met zoeken.
with looking."
"If Jan has {probably / unfortunately / mysteriously / clearly } decided to buy that car, then we can stop looking.

Although there is some variation, the general patterns line up with those of English, with all SpOAs ungrammatical after simple negation (in the first sentence in each set), and at least some of them ungrammatical in questions and conditionals (in the next two sentences). The contrast between the grammatical and ungrammatical cases is addressed below.

In this section, I will argue that while Nilsen was correct in identifying SpOAs as PPIs, his way of encoding the idea in formal theory in terms of strengthening (Kadmon and Landman 1993) should be replaced by one grounded in the (non)veridicality approach to polarity (Giannakidou 1999, 2001).[10] This analysis takes as its core the idea that SpOAs are PPIs because they have a lexical property—the speaker's subjective commitment to the truth of the evaluation represented by *possibly*, *luckily*, and most other SpOAs—that is incompatible with doubt expressed by nonveridical operators. Importantly, it aims not only to explain SpOAs PPI behavior on these grounds, but to use lexical variation in this subjective commitment, and in the type of NV context, to predict variation among subclasses of SpOA.

3.2 The NV approach: basics

The (non)veridicality (NV) approach to positive and negative polarity, developed in Giannakidou (1999, 2001, 2006, 2007), and other work, is based on the notion that

[10]There are a few exceptions to the generalization that SpOAs are PPIs. Among the modal adverbs, *possibly* occurs as a quasi-intensifier with modal auxiliaries like *can* and *could* in negative sentences, as

polarity phenomena result from the interaction of lexical items with operators that either do (veridical) or do not (nonveridical) entail the truth of a proposition. An important aspect of the theory is that it recognizes variation in polarity behavior both cross-linguistically, between the same operator or construction in different languages, and between different polarity items within the same language. In order to account for this variation, it holds that understanding the relevant lexical properties of PIs is crucial to explaining their distribution; in particular, PIs are often said to have some sort of "deficit" that must be filled by a licenser, or that some lexical semantic property clashes with an anti-licenser. Further, it posits a cluster of (non)veridicality-related semantic properties, such as nonveridicality, antiveridicality, intensionality, and so on, different subsets of which may figure in different cases of PI licensing. Thus one important feature of the NV theory as currently formulated is its attempt to account for this "fine structure" of polarity licensing.

The most basic licensing condition of early NV theory was (some version of) (43), where NPIs were licensed only within the scope of nonveridical operators ((non)veridicality is defined as in (44), and the notion of belief models in (45)):

(43) Licensing Conditions for Negative Polarity Items (Giannakidou 1999:408)
  a. A negative polarity item A will be licensed in a sentence S iff S is antiveridical.
  b. In certain cases, A may be licensed indirectly in S iff S gives rise to a negative implicature ϕ, and A is in the direct scope of negation at ϕ

(44) Nonveridicality (Giannakidou 1999)
  Let $c = \langle cg(c), \mathrm{W}(c), \mathrm{M}, \mathrm{s}, \mathrm{h}, \mathrm{w_o}, \mathrm{f}, \ldots \rangle$ be a context.
  (i) A propositional operator *Op* is *veridical* if it holds that: $[\![Op\ \mathrm{p}]\!]_c = 1 \rightarrow [\![\mathrm{p}]\!] = 1$ in some epistemic model $\mathrm{M(x)} \in c$; otherwise *Op* is nonveridical.
  (ii) A nonveridical operator *Op* is antiveridical iff it holds that: $[\![Op\ \mathrm{p}]\!]_c = 1 \rightarrow [\![\mathrm{p}]\!] = 0$ in some epistemic model $\mathrm{M(x)} \in c$.

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illustrated in (i), and *necessarily* also may follow *not*, regardless of the auxiliary used in the sentence (see (ii)):

(i) She can't possibly have imagined my delight.
(ii) This doesn't necessarily mean that functional heads can be radically empty.

The same is true of *definitely*, though it seems less common, more in need of a supporting context, and less of a fixed expression than *not necessarily*; (iii), for example, quotes a soccer team manager after news reports had widely tipped a famous player of his as about to move to a new team:

(iii) "Ruud is not definitely leaving and I expect to see him at training on Monday."
(soccernet.espn.go.com, 7/21/06)

Given the relatively unrestricted nature of the *necessarily* and *definitely* cases, these two adverbs seem to be lexical exceptions to the PPI generalization. *Necessarily*, on its non-philosophical, everyday interpretation as in (ii), appears to be a negative polarity item. On the other hand, *can't possibly* sequences seem to be part of a larger phenomenon (including affirmative sentences with *could perhaps*, *might maybe*, etc.) of *modal concord*, by which two modal lexical items combine to form one operator (see Hoye 1997; Palmer 2001; Huddleston and Pullum 2002 for discussion).

(iii) Epistemic models are: belief models $M_B(x)$, dream models $M_D(x)$, models of reported conversation $M_{RC}(x)$, and nothing else.

(45) Definition of Belief Models (=Giannakidou's 1999:395(45)):
Let $c = \langle cg(c), W(c), M, s, h, w_o, f, \ldots \rangle$ be a context.
A model $M_B \in M$ is a set of worlds associated with an individual x, representing worlds compatible with what x believes.

(The elements of c relevant for current purposes are the common ground cg, the model M, the speaker s, and the hearer h; see Giannakidou 1999:386 for further explanation.) Negation is of course nonveridical by (44i), and also antiveridical by (44ii). Questions and the antecedents of conditionals are also nonveridical by this definition. Taking questions as denoting the set of propositions that count as answers (Karttunnen 1977; Groenendijk and Stokhof 1984), then questioning P does not entail ∼P, nor do conditional operators. Thus, as expected, NPIs are licensed in these contexts, as demonstrated in (46a–c) with the NPI *anything*:

(46) a. George has not eaten anything.
b. Has George eaten anything?
c. If George has eaten anything, we'll postpone the procedure.

Although the distribution of a PPIs is not always the exact inverse of its paired NPI (Baker 1970), the licensing condition based on (43) reflects their basic complementary distribution:

(47) Licensing Conditions for Positive Polarity Items (adapted from conditions for NPIs in Giannakidou 1999:408)
a. A positive polarity item A is blocked in the local scope of a nonveridical operator.[11]
b. In certain cases, A may be licensed indirectly despite being in the local scope of a nonveridical operator in a sentence S, iff S gives rise to a positive implicature ϕ.

The main condition, (47a), accounts for the basic patterns of SpOAs shown in (6b–8b) and (27b–28b) for negation, questions in (29–30), and conditionals in (31–32). (47b) embodies *indirect licensing*, a secondary mechanism that allows for a range of additional cases where implicatures or presuppositions license a polarity item.

To tell the whole story of SpOA PPIs, we must (i) consider variation within this class of adverbs with respect to different NV environments, and (ii) provide a deeper explanation than (47) for why SpOAs are subject to this condition. We start by examining variation between two types of SpOA, weak and strong.

[11] *Local* is to be taken as referring to items within the same clause.

3.3 Weak and strong SpOAs

Some PIs are licensed or forbidden only in the strongest NV contexts—antiveridical ones, especially negation—while others are more broadly sensitive (see Zwarts 1996; van der Wouden 1997). Polarity licensers form a hierarchy, one form of which is given in (48), with stronger classes more to the left; each class on the left forms a subset of those to its right (illustrative examples are provided below the class labels):

(48) a. Antiveridical < Strictly Nonveridical
b. Antimorphic ⊆ Anti-Additive ⊆ Downward Entailing ⊆ NV
not *nobody, never* *rarely, no longer, few* Q, Cond

All of these nonveridical operators do not preserve truth value; antiveridical operators, loosely speaking, reverse truth value. I term operators that are nonveridical, but not antiveridical, *strictly nonveridical*.[12] Important here is the existence of a hierarchy, with the antimorphic *not* being the strongest of these, conditionals and questions the weakest, and other operators intermediate.

SpOAs exhibit variation along this hierarchy. First, although they at first seem impossible in questions and counterfactuals ((49–50) = (30), (32)), sentences like (51a–b) are fine:

(49) a. They unfortunately withdrew their funds.
b. *Did they unfortunately withdraw their funds?

(50) a. They have possibly decided to buy a Ferrari.
b. *If they have possibly decided to buy a Ferrari, I'm going to stay off the road.

[12]The following formulations, originally due to Zwarts (1996), are taken from Ladusaw (1996):

(i) A functor f is *anti-additive* iff $f(X \vee Y) = f(X) \wedge f(Y)$.
(ii) A functor f is *antimorphic* iff f is anti-additive and additionally $f(X \wedge Y) = f(X) \vee f(Y)$.
(iii) provides definitions for the (non)veridicality of quantifiers (Nilsen's 2004 Def. 3.1. (2), simplified for clarity):
(Non)veridicality of quantifiers: If f is a generalized quantifier, f is

(a) veridical iff $[\![f(x)]\!] = 1 \rightarrow \exists y[\![x(y)]\!] = 1$
(b) nonveridical iff $[\![f(x)]\!] = 1 \nrightarrow \exists y[\![x(y)]\!] = 1$
(c) antiveridical iff $[\![f(x)]\!] = 1 \rightarrow\!\sim \exists y[\![x(y)]\!] = 1$

See also Ladusaw (1996) and van der Wouden (1997) for general discussion of such hierarchies.

(51) a. Are they not probably more concerned with looking good than with winning?
b. If Lisa had not conveniently dropped her napkin at that moment, Giorgio would certainly have seen her.

At the same time, English evidential SpOAs like *clearly* and *obviously* are allowed not only in questions and conditionals, but also after negation, as (52) illustrates:

(52) a. Well, the board has not {obviously/clearly} committed itself to any one candidate.
b. Are they {obviously/clearly} going to be eligible for the competition?
c. If Allison has {obviously/clearly} completed her analysis, there's no need for you to wait around.

