Revolution #9 – Not by the Beatles

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All comments welcome.

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Introduction

Ever since Ladusaw's (Ladusaw 1980a, b) groundbreaking work, it has been recognized that Negative Polarity Items are, as a first approximation, licensed in the (immediate) scope of downward entailing operators (for discussion and differing views cf. Chierchia 2000; Giannakidou 1998; Heim 1984; Linebarger 1980, 1987; Progovac 1993, 1994; von Fintel 1999; Zwarts 1995/???). Some recent work on Negative Polarity Items (NPIs) tries to deduce their distribution from their lexical semantics (Chierchia 2000; Kadmon and Landman 1993; Krifka 1994; Lahiri 1998; Lee and Horn 1995). This paper deals with the behavior of a particular class of NPIs, the minimizers, in questions. I claim that, although questions are not downward entailing, minimizers are expected to be licit in questions and to have the readings in questions that they do. This result, if true, lends strong support to the view that the distribution of NPIs follows from their lexical semantics and that Ladusaw's generalization should be derived that way.

The minimizers include the quantificational use of the superlative (*the least bit*, *the slightest noise*), NPIs built on VP idioms (*lift a finger, bat an eyelash*), NPI uses of indefinites (*a damn, a red cent*) etc. The minimizers do not included NPIs like *any*, and *ever*. I will follow Guerzoni 2002; Heim 1984; Schmerling 1971 and treat minimizers as "semantically equivalent to expressions containing the word "even". E.g. "so much as a dime" is equivalent to "even so much as a dime", "the least bit of taste" to "even the least bit of taste", and so on" (Heim 1984:105). One striking property of minimizers is that they give rise to rhetorical readings in questions obligatorily (Guerzoni 2002; Heim 1984:106; Linebarger's "queclaratives"1980). This is illustrated in examples (3) and (4). Non-minimizer NPIs do not give rise to rhetorical readings obligatorily as examples (1) and (2), which can easily be used as information seeking questions, show (examples (1)-(4) from Heim 1984:106).

(1) Which of these people has ever fixed your car?

(2) Which of these people has fixed any of your cars?

(3) Which of these people has given you so much as a dime?

(4) Which of these people has the least bit of taste?

Guerzoni 2002 argues that minimizers pattern with indefinites denoting the lower endpoint of a scale used in construction with *even*. This is illustrated in the examples below.

(5) *John gave Mary so much as a dime to support their child.

(6) *John gave Mary even a cent to support their child.

(7) ✓John didn't give Mary so much as a dime to support their child.

(8) ✓John didn't give Mary even a cent to support their child.

(9) ✓If John gives Mary so much as a dime to support their child, his new girlfriend will hate him.

(10) ✓If John gives Mary even a cent to support their child, his new girlfriend will hate him.

(11) *If John goes to see their child, he gives Mary as much as a dime to support her.

(12) *If John goes to see their child, he gives Mary even a cent to support her.

What is important for our present purposes is that combinations of *even* with the lower endpoint of a scale behave like minimizers in questions. Thus all the examples below only have rhetorical readings.

(13) Does John give Mary so much as a dime to support their child?

(14) Does John give Mary even a cent to support their child?

(15) Which of these people haven given their ex-wives so much as a dime to support their children?

(16) Which of these people have given their ex-wives even a cent to support their children?

In the examples above, we made use of an inherent scale of amounts of money. Guerzoni 2002 observes that the parallelism between minimizers and lower endpoints of scales shows up even if the scale is not inherent but entirely given by context. She shows that in order to interpret example (17) felicitously, a context must be given where problem #9 is the hardest of a given set of problems, i.e. problem #9 must be at the top of a scale of difficulty. I call this the HARD-reading.

(17) John solved even problem #9.

In example (18) on the other hand, problem #9 must be construed as the simplest of a given set of problems, i.e. problem #9 must be at the bottom of a scale of difficulty. I call this the EASY-reading.

(18) John didn't even solve problem #9.

As the reader can verify for herself, the EASY-reading shares the distribution of minimizers. What is particularly important for our purposes is that the EASY-reading gives rise to the rhetorical effect in questions.

(19) Did John even solve problem #9?

(20) Which of you guys solved even problem #9?

Both questions in (19) and (20) have two readings. On the HARD-reading the questions are neutral, information seeking questions. On the EASY-reading, however, (19) and (20) can only be construed as rhetorical questions. I will mostly discuss in this paper with the EASY-reading of *problem #9*. At times I will also make reference to the HARD-reading. The results obtained carry over straightforwardly to lower endpoints of inherent scales+*even* and minimizers, which are by assumption, recall, synonymous with endpoints of scales+*even*. The reason for this choice is that *problem #9* is the most interesting case. Inherent scales tend to have certain monotonicity properties that accidental scales lack. Thus, giving a dollar entails giving a cent; having helped a lot entails having helped a little (i.e. having 'lifted a finger'). And of course, not giving a cent entails not giving a dollar; not lifting a finger entails not helping a lot.

On the other hand, no entailments hold on either reading of *problem #9.* On the HARD-reading, solving problem #9, the hardest in the set, does not entail solving problem #8. Problem #8 might have been easier, but maybe you were distracted when tackling problem #8 or ran out of time and failed to solve it for this reason. Of course, solving problem #8 is not a guarantee to have solved problem #9 on the HARD-reading.

The same is true for the EASY-reading. Solving problem #9, the easiest in the set, does not guarantee solving any of the others. Solving any of the other problems does not entail solving problem #9, again, because we might have been distracted or run out of time.

Because of this failure of any straightforward logical relations to hold within an accidental scale, this case is the most difficult and interesting and I will stick to it throughout. In other words, the main objective is to show why examples (19) and (20) have the readings they do and no others.

With this much as background, let me outline the structure of the paper. In section 1 I introduce my assumptions about the lexical entry for *even*. I introduce a modification of the standard view. The modification is shown to be necessary independently of the account of *problem #9* in questions, although it will play a crucial role there. Section 2 shows how the proposed lexical entry for *even* accounts for the readings that the declarative sentences (17) and (18) get. In this section I suggest that the range of contextual alternatives that *even* has access to is greater than usually assumed. I argue that, given the semantics of *even* from section 1, this is an innocuous move for examples (17) and (18). Section 3 is the heart of the paper. In it examples (19) and (20) are discussed in detail. Section 4 considers the consequences of the idea that *even* has access to an enlarged set of contextual alternatives for a range of standard NPI licensing and some other contexts. The function of Section 5 is twofold. It shows first that enlarging the set of alternatives in the way proposed is not only possible (Section 2-4 make that point), but that it is actually necessary. Section 5 also justifies the particular way in which the set of alternatives is enlarged. In Section 6 I compare the present theory to Guerzoni's approach to the same set of facts. The remainder of this introduction gives a brief, informal characterization of the proposal.

The core idea of the present paper is that *even* has, under certain circumstances, access to what I will call the zero-point on the scale as one of the alternatives it quantifies over. The zero-point is not part of the scale proper, it describes a state of affairs in which no value on the scale turns out to be true. This is relevant, in particular—and in fact only—in questions like (19) (and of course (20), but I will stick with (19) for the moment), where the zero-point of the scale is (21).

(21) *that John solved no problem*

Even presupposes the truth of the alternatives that it has access to. If *even* has access to this alternative, then we are in a position to explain why (19) can have the rhetorical reading. The rhetorical reading is the reading that presupposes the truth of (21). As I will show, using the proposition *that John solved no problem* is not only a possibility for construing (19) on the EASY-reading, but the only coherent possibility.

I ask the reader to keep in mind during my discussion of examples (17) and (18) that the availability of (21) will be crucially important in my account of example (19). As I demonstrate, for examples (17) and (18) the availability of (21) does not and cannot play any role whatsoever. This is a pleasing result, since it is a first step towards showing that the availability of (21) does not lead to overgeneration.

Section 1

It is standardly assumed that *even* is truth functionally inert and that it contributes two presuppositions or conventional implicatures (the distinction between these two categories being notoriously murky, but see Potts 2002 for an attempt at distinguishing them). I will call the contributions of *even* presuppositions here for concreteness. I use the notation of Heim and Kratzer 1998 for presuppositions and propositional content. The two presuppositions that characterize *even* are (i) a scalar presuppostion and (ii) an existential presupposition. A standard lexical entry for *even* (taken from Wilkinson 1996:194 with notation adapted) is given in (22).

(22) $[\![\text{even}]\!] = \lambda C_{<st,\, t>}\ \lambda p_{<s,t>}\ \lambda w_{<s>}$:

(i) $\forall q_{<s,t>}[[q \in C\ \&\ q \neq p] \rightarrow q >_{likely} p]\ \&$

(ii) $\exists q_{<s,t>}[\ q \in C\ \&\ q \neq p\ \&\ q(w)]$.

(iii) $p(w)$

C is a contextual variable, a set of alternative propositions.

The scalar presupposition (i) says that the proposition actually asserted must be the least likely of all the alternatives. The existential presupposition (ii) says that there must be at least one alternative to the asserted proposition which is true. The LF I will assume for a sentence like (17) is given in (23), its interpretation according to (22) is shown in (24).

(17) John solved even problem #9.