(For some speakers, evidentials are not always perfectly acceptable in these contexts, but there is still a contrast.) Thus we can distinguish three groups in English, according to their differing sensitivity to such NV contexts:

(53) a. Strong PPIs (Strong Evaluatives): Blocked in all NV contexts
Examples: *unfortunately, luckily, amazingly, unbelievably, sadly, oddly, bizarrely*
b. Weak PPIs (Weak Evaluatives/Modals): Blocked in antiveridical contexts, sometimes OK in strictly nonveridical contexts
Examples: Weak Evaluatives: *mysteriously, appropriately, famously, conveniently, significantly, mercifully*
Modals: *probably, possibly, certainly*, *maybe, perhaps, assuredly, surely*
c. Non-PPIs (Evidentials): Allowed in all NV contexts
Examples: *obviously, clearly, transparently*, *seemingly, evidently*

(I will refer to weak PPI SpOAs and non-PPI SpOAs collectively as *weak SpOAs*, strong evaluatives being *strong SpOAs*.) Intuitively speaking, strong SpOAs are more "emotive" expressing the speaker's strong emotional reaction to a proposition, while weak SpOAs are more purely "descriptive" or "objective." We will return shortly to this conceptual basis for distinguishing strong and weak SpOAs.

(54) summarizes the patterns that we must eventually account for, with the most important distinctions being those between (i) the first column (regular negation: an antiveridical context) and those to its right (strictly nonveridical contexts), and (ii) the top line (strong SpOAs) and those below it (weak SpOAs).

(54)

	Adverb type	Regular negation	Questions/ conditionals	Negative questions	Negative counterfactuals	Low-tone denial MN	Other metalinguistic negation (MN)
a.	Strong evaluatives (*luckily*)	*	*	*	*	*	OK
b.	Weak evaluatives (*mysteriously*)	*	*/OK	OK	OK	OK	OK
c.	Modals (*probably*)	*	*/OK	?/OK	*/OK	OK	OK
d.	Evidentials (*clearly*)	OK	OK	OK	OK	OK	OK

As noted, there is a clear difference in the patterns for strong and weak PPIs; both are bad under regular negation (55a), and appear at first to be bad in affirmative questions (55b) and antecedents of conditionals (55c).

(55) a. *They haven't {unbelievably/mysteriously/probably} decided to resign.
b. *Has George {unfortunately/oddly/maybe} come?
c. *If George {unfortunately/oddly/probably} comes, the party will be a disaster.

However, there are many instances where weak PPI SpOAs are allowed in affirmative questions (56a–c) and conditionals (57a–b):

(56) a. Are they probably going to be invited to the meeting?
b. Where have they probably put the loot?
c. Will our hero once again tragically be deprived of his chance for love?
d. *Are they unbelievably going to be invited to the meeting?

(57) a. If, as you say, they're probably in line for an award, maybe we should get tickets for the ceremony as soon as we can.
b. If they have conveniently decided to withdraw, the competition will go better for us.
c. *If they have luckily decided to withdraw, the competition will go better for us.

In (56a), imagine a context where the speaker has no control over the meeting's organization, and is asking about the likelihood of their inclusion so as to make preliminary travel plans: the issue of probability is salient. (56c) is an example of "Tune-In-Next-Week" questions, a stereotypical feature of the end of old radio dramas. In both (56) and (57), the last sentence has a strong evaluative SpOA and is unacceptable, while the other sentences have weak evaluatives and are fine (for some speakers, the contrasts are not sharp, but they do exist).

3.4 Speaker commitment and SpOAs

Understanding variation among SpOAs requires a closer look at their underlying lexicosemantic motivation for being PPIs. A common characterization of SpOAs is that they involve a "speaker's commitment" to the truth of a proposition (see, for example, Bybee and Fleischmann 1995; Palmer 2001; Papafragou 2006). But it is not always clear how the notion of speaker commitment actually affects the behavior of the adverb. Moreover, this concept is usually taken, in the context of epistemic modality, to refer to the degree of the speaker's commitment to the truth of the proposition P modified by the adverb. While this is indeed a feature of SpOAs in general (evaluatives are almost all factive, thus also representing a full commitment to the truth of P), the tack taken here is that a more important factor for polarity behavior is the speaker's commitment to the truth of the proposition Q = ADV(p), not that of P.

Speaker commitment can be approached in terms of the concepts of *subjectivity*, and of *commitment* in the sense of the speaker holding strongly to a judgment, i.e. the more committed a speaker is to a SpOA's evaluation of P, the less likely she would (re)consider that judgment on the basis of any objective, outside information. Consider how the three kinds of SpOA laid out in (53) can be characterized in these terms. First, strong evaluatives have a more strongly emotive flavor to them than weak evaluatives do: they express a more extreme judgment of good or bad, or of surprise, astonishment, disbelief, or the like. These notions conform to common evaluative "stances" identified by Thompson and Hunston (2000), points of view that narrators commonly take in discourse. Emotions are of course highly subjective, and a strong emotional attachment to a given proposition does not depend on objective information. Second, on the opposite end of the subjective-objective scale, evidentials like *obviously* and *clearly* are objective, since their use depends on evidence that is either physically perceptible, or a matter of very easy, transparent inference from publicly available evidence (see Nuyts 2001a, 2001b for discussion).

Weak SpOA PPIs, i.e. weak evaluatives and modals, are in the middle: They do not have a strong emotive flavor, nor is their use based on overt evidence to the same extent as evidentials. Thus epistemic modal adverbs (and epistemic modality in general) can be used either subjectively or objectively, as has frequently been noted (Lyons 1977; Nuyts 2001a; Papafragou 2000, 2006; Kratzer 2002). In (58a), for example, *might* can be interpreted as the speaker's (subjective) expression of a degree of confidence in asserting that it will rain tomorrow, or as an (objective) assessment of it (e.g. based on meteorological analysis). Similarly, in (58b), *must* is subjective if the speaker uses it to assert certainty derived from inferences based on knowledge of Smith's character, the lack of other obvious candidates, and so on, and objective if spoken by a detective after a thorough examination of the crime scene and listing of the incriminating evidence:

(58) a. It might rain tomorrow.
b. Smith must be the murderer.

The distinction is often subtle, and is not a sharp one (see Hoye 1997; Papafragou 2000; Nuyts 2001a; Kratzer 2002),[13] but it can be seen in the right context, as when two modal expressions occur in one clause, such as (59a–b):

(59) a. Perhaps he may be late.
b. Most certainly, he will possibly be implicated in the scandal.

(59a) can be interpreted with *perhaps* providing a subjective evaluation of the proposition that there is a(n objective) possibility of him being late;[14] (59b), which seems odd at first to many speakers, is better where it expresses the speaker's subjective judgment that there is some (objective) chance he will be implicated in the scandal. For example, it could be uttered after a discussion about the chances that Smith, Jones, and Williams might be tied to the scandal, and someone asks about Franklin; (59b) (perhaps with *too* added) could be the response. Thus *may* in (59a) and *possibly* in (59b) seem best interpreted as objective modality, indicating that there is a logical possibility of him (respectively) being late or being implicated in a scandal. (60) shows a case where we can specifically point to a reason for the (greater) objectivity of the modal auxiliary:

(60) Apparently, John must be upset.

As Speas (2004:20) points out, it is hard to get an epistemic reading for *must* in (60) in the normal case. However, we can imagine Mary running around trying to make peace after she notices that John is upset. We notice her activity and utter (60), basing our judgment on evidence that anyone can see.

I see no strong evidence that weak evaluatives can have both subjective and objective readings in the manner of epistemic modal adverbs. I will henceforth take them as essentially objective, on intuitive grounds; this choice does not appear to make any difference in the analysis proposed here. We therefore have the following classification of SpOAs, a revision of (53):

[13] Objective modality is sometimes identified with alethic modality (Wright 1951), but some scholars take it as separate, between subjective and alethic modality (Lyons 1977:798).

[14] *Perhaps* seems to express subjective modality exclusively, while *probably*, *possibly*, etc., can sometimes be objective with a supporting context. Evidence for this comes from comparisons of (i) with (59b), and (ii) with the acceptable (57a), which has an objective reading of *possibly*, the issue of possibility being salient in context:

(i) *Most certainly, he will perhaps be implicated in the scandal.
(ii) *If, as you say, they're perhaps in line for an award, maybe we should get tickets for the ceremony as soon as we can.
(Conditionals exclude subjective speaker-oriented modification; see below for more discussion.)

(61) a. Strong PPIs: Subjective; blocked in all NV contexts (indirect licensing disallowed)
b. Weak PPIs: Subjective or objective; blocked in antiveridical contexts, sometimes OK in strictly nonveridical contexts (indirect licensing allowed)
c. Non-PPIs: Objective; allowed in all NV contexts

If (61) is correct, then there is a correlation between subjectivity and PPI status.

The notion of subjectivity can be sharpened by defining it (following Papafragou 2006) in terms of a speaker's current belief set, by which epistemic adverbs characterize a relation between P and $M_B(s)$ (i.e. the speaker's belief set). At its most extreme, subjective epistemic modality restricts the possible worlds in its conversational background to what the speaker believes at the time of utterance, while objective epistemic modality includes what is generally known, or what the publicly available evidence is.[15] This is formulated in (62):[16]

(62) Subjectivity (for Speaker-Orientation):
Where a speaker asserts Q = ADV(p) (thus Q is in $M_B(s)$),
(a) ADV is *subjective* iff all worlds by which Q is evaluated are consistent with respect to $M_B(s)$ at the time of utterance;
(b) otherwise ADV is *objective*.

(63) Consistency: a set of worlds (q-worlds) is consistent with a belief state M if the proposition q is true both in q-worlds and in all the worlds in M.

(Though only formulated for adverbs, I take (62) as potentially relevant for other categories as well. In particular, adjectives corresponding to SpOAs appear always to be objective; see below.) In effect, subjective SpOAs must be true for the speaker's entire belief set—the speaker brooks no possibility of the proposition ADV(p) being false. This is how strong SpOAs work, their strong emotion underlying this certitude. In contrast, evidentials are (very) objective because they necessarily invoke publicly available evidence which in principle may be at odds with the speaker's belief set. Weak PPIs are somewhere in the middle between the extremes of strong evaluative SpOAs and evidentials. We may also generalize, as in (65), to connect

[15] See Kratzer (1991, 2002) and Papafragou (2000), for discussion of conversational backgrounds for modality. Note that while Papafragou focuses on relation between the speaker's belief set and P modified by a modal expression, the focus here is on that between this belief set and Q = ADV(p), though the definitions ought to work for either one.

[16] Note that this is not the same notion of subjectivity as that invoked in the literature on cognitive grammar (e.g. Langacker 1991, 1999; Croft and Cruse 2004). Also, it should be remembered that a speaker's commitment is independent of who is affected by a situation (though the latter may inform the speaker's evaluation); thus, for example, phrases like *unfortunately for Ken*, or *surprisingly to all concerned* are still speaker-oriented because the speaker asserts that some situation is unfortunate or surprising.

subjective/objective speaker commitment as used above with the patterns shown by strong and weak PPIs in strictly nonveridical contexts:

(65) Only objective SpOAs allow indirect licensing.

How this works is discussed in the next section.

3.5 Accounting for SpOA variation

3.5.1 Main proposal

We must now provide a more specific account of differences between the three classes outlined above than the general condition (47). For NPIs, Giannakidou (2006, 2007) aims to provide more specific accounts of why NPIs are banned in nonveridical environments; for example, she proposes that *any* and similar items require a particular type of variable, intensional variables, which can only be bound by operators provided in these contexts. In the case of SpOA PPIs it is not a matter of a deficit being filled, but rather some clash between the subjective, speaker-commitment element of the polarity item and its context.

The relevant aspects of the meaning of *unfortunately* (and equivalently for other strong SpOAs) can be represented as in (66):

(66) $[\![\text{unfortunately (P)}]\!]$ = a. $[\![\text{P}]\!] = 1$ in $M_B(s)$
b. $\forall w \in M_B(s))$, $[\![\text{it is unfortunate that P}]\!] = 1$ in w
(i.e. ADV(p) is true in all worlds in the speaker's belief set)

(66) accounts for the ungrammaticality of these adverbs in all nonveridical contexts because by (66b) they always require veridical contexts. In regular negative sentences, (66b) commits the speaker to the truth of Q = ADV(p) in the speaker's belief set $M_B(s)$, but *not* simultaneously negates Q in $M_B(s)$, thus yielding a contradiction: Q is both true and false in $M_B(s)$. This is the root of the ordering restriction shown in (3), requiring SpOAs to precede negation, illustrated in (27), given again here, with the strong SpOA *luckily*:

(27) a. Karen luckily has not left.
b. *Karen has not luckily left.

(27b) is ruled out because (66b) requires the proposition *Karen has luckily left* to be true in the speaker's belief set, while the use of *not* represents the claim that the same proposition is false in the speaker's belief set. (27a) is a good sentence because the speaker asserts an affirmative proposition equivalent to *It is a lucky thing that Karen has not left*, and there is no contradiction between the speaker's commitment to this proposition and the embedded negation (which negates *Karen has left*).

Questions and conditionals, being nonveridical, allow Q to be true in some worlds and false in others, but this violates (66b) as well. For example, in a simple ques-

tion like (67) (=(21a)), whose denotation is the set {UNFORTUNATE (she found a scorpion in her boot), ∼UNFORTUNATE (she found a scorpion in her boot)},[17] Q (=UNFORTUNATE (she find a scorpion in her boot)) is true in some worlds and false in others.

(67) *Has she unfortunately found a scorpion in her boot?

(68) *Has she not unfortunately found a scorpion in her boot?

As discussed in Romero and Han (2004), negative yes-no questions have a rhetorical use of "checking" on a proposition that one expects to be true, i.e. P is true in the speaker's expectation model $M_{EX}(s)$, a subset of $M_B(s)$. For example, *Has she not left?* is asked when the speaker expects that she did in fact leave, but wants to confirm this (at least rhetorically) with the audience. So in (68) the speaker leaves open the (slight) possibility that the hearer knows that Q is in fact false (i.e. that she has **not** unfortunately found a scorpion in her boot); Q is true in the speaker's expectation model $M_{EX}(s)$, but there are other worlds in $M_B(s)$ where Q is false, violating (66b). Similarly, for regular conditional sentences such as (69), there are evaluation worlds in which Q is false; once again the adverb's condition in (66b) is violated.

(69) *If she has unfortunately found a scorpion in her boot, she'll be sorry.

Negative counterfactuals like (70) are slightly more complex, because in counterfactuals the pattern *If P, (then) Q* implicates ∼P, so that a negative counterfactual antecedent of the form *If* ∼P implicates P. In (71) this proposition is "She found a scorpion in her boot," taken as true. If this implicature were the whole story, then sentences like (70) should be fine, because this proposition, ADV(p), is true all worlds in the speaker's belief model, just as (66b) requires.

(70) *If she hadn't unfortunately found a scorpion in her boot, she'd be here today.
(71) If she hadn't found a scorpion in her boot, she'd be here today.

However, according to the widely adopted analysis of counterfactuals proposed by Lewis (1973) (see also Stalnaker 1968), these sentences in essence are evaluated in two parts. For negative counterfactuals like (70), the first part corresponds to the counterfactual implicature just noted. The second says that there is at least one world, very close to our own actual world, where the antecedent's proposition is in fact false, and the consequent is true. That is, (70) is evaluated in part by seeing if there is a world where (a) it is false that she unfortunately found a scorpion in her boot, and (b) she is here today. This is taken as a very plausible world. If we assume that such worlds are part of the speaker's belief model, then (70) and its ilk are bad because the proposition UNFORTUNATE (she found a scorpion in her boot) is not true in all worlds of $M_B(s)$, as (66b) requires for strong SpOAs.

[17] This assumes an analysis of questions based on Karttunnen (1977), Groenendijk and Stokhof (1984).

Given this explanation for questions and counterfactual conditionals, we account for the fact that strong, subjective SpOAs cannot occur in any of these nonveridical contexts.

Turning to weak SpOAs, the difference between them and strong SpOAs can be attributed to the fact that the former are not necessarily subjective. When they are subjective, their lexical entries include the provision in (66b). (This reflects the consistency condition in (62a), as defined in (63).) However, when they are objective, (66b) is replaced by a weaker provision that simply requires truth within some relevant model of belief, expectation, desire, etc. (including $M_B(s)$). This is illustrated for the weak evaluative SpOA *mysteriously* in (72):

(72) $[\![$mysteriously (P)$]\!] =$ a. $[\![P]\!] = 1$ in $M_B(s)$
b. for all w in some subset W of $M \in \{M_B(s), M_B(h)\}$,
$[\![$it is mysterious that P$]\!] = 1$ in w

(Non-factive epistemic adverbs like *probably*, of course, will have a different basic representation for their equivalent of (72a).) The exact identity of W in (72b) will vary by construction and lexical class (further work is surely needed on this); individual cases will be discussed momentarily.

Note that, importantly, weak evaluatives will still be impossible in the scope of regular negation because in such constructions the only available model is the speaker's belief model $M_B(s)$, setting up a contradiction in the same way as there was for strong SpOAs: Q is false for all w in $M_B(s)$, while the adverb requires that Q be true, for at least some worlds in $M_B(s)$. But in nonveridical contexts, when an appropriate subset of worlds can be found in which Q is true, we predict that the weak SpOA may be grammatical. We will examine three sets of constructions where this is the case, distinguishing strong from weak PPIs: (i) Negative questions and negative counterfactual conditionals; (ii) regular questions and counterfactuals like (56–57); and (iii) low-tone VP denials, a particular kind of metalinguistic negation.

3.5.2 Negative questions and negative counterfactual conditionals

Negative questions and negative counterfactual conditionals are shown in (73–74) and (75–76), respectively, for evaluative SpOAs, and in (77) for modals (in each case, the first sentence has a strong SpOA, and the second a weak one):

(73) a. *Haven't they unbelievably decided to resign?
b. Haven't they mysteriously decided to resign?

(74) a. *Haven't they luckily decided to leave early?
b. Haven't they conveniently decided to leave early?

(75) a. *If they hadn't unbelievably decided to resign, things would have been fine.
b. If they hadn't mysteriously decided to resign, things would have been fine.

(76) a. *If Jack had not luckily been nominated while his party was in power, he would never have been confirmed.

b. If Jack had not conveniently been nominated while his party was in power, he would never have been confirmed.

(77) a. Weren't these coins probably cached here in the 5th century when Germanic tribes overran the region?
b. If they hadn't probably been cached here in the 5th century, we would not have been interested in the find.

(77) would be appropriate in a context where archeologists are discussing a cache of coins, found in an area of Europe where many well-to-do Romans were known to have hidden coins and other valuables during the troubles at the end of the Roman Empire. (Some speakers find (77b) mildly odd.) Crucially, both of these two sentence patterns bring in the truth of P, even though P has overt negation. In an adverb-less version of (73), for example, when we ask: *Haven't they decided to resign?* we presuppose that they have in fact decided to resign; (73b) implicates that they have mysteriously decided to resign. As noted above, for Romero and Han (2004), negative yes-no questions are a way of checking on a proposition that one expects to be true, i.e. P is true in the speaker's expectation model $M_{EX}(s)$. This is the subset of $M_B(s)$ required by (72b), so weak SpOAs are allowed in these contexts.

In a parallel way, negative counterfactual conditionals license weak SpOAs because negative counterfactuals implicate the truth of the antecedent. (75b), for example, implicates that they mysteriously decided to resign. Thus the relevant proposition is true in a subset W of worlds in $M_B(s)$, and (72b) is satisfied.

The provision in (66b) is a reflection of the NV theory's notion of indirect licensing, formulated originally as (47b) (going back to antecedents in Linebarger 1980), in which elements of the global context introduce an element of veridicality, despite the presence of a nonveridical operator. (In the case of NPI licensing, of course, the global context would introduce elements of nonveridicality, in the absence of a true nonveridical operator.) In more recent work (47b) is replaced by more integrated mechanisms, such as "rescuing" and the fulfillment of negative presuppositions (see, e.g. Giannakidou 2006, 2007); the lexical encoding of this looser licensing mechanism proposed here continues this trend.[18]

3.5.3 Weak SpOAs in strictly nonveridical contexts

It was noted earlier that weak SpOAs sometimes occur in (affirmative) questions and antecedents of conditionals. This is indicated, in the chart in (53), by the notation "*/OK"; they are often odd, but with the right context they are acceptable. The examples below show modal adverbs in (78) (questions) and (79) (conditionals), and

[18] As Marcel den Dikken has pointed out to me, this means that accounting for SpOAs, and polarity items more generally, must appeal to the semantics-pragmatics (or syntax-pragmatics) interface. I sidestep any theoretical discussion of this here, since we are only beginning to understand how a few individual cases of indirect licensing work.

evaluatives in (80) (questions) and (81) (conditionals). Recall also that weak SpOAs contrast with the strong SpOAs, shown in (82–83).[19]

(78) a. Are they possibly going to be invited to the meeting?
b. Where have they probably put the loot? (=60b)

(79) a. If, as you say, they're probably in line for an award, maybe we should get tickets for the ceremony as soon as we can. (=73a)
b. If they have possibly found a new Vermeer in that old farmhouse, then we will have to fly to Holland to investigate.