(23) [even [John solved problem #9]]

(24) λw:

(i) $\forall q_{<s,t>}[[q \in \{$that John solved problem #1, that John solved problem #2, …, that John solved problem #9$\}$ & $q \neq$ that John solve problem #9$] \rightarrow q >_{likely}$ that John solved problem #9$]$ &

(ii) $\exists q_{<s,t>}[\ q \in \{$that John solved problem #1, that John solved problem #2, …, that John solved problem #9$\}$ & $q \neq$ that John solved problem #9 & $q(w)]$.

(iii) John solved problem #9 in w

The sentence is felicitous only on the HARD-reading. The scalar presupposition (i) says that John's solving problem #9 is the least likely of the alternatives. That is, John's solving problem #9 is less likely than his solving problem #1, #2, #3, etc. This is supported by the context, since problem #9 by assumption is the hardest.

The scalar presupposition (ii) says that there must be some other alternative proposition that is also true. In other words, for (17) to be felicitous John must have solved at least one other problem. The existential presupposition serves to functions here. It makes sure that the set of alternatives is not empty and it makes sure that one of the alternatives is actually true. We can state this slightly more explicitly by endowing *even* with three presuppositions as in (25). (25i) is simply the old scalar presupposition (22i), (25ii) is the newly added presupposition that the set of alternatives be non-trivial, (25iii) is the familiar existential presupposition, and (25iv) the assertion. (25) is equivalent to (22), it just shows in a more perspicuous way the double function of the existential presupposition.

(25) $[\![\text{even}]\!] = \lambda C_{<st,\,t>}\ \lambda p_{<s,t>}\ \lambda w_{<s>}$:

(i)	$\forall q_{<s,t>}[[q \in C \;\&\; q \neq p] \rightarrow q >_{likely} p]$ &	Scalar presupposition
(ii)	$\exists q_{<s,t>}[\ q \in C \;\&\; q \neq p]$ &	Notriviality of C
(iii)	$\exists q_{<s,t>}[\ q \in C \;\&\; q \neq p \;\&\; q(w)]$.	Existence of true alternative
(iv)	$p(w)$	assertion

It turns out that presupposition (25iii) is actually too weak. A brief look at example (17) suffices to see this. (25iii) is satisfied, if John solved any one problem among the alternative problems. It should therefore be possible to utter (17) in a context where John solved, say, problem #1, problem #9, and no other problem. This is false, however. In fact, (17) can be uttered only if John solved all the relevant alternative problems. A revision of (25iii) along the following lines seems to be called for:

(25iii') $\forall q_{<s,t>}[[q \in C \;\&\; q \neq p] \rightarrow q(w)]$ Truth of all alternatives

The revised version, (25iii') does not have existential import any more, however sentence (17) is infelicitous in a context that lacks relevant alternatives. It then seems necessary to assume that *even* actually has the three presuppositions (25i), (25ii), and (25iii'). The remainder of the discussion in this paper is based on the revised and final version for the lexical entry of *even* given in (26). An additional argument against (22) is hinted at in footnote (11) below.

(26) $[\![\text{even}]\!] = \lambda C_{<st,\, t>}\; \lambda p_{<s,t>}\; \lambda w_{<s>}$:

(i) $\forall q_{<s,t>}[[q \in C \;\&\; q \neq p] \rightarrow q >_{likely} p] \;\&$ Scalar presupposition

(ii) $\exists q_{<s,t>}[\, q \in C \;\&\; q \neq p] \;\&$ Notriviality of C

(iii) $\forall q_{<s,t>}[[q \in C \;\&\; q \neq p] \rightarrow q(w)]$ Truth of all alternatives

(iv) $p(w)$ assertion

In this section I have argued that a lexical entry amended by presupposition (25iii') more closely mirrors the facts about the interpretation of *even*. The next section uses this amended lexical entry of *even* to show how sentences (17) and (18) receive their readings.

Section 2

Section 2 part 1 – Example (17)

In the previous section we discussed the presuppositions of *even* and left the question what makes up the set of alternatives C open. This section addresses this question. Here, too, I will deviate slightly from the standard view. Let's return to example (17). When (17) is uttered, C remains implicit.

(17) John solved even problem #9.

The hearer must construct a suitable value for C to make the utterance relevant, coherent, etc. Construction of suitable values for contextual variables is a routine operation that is invoked for example whenever quantifiers or focus sensitive items are interpreted. A simple example is given in (27). The contextual restriction on the domain of *everybody* must exclude *John* otherwise the sentence would have the nonsensical interpretation where, among other things, John's computer runs faster than John's computer. Cooperative hearers automatically adjust C so that the sentence comes out coherent, relevant, etc.

(27) Everybody's computer runs faster than John's.

The question now is what propositions can possibly enter into the construction of C in (17), and which of the possible values for C will lead to a coherent and relevant interpretation of (17). In other words, what happens when different values for the contextual variable C are chosen? The standard answer is roughly (28). C is a subset of the focus semantic value of the LF-sister of *even*.

(28) Let C be the contextual variable of *even*, α be the LF-sister of *even*, $[\![\,]\!]^f$ be the focus interpretation function, then

$C \subseteq [\![\alpha]\!]^f$

Suppose that problem #9 is a question on an exam that had ten questions. All other problems that were on the exam should certainly be alternatives to problem #9 ((29b)-(29k)). Well behaved scales (the set of problems in our example is not a well-behaved scale anyway!) have certain monotonicity properties. Maintaining these monotonicity properties demands excluding the zero-point from the scales proper, and (28) demands this, too. However, intuitively it is quite clear that the zero-point has a strong affinity to the scale and that zero-points are invoked when scales are mentioned. This leads me to postulate that the set of alternatives to problem #9 may possibly include also the zero-point of the scale (29a).[1] In section 2 part 2 (33), I reformulate (28) in a way that allows the zero-point to enter into the construction of C.

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[1] In Section 5 part 1 I argue that the inclusion of the zero-point is necessary. For the moment, the vague intuition that zero-points play a role will have to suffice.

(29a) That John solved no problem.

(29b) That John solved problem #1.

(29c) That John solved problem #2.

(29d) That John solved problem #3.

(29e) That John solved problem #4.

(29f) That John solved problem #5.

(29g) That John solved problem #6.

(29h) That John solved problem #7.

(29i) That John solved problem #8.

(29j) That John solved problem #9.

(29k) That John solved problem #10.

I discuss briefly what happens when different values for the contextual variable C are chosen. I limit the discussion to four possible values for the contextual variable C. The first value sets C={(29b)-(29k)}, the second value is C = {(29j)}, the third value C={(29a),(29j)}, and the fourth is C={(29a)-(29k)}.

VALUE I: C={(29b)-(29k)}

By the scalar presupposition of *even* (26i), problem #9 must be the least likely for John to have solved. This enforces the HARD-reading of problem #9. The set of given Value I is non-trivial, thus the non-triviality presupposition (26ii) is automatically satisfied. Finally, the truth-of-all-alternatives presupposition (26iii) guarantees that John must have solved all problems other than problem #9. Value I quite accurately describes the most natural reading of example (17). The value for C can be altered by removing some propositions from C by declaring them irrelevant (*John solved problem #2 and even problem #9. All the other problems were irrelevant anyway*.).

VALUE II: C = {(29j)}

Given Value II, C is a singleton set. Thus the scalar presupposition (26i) is satisfied trivially, no matter whether problem #9 is given the HARD-reading or the EASY-reading (or any other reading for that matter). The truth of the truth-of-all-alternatives presupposition (26iii) is also trivial. However, the non-triviality presupposition (26ii) is violated since C does not contain a proposition different from (29j). Value II is ruled out because the non-triviality presupposition is violated.

VALUE III: C={(29a),(29j)}

The scalar presupposition of *even* can be satisfied just in case solving no problem is deemed more likely than solving problem #9. The set of alternatives is non-trivial (26ii). (26iii) can only be satisfied if John in fact solved no problem. The presuppositions are not in conflict with each other. However, the sentence now presupposes that John solved no problem and asserts that he solved problem #9. This contradiction between presupposition and assertion makes Value III unusable.

Value III will be extremely important in the discussion of rhetorical questions and I ask the reader to bear in mind that Value III has non-contradictory presuppositions but that it was unusable, because of a clash between the presuppositions and the assertion.

VALUE IV: C={(29a)-(29k)}

The scalar presupposition of *even* is satisfiable if solving problem #9 is both less likely than solving any of the other problems an less likely than solving any problem at all. The set of alternatives is also non-trivial. However, (29a) contradicts (29b)…(29k) in violation of the truth-of-all-alternatives presupposition and the value for C assumed in Value IV is ruled out because of contradictory presuppositions. Value IV is also ruled out, of course, because one of the presuppositions, (29a), contradicts the assertion, (29j).

Note that it is quite important here that we use the universal formulation of the third presupposition of *even* (25iii') rather than the existential version (25iii). If we were assuming the existential formulation (25iii), then Value IV would not be contradictory. It would give rise to the rather weak presupposition that John either didn't solve any problems at all or that he solved at least one of the problems different from problem #9. But this is clearly too weak quite independently of whether we consider (29a) a valid alternative to (29j). Value IV is then ruled out because of its contradictory presuppositions.[2]

So far, we have discussed sentence (17). Of the possible values for C that we discussed all but Value I were ruled out. Value I forced the HARD-reading by the scalar presupposition. This accords with intuitions about example (17).

The values for C that were ruled out came in different flavors. Value II and IV were ruled out because of contradictory presuppositions. Values III and IV were ruled out because of a contradiction between presuppositions and assertion. Value III is the only value for C that is ruled out exclusively on the basis of a clash between presuppositions and assertions. The discussion thus showed that the correct truth conditions and presuppositions for (17) are predicted and that broadening the range of alternatives for inclusion in C to include the zero-point does not do any harm in this example.

Section 2 part 2 – Example (18)

Let's turn to sentence (18) now. The discussion of the example will follow the mold of the discussion of example (17). In the LF for (18), *even* takes scope over *not*. It seems that *even,* when it appears with clausemate negation, always takes scope over it. This

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[2] One might wonder why I am not including the upper endpoint of the scale as in (29l) and the associated Values V and VI in the discussion. The reason is simple – inclusion of the upper endpoint always leads to contradictory presuppositions, any value for C which includes (29l) is always unusable.

(29l) That John solved all problems.

VALUE V: C={(29b)-(29l)}

Value V, like its companions Values II through IV, is unusable. Although the set of alternatives is non-trivial and although it is possible without contradiction to fulfill the truth-of-all-alternatives presupposition, the scalar presupposition becomes quite strange. It is obviously true that in all cases in which John solves all problems, i.e. in all cases where he satisfies ((29l), he also solves problem #9. In other words, ((29l) → (29j). But, John may well solve problem #9 and not solve all of the problems. In other words, the entailment relation from ((29l) to (29j) is asymmetric. It then follows that (29j) is more likely than (29l), but this contradicts the scalar presupposition of *even*. Value V is thus ruled out because of its contradictory presuppositions.

VALUE VI: C={(29j), (29l)}

Value VI obviously suffers from the same problems as Value V. it is ruled out because the scalar presupposition is necessarily false.

doesn't follow from anything as far as I can see (c.f. Wilkinson 1996 for discussion). Thus the LF for (18) is (30). I proceed to introduce a set of alternatives to (18). It is modeled directly on (29). Again I include the projected zero-point of the pragmatic scale in the set of alternatives although they are not part of the scale proper.

(18) John didn't even solve problem #9.

(30) [Even [John did not solve problem #9]]

(31a) That John didn't solve problem #1.

(31b) That John didn't solve problem #2.

(31c) That John didn't solve problem #3.

(31d) That John didn't solve problem #4.

(31e) That John didn't solve problem #5.

(31f) That John didn't solve problem #6.

(31g) That John didn't solve problem #7.

(31h) That John didn't solve problem #8.

(31i) That John didn't solve problem #9.

(31j) That John didn't solve problem #10.

(31k) That John solved all problems.

Interestingly, the intuitive zero-point is now that John solved all problems. This comes about by negating that John failed to solve the hardest problem. If we had simply retained the quantifier used in (29a) and given it low scope, we would have derived (31k)' instead of (31k).

(31k)' That John didn't solve all problems = that some problems were left unsolved by John.

(31k)' is in no intuitive sense part of the scale. (31k)' could be the result of allowing generalized quantifiers into the set of contextual alternatives in general – but admitting only those as relevant that can form part of the scale. This would allow generating (31k). However, there is evidence that the source of (31k) should not be a quantifier taking scope below negation but rather a quantifier (or a quantifier like element) taking scope above negation. In fact it has to scope together with *even*. The evidence involves rhetorical readings for questions that are triggered by *even*+the zero-point of a scale within an embedded clause (32). I have to put off discussion of this example until Section 3.

(32) Do you have hope that John will solve even problem #9?

I will assume that C is a subset of the union of the set of focus alternatives of the LF-sister of *even* with the negation of the disjunction of the set of focus alternatives (33). (33) states which propositions must minimally available for the construction of C. Further additions might in principle be contemplated, but they will be ruled out for one or another reason. The availability of all the material in (33) is the crucial assumption that drives the present account of the rhetorical effect.[3]

(33) Let C be the contextual variable of *even*, α be the LF-sister of *even*, $[\![\,]\!]^f$ be the focus interpretation function, and W be the set of all possible worlds, then
$C \subseteq [\![\alpha]\!]^f \cup \{W - \cup[\![\alpha]\!]^f\}$

For the moment, I simply stipulate (33). I ask the reader to bear with me and see in section 3 what work (33) does for me. In section 4 I show how the looming danger of overgeneration can be staved off. Finally, in section 5 I return to (33) and argue that it is not quite as anomalous as it looks at first.

Now I discuss briefly what happens when different values for the contextual variable C are chosen. I limit the discussion to four values for C. The first value sets C={(31a)-(31j)}, the second value has C = {(31i)}, the third value has C={(31i), (31k)}, and the fourth C={(31a)-(31k)}.

VALUE I: C={(31a)-(31j)}

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[3] It is conceivable that even more alternatives enter into the construction of C, in which case we would say that (i) $C \subseteq P$ and (ii) $[\![\alpha]\!]^f \cup \{W - \cup[\![\alpha]\!]^f\} \subseteq P$. There are principled ways of construction such sets P based on $[\![\alpha]\!]^f$ which conform to (ii). (We could for example exploit the notion of weakly and strongly exhaustive answerhood.) For reasons that should become clear in section 5 of the paper, I will not pursue any option where $P \supset [\![\alpha]\!]^f \cup \{W - \cup[\![\alpha]\!]^f\}$ and stick, instead, with the formulation in the text where $P = [\![\alpha]\!]^f \cup \{W - \cup[\![\alpha]\!]^f\}$.

By the scalar presupposition of *even* (26i), problem #9 must be the least likely for John not to have solved. This enforces the EASY-reading of problem #9. The set of alternatives given Value I is non-trivial, thus the non-triviality presupposition (26ii) is automatically satisfied. Finally, the truth-of-all-alternatives presupposition (26iii) guarantees that John must have failed to solve all problems other than problem #9. Value I quite accurately describes the most natural reading of example (18). This value for C can be altered by removing some propositions from C by declaring them irrelevant (*John didn't solve problem #2 nor even problem #9. All the other problems were irrelevant anyway*.).

VALUE II: C = {(31i)}

Value II sets C to be a singleton. Thus the scalar presupposition (26i) is satisfied trivially, no matter whether problem #9 is given the HARD-reading or the EASY-reading (or any other reading for that matter). The truth of the truth-of-all-alternatives presupposition (26iii) is also trivial. However, the non-triviality presupposition (26ii) is violated since C does not contain a proposition different from (31i). Value II is ruled out because the non-triviality presupposition is violated..

VALUE III: C={(31i), (31k)}

The scalar presupposition of *even* can be satisfied just in case solving every problem is deemed more likely than not solving problem #9. The set of alternatives is non-trivial (26ii). (26iii) can only be satisfied if John in fact solved every problem. The presuppositions are not in conflict with each other. However, the sentence now presupposes that John solved every problem and asserts that he failed to solve problem #9. This contradiction between presupposition and assertion makes Value III unusable.

VALUE IV: C={(31a)-(31k)}

The scalar presupposition of *even* is satisfiable if not solving problem #9 is both less likely than not solving any of the other problems an less likely than solving all problems. The set of alternatives is also non-trivial. However, (31k) contradicts (31a)…(31j) in violation of the truth-of-all-alternatives presupposition and the value for C assumed in VALUE IV is ruled out because of contradictory presuppositions. VALUE

IV is also ruled out, of course, because one of the presuppositions, (31k), contradicts the assertion, (31i).

Note again that it is quite important here that we use the universal formulation of the third presupposition of *even* (25iii') rather than the existential version (25iii). If we were assuming the existential formulation (25iii), then Value IV would not be contradictory.

Section 2 - Conclusion

In this section I have discussed what the set of alternatives that *even* quantifies over may include. I have claimed that it is quite intuitive to include the zero-points of the scale, (29a) and (31k) respectively. I have also shown that this addition does not cause any trouble for the usual functioning of *even* in simple contexts like (17) and (18). The only usable value for C was Value I, which excludes the zero-points of the scales. In our discussion of various values assigned to C including the zero-points of the scales an interesting asymmetry emerged. Values II and IV are unusable because they lead to contradictory presuppositions. Value III on the other hand does not lead to contradictory presuppositions. Value III is unusable because the presuppositions it gives rise to contradicted the assertion.

In the next section I discuss examples (19) and (20), the interrogative version of (17), and show how the inclusion of the zero-point of the scale and the existence of Value III help derive the rhetorical effect.

Section 3

Section 3 part 1 – Example (19)

Example (19) poses the following challenge. Depending on the context it has two readings. In a context where problem #9 is hard, (19) functions as an information seeking reading. It cannot be used to suggest that John did not solve problem #9. It cannot be used to suggest that John did solve problem #9 (or in fact all problems). In a context where problem #9 is easy, (19) functions as a rhetorical question only, suggesting that John did not solve problem #9.

(19) Did John even solve problem #9?

I make the standard assumption that polar interrogatives are two membered sets of propositions. The LF for (19) that I assume is given in (34). (34) is interpreted as (35).