(80) a. Will our hero once again tragically be deprived of his chance for love? (=60c)
b. Have these villains mercifully been granted a reprieve?
c. Should their new butler conveniently be a handsome young man?

(81) a. If they have conveniently decided to withdraw, the competition will go better for us.
b. If he has mysteriously been showing up at seedy bars in weird costumes, then we are going to have to investigate. (=73b)

(82) a. *Has George unfortunately come?
b. *Are they unbelievably going to be invited to the meeting?

(83) a. *If they have luckily decided to withdraw, the competition will go better for us. (=73c)
b. *If Fred had oddly gone home before his own awards ceremony, we'll have to go talk to him.

In cases like (78b), the question treats the issue of possibility as salient, focusing on the idea of whether their coming is or is not possible. If an issue is salient, then it is "at issue" for the speaker: she is willing to consider evidence for the falsity of the relevant proposition, from points of view other than her own—that is, models other than $M_B(s)$. By definition, this is a matter of objectivity for SpOAs: we may take objective (but not subjective) modification as compatible with the salience of an issue, indicating the issue's presence in the mental models of many speakers (where a larger number of speakers correlates with increased objectivity; see Nuyts 2001a:34). On an objective reading, then, we may say that the speaker's belief model contains a subset W of worlds in which the speaker sees some evidence for believing P to be true. (The subjective reading required for strong SpOAs cannot appeal to these worlds, and thus we correctly account for the strong/weak distinction in the data.[20])

[19] See also Drubig (2001) and Haumann (2007) for discussion of modal SpOAs in interrogatives.

[20] The formulation of objectivity proposed here thus presupposes an important component of evidentiality, following Nuyts (2001a, 2001b). For discussion of the relation between evidentiality and epistemic modality, see the preceding and deHaan (1999), Drubig (2001), Aikhenvald (2004), and Papafragou (2006).

As noted, in (78) the issue of probability/possibility is salient in that we are concerned to assess the relative chances of their being invited. In (79a–b) the probability/possibility is grounds for the consequent of the conditional: for example, (79b) puts probability at issue because, given the rarity and importance of a new Vermeer painting, mere possibility is enough reason to go and investigate (and in (79a) *as you say* stresses that the speaker is considering objective information, in the hearer's belief model). As with the questions considered just above, for this objective reading the speaker's belief model contains a subset W of worlds in which the speaker sees some evidence for believing P to be true; therefore, weak SpOAs are allowed in these cases.

Note that this conception of subjectivity/objectivity, if expanded to non-SpOA modal operators in general, predicts the fact (e.g. Lyons 1977:808; Papafragou 2000) that only objective modality is possible in conditionals and questions. (84a–b) cannot represent a speaker's assessment of possibility, but instead involve objective evaluation, e.g. with paraphrases like "If there is a chance that it will rain tomorrow. . . " and "Is there a possibility of rain tomorrow?"

(84) a. If it might rain tomorrow, people should take their umbrellas.
b. Might it rain tomorrow?

Similarly, the content of the subjectively modalized assertion in (85a), if taken as the antecedent of a conditional, would normally be embedded without a modal expression, as in (85b). (86a) is odd because the subjective interpretation of the modal is at odds with the nonveridicality of the antecedent. (86b), by contrast, is only acceptable if *may* is taken objectively, paraphrased by "If it is (still) possible that George will be here on time, . . . "

(85) a. George may be here on time.
b. If George is here on time, work can begin at 9AM.

(86) a. ?If George may be here on time, work can begin at 9AM.
b. If George may (still) be here on time, then we certainly shouldn't leave yet.

As Hoye (1997), Nuyts (2001b) (citing Kiefer 1984; Hengeveld 1988), and Kratzer (1991) note, epistemic modal adverbs like *possibly*, as well as modals such as *may/might*, tend to be subjective, while the corresponding adjectives and nouns are objective (*(there be) a possibility of/that* and *possible (that)*).

"Tune-In-Next-Week" questions, as in (80), work in a way similar to the modals just discussed. These questions are posed in a context where anyone familiar with the conventions of radio dramas knows what is likely to happen in the next episode. If (80b) is the end-of-show question, for example, we would presumably know from what just happened that the appearance of a handsome young butler would be convenient for them. Thus there is evidence to take this sentence's proposition as true, and we have the required subset W of worlds in the speaker's belief model to license the use of the weak SpOA. Finally, in (81), since weak evaluatives are inherently objective, and conditionals exclude subjective interpretations, this is a strongly objective combination, and this pattern is allowed.

As shown in (48), the class of strictly nonveridical operators also includes downward entailing (DE) quantifiers such as *rarely, no longer*, and *few N's*. Weak SpOAs ought to be possible in their scope, and this is in fact borne out, as shown by the sentences in (87); these contrast with the corresponding, ungrammatical sentences with strong SpOAs in (88):[21]

(87) a. One often hears the term "responsible pharmacist" but **few probably** take time to explore i[t]s full meaning.
(home.fuse.net/adherence/Responsible%20pharmacist%202004.pdf)
b. When a client calls looking for case status, popping the case up on your monitor is infinitely faster than shuffling through files, especially since the file is **rarely conveniently** on your desk.
(www.senseient.com/default.asp?page=publications/article21.htm)
c. There are many lovely hybrids to try. 'Lucy Ball' is delightful and easy and will increase so that you have enough for a good display and will **rarely mysteriously** disappear in your garden over the winter.
(www.bestgardening.com/bgc/plant/allium01.htm)

(88) a. *One often hears the term "responsible pharmacist" but few strangely take time to explore its full meaning.
b. *When a client calls looking for case status, popping the case up on your monitor is infinitely faster than shuffling through files, especially since the file is rarely luckily on your desk.
c. *There are many lovely hybrids to try. 'Lucy Ball' is delightful and easy and will increase so that you have enough for a good display and will rarely unfortunately disappear in your garden over the winter.

The case of SpOAs with these quantifiers is more complex than (48) would suggest; for example, (89) provides an instance of *probably* with the antiveridical quantifier *nobody*:[22]

[21] Nilsen (2004) claims that SpOAs are blocked in the scope of DE operators like *rarely*, supplying the following example constructed from an internet source (which had *often* in place of *rarely*):

(i) ??His retaliations killed or endangered innocents and rarely possibly had an effect in locating terrorists. (Nilsen's (15b))

However, this example is degraded by the closeness of the adverbs, the aspect, and the fact that *possibly* often does not work well to describe knowable past events. (ii) shows that the sentence is far better with a weak evaluative, and (iii) illustrates that the sequence *rarely possibly* works when these extraneous factors are removed and context makes the question of the degree of possibility salient:

(ii) His retaliations might kill or endanger innocents, but rarely would they helpfully have an effect in locating terrorists.
(iii) Only rarely would our data possibly be useful in proving that kind of hypothesis.

[22] In (89a) *probably* takes wide scope over *nobody*; this option of wide scope over subjects is well known for adverbs, negation, and other items in or around Infl. In other such sentences, such as (i), with one possible interpretation brought out by the paraphrase in (ii), the subject quantifier takes wide scope.

(i) Nobody was probably going to get into an Ivy League school.
(ii) Not one of those students, as far as we could determine in interviews with admissions officers, was probably going to get into an Ivy League school.

(89) a. Nobody probably cares... but I'm excited!!!
(www.alternativenation.net/forums/showthread.php?t=60769)
b. *Nobody unfortunately cares... but I'm excited!!!

Furthermore, for reasons that remain obscure, adding *so* to a SpOA adverb under a nonveridical operator, even a strong one like *strangely* in (90), improves it:

(90) a. ??No longer would the young man strangely be denied his just deserts.
b. No longer would the young man so strangely be denied his just deserts.

I will not pursue these nuances here; such details surely must fall under a more elaborated account of the strength and weakness of polarity operators and polarity items. The main point to be made here nevertheless holds: by invoking the hierarchies of strength and weakness in an NV theory, it is possible to account for the broad patterns of SpOAs in strictly nonveridical contexts.

3.5.4 Low-tone VP denials

We turn finally to low-tone VP denials, a subcase of metalinguistic negation. Horn's (1989:363) characterization of this phenomenon is that of a device for objecting to a previous utterance on any grounds, including pronunciation and presupposition as well as truth value, as (91a–c) illustrate:

(91) a. He's not an [əmɚɪkən], he's an [əm**ɛr**ɪkən].
b. Allison didn't **manage** to solve the problem—it was very easy for her.
c. We don't **discuss** such things, we ignore them completely.

Metalinguistic negation sometimes allows bypassing the normal constraints on positive polarity (Baker 1970:169; Horn 1989:397; Carston 1996:321–322), as in (92), where the PPI *already* presupposes some expectation that Dan got tired earlier than expected.

(92) a. Dan is already tired.
b. *Dan isn't already tired.
c. No, Dan isn't already tired; he's so in shape this year that he could go all day.

The same holds for the SpOA PPIs in (93–94):

(93) a. - - But they **haven't** possibly been disappearing!
b. - - But they **haven't** mysteriously abandoned their research!

(94) a. We haven't **probably** found a new Vermeer, we've **definitely** found one!

This raises a number of issues beyond the fact that a PPI seems possible in the scope of an antiveridical quantifier: If nothing else, PPI licensing may have to depend on surface c-command relationships rather than scope in semantic representation.

b. They haven't **unbelievably/amazingly** decided to resign—if you know them, it was completely expected.

(94) shows both weak (a) and strong (b) SpOAs, and the adverbs are the focus of metalinguistic negation. But where they are not the focus of negation, there is a split: weak SpOAs are acceptable (as in (93)) but strong ones are far worse (cf. (95)).