(34) [Q [even [John solved problem #9]]]

(35) ⟦(34)⟧ = { λw. [⟦even⟧(λw'. John solved problem #9 in w')](w),
λw. ¬ [⟦even⟧(λw'. John solved problem #9 in w')](w)}

The first member of the set in (35) is, of course, the interpretation of our old friend (17), as a comparison with (23) immediately reveals. However, the second member of (35) is not identical to the interpretation of (18), i.e. (30), since in (30) negation takes scope below *even*, but in (35) it takes scope above it. As a result, negation in (35) is integrated with the structure too late to affect the presuppositions of *even*; only the propositional content is negated. As a result, both members of the set in (35) share all their presuppositions, namely those of (17).

(30) [Even [John did not solve problem #9]]

In a scenario where problem #9 is a hard problem, nothing spectacular need happen. The presuppositions of the two members in (35) will simply be those of (17) according to Value I above. This derives why an information seeking reading of example (19) is possible in such contexts. This addresses the first point raised above. I turn to the impossibility of rhetorical readings in contexts where problem #9 is hard below.

In a scenario where problem #9 is an easy problem, the presuppositions of Value I cannot be satisfied. Recall, that Value I demanded that solving problem #9 be unlikely – but this is false on the EASY-reading. Value I is therefore unusable. The reader will recall that all other Values with the exception of Value III are also systematically unusable due to contradictory presuppositions. Value III is the only remaining option in such a context. Recall from above that in Value III we are considering only two alternatives, (29a) and (29j).

(29a) That John solved no problem.

(29j) That John solved problem #9.

Recall that under Value III, the scalar presupposition of *even* can be satisfied just in case solving no problem is deemed more likely than solving problem #9. The set of alternatives is non-trivial (26ii). (26iii) can only be satisfied if John in fact solved no problem. This last presupposition conflicted with the assertion made in (17), but example

(19) is not an assertion but a question. No contradiction therefore arises. Given this reasoning, (19) now presupposes that John did not solve any problems. This is the rhetorical effect.

If the question is to be admitted into the discourse, the presuppositions of the question will have to be accommodated. The updated context now entails that John did not solve any problem. The updated context also entails the answer to the question, which ceases to be a true question.

What remains to be shown is why Value III is only available if problem #9 is the easiest problem of the set. As far as I can see, the theory as it stands doesn't account for this fact. I have only some observations on the logic of the situation and some preliminary speculations to offer towards an explanation. The basic idea is that a cooperative hearer will take a question to be a request for information. He will deviate from this assumption only if forced.

Notice first that if, instead of dealing with problem #9, we were dealing with the lower endpoint of inherent scales, the problem would not arise. *Lift a finger* cannot be construed other than as the lower endpoint on the scale of amounts of work. Given this, the only non-contradictory construal of the question makes use of Value III, i.e. for the lower endpoint of an inherent scale the rhetorical reading is forced.

For an upper endpoint of an inherent scale, the situation is more complicated. *The most difficult problem* can only be understood as the upper endpoint of a scale. Both Value I and Value III are in principle available without contradiction. Whereas in the case of a lower endpoint of a scale, the hearer knows he has to chose Value III to make any sense of the utterance at all, no such clue exists in the case of the upper endpoint. Furthermore, the speaker, by uttering a question signals a lack of information – requesting information being the basic function of questions – the construal of the question consistent with this signal is based on Value I.

I would like to suggest that this is enough to make the rhetorical reading unavailable. The same reasoning applies to a third possible reading of problem #9. If problem #9 were in the middle of some contextual scale, there are again two possibilities: problem #9 could be embedded into Value III or problem #9 could be taken as the upper endpoint of a scale from which all the elements above problem #9 have been removed (problem #9 as the upper endpoint of a pruned scale). The latter case yields an information seeking question. Again the rhetorical construal is not forced and hence, by the reasoning suggested above, not allowed.

In this section I have shown how the rhetorical reading for lower endpoints of scales comes about and why it is the only available reading. I have also shown how the information seeking reading for upper endpoints of scales comes about. I offered some speculation why upper endpoints of scales do not admit of rhetorical readings, linking this fact to the function of questions as requests for information.

Section 3 part 2 – Example (20)

We now turn to example (20). I assume a standard semantics for *wh*-questions, treating them as sets of propositions. The LF for (20) is schematized in (36).

(20) Which of you guys solved even problem #9?

(36) [Which of you guys [C_Q [even [t_{wh} solved problem #9]]]]

(37) $[\![(20)]\!] = \{p \mid \exists x [$ x is one of you guys $\wedge$ $p=\lambda w.[[\![even]\!](\lambda w'.x$ solved problem #9 in $w')](w)]\}$

= {Luisa solved even problem #9, Sarah solved even problem #9, Serkan solved even problem #9,…}

If problem #9 is a hard problem, then the elements contained in the set in (37) are all compatible with Value I. By the reasoning given at the end of Section 3 part 1, Value I can (and therefore must) be chosen. This accounts for the information seeking reading of (20) on the HARD-reading of problem #9.

If problem #9 is an easy problem, Value III must be invoked (Value I having a contradictory scalar presupposition). For every individual in the domain of *which of you guys* the answer ends up being presupposed: that individual did not solve problem #9 or any other problem, for that matter. None of the relevant individuals could have solved any problems without violating the presuppositions of the questions. This explains the rhetorical force of (20) on the EASY-reading of problem #9.

Section 3 part 3 - Example (32)

In Section 2 part 2 I brought up example (32) as potential evidence for a particular way of constructing the zero-point of the scale, the alternative that crucially enters into the construction of Value III.

(32) Do you have hope that John will solve even problem #9?

As expected, on the HARD-reading (32) is an information seeking question. However, (32) also has a rhetorical reading under the EASY-reading of problem #9 – I believe. When uttering (32) the speaker is suggesting that there is no hope for John to solve problem #9 – or maybe that John won't solve problem #9. This reading can be generated by giving *even* wide scope. The relevant alternatives are going to include *that you have hope that John will solve problem #1…#10* and, by (33), *that you have no hope that John will solve problem #1 or #2 or … or #10*. Under the rhetorical interpretation this gets presupposed barring all hope for John to solve problem #9. So far so good.

The example is important, because any low scope quantifier, notably *no problem*, would lead to the wrong results. Depending on whether we assign *even* scope in the matrix or in the embedded clause, (32) would come to have one of the following presuppositions:

(38a) high scope: *you hope that John will solve no problem*

(38b) low scope: *John will solve no problem*

(38a) is clearly wrong and in fact, the proposition in (38a) could not form part of the relevant scale. It is simply unrelated. (38b) seems to be much more appropriate, but crucially it restores the statement in (33) to its validity. Negation must scope where *even* is.

Section 3 – Conclusion

This section has shown how the relevant readings for questions containing *even problem #9* can be derived. The present theory can generate all the necessary readings, but it does face an overgeneration problem: why are there no negative rhetorical readings on the HARD-reading of problem #9? A functional explanation was suggested to avoid this.

Section 4 – *Even problem #9* in other contexts

Extending possibilities always brings with it the danger of overgeneration. I have suggested in section 2 that the set of alternatives that *even* quantifies over is larger than usually assumed (33). I showed that for the simplest case (presence or absence of clausemate negation) this does not create any problems. In the first part of this section I consider several standard NPI licensing contexts and show how they interact with the proposal put forward here. I then turn to other, non-NPI-licensing contexts. Interestingly, the discussion in this section yields a twofold prediction: (a) Value III for the contextual variable restring *even* is possible only in questions and in no other contexts; and (b) when *even* appears in a question and the contextual variable is assigned Value III, *even* must take highest scope within the question.

Section 4 part 1* – Even problem #9 *in NPI-licensing contexts

The discussion of the environments will follow a simple mold, which I explain now. Sentence with *even* are often ambiguous. Thus example (39) can be uttered in a context that supports the HARD-reading and the EASY-reading of problem #9. The scope theory of *even,* which I am assuming, accounts for this ambiguity by assuming that two different LF-representations are available for example (39). This is schematically shown in (40).

(39) Frank doubts that John solved even problem #9.

(40a) [even [Frank doubts that John solved problem #9]]

(40b) Frank doubts that [even [John solved problem #9]]

Syntactically both LFs are available in both kinds of contexts, of course. I will restrict my attention for the moment to Value I, i.e. to the standard theory of what the contextual alternatives available to *even* are. Given the syntactic ambiguity of (39), there are four possibilities once we take the two construals of problem #9 (the HARD-reading and the EASY-reading) into account: (i) low scope of *even* (40a) on the HARD-reading, (ii) low scope of *even* (40a) on the EASY-reading, (iii) high scope of *even* (40b) on the HARD-reading, (iv) high scope of *even* (40b) on the EASY-reading.

Of these four potential readings only two, namely (i) and (iv) are actually available. The embedded clause in (40a) is, for all intents and purposes, identical to (17).

We saw that the scalar presupposition of *even* forces the HARD-reading for problem #9 in (17) under Value I. The same reasoning applies in (40a), ruling out (ii – low scope, EASY-reading) above.

Option (iii – high scope, HARD-reading) above is ruled out basically for the same reason. The alternatives to *I doubt that John solved problem #9* are propositions like *Frank doubts that John solved problem #1…#8*. If problem #9 is easy, then the least likely thing of these to do is to doubt that John solved problem #9. This accords with the scalar presupposition of *even* and results in option (iv). If problem #9 is the hardest in the set, then the most likely thing of the alternatives to do is to doubt that John solved problem #9. This violates the scalar presupposition of *even*; thus, option (iii) is ruled out.

So far, this is the standard account. Now let's check what happens once Value III enters the picture as a possibility. Again there are, potentially, the four options (i)-(iv) above. Under the low scope construal of *even* Value III (i-ii), irrespective of whether the EASY-reading or the HARD-reading is considered, the embedded clause in (39) presupposes that John didn't solve any problem and the embedded clause expresses the proposition that John solved problem #9—a contradiction as we saw above in section 2 part1. For Frank to doubt x, Frank has to consider the possibility that the assertion of x and its presuppositions are fulfilled. But Frank cannot doubt a contradiction. In fact, Frank has to agree with the presuppositions of the embedded clause as the illicit continuations in (40) and (41) show. (40) presupposes that Mary left and (41) presupposes that people other than Mary left. For the sentences to be felicitous, Frank has to agree with these presuppositions – hence the oddness of the continuations.

(41) Frank doubts that only Mary left. #He thinks that Mary is still here and that Peter and Frank are gone.

(42) John doubts that even Mary left. #He thinks everybody is still here.

This explains why possibilities (i) and (ii) are ruled out given Value III.

For the high scope reading, the relevant alternative systematically contradicts the propositional content of the clause (simply because of the way (33) is formulated) and the high scope readings are never possible. The results of this discussion are summarized in Table 1.

	HARD-reading	EASY-reading
Low scope	(i) *	(ii) *
High scope	(iii) *	(iv) *

Table 1: Value III for *doubt*

More generally, given the way (33) is stated, the high scope reading is necessarily unavailable given Value III. In what follows, we therefore need not concern ourselves with any high scope readings. The fact that the low scope reading is not available, depended more narrowly of properties of the predicate under discussion (*doubt*). We therefore have to consider the low scope readings given Value III. This is what I do in the following subsections. It turns out that the low scope readings are systematically unavailable given Value III. It turns out, we were not dealing with an isolated property the predicate *doubt* in example (39).[4]

Restrictions of universals and Conditionals

The EASY-reading of problem #9 is clearly possible in the restriction of universals and in the antecedents of conditionals.

(43) Everybody who solves even problem #9 will get a passing grade.

(44) If John solves even (as much as) problem #9, he will be given another chance.

Globally accommodating the presuppositions of the *if*-clause (or the relative clause in the restriction of the universal) is impossible in general (c.f. Heim 1983 for discussion). We therefore need to accommodate these presuppositions locally. This amounts to entering the presupposition into the restriction of the quantifier. The result is shown in (43') and (44') respectively.

(43') Everybody who solves problem #9 and doesn't solve any problem will get a passing grade.

(44') If John doesn't solve any problem and solves problem #9, he will be given another chance.

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[4] The same reasoning we applied to *doubt* incidentally also applies to *have hope* in example (i), which is the non-interrogative version of example (32).

(i) You have hope that John will solve even problem #9.

On the assumption that universal quantifiers are presuppositional (and that conditionals are universal quantifiers) both of these are ruled out. Example with *prohibit* can be dealt with along the same lines on the assumption that *prohibit* contains a necessity modal (i.e. a universal quantifier).

(45) Mary prohibited that John solve even problem #9.

Presuppositional items and Factives

The EASY-reading of problem #9 is also possible in the complement of factives that license NPIs and in the context of other NPI licensing presuppositional elements.

(46) I will be glad if John solves even problem #9.

(47) I am surprised John solved even problem #9.

(48) Peter arrived before John solved even problem #9.

(49) Only John managed to solve even problem #9.

What all of these contexts share is that they presuppose that the propositional content of the relevant bit of structure containing *even* be true. However, the presuppositions of *even* under Value III flatly contradict this. This renders low scope Value III unavailable.

Negation in a higher clause

In the discussion of example (18) in section 2 part 2, I mentioned the fact that, for unknown reasons, *even* always scopes above clausemate negation. One might wonder what happens when *even* is embedded under negation in a higher clause as in (50).

(50) It is not the case that John solved even problem #9.

The reading we are interested in is, of course, the low scope construal of *even* coupled with Value III for C as shown in (51).

(51) It is not the case that [even [John solved problem #9]]

Value III: C={that John solved no problem, that John solved problem #9}

The embedded clause now corresponds exactly to example (17) given Value III, i.e. it is contradictory. At the level of the matrix clause, (51) asserts (trivially) that the contradiction is false and presupposes that John solved no problem. It is unclear whether we should rule out this particular construal of example (50). In any given context of utterance, the net effect of (51) is exactly identical to a reading where *even* takes scope above negation and Value I is chosen for C. Under this reading (50) asserts that John didn't solve problem #9 and presupposes that John solved no other problems.

If (51) needs to be ruled out, we can do this by making the choice of Value III a marked option that is only chosen if it has to be chosen. We needed this condition anyway to deal with the absence of rhetorical readings for the EASY-reading of problem #9 in questions.

Conclusions

I have shown briefly why the availability in principle of Value III does not wreak havoc in NPI contexts. I believe that all standard NPI licensing contexts reduce to one of the cases discussed here. In a sense, this is of course a pleasing result. The specter of massive overgeneration can be warded off. But then another problem arises. If Value III is available in principle, can it really be coincidence, can it really be a big conspiracy that it only ever has an effect in questions? Or have we overlooked examples where Value III could play a role? The answer to the first question will be that, yes, it is a conspiracy that Value III can only rear its head in questions. The answer to the second question is that, no, we have not missed any evidence. The next part of this section addresses these questions.

Section 4 part 2* – Even problem #9 *in non-NPI-licensing contexts

The point of this section is to show why *even problem #9* can never be used when coupled with Value III for the contextual variable C in contexts that are not interrogative. In the preceding section we have taken care of NPI-licensing contexts and in the discussion of examples (17) and (18) we dealt with highest scope for *even*. Furthermore, I will not consider simple quantifiers taking scope above *even.* Given the preceding discussion it should be obvious by now why *even problem #9* coupled with Value III for C can occur neither in the scope nor the restriction of quantifiers. We can then restrict our attention to intensional contexts.

Many intensional predicates (verbs of saying, perceiving, …) have non-expletive subjects. As the discussion of *doubt* (example (39)) and *hope* (example (i) in footnote (4)) showed, such verbs do not tolerate *even problem #9* coupled with Value III for C in their complement. As far as I can see, this takes care of all intensional verbs with animate subjects. This leaves us with impersonal constructions, i.e. we are left with examples such as (52) and (53).

(52) It seems that John solved even problem #9.

(53) It is likely that John solved even problem #9.

Examples (52) and (53) do not allow the putative reading we are interested in. The reason is the following. When we say that X is likely, it must be likely that the propositional content of X and its presuppositions both come true. Likewise for *seem*; when we say that it seems that X, then it must appear as though both the presuppositions of X and the propositional content of X are fulfilled. But the presupposition and the proposition contradict each other under Value III. (52) and (53) are then necessarily false. Assuming a model of the discourse along the lines of Stalnaker 1974, we can derive that (52) and (53) are unusable.

Following Stalnaker we will say that the information in a discourse is modeled as a proposition c, the context set. A proposition p is assertable in a context iff (i) $c \cap p \neq \emptyset$ and (ii) $c \cap p \neq c$. Condition (i) ensures that the proposition made does not contradict the context, condition (ii) guarantees that a proposition be informative with respect to the context.

Since (52) and (53) (on the construal under discussion) express falsehoods, they can never be integrated into any discourse because this would violate condition (i) above. Incidentally, this also explains why the negations of (52) and (53), (54) and (55) respectively, are unusable under the relevant low scope for *even* coupled with Value III. On that reading, (54) and (55) express non-contingent truths, i.e. they are not informative with respect to any context whatsoever.[5]

(54) It isn't likely that John solved even problem #9.

(55) It doesn't seem that John solved even problem #9.

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[5] Examples (54) and (55) could be argued to be informative after all, since they come with a non-trivial presupposition: that John solved no problem. Unfortunately, it is very hard to find out whether this is relevant, since the reading is too difficult for me to distinguish intuitively from another reading that (54) and (55) have, namely the reading where *even* outscopes negation and C is assigned Value I.

One more remark on example (52). Unsurprisingly, there is an asymmetry here between examples like (52), where the propositional content of the embedded clause contradicts its presupposition, and examples like (56), where two mutually contradictory propositions are embedded under *seem*.

(56) It seems that John came home on that day and that he didn't come home on that day.

Example (56) could be taken from a mystery story where someone is puzzled by conflicting evidence he has. The interpretation would then be something along the lines that it seems that John came home on that day and that it seems that he didn't come home on that day. The difference between example (56) and example (52) is that the two propositions in (56) can be evaluated independently with respect to *seem*, but proposition and presupposition come as a package in (52) and cannot be evaluated independently of each other.

We have derived the fact that Value III can never be used except in questions. This was mentioned as one of the predictions of the current approach at the beginning of this section. It remains to be shown how the second prediction mentioned there can be derived: When C takes Value III, *even* must take widest scope in questions. This is point is addressed in the following, final part of this section.