(95) a. - - *But they **haven't** unbelievably been disappearing!
b. - - *But they **haven't** amazingly abandoned their research!

Iwata (1998) notes that the lifting of polarity restrictions in metalinguistic negation occurs when the polarity item is focused; otherwise, polarity licensing may still apply. Thus in (96a–b) (Iwata's (1998) (38a) and (46A/B_2)) show that the NPIs *at all*, *any*, and *yet* can be licensed by metalinguistic negation in unstressed positions:

(96) a. That car isn't old at all. It's antique.
b. (So you've already trapped two mongeese.)

I haven't trapped any monGEESE yet. I have trapped two monGOOSES.

Cases of low-tone VP denials like (93) and (95) lack focus on the SpOAs, so at least the strong evaluatives are antilicensed by negation.

The proposal that weak SpOAs are evaluated as in (72), with more flexibility than for strong SpOAs, also accounts for low-tone metalinguistic negation. While strong SpOAs are rigidly indexed to the actual speaker, in these contexts weak SpOAs need not be. Any elaborated theory of reference and predication must allow for how reference to speakers, subjects, objects, and the like can change in discourse, including cases of switch-reference phenomena (Sells 1987; Stirling 1993), and indirect discourse. In the latter, as in (97), for example, a SpOA is interpreted with respect not to the speaker of (97) but to the speaker of the reported discourse (Jenny):

(97) Jenny said that Amanda had unfortunately been rained out of her camping trip.

I assume that the appropriate treatment of denials like (93) includes a statement that the person whose utterance is denied becomes the speaker relevant for the SpOA. We thus have a situation where the original speaker asserts/believes Q = ADV(p) (for (93b), *They have mysteriously abandoned their research*) while the actual speaker negates this proposition. This inconsistency is allowed for weak SpOAs, but not for their strong counterparts.

More concretely, (72b) permits the relevant set W that licenses weak SpOAs to be part of M_B(h), the hearer's belief model, and this is the relevant model for this type of denied assertion (or perhaps, with a suitable definition of *hearer*, the speaker of an assertion recoverable from the common ground).[23] Given this approach, (93)

[23] See Sells (1987) for an example of a format, that of Discourse Representation Theory (Kamp and Reyle 1993), that would work for the purpose of anchoring these models in a theory of discourse.

is acceptable because *They have possibly been disappearing* is true in $M_B(h)$, even though it is false in $M_B(s)$.

3.6 Summary

In this section, I presented an analysis of SpOAs that treats them as positive polarity items, within the (non)veridicality theory of polarity. Most crucially, SpOA PPIs are taken as asserting the truth of Q = ADV(p), as embodied in lexical representations of the form in (66) or (72). The difference between strong and weak SpOA PPIs is attributed to the fact that this assertion that Q is true holds rigidly in the speaker's belief model for the former, but need not hold in all worlds—only a definable subset—for weak SpOAs. It was shown how this weaker condition in (72b) allows weak SpOAs to occur in the strictly nonveridical contexts of negative questions and negative counterfactual conditionals, regular questions and conditionals, and low-tone VP negations. All of this has as its underpinning a conception of SpOAs as encoding more or less *subjective* evaluations on the part of the speaker, with true subjectivity implying a rigid insistence on the truth of Q—making for strong PPI behavior—and objective interpretations allowing indirect licensing of weak SpOAs as well as, in the most extreme case, the non-PPI evidentials.

4 The strengthening and nonveridicality approaches compared

4.1 Introduction: strengthening and scalarity

Among approaches to polarity that stress semantic/pragmatic explanations, the most widely adopted is probably the scalar approach, as broadly conceived.[24] The crux of this approach is that polarity item licensing involves some sort of quantitative comparison, possibly as the basis for an entailment relationship. The earliest of these, going back to Fauconnier (1975) and Ladusaw (1979), claims that NPIs occur in downward-entailing (DE) contexts, and denote extreme elements among a set of alternatives ranged along a scale. A DE context is one in which replacing some phrase with a weaker (less specific) phrase results in a stronger (more specific) expression overall. For example, negation is DE, as shown by the fact that shown in (98a) that *apples* is stronger than *fruit* (where $\subseteq$ denotes semantic strength: A $\subseteq$ B means that A is at least as strong as B, i.e. more specific, or smaller in set-theoretic terms). Substituting *apples* for *fruit* in (98b) makes for a more specific statement; thus, on theories where DE expressions license NPIs, negation licenses the NPI *any* in (98c):

(98) a. apples $\subseteq$ fruit
b. Amanda didn't pick fruit. $\subseteq$ Amanda didn't pick apples.
c. Amanda didn't pick any apples.

[24] For discussion of various approaches to polarity phenomena, including scalar theories, see Krifka (1995), Ladusaw (1996), and van Rooy (2003); for a more focused view of scalar theories see Krifka (1995) and Chierchia (2004).

Similarly-oriented accounts have been offered for *even*, *yet*, minimizers such as *a bit*, *squat*, or *lift a finger*, and *either*.

Kadmon and Landman (1993) propose a scalar account of *any* based on the concept of widening and strengthening, by which NPIs are licensed only where they result in a sentence that is stronger than the equivalent sentence containing a corresponding, non-NPI expression. Consider the paradigm in (99):

(99) a. Greg found a shirt in the closet.
b. *Greg found any shirt in the closet.
c. Greg didn't find a shirt in the closet.
d. Greg didn't find any shirts in the closet.

Kadmon and Landman would explain this pattern as follows. The difference in meaning between (99a) and (99b) is that with *a* in the former, Greg carries out a normal, everyday search for shirts in the closet, while *any* requires that he carry out a widened, more extreme search with more than the normal range of possibilities—perhaps checking in those old boxes, behind the tie rack, under the ironing board, etc. The use of the NPI *any* is then subject to the strengthening condition in (100):

(100) Strengthening Condition (widening)
The result of domain widening must entail the same proposition without domain widening.

The set of possible worlds in which one finds *any* shirt (on the expanded search) includes that in which one finds *a* shirt. That is, there are worlds in which one could find a shirt on the expanded search but not on the normal one; thus, (99b) does not entail (99a), and the condition is not met for (99b) or any other simple affirmative sentence with *any*, hence their ungrammaticality. On the other hand, when negated as in (99c–d), the scale is reversed, so that the *any* sentence does entail the *a*−sentence, the condition is met, and (d) is allowed.

Other analyses, such as van Rooy (2003), Krifka (1995), and Chierchia (2006), and many others, invoke scales and scalar implicatures in a fundamental way to explain polarity phenomena. On the other hand, NV theories base their accounts of polarity on a cluster of properties centering on truth values: at the core are veridicality, nonveridicality, and antiveridicality, but other, related properties include modality, intensionality, and downward entailingness (Giannakidou 2006:591). Lexical items may vary with respect to the set of properties to which they are sensitive, and they may be sensitive to them in different ways.[25] For example, as noted earlier, on the analysis of Giannakidou (2001) *any* is an NPI because it requires an intensional variable to be

[25] *Lexical* should be interpreted here as "listed in the lexicon," so that a phrasal PPI like *in all likelihood*, for example, has a lexical entry containing specifications along the lines discussed above for weak SpOAs. The lexical nature of polarity licensing also means that there can be some arbitrariness and variation, such as that discussed for *necessarily* and *definitely* in note 10, or in the difference between the PPI *possibly* and its non-PPI adjectival counterpart *possible*. In the latter case there may be an effect of adverb-properties *vs*. adjective-properties, if it is generally true that adverbs tend to be more backgrounded and subjective, and thus more likely to be PPIs; this is "lexical" in that category specification is part of lexical entries.

properly licensed, while the *even*-type NPIs analyzed in Giannakidou (2007) are licensed by means of negative contexts satisfying certain presuppositions. NV theories view lexical items as complex, and agree with strengthening approaches to polarity that scalar phenomena may figure saliently their semantics. However, NV theories hold that these scalar effects are not the root of their polarity status.

The goal of this section is to show that the NV account presented earlier is better for SpOAs than Nilsen's narrowing-and-strengthening proposal, a type of scalar theory. There are two arguments to this effect: first, that SpOAs do not really show the meaning properties expected for domain-narrowing; and second, that the NV theory, but not the strengthening theory, makes the "right cuts" among adverb classes, i.e. it predicts the types of variation that one finds for different kinds of adverbs.

4.2 Nilsen's strengthening theory[26]

Nilsen's (2004) analysis starts from the observation that there are differences between the behavior of the adverb *possibly* and that of its corresponding adjective *possible*. As (101) shows, one can construct a good sentence with the beginning in (a) and the continuation in (c): In (a) *possible* indicates a bare, theoretical possibility, which allows for the negation in (c), a prediction of reality. By contrast, (b) with *possibly* does not allow (c)'s continuation. Intuitively speaking, this difference could result because *possible* allows for a wider set of possibilities, is wider and "looser," while *possibly* is narrower (stronger).

(101) a. It's possible that Le Pen will win... (Nilsen's (36a–b, d))
b. #Le Pen will possibly win ...
c. ...even though he certainly won't.

This intuition is similar to that for *a/any* in Kadmon and Landman (1993) in (99a–b); and in fact we see a similar paradigm for *possible/possibly*:

(102) a. It is possible that Stanley ate his Wheaties.
b. Stanley possibly ate his Wheaties.
c. *Stanley didn't possibly eat his Wheaties.
d. It is not possible that Stanley ate his Wheaties.

Nilsen (adapting Chierchia 2004) models epistemic modification in terms of a plausibility relation on propositions, with propositions that a speaker strongly believes taken as very plausible. Propositions that are less strongly believed, i.e. merely possible, are treated as at least as great as a contextually determined lower bound referred to as LOW. Propositions less plausible than LOW are those that speakers consider not possible: It is certain that the proposition is false. Further, if the plausibility of P as LOW, then the plausibility of ∼P is HIGH. The definitions of *possi-*

[26] I am indebted to a reviewer for discussion of the material in this and the next subsection.

ble and *possibly* amount to those in (103a–b) (where PL(p) is the plausibility of the proposition p for a given speaker):

(103) a. $[\![possible]\!] = \lambda p.PL(p) \geq LOW$
b. $[\![possibly]\!] = \lambda p.PL(p) > LOW$

While *possible* allows the plausibility of a proposition to be exactly at the lower bound LOW, *possibly* does not; therefore *possibly* is a stronger expression than *possible* (having a narrower domain). Given Kadmon and Landman's strengthening condition, with its polarity appropriately reversed, as in (104), the patterns in (102) (opposite from the NPI *any*) are accounted for:

(104) Strengthening Condition (narrowing)
The result of domain-narrowing must entail the same proposition without domain-narrowing.

Possibly is allowed in (102b), because if it is true that Stanley ate his Wheaties in a narrow, restricted set of possible worlds, then he does so in a wider set of worlds, as represented by *possible*. So (102b) entails (102a) and thus is allowed. But for (102c–d), since negation reverses the scale, (102c) does not entail (102d), and so the former is ruled out.

Nilsen takes the pattern in (101) as evidence for this analysis, given that the meanings of *certain* and *certainly* amount to (105a–b) (see Nilsen 2004 for formal details):

(105) a. $[\![certain]\!] = \lambda p.P(p) \geq HIGH$
b. $[\![certainly]\!] = \lambda p.P(p) > HIGH$

In (101a), with the continuation in (101c), there is no conflict between the meanings of *possible* and *certainly*. With the relevant proposition being *Le Pen will win*, (101a–b) are in essence (106a–b), respectively:

(106) a. $\lambda p.P(p) \geq LOW \;\&\; \lambda p.P(\sim p) > HIGH$
b. $\lambda p.P(p) > LOW \;\&\; \lambda p.P(\sim p) > HIGH$

(106a) is well-formed because p can be exactly LOW, while ∼p is greater than this on the plausibility scale, i.e. HIGH; there is no contradiction. But (106b) is not well-formed, since if the plausibility of p is greater than LOW, then the plausibility of ∼p is necessarily smaller than HIGH (not greater than HIGH, as *certainly* requires). Thus the continuation of (a) in (c) represents a contradiction, and this analysis correctly predicts the pattern in (101).

I turn now to examining two problems for this strengthening analysis.

4.3 Scalarity vs. speaker commitment: is it really a matter of domain-narrowing?

The strengthening theory is based on the perceived domain-narrowing that takes place between *possible* and *possibly*: the latter adverb seems to be more restrictive, allowing a smaller set of possible worlds. This idea is attractive in part because it links PPI

behavior to that of the NPI *any* by treating them both as instances of strengthening. However, there are indications that there is no true domain-narrowing going on, at least across the class of SpOAs.

Consider first of all the hallmark of scalar approaches, the sense of increase or decrease along a continuum. This sense is clearly present in (107a–b), for example, with *a/any* and *even*:

(107) a. She didn't buy a book at Borders—I'd go so far as to say she didn't buy **any** book (at Borders).
b. (With her income,) She wouldn't buy a car, wouldn't buy a bicycle—I'd go so far as to say she wouldn't even buy a little plastic scooter.
c. For her vacation, it's possible that she'd go to Albany, more possible that she'd go to Boston—and I'd go so far as to say that she'd possibly go to Paris.

In (107a) there is a contrast between the bare indefinite *a* and the wider, stressed *any* (speakers generally find this sentence mildly odd, but acceptable). In (107b) there are three items along a continuum of increasingly likely purchases, where *even* contributes its well-known meaning that the element it focuses (here, *a little plastic scooter*) is at the extreme of the relevant scale (see, e.g. Rooth 1985). The phrase *I'd go so far as to say* likewise signals that the following expression represents a further increment along the scale, in both (107a–b). However, (107c) does not have this same feeling: though the scalar/strengthening analysis predicts that *possible—more possible—possibly* align along a scale (or, at least, *possible* and *possibly* do, depending on how *more* is analyzed), in (107c) *possibly* does not act to express the extra increment of a scale. The scalar feel comes from a scale of increasing desirability of Albany $<$ Boston $<$ Paris, and *I'd go so far as to say*; but *possibly* seems irrelevant to it, while *any* and *even* in (107a–b) are clearly part of the expression of scalarity. (Though one might argue that *any* and *even* involve extremes of scales, while *possibly* only represents a further increment but not an extreme, (107) shows the same patterns when *further* or *what's more* substitutes for *I'd go so far as to say*.)

Second, there is reason to doubt that domain-narrowing and strengthening is at the root of the infelicity of (101b–c): once we examine other SpOAs, we find a similar pattern, but not the same justification. Nilsen does not supply an account of how evaluative and evidential SpOAs can be handled on the strengthening approach; in the absence of a proposal, the theory is incomplete as it stands. Nevertheless, a reasonable proposal is that the adverb and adjective represent standard gradable predicates,[27] evaluated with respect to a contextual norm, but with slightly different relationships to this norm. So, for example, in a way parallel to the modal adverbs above, *odd* might be represented as $\mathrm{ODD}(p) \geq d_o$ (where d_o is the contextually determined norm) and *oddly* would be $\mathrm{ODD}(p) > d_o$. This preserves the crucial idea of domain narrowing

[27] See Kennedy (1999) and references cited there.

from adjective to adverb. Now examine the sentences in (108), showing a parallel to (101):

(108) a. It's odd that she left...
b. #Oddly, she left ...
c ...although it's not *very* odd that she left.

((108c) is only felicitous with stressed *very*, given the contrastive structure.) Now, suppose that the effect of *very* is to boost the degree of oddness (fortunateness, mysteriousness, etc.) by some constant amount c, so that the domain shift from *odd* to *very odd* is that of $\{d \mid d \geq d_o\}$ to $\{d \mid d_o + c\}$; *oddly* represents a domain narrowing from the former to $\{d \mid d > d_o\}$. (Other analyses of *very* are possible but would seem to yield the same results; see, for example, von Stechow 2006.) I will take the constant c that helps define *very* as greater than the interval separating *odd* from *oddly*, i.e. that *very odd* denotes a smaller set of degrees, higher up on the scale, than either *odd* or *oddly*. On these assumptions, both (a) and (b) should be fine with (c) as a continuation. Both claim that her leaving is odd to some degree, but not to a more extreme degree. Thus the infelicity of (108b–c) cannot flow from the same problem as in (101). The same point can be made with the evidential pair *clear/clearly*, the adverb of which is not even a polarity item.

(109) a. It's clear that he refused, although it's not *very* clear that he refused.
b. *Clearly, he refused, although it's not *very* clear that he refused.

(Not all speakers accept (109a), but the pattern in (109) does hold for those who accept the first sentence.) As (109) illustrates, such contrasts are generally fine with two adjectives, but not with one adverb and one adjective, regardless of the type of SpOA or whether polarity is involved.

There is a plausible alternative explanation for the strange sentences in (101) and (108–109): lack of a direct contrast. Once this is factored out, the adjective and adverb sentences are equally good. Examine (110):

(110) a. ?She softly sang the folk tune, though it was audible.
b. The folk tune was soft, but it was audible.

(110a) is slightly odd, presumably due to the fact that a de-emphasized[28] adverb is set up to contrast with an adjective, as opposed to the acceptable (b) sentence where two adjectives are in opposition. The same obtains in (108b/c–109b), suggesting that their oddness derives from the same source as (110), independent of scalar semantics.

[28]English preverbal manner adverbs are normally backgrounded; see Ernst (2002:272ff.) for discussion.

If so, we must explain why (101b–c) is worse than (108b–c) and (109b). This can be done by considering (111):

(111) a. It's possible that she will win the election, but she won't (win the election).
b. It's possible that she will win the election, but it's not possible (that she'll win the election).
c. It's possible that she will win the election, but (actually) it's not (really) possible.

(111a) is fine as long as *possible* is stressed; (111b) sounds terrible at first, but again, with heavy stress on the first *possible*, speakers find it acceptable, interpreted as saying that there is some theoretical possibility of her winning, but no actual possibility: the stress on *possible* in (111b) allows taking it in a strict, philosophical sense of possible worlds that might not line up with what we know pragmatically about the world. This reading is brought out more naturally in (111c) (speakers vary in their stress patterns and preference for the adverbs in the second clause). The same dynamic saves (101b–c), as shown in (112):

(112) a. It's possible that Le Pen will win...
b. Le Pen will **possibly** win ...
c. ...even though he certainly won't.

Thus, given (i) the discussion of (107), and (ii) the existence of an alternative explanation for (101), there is reason to doubt that SpOAs' polarity behavior is really a matter of scalar semantics, in terms of narrowing and strengthening.

4.4 Making the right cuts (on a unified conceptual basis)

In Sect. 3 I presented a theory of the lexical meaning of SpOAs, by which they are subjective to differing degrees, and these differences underlie their division into three polarity groups: Strong PPIs like *unfortunately*, weak PPIs like *probably* and *conveniently*, and non-PPIs like *obviously*. This version of the NV theory predicts the different distribution of these three SpOA subclasses; the strengthening theory does not. In essence, the argument is that only the NV theory can explain the "fine structure" of polarity where SpOAs are concerned.

Examine first the distinction between strong and weak PPIs. The former are marked by a strong speaker's commitment to the truth of Q = ADV(p), as formulated in (62), translating into a ban on indirect licensing. Thus they cannot occur in such contexts as conditionals, interrogatives, and low-tone VP metalinguistic negations. By contrast, modals and weak evaluatives are not strongly subjective, and the lack of strong speaker commitment translates to the possibility of indirect licensing embodied in (72b). On their objective readings, such as those seen in questions like (56a–c), weak SpOAs do not act like PIs. This confirms the essential link between subjectivity and positive polarity behavior, and to the extent that subjectivity represents speakers commitment (a notion within the NV complex), this shows the fundamental (non)veridicality quality of SpOAs.

Second, consider the split between the PPI SpOAs and evidentials, which are generally not polarity items. Again, there is an evident correlation between subjectivity and positive polarity behavior, and objectivity and non-polarity behavior, with the most extreme cases of objectivity not participating in polarity phenomena. Thus adverbs like *evidently* appeal to publicly-available, objective evidence, and are not PPIs. This falls out naturally on the NV theory, while nothing obvious in a strengthening theory predicts this.

Third, if we assume with Kratzer (2002) and others that adjectives like *possible* are objective, then we have an explanation for why they are not PPIs, and therefore why the sequence *not possible* is grammatical while **not possibly* is normally ungrammatical. SpOAs are (mostly) PPIs because they are subjective; the corresponding adjectives are not, because they always represent objective modification.