Section 4 part 3 – Why, given Value III,* even problem #9 *takes wide scope in questions

We observed that *even* must take wide scope in example (32), but I will also consider here the interrogative versions of examples (39) and (52).

(32) Do you have hope that John will solve even problem #9?

(57) Does Frank doubt that John solved even problem #9.

(58) Does it seem that John solved even problem #9.

Given our discussion of example (39) above, it should be immediately clear, why example (32) does not allow of a narrow scope reading. On the narrow scope reading we would be asking whether the addressee has contradictory hopes. However, readings where contradictory hopes are ascribed to the subject of *hope* are not available in general.

To see this, consider the following examples. Despite the fact that John cannot both arrive and not arrive, there is no contradiction in (59) and (60). In (60) it is simply the case that in a certain respect Frank hopes that John will arrive and in some respects he hopes that John will not arrive. He does not hope that Frank will both arrive and not arrive. Put differently, in some of the worlds corresponding most closely to Franks hopes John arrives and in some of the worlds corresponding most closely to Franks hopes John does not arrive.[6] But there are no worlds corresponding to Franks hopes in which John both arrives and does not arrive. In (59) and (60) Frank has conflicting hopes, but not contradictory ones. It is impossible here to ascribe contradictory hopes to Frank.

(59) Does Frank hope that John will arrive and that John will not arrive?

(60) Frank hopes that John will arrive and that John will not arrive.

Example (32) on a low scope construal for *even* would require Frank to have contradictory hopes. Since this is ruled out, as we see in (59) and (60), (32) is not compatible with the low scope construal of *even* (under Value III for C). This leaves us with the high scope reading explicated above in section 3 part 3. Similarly for (57).[7]

Finally lets turn to example (58). We saw above why low scope for *even* cannot be coupled with Value III for C in example (52) – the non-interrogative version of (58). (52) on the relevant reading is unusable, because it is necessarily false. The negation of it, (55), is unusable because it is not informative. Note that (52) and (55) together make up the Hamblin denotation of (58). The question is unusable, because both answers are unusable.[8]

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[6] A possible way to think of this is to give the conjunction scope above the intensional operator: Frank hopes that X and Frank hopes that Y. This is clearly not the same as Frank hopes that (X and Y).

[7] When we construct examples that bear the relation to (57) that (60) bears to (32) we get examples like (i).

(i) Frank doubts that John will arrive and that John will not arrive.

If the conjunction outscopes the intensional operator (ii), the sentence is odd. If conjunction scopes below negation the sentence is nonsensical. Both the oddness of (ii) and the reason why (i) is nonsensical on the reading where conjunction scopes below negation can be explained if *doubt* means something like *expect that not* or *believe that not.*

(ii) Frank doubts that John will arrive and Frank doubts that John will not arrive.

[8] One could claim that (58) is usable on the relevant reading, since, after all, it introduces the presupposition that John didn't solve any problem – and that presupposition is certainly informative. Given

Section 4 – Conclusion

This section of the paper presented a tour de force through a range of contexts. The aim was to show that the introduction of Value III as a possible value for C does not wreak havoc and does not lead to massive overgeneration. In most cases, using Value III leads straightforwardly to deviant readings which, therefore, we do not expect to encounter. For the few cases where the readings are not straightforwardly deviant ((50) and (58)), the assumption that Value III is available also seemed to be benign.

The fact is that all of putative readings given Value III for C turn out to be deviant, except for the ones where *even* takes scope immediately below an interrogative operator. We can therefore derive the fact that there are rhetorical questions but no rhetorical assertions and that *even* takes scope just below the interrogative operator in rhetorical questions.

Section 5 – In defense of (33)

Sections 2 through 4 of the paper have shown how the system assumed here works. I have crucially relied on Value III to be available for the contextual variable C. Value III is made possible by assuming condition (33), repeated here for reference.

(33) Let C be the contextual variable of *even*, α be the LF-sister of *even*, $[\![\,]\!]^f$ be the focus interpretation function, and W be the set of all possible worlds, then $C \subseteq [\![\alpha]\!]^f \cup \{W - \cup[\![\alpha]\!]^f\}$

At this point, I hope to have convinced the reader that a system incorporating (33) is descriptively adequate in the sense that it generates all and only the readings which are actually available. Several questions have remained open so far.

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that one of the alternatives in the Hamblin set (52) is still contradictory, we are, again left with a rhetorical question. This rhetorical question would presuppose that John solved no problem and assert nothing. My intuitions fail to distinguish this rhetorical reading clearly from the wide scope rhetorical reading.

We have seen then that it is possible to account for the facts by assuming (33), but is (33) necessary? The crucial part of (33) is, of course, the availability of the negation of the disjunction of alternatives (‘W - $\cup[\![\alpha]\!]^f$’) in constructing C. In part 1 of this section I discuss an example due to Yael Sharvit (p.c.), which suggests that the availability of ‘W - $\cup[\![\alpha]\!]^f$‘ is indeed necessary.

Part 2 of this section is devoted to a different question concerning (33) that I have not addressed so far. Why is (33) a reasonable assumption to make? The question comes in two parts. (a) Is it necessary to formulate (33) as a lexical quirk of *even*, or is there a more general principle that could subsume (33)? (b) Why is the set of alternatives augmented, of all things, by ‘W - $\cup[\![\alpha]\!]^f$‘? The answer to (a) that I will give is that indeed (33) can and should be subsumed under a more general principle that says, roughly, the following: when a set of alternatives is invoked, the negation of the disjunction of these alternatives is invoked as well. I discuss the validity of this more general principle in part 2 of this section. For question (b) I don’t have an answer. It just seems to be a fact that ‘W - $\cup[\![\alpha]\!]^f$‘ is available and other conceivable alternatives are not.

Section 5 part 1 – Sometimes W - $\cup[\![\alpha]\!]^f$ must be considered

It is sometimes possible to use questions with minimizers as information seeking questions or as embedded interrogatives without rhetorical force. This can be described by allowing the truth of all alternatives presupposition of *even* (26iii) to be cancelled. Such information seeking readings are illustrated in the following two examples.[9]

(61) Context: Torben is not a particularly helpful person. Kirsten has just moved to a new flat. I say to Kirsten:
I know that Torben probably didn’t help very much. But what I want to know is whether he even lifted a finger.

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[9] In very emphatic utterances it is apparently possible to cancel the truth of all alternatives presupposition also in declaratives (i). This option is restricted to some minimizers (ii). It is unclear what’s going on here.

(i) ✓ The university administration gives a flying fuck about grad-students’ problems!

(ii) * The university administration lifts a finger to help the grad-students!

(62) Context: My friend Kirsten, who has a bad back, has recently moved while I was away. I was hoping that some other people would help her move the heavy boxes. People are giving evasive answers to the question how many boxes they carried. In mounting desperation I ask:
Who of you even lifted a finger to help Kirsten?

Two points about such examples are important. First, the scalar presupposition of *even* (26i) must remain intact. Second, the zero-point of the scale must be included as one of the alternatives, i.e. the non-triviality presupposition of *even* (26ii) must also remain intact. This is shown by the following two examples (due to Yael Sharvit, p.c.). (63) is simply another example of the type we have just seen, where a question with a minimizer is used as an embedded interrogative. Given the right context, as in the examples above, (63) is well-formed. Example (64) is decidedly odd. The question is why.

(63) ✓John is wondering who lifted a finger to help.

(64) #John believes that people are more likely to help than to not help, and he is wondering who lifted a finger to help.

The embedded interrogative *who lifted a finger to help* is completely parallel to example (19) on the ESAY-reading of *problem #9.* As we saw in section 3 part 1, the only available value for C under these circumstances was Value III. No other value for C is compatible with the presuppositions of *even*.[10] This means that the scalar presupposition of *even* must compare not helping at all with helping a minimal amount and that not helping at all must be more likely that helping a minimal amount. This presupposition is explicitly denied in the first conjunct of (64); hence the deviant status of (64).

It is crucial here that both the scalar presupposition and the non-triviality presupposition remain intact. If the scalar presupposition were cancelable, *even* would simply fail to give rise to a comparison, but then the relative likelihood of helping vs. not

[10] Given the inherently scalar nature of *lift a finger* we need not worry about any values for C except for Value III, since all alternatives to Value III automatically fail the scalar presupposition of *even.*

helping could not possibly matter. If the non-triviality presupposition were cancelable, *even* could simply work with an empty set of alternatives, thus trivializing the scalar presupposition. If this were possible, (64) would not be deviant counter to fact.[11]

Accounts that do not allow the zero-point of the scale (i.e. $W - \cup[\![\alpha]\!]^f$) to enter into the construction of C have no way of making *even* sensitive to the likelihood of not helping at all. Not helping at all simply never enters the picture. This is easy to see. On the standard account the alternatives to *lift a finger* are other, bigger amounts of help. Since *even* compares only the likelihood of the alternatives in C and since, by assumption, not helping at all is not among the alternatives, the likelihood of not helping at all cannot possibly play a role. But the crucial difference between example (64) on the one hand and examples (61) and (62) on the other rests in the likelihood of not helping. In (61) and (62) not helping is likely, in (64) not helping is unlikely. This is how (61) and (62) can conform to the scalar presupposition of *even* while (64) cannot.

In sections 2-4 of this paper, I have shown that it is possible to give an adequate description of the facts if we assume that the zero-point of the scale is a potential member of C. This subsection has presented an argument that the inclusion of the zero-point is in fact necessary.

Section 5 part 2 – Generalizing (33)

Although (33), repeated here one more time, is formulated with explicit reference to *even* and explicit reference to focus semantic values, the gist of (33) seems to involve something more general.

(33) Let C be the contextual variable of *even*, α be the LF-sister of *even*, $[\![]\!]^f$ be the focus interpretation function, and W be the set of all possible worlds, then

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[11] Abels 2002: section 3.5 is an earlier attempt to come to grips with examples (61) and (62). The theory there is based on the (wrong) standard lexical entry for *even* (22). I assumed there that information seeking readings with minimizers involve canceling the existential presupposition of *even* (22ii) thus trivializing the scalar presupposition. As just shown in the text, the earlier theory cannot account for (64). As far as I can see, no theory based on (22) could account for (64), which is a further, if indirect, argument against (22) (and for (25) or (26)) as the lexical entry for *even*.

$$C \subseteq [\![\alpha]\!]^f \cup \{W - \cup[\![\alpha]\!]^f\}$$

Consider the following quote from Karttunen 1977:18 ft. 11: "*John knows whether Mary cooks or Bill eats out* [is] true just in case John knows every proposition in the set denoted by *whether Mary cooks or Bill eats out* provided that the set is non-empty, and in the event it is, just in case John knows that it is empty, i.e. knows that Mary doesn't cook and Bill doesn't eat out." The intuition behind this remark is quite strong. What Karttunen is saying here is that for John to know Q, Q a set of propositions, John has to know which member(s) of the set $Q \cup \{W - \cup Q\}$ is/are true. Replace Q (a set of propositions) by $[\![\alpha]\!]^f$ (also a set of propositions) in this expression and you get the characterization of the domain for C in (33). At least this shows that we are in good company when postulating (33).

For questions it is actually true in general that the negation of the disjunction of the members of the question is a well-formed and natural answer. This can be seen in (65a). Notice that the explanation for why (65a) is well-formed cannot come from the assumption that the *wh*-element denotes a generalized quantifier. Other quantifiers are not well-formed answers to the question as shown in (65b) and (65c).

(65) A: Who came?
(65a) B: ✓ Nobody did.
(65b) B: # Some people did.
(65c) B: # Most people did.

One might try to maintain that none of (65a) through (65c) are answers to the question. The difference between the three could be attributed to the fact that the question presupposes that somebody came and (65a) rejects this presupposition. (65b) and (65c) would then be odd because they are neither answers nor do they address the presupposition of the question in any way. That this is not a plausible account of (65) is shown in (66). (66) is a *why*-question and *why*-questions, uncontroversially, presuppose the truth of their propositional content. (66a) shows that neutral intonation in an answer is not sufficient to reject the presupposition of a question. (66b) through (66d) show that focus on the predicate, verum focus, or an explicit marker is necessary if the speaker wants to reject the presupposition of the question. If it were true that *wh*-questions presuppose that one of the answers in the domain of the *wh*-element is true, then we would expect the same devices to be necessary to reject that presupposition. (66e) shows that this is not, in fact, the case. (66f) through (66h) show that typical devices for rejecting presuppositions are actually inadequate here.

(66) A: Why did you eat an apple?
(66a) B: # I didn't eat any APPLE.
(66b) B: ✓ I didn't EAT any apple.
(66c) B: ✓ I DIDN'T eat any apple.
(66d) B: ✓ But I didn't eat any apple.
(66e) B: ✓ I didn't do it for any particular reason.
(66f) B: # I didn't DO it for any particular reason
(66g) B: # I DIDN'T do it for any particular reason
(66h) B: # But I didn't eat an apple for any particular reason.

This strongly suggests that *wh*-questions do not presuppose the truth of one of the answers in their Hamblin-set. It follows that the distinction between (65a) on the one hand and (65b) and (65c) on the other hand cannot be based on the presuppositions of the question. It must then be the case that (65a) but not (65b) or (65c) is a genuine answer to the question. This validates Karttunen's claim: to answer a question Q is to indicate which member(s) of $Q \cup \{W - \cup Q\}$ is/are true.[12]

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[12] A formulation in terms of quantifiers is again implausible because it potentially opens the door for incorrect scope. The answer in (i) means (ii) rather than (iii). We need to make sure that *nobody* takes scope with the question forming operator. This is guaranteed by the formulation '$Q \cup \{W - \cup Q\}$'.

(i) Who did John say that Mary saw? – Nobody.
(ii) There is nobody such that John said that Mary saw him.
(iii) John said that Mary saw nobody (i.e. that Mary didn't see anybody).

A similar argument for the availability of the negation of the disjunction of alternatives can be made for constructions involving focus (but not *even*). Consider the following example.

(67) A: Did JOHN go to the party?

(67a) B: ✓ No, MARY did.

(67b) B: ✓ No, NOBODY did.

(67c) B: # No, SOMEBODY did

(67d) B: # No, MOST people did.

In (67) *nobody* is apparently a licit alternative to *John* on a par with *Mary*, but *somebody* and *most people* are not.

Section 6 - Guerzoni 2002

This paper owes a lot to Guerzoni's work, although it differs in crucial respects. Simplifying her proposal a great deal, we can say that Guerzoni proposes to treat polar questions basically as disjunctions of an affirmative and a negative clause. Thus examples like (19), repeated here for convenience, are treated as a disjunction between (17) and (18). Since (17) is illicit on the EASY-reading, the Hamblin denotation of the question ends up with only a single usable element to choose from. This degenerate 'choice' gives rise to the rhetorical reading.

(19) Did John even solve problem #9?

(17) John solved even problem #9.

(18) John didn't even solve problem #9.

Abstracting away from the technical details, this is achieved by scoping *even* above a scope bearing element introduced by the question forming operator, which surfaces as *whether* in embedded questions.[13] Guerzoni's negation introduced by whether corresponds directly to my negative alternative in (33).

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[13] In Guerzoni's account the scope bearing element is the trace (type <st, st>) left by the question forming operator (type <<<st, st>, st>, <st, t>>), which starts out adjoined to IP and then *wh*-moves into the C-domain. This question forming operator introduces negation which takes semantic scope at the original position of the operator.

This account has several properties worth pointing out. First of all, the invisible negation is only present in questions, this is how Guerzoni derives the fact that rhetorical effects are only present in questions and nowhere else. Second, Guerzoni's account directly predicts that *even* should have highest scope in rhetorical questions, since it needs to scope over the base position of the question forming operator. Thirdly, the ghost of overgeneration that formed the background of sections 2 and 4 of the present paper need not concern Guerzoni, since she does not assume that the zero-point of the scale is available as an alternative in constructing C.

There are several questions that immediately arise with respect to this account. First it is unclear how Guerzoni would deal with example (64) discussed extensively in section 5 part 1. I argued there that example (64) forces us to assume that the zero-point of the scale can, in principle, enter into the construction of the contextual restriction on *even.* If this argument is correct, then Guerzoni would have to change her account and allow the zero-point into consideration in principle. But then, as this paper has shown, the assumption that the question forming operator introduces negation that *even* can scopally interact with is at best redundant – at worst it will lead to wrong predictions. In what follows I mention some potential problems of over- and of undergeneration that need to addressed by Guerzoni because of this assumption.

One might for example wonder whether other scope bearing elements such as determiner quantifiers or *only* might also be able to scope above negation in the relevant examples. If this were so, (68) ought to have a construal where the affirmative and the negative answers are interpreted as in (69), where (69b) arises by scoping *everybody* above the operator. Of course, answering (68) never is interpreted as (69b).

(68) Does everybody know French?

(69a) Yes. (=Everybody knows French.)

(69b) No. (=Everybody is such that he does not know French. =Nobody knows French.)

Similarly, if *only* were able to scope over negation in (70), the expected affirmative and negative answers should be as in (71a) and (71b) respectively. Again this prediction is not borne out, since (71b) is not available.

(70) Does only John know French?

(71a)	Yes.	assert:	Nobody but John knows French.
		presuppose:	John knows French.
(71b)	No.	assert:	Nobody but John doesn't know French. =Everybody but John knows French
		presuppose:	John doesn't know French.

However, these examples are less serious of a problem than might appear at first sight, since *even*, quite independently of these facts, has to be able to take much wider scope than quantifiers in general or *only*.

A more serious problem arises with respect to example (19), repeated here for convenience. To account for the rhetorical effect of (19), *even* must be able to scope over negation as we saw. This gives rise to the two alternatives shown in (72). Depending on the context, the question ought to be degenerate in one or the other way. In contexts that provide the EASY-reading, the question ought to have the negative rhetorical effect that it does have. In contexts that provide the HARD-reading, the question ought to have a positive rhetorical reading, which, in fact, it lacks.