4.5 Summary/conclusion

In this section it was shown that SpOA patterns do not show the flavor of scalarity that one would expect under Nilsen's strengthening analysis, and that analysis provides no explanation for the distinctions between SpOA subclasses. By contrast, the NV approach directly embodies the notion of speaker commitment that seems at issue in contexts where a speaker is in doubt about the truth of a proposition; and, using this notion, it accounts neatly for the types of subclasses. This provides evidence for the NV approach over the strengthening approach.

The characterization of SpOAs in terms of subjectivity and objectivity serves also to condition their linear order with respect to each other, something that scalar approaches cannot do. This is the subject of Sect. 5.

5 Linear ordering of SpOAs

5.1 Relative ordering of strong and weak SpOAs: subjective *vs*. objective modification

In Sect. 3 I showed that the PPI behavior of SpOAs is responsible for the restriction to SpOA > Neg order in the normal case, and that the NV account explains this, as well as the exceptions to the generalization for weak SpOAs in negative yes-no questions, negative counterfactual conditionals, and certain instances of metalinguistic negation. Now I must explain the order of multiple SpOAs, starting with the fact that strong evaluative adverbs normally precede epistemics, as in (8), given again here.[29]

(8) a. Luckily, the plan will probably work.
b. *Probably, the plan will luckily work.

Recall that the strong *vs*. weak distinction is based on that between strongly subjective readings and more objective readings: the former are those where the speaker has

[29] See Haumann (2007:336f.) for further discussion of these patterns.

a strong commitment to the truth of Q = Adv(p), while in the latter case the speaker less adamant about asserting Q. This distinction was used above to condition their difference in negative questions, negative counterfactuals, and metalinguistic negation, where strong subjectivity disallows indirect licensing, and weak PIs can sometimes be objective and thus escape antilicensing as PIs.

I now extend the subjective/objective distinction among SpOAs to their ordering, with the following condition in (113) (where (a) is a version of (61) above):

(113) Linear Ordering of SpOAs:
  a. Lexical specifications:
    i. Strong evaluatives are subjective; weak evaluatives are objective
    ii. Modals can be either subjective or objective (but prefer subjective readings)
    iii. Evidentials can be either subjective or objective (but prefer objective readings)
  b. Structural constraint: (more) subjective SpO modifiers always take scope over, and thus precede, (more) objective SpO modifiers.

(113) predicts, generally, that strong evaluatives should precede and never follow all weak SpOAs, while the latter are freely ordered, in principle (assuming that two objective SpOAs, or two subjective SpOAs, may adjoin in either order as far as syntax is concerned). To a large extent, these predictions are borne out, and the exceptions can be explained by other factors.

First, strong evaluatives always precede weak evaluatives; see (114):

(114) a. Luckily, she conveniently disappeared before the trial date.
  b. *Conveniently, she luckily disappeared before the trial date.

Second, (113) predicts that modals and weak evaluative adverbs should in principle occur in either order, though if a modal adverb is second it must have an objective reading.

(115) a. Probably, they have appropriately been more concerned with style than with substance.
  b. Appropriately, they have probably been more concerned with style than with substance.

Modal adverbs tend toward subjective interpretations, so examples like (115b) are less common than those with modal > weak evaluative order. Further examples of the latter are given in (116) and (117), while (118a–c) provide more examples of the reverse:

(116) a. Why would they have left town without talking to anyone? Perhaps they have mysteriously been offered a new well-paying job in Washington?
  b. Certainly, they have (quite) ironically been trying to imitate their erstwhile enemies.

(117) a. Maybe Jocelyn had conveniently misunderstood her mother's suggestion.
b. Christine's obstetrician hadn't persuaded her to … help her trace her best friend's aunt who, judging by previous stories, had probably mysteriously disappeared 30 years previously!
(homepage.ntlworld.com/philipg/detectives/bennett.html)
c. A lot of this tape though is American humor and that would probably ironically go over most wrestling fans heads.
(www.dooyoo.co.uk/tv-programs/bill-hicks-relentless/358317)

(118) a. Significantly, they probably put in more time preparing for the softball game than for the quarterly report presentation.
b. Well, today I want to share some really good news. It's news that, mysteriously, you probably won't come across anywhere else, though it's readily available.
(worldnetdaily.com/news/article.asp?ARTICLE_ID=48888) (cf. 117b)
c. Ironically, what she claimed in this article is probably even less supported by evidence than what she criticized. (cf. 117c)

Third, by (113) modals and evidential adverbs should occur in either order, although as always, the lexical items impose constraints: if an evidential adverb comes first, the following modal must be interpreted objectively; if the modal comes first, any doubt expressed by the modal must somehow be compatible with the evidential's expression of overt evidence (this is often difficult). (119–120) provide more examples of evidential adverbs preceding modals:

(119) Clearly, she is definitely going to succeed.

(120) Evidently, the new plans will most likely not be implemented before the new chairman takes office.

Here, the modal adverb has an objective interpretation; in (120), for example, the likelihood of delayed implementation can be inferred in the normal context triggered by *the new chairman* (i.e. the need for an organization to wait for the latter).

(121) a. Obviously, you probably don't want to talk to Franz right now.
b. They probably were obviously going to get fired, so they quit first.

(121a) is possible because the context pushes the modal adverb toward an objective interpretation: With Franz across the room foaming with rage, say, the advisability of (not) talking to him is easily judged. However, (121b) could not be uttered where *probably* specifically qualifies *obviously* ("its obvious nature is probable…"): There is no reason for a speaker's epistemic judgment if something is obvious to participants in the conversation. But (121b) is acceptable if it is taken as obvious to **them** that they were going to get fired ("It probably was obvious to them that…"); the speaker makes an epistemic judgment about how likely this situation was. Since *probably* is indexed to the speaker, and *obviously* to the referent of *them*, a clash is avoided

and the sentence is interpretable.[30] In other cases, an irrealis context helps; for (122) imagine that we are waiting for a committee to choose the winner of a contest, and we know that the faces of committee members can easily be read. Even though they are bound to delay an official announcement, we think it likely that we will know, by seeing the committee members' relief as they leave the meeting room, that they will have made a decision:

(122) Probably, when they emerge, the committee will have obviously decided on the winner.

Fourth, (113) predicts that evidentials and weak evaluatives should be freely ordered, and this is borne out; (123–124) illustrate:

(123) a. Apparently, they were mysteriously being harassed by the police.
b. Mysteriously, they were apparently being harassed by the police.

(124) a. Clearly (as we could see from their going ahead with the scheme), their new recruit was conveniently unencumbered by a police record.
b. Conveniently (for their scheme), their new recruit was clearly unencumbered by a police record.

Fifth and finally, there is one more fact to be accounted for: since modal and evidential adverbs can be subjective, and strong evaluatives must be, the latter should be permissible on either side of a modal/evidential adverb, by (113). But, in fact, this is not quite what we find: modals and evidentials obligatorily follow strong evaluatives:

(125) a. Unfortunately, she has probably been posted to Burkina Faso.
b. *Probably, she has unfortunately been posted to Burkina Faso.

(126) a. Unfortunately, she obviously has lost the competition.
b. *Obviously, she unfortunately has lost the competition.

The first restriction can be explained by the fact that subjective modal adverbs (as *probably* must be in such cases, since it takes scope over the obligatorily subjective strong evaluative *unfortunately*) are only used when the speaker judges that there is some doubt about the truth of the following proposition. Even modal adverbs like *certainly*, *surely, assuredly*, etc. produce a weaker statement than their adverb-less equivalent, which can be used when there is no doubt (Karttunen 1972; Lyons 1977:808,

[30]This example shows that, at least for evidentials, the formulation in terms of speaker-orientation may be too narrow; here, subject-orientation or (more likely) experiencer/point-of-view orientation is at issue. Presumably, this will require an adjustment in conditions for PPI licensing with respect to admissible mental models for indirect licensing. Exploring these nuances would take us too far from the main goals in this paper; for discussion, see Speas and Tenny (2003).

Kratzer 2002). Compare (96a) and (96b), where *surely* in (a) is used to shore up the statement that in context is not taken to be definitely true:

(127) a. She's surely a fine singer.
b. She's a fine singer.

Recall now that strong evaluatives are strong in part because they are expressions of total speaker commitment to the judgment they represent. Therefore, they are pragmatically incompatible with the use of a preceding modal adverb, which presupposes some measure of doubt. The reverse (as in (125b)) is of course possible, indicating an evaluation of a probability (possibility, etc.).

(126) can be explained on the grounds (noted earlier with respect to (82)) that evidentials require there to be objective evidence for the following proposition. Thus, sentences like (126b) involve a semantic clash, as *unfortunately* and other strong evaluatives are obligatorily subjective modifiers, which are incompatible with objective evidence.

To summarize, in Sect. 5.1 I have covered all the possible relative orders of two SpOAs. I have proposed that the patterns can be understood by placing each adverb on a scale of subjective *vs*. objective modification, and by taking them as in (113a): Strong evaluatives as obligatorily subjective, weak evaluatives and evidentials as obligatorily objective, and modals as either but tending toward subjective. Combining these assignments with the structural constraint in (113b), the relative orderings are explained, with subjectively interpreted SpOAs preceding objectively interpreted ones. In particular, strong evaluatives will come first in any pair, modals will tend to do so, and weak evaluatives and evidentials will tend to be the second of any pair.

5.2 Interaction of SpOAs with lower operators

The main empirical goals of this paper have been to account for the fact that SpOAs normally precede negation, and for the relative order of two SpOAs. There are two additional issues, which must receive only quick consideration; they are illustrated in (10–11), given again here:

(10) a. They obviously have cleverly been siphoning off little bits of cash.
b. *They cleverly have obviously been siphoning off little bits of cash.

(11) a. They will ideally be leaving.
b. *They will be ideally leaving.
c. *They will have been ideally leaving.

Ernst (2002) attempted to explain both of these by means of the FEO calculus (see (25)), by which event-taking elements, including subject-oriented adverbs like *cleverly* in (10) and aspectual operators like the progressive *be* in (11), cause semantic ill-formedness if they are above proposition-taking items like SpOAs. However, if we are to reject (this part of) the FEO calculus in favor of PPI licensing and other devices to explain the distribution of SpOAs, some other solution must be found.