(19)	Did John even solve problem #9?		
(72a)	John even solved problem #9.	✓HARD-reading	*EASY-reading
(72b)	John didn't even solve problem #9.	*HARD-reading	✓EASY-reading

The information seeking reading that question (19) does have on the HARD-reading is generated by scoping *even* below negation. This generates the correct reading on the HARD-reading and is ruled out on the EASY-reading. The overgeneration problem is not touched by this, except insofar as Guerzoni could claim that rhetorical readings are only possible if all else fails – basically a conclusion that we were forced into, as well. The absence of rhetorical effects in (19) on the HARD-reading, can therefore hardly be taken as an argument in favor of the present account.

Let's turn to *wh*-questions now. Since *wh*-interrogatives exhibit the same rhetorical effect that we find with polar interrogatives, we should strive for a uniform account. A possible line along which Guerzoni's account might be extended to include *wh*-questions is to assume that the Hamblin set of a *wh*-question contains both the positive and the negative answers, i.e. to replace the standard interpretation of (73), given in (74), by (75). Informally, (75) corresponds to the set {that John bought a car, that John didn't buy a car, that Sue bought a car, that Sue didn't buy a car, that Peter bought a car, that Peter didn't buy a car, …}. This could be derived by assuming that *wh*-questions like polar questions contain an abstract *whether* with the properties Guerzoni assumes for *whether.*

(73) Who bought a car?

(74) $[\![(73)]\!] = \{p|\exists x[p=\lambda w.x$ bought a car in $w\}$

(75) $[\![(73)]\!] = \{p|\exists x[p=\lambda w.x$ bought a car in $w \vee p=\lambda w.\neg x$ bought a car in $w]\}$

At first blush, this does not seem to work, because now, given the right scope for *even,* half of the members of the Hamblin set of a question like (16), repeated below as (76), are well-formed. This is shown in (77). The question does not get reduced to a singleton as the polar interrogative. It does therefore provide a genuine choice between different answers.

(76) Which of these people have given their ex-wives even a cent to support their children?

(77) $[\![(76)]\!] =$ $\{p|\exists x[p=\lambda w.x$ is one of these people and x has given x's ex-wife even a cent to support x's and x's wife's children
$\vee$ $p=\lambda w.x$ is one of these people and x has not given x's ex-wife even a cent to support x's and x's ex-wife's children$]\}$

The first disjunct in (77) is ill-formed, no matter what the choice of x. Again this problem is solvable. The rhetorical effect can still be derived if we observe that, for any choice of x, $[\![(76)]\!]$ contains no choice, but only a single answer.

The same issues that arose for polar interrogatives arise again. Why does not other scope bearing element interact scopally with the question forming operator in the way that *even* does? Why does *even* only enter into this interaction under the EASY-reading for problem #9 but not under the HARD-reading?

Treating *wh*-questions as sets of positive and negative answers engenders some problems with respect to partial answers. Consider question (78) uttered by A in a context where B is fully informed. In particular, B knows that one can buy newspapers on Sunday at the gas station, at the supermarket, but not at the twenty four hour corner-store.

Given (78), (79) is a perfectly coherent if incomplete answer. However, (80) is not.[14] The derivative and secondary character of (80) can easily be explained if *wh*-interrogatives contain positive answers only, it poses a problem if *wh*-interrogatives contain both positive and negative answers.

(78) A: Where can I buy a newspaper on Sundays?

(79) B: At the gas station.

(80) B: Not at the twenty four hour corner-store.

There are further issues of a more syntactic nature, too. The *wh*-phrase has to cross the question forming operator in interrogatives like (76). If such crossing over the question forming operator happens in all *wh*-questions, as Guerzoni assumes, what is the source of the weak island effect observed in (81) and (82)? Standardly, the weak island effect is attributed to the fact that here a *wh*-operator crosses over the question forming operator, but this explanation is not open to Guerzoni.

(81) ?? What did you wonder whether Peter bought?

(82) * Why did you wonder [whether Peter bought the book t_{why}]

Why- and *how come*-questions raise further issues. *Why* is extremely sensitive to intervening operators and *how come* is immobile altogether and has been argued to be base generated in [Spec, CP} (Starke 2001). Both *why* and *how come* presuppose that the proposition expressed in the interrogative is true. However, letting *why* or *how come* apply to a question formed by Guerzoni's question forming operator gives rise to the wrong result.

(83) Why did you leave?

(84a) If you left, what is the reason for your leaving.

(84b) If you didn't leave, what is the reason for your not leaving.

Why and *how come* therefore have to start below the negation introduced by the Q-operator crossing over it. This violates the assumption that *how come* never moves and is hard to reconcile with the extreme island sensitivity of *why*. The problems related to locality clearly do not arise under the present approach.

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[14] (80) becomes possible as an answer only if B is not fully informed and (80) is the best he can do to help A.

Section 6 -- Conclusion

In this section a brief comparison between Guerzoni's (2002)theory and the present approach was undertaken. Although Guerzoni's theory explains nicely why rhetorical effects are absent in non-interrogative contexts and why *even* always has to take high scope in rhetorical questions, a number of problems arise for her account as well. One has to do with the question of how Guerzoni would deal with example (64), which appears to necessitate including the zero-point of the scale as an alternative. Most of the other difficult questions have to do with locality theory. The present paper's theory as an edge in these areas.

Section 7 – Overall Conclusion

This paper presents a novel approach to the rhetorical effect which *even* in conjunction with the lower endpoint of a scale gives rise to. Some problems of the theory were left open here. Further attention to these questions is necessary – also because these are areas that distinguish the present theory from Guerzoni's.

In any case, if a theory along these lines turns out to be on the right track, then that fact would provide rather strong support for three interrelated theses: (i) minimizers are semantically lower endpoints of scales + *even*, (ii) the distribution of NPIs (i.e. Ladusaw's generalization to the extent that it holds) can and should be derived from the lexical semantics of the NPIs, and (iii) the scope theory of *even* is to be preferred over the ambiguity theory.

Bibliography

Abels, Klaus. 2002. Thoughts on NPIs in Questions. Ms. University of Connecticut, Storrs

Chierchia, Gennaro. 2000. Scalar Implicatures and Polarity Items. Paper presented at *31 Conference of the North East Linguistics Society*, Georgetown University, Washington, DC.

Giannakidou, Anastasia. 1998. *Polarity Sensitivity as (Non)veridical Dependencies.* Amsterdam, Philadelphia: John Benjamins.

Guerzoni, Elena. 2002. Even NPIs in Questions. Paper presented at *NELS 32*, NYU.

Heim, Irene. 1983. On the projection problem for presuppositions. In *Proceedings of the Second Annual West Coast Conference on Formal Linguistics*, eds. M Barlow, D Flickinger and M Wescoat, 114-125. Stanford, CA.: Stanford Linguistic Society.

—. 1984. A Note on Negative Polarity and Downward Entailingness. In *NELS 14*, eds. C Jones and P Sells, 98-107. Amherst, MA.: GLSA.

Heim, Irene, and Angelika Kratzer. 1998. *Semantics in generative grammar*. Malden, MA.: Blackwell Publishers.

Kadmon, Nirit, and Fred Landman. 1993. *Any*. *Linguistics and Philosophy* 16:353-422.

Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1:3-44.

Krifka, Manfred. 1994. The semantics and pragmatics of weak and strong polarity items. In *Proceedings from Semantics and Linguistic Theory IV*, eds. Mandy Harvey and Lynn Santelmann, 195-219. Ithaca, NY: Cornell University.

Ladusaw, William. 1980a. *Polarity Sensitivity as Inherent Scope Relations*. New York: Garland.

—. 1980b. On the Notion Affective in the Analsysis of Negative-Polarity Items. *Journal of Linguistic Research* 1:1-16.

Lahiri, Utpal. 1998. Focus and negative polarity in Hindi. *Natural Language Semantics* 6:57-123.

Lee, Young-Suk, and Laurence Horn. 1995. *Any* as Indefinite plus *Even*. Ms. Yale University, New Haven, CT.

Linebarger, Marcia. 1980. The grammar of negative polarity. Doctoral dissertation. MIT, Cambridge, MA.

—. 1987. Negative polarity and grammatical representation. *Linguistics and Philosophy* 10:325-387.

Potts, Chris. 2002. Expressive Content as Conventional Implicature. Paper presented at *NELS 33*, MIT, Cambridge, MA.

Progovac, Ljiljana. 1993. Negative Polarity: Entailment and Binding. *Linguistics and Philosophy* 16:149-180.

—. 1994. *Negative and positive polarity*. Cambridge: Cambridge University Press.

Schmerling, Susan F. 1971. A Note on Negative Polarity. *Papers in Linguistics* 4:200-206.

Stalnaker, Robert. 1974. Pragmatic Presuppositions. In *Semantics and Philosophy*, eds. M. K. Munitz and P. K. Unger, 197-214. New York: New York University Press.

Starke, Michal. 2001. Move Dissolves into Merge: a Theory of Locality. Doctoral dissertation. University of Geneva.

von Fintel, Kai. 1999. NPI Licensing, Strawson Entailment, and Context Dependency. *Journal of Semantics* 16:97-148.

Wilkinson, Karina. 1996. The Scope of Even. *Natural Language Semantics* 4:193-215.

Zwarts, Frans. 1995 Three types of polarity. In *Plural Quantification*, eds. F Hamm and Erhard W. Hinrichs. Dordrecht: Kluwer.

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