(10) can be handled by appealing to the requirement on subject-oriented adverbs, suggested in Ernst (2002) (see also Cormack and Smith 2002:154ff.), that the subject *control* the event in question (in the sense that s/he must be able to not perform the action or enter into the state described; see Ernst 1984, 2002 for discussion). If a subject-oriented adverb takes a SpOA in its scope, then the subject must be able to control the speaker's epistemic or evaluative judgement, but this is impossible—e.g. (10b) would have to imply that the referent of *they* can control the speaker's perception that the proposition is obvious. The order subject-oriented adverb > speaker-oriented adverb will thus always be excluded.

The ban on low attachment of SpOAs represented by (11) is, plausibly, a subcase of the more general requirement that speaker-oriented elements take scope over aspect. As noted by Foley and Van Valin (1984) (drawing on Jakobson 1971) tense is speaker-oriented in the sense that is indexical with respect to the present speech act and its moment in time, while aspect is not—it merely expresses the temporal structure of the event. All speaker-oriented operators, including of course SpOAs, are indexical in the same way (necessarily being relativized to the speaker), as are epistemic modals like *might* or *must*. Thus the lower structural position of aspect with respect to tense and epistemic modality can be taken as a subcase of (113b), given a suitable generalization of the definition of "subjective" such that operators indexed to speakers are more subjective.

In frameworks like Functional Grammar and Role and Reference Grammar, the "layering" of operators is a central part of the grammar (see Foley and van Valin 1984 for discussion with respect to epistemic operators). In the version of the Principles-and-Parameters framework assumed here (see Ernst 2002), layering ought to be the effect of a small number of iconic principles of this sort that guide more formal mechanisms. In this case, we might posit a principle saying that operators relativized to the speaker (SpOAs, modality, tense) precede those that are not so relativized and refer to time or to arguments of the predicate (aspect, voice). Note that this would be compatible with (113), as items making no reference to speakers are more "objective" than that do make such reference. Thus, presumably, a (far) more refined version of this principle would include (113b) as a subcase.

The issue is a big one and I will go no further here. However, if the semantically-based approach to adverbial syntax is correct, these underlying iconic principles play some role in a formal grammar. Even the more syntactically-oriented approach of Cinque (1999) assumes that something along these lines exists, indirectly determining the order of functional heads in UG. In the theory assumed here, they play a more direct role, helping to determine the order of elements in terms of their semantics, regardless of whether they are heads or adjuncts. (Perhaps they constitute a small number of guidelines to which more specific, and less functionally grounded, syntactic principles conform in the unmarked case.)

5.3 The adjunction and F-Spec theories

The "F-Spec" theory of adverb licensing embodied in Cinque (1999) and Haumann (2007) posits that each distinct adverb subclass is licensed by a separate, empty functional head, in a hierarchy of heads that is rigidly ordered by UG. It thus claims that

if there are alternative orders of two given adverbs, at least one of them must have two distinct licensing heads in two different positions, corresponding to some identifiable meaning difference. The same holds for ordering of adverbs and negation. On the other hand, the semantically-based theory of Ernst (2002), Haider (2004) and others allows the adjunction of adverbs to various maximal projections, and rules out impermissible adverb orders largely on semantic grounds. This theory predicts that alternate orders of two adverbs, or an adverb and negation, are allowed wherever no semantic ill-formedness results.

As shown in Ernst (2007), the patterns of data for SpOAs and negation can only be handled easily by a semantic account, such as is required on the adjunction theory. Consider how the F-Spec can handle the data presented above. It easily accounts for normal ban on SpOAs following negation (*Neg > SpOA), by positing that Neg follows all SpOA licensing heads (Cinque 1999; Haumann 2007). It must also explain why Neg > SpOA order is allowed in negative questions and negative counterfactuals, and why SpOAs are often ungrammatical in regular questions and conditionals. In the first case, a sentence like (27a), given again here, must have a base configuration where the SpOA precedes negation to account for the rigid order of negation and strong SpOAs. For negative questions and counterfactuals, there must be a second SpOA head below Neg, as illustrated in (128):[31]

(27) a. Karen luckily has not left.
(128) $SpOA_S > Neg > SpOA_W$

However, the question now becomes that of ruling out cases where negation precedes weak SpOAs (*Neg > $SpOA_W$, for sentences like (129a–b)) except in precisely the case (129c) where $SpOA_W$ and Neg heads cooccur with a (rather distant) question operator in Comp.

(129) a. *They have not mysteriously been refusing to answer questions about the budget.
b. *$Have_i$ they t_i mysteriously been refusing to answer questions about the budget?
c. $Have_i$ they t_i not mysteriously been refusing to answer questions about the budget?

The same issue holds for negative counterfactual conditionals like (75–76). Additionally, a subset of adverbs licensed by $SpOA_W$—the adverbs with objective readings—must be allowed in regular questions and conditionals. Moreover, the F-Spec theory has to allow for Neg > SpOA in cases of metalinguistic negation where even strong evaluatives are allowed, as noted above. For this set of syntactic contexts, it is not likely that the normal syntactic devices allowed in F-Spec theories, such as positing

[31]Cinque (1999:120ff.) also would allow the existence of two Neg heads to handle this problem, one below and one above a single SpOA head. However, this solution seems inferior: It would provide no way to account for the different distribution of strong and weak SpOAs; and such a configuration with two SpOA heads as in (128) would seem independently necessary to handle the two-adverb sentences in Sect. 5.

additional empty functional heads, Spec-head licensing, feature-checking, and the like, can account for these facts easily (see Ernst 2002 for a review of problems caused by these devices). More important, when viewed syntactically they represent a rather disparate set of long-distance dependencies, missing what seems to be a fairly simple semantic generalization about polarity and nonveridicality. The argument against the F-Spec theory, and in favor of a semantically-based adjunction theory of adverbs, is thus that in any case the former needs a semantically-based theory of SpOA polarity behavior (to explain part of the adverbs' linear order). Combined with other work showing that semantically-based explanations are required (e.g. Ernst 2002, 2007), this result indicates that the F-Spec theory's syntactic mechanisms of rigidly ordered, proliferated empty heads is unnecessary, and forces extra complications in the grammar.

6 Conclusion

This paper has presented an analysis of the linear order of speaker-oriented adverbs (SpOAs) and negation, based on the idea that adverbs adjoin freely as far as syntax is concerned, but are restricted in their distribution by their lexical semantic requirements and those of the sentences in which they appear. Most central to this is that SpOAs fundamentally represent speakers' asserting an evaluation of a proposition, about the degree of certainty about that proposition's truth (modal adverbs), the perception of that truth (evidential adverbs), or various evaluations of the fact/situation represented by the proposition (evaluatives). A speaker may be more or less committed to the judgment s/he makes, a judgment thus represented as more subjective or more objective.

Most SpOAs are positive polarity items, with the result that they cannot occur in the scope of negation (and so they must be ordered before negation) and, to a lesser extent, in other positive polarity contexts such as questions and conditionals. Strong PPI SpOAs (all evaluative adverbs) are those that are obligatorily subjective: this reflects, cognitively, the strongest speaker commitment, and, semantically, the greatest sensitivity to positive polarity constraints. This is captured by the lexical requirement shown in (66b). Weak SpOAs are less tied to the speaker: They allow (or require) an objective interpretation; they represent a lesser commitment to the truth of a proposition; they sometimes represent speakers other than the actual speaker of the utterance; and they are possible in some polarity environments. This is embodied in the lexical specification in (72b). The distinction between subjective and objective modification also acts independently to help determine the relative order of two SpOAs.

Specifically, with respect to (3), evaluative and epistemic adverbs normally precede negation because they are PPIs and therefore are normally blocked when they follow negation. Evidentials are (for the most part) not PPIs and may occur either before or after negation.

(3) Evaluatives > Epistemics > Negation

The relative order of SpOAs shown in (3) holds for strong evaluatives like *unfortunately*, because they obligatorily have subjective readings: Weak evaluatives (*mys-*

teriously) and evidentials (*clearly*) must follow them because these classes have objective readings, and I take elements with subjective readings to be mapped to higher structural positions than those with objective readings, by (113). Modals follow strong evaluatives because their use always implies some doubt about the truth of P, but strong evaluatives always imply full speaker commitment to Q = ADV(p): thus modal > strong evaluative orders always result in a contradiction. Weak SpOAs are in principle freely ordered, although many specific cases are ruled out by the interaction of lexical semantic properties and context.

If this explanation holds, then the main goal of this paper has been accomplished: I have explained the linear distribution of SpOAs with respect to each other and to negation by means of general, semantically-based principles. By extension, the two more theoretical goals have been met as well.

First, I have provided evidence for the (non)veridicality approach to polarity sensitivity. The (non)veridicality theory is based on the concept of (degrees of commitment to) truth, and specifically makes room for licensing based on the truth of a proposition by implication, and in different mental models, as opposed to the scalar implicatures invoked on other theories. SpOAs fit particularly well into this model because they are, in fact, specifically and fundamentally a matter of a speaker's commitment to the truth of a proposition.

Second, I have shown how SpOAs' syntactic distribution can be explained on a mostly semantic basis, licensing them via general syntax-semantic mapping principles rather than via local licensing by empty functional heads; thus they can be treated more simply, as being in adjoined positions. Specifically, for SpOAs, the mapping principle that subjective operators precede objective operators is paramount, as are the principles of polarity licensing. Also, this semantically-based theory holds that sentences will sometimes be ruled out because the lexical semantics of the adverbs causes a semantic clash. In part this is the case for polarity behavior, of course; other instances arise, for example, with the order modal > strong evaluative, and with the requirement that SpOAs precede subject-oriented adverbs.

Finally, to the extent that the account offered here is correct, we can see the importance of a generalized notion of subjective *vs*. objective modification for SpOAs. This is perhaps as expected, given the nature of SpOAs: The subjective/objective scale is simply a matter of degrees of speaker commitment. This notion, combined with an appropriate syntax-semantics mapping principle, allows a fine-grained account of SpOA order, and helps illuminate the way speakers' judgments interact with grammar. Combined with the NV account of polarity sensitivity, we therefore have a contribution to consistent, semantically-based theory of adverb behavior.

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