It has been a long-standing puzzle that Negative Polarity Items appear to split into two subvarieties when their effect on the interpretation of questions is taken into account: while questions with *any* and *ever* can be used as unbiased requests of information, questions with so-called ‘minimizers’, i.e. idioms like *lift a finger* and *the faintest idea*, are always biased towards a negative answer (cf. Ladusaw 1979). Focusing on yes/no questions, this paper presents a solution to this puzzle. Specifically it is shown that in virtue of containing *even* (cf. Heim 1984), minimizers, unlike *any*, trigger a presupposition, which reduces the set of the possible answers to a question to the singleton containing the negative answer.

1. Introduction

It is well known that Negative Polarity Items (NPIs) like *any*, *lift a finger*, and *the faintest idea* are grammatical in questions. However, the class of NPIs appears to split into two subvarieties when their effect on the interpretation of questions is taken into account: while questions with *any* and *ever* can be used as unbiased requests of information, questions with so called ‘minimizers’, i.e. idioms like *lift a finger* and *the faintest idea*, are always biased towards a negative answer (a problem first addressed in Ladusaw 1979). This paper presents an account of this minimizer-induced rhetorical effect in yes/no questions.

The analysis I will propose elaborates on Ladusaw’s original appeal to general pragmatic principles linking the way a question is asked to the speaker’s expectations concerning its answer. Specifically, I show that the rhetorical effect of yes/no questions with minimizers is a consequence of presuppositions, which, in each utterance context, reduce the set of possible answers for the speaker to the singleton containing the negative answer. From the perspective of the hearer, the speaker’s preference for a question associated with presuppositions of this sort is a signal of her bias towards the negative answer.

* I am most grateful to Danny Fox, Kai von Fintel, Jon Gajewsky, Martin Hackl, Irene Heim, and Utpal Lahiri for their generous comments and suggestions. My thanks also go to Klaus Abels, Sabine Iatridou, David Pesetsky, and the audience of NELS 32 for helpful discussion.

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The distinctive property of minimizers that accounts for these presuppositions is, as already proposed in Heim (1984), that minimizers contain a silent \textit{even}, whereas \textit{any} and \textit{ever} do not (contra Lee and Horn 1994). In other words, minimizers, but not \textit{any}, are NPIs of the Hindi variety, which also involve \textit{even} plus an expression referring to a lower scale-endpoint (see Lahiri 1998).\footnote{Importantly Lahiri (p.c.) points out that Hindi questions with NPIs are biased as well.}

One crucial ingredient of my proposal is Wilkinson’s (1996) scope theory of \textit{even}. The present paper shows that, once the scope possibilities of \textit{even} in a question are taken into account, the bias follows from the semantics and pragmatics of questions.

This work reveals an additional advantage of this analysis in terms of scope, i.e. that it accounts, without any further stipulation, for certain otherwise unexpected presuppositions of questions containing minimizers and, more generally, of questions where \textit{even} associates with the lower endpoint of pragmatic scales (see Wilkinson 1996).

This paper is organized as follows: section 2 presents the relevant empirical facts. Section 3 shows that the same bias of questions with minimizers is found in questions where \textit{even} associates with expressions denoting the lower endpoints of the relevant pragmatic scales. Section 4 illustrates how the presuppositions introduced by \textit{even} in a question relate to those introduced by this particle in declarative contexts. Interestingly, when \textit{even} associates with the low endpoint of a scale, the presupposition of the question is the same as the found in negative contexts, although no overt negation is present in the question. In sections 5, 6, and 7, I present my proposal. Specifically I will argue that an analysis in terms of scope predicts not only the bias of the questions under consideration, but also the peculiar presuppositions they come with. What makes this unified account feasible is a simple and natural notion of possible answer to a question in a context that restricts the set of possible answers to those propositions whose presuppositions are satisfied in that context. My concluding remarks will be in section 8.

2. \textbf{A Brief Survey of the Facts}

Questions that contain \textit{any} and \textit{ever} (like (1a) and (1b)) can be used as neutral requests for information.

(1) a. Did \textit{anybody} call?
    b. Has John \textit{ever} been to Paris?

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On the other hand, questions with minimizers come with what has often been described as a negative rhetorical flavor (Ladusaw 1979; Heim 1984; Wilkinson 1996; Han 1998). Consider the examples in (2).

(2) a. Did anyone lift a finger to help you?  
     b. Does John have the least bit of taste?  
     c. Does Sue have the faintest idea of how hard I’m working?

In order to avoid confusion, a better qualification of these facts is needed at this point.

It has recently become common practice to classify as ‘rhetorical’ those uses of questions whose purpose is different from seeking information. Within this practice, ‘negative rhetorical questions’ are only those questions whose force is not interrogative but, for all intents and purposes, the force of a negative assertion (see, e.g., Progovac 1993; Han and Siegel 1996; Han 1998).2

This notion of ‘negative rhetorical question’ does not suitably capture the rhetorical effect of questions like those in (2), as the presence of minimizers does not always prevent an information-seeking force altogether.3

Nonetheless, questions with minimizers are never neutral. If they are not ‘negative rhetorical’, the flavor they come with is that of ‘negative bias’. In fact, to the extent that these questions can be used to elicit information, they cannot be used to do so “disinterestedly” (Ladusaw 1979, chapter 8, p. 188). The presence of minimizers is systematically felt to signal the speaker’s expectation (or bias) for a negative answer.

Borkin (1971) illustrates this point by showing that questions like those in (2) are infelicitous in contexts where it is clear that the speaker is unbiased as to what the true answer would be. Notice that their counterparts with any, instead, are fine. (3)–(5) illustrate this point.

2 However, notice that within the above-mentioned previous tradition, i.e. Borkin (1971), Ladusaw (1979) among others, the classification as ‘negative rhetorical’ was meant to merely indicate that the questions under consideration are felt to be biased towards the negative answer.

3 I’d like to thank Klaus Abels and Sabine Iatridou for pointing out to me the importance of this clarification.
Sue and I gave a party. Some friends had volunteered to help organize it. A few would come with me to do the shopping, others perhaps were going to help Sue clean the apartment. At the end of the party, I wanted to thank all those who helped, but I didn’t know who, if anybody, helped Sue in the apartment while I was out. Therefore I asked Sue . . .

a.  Did anyone help you?
b.  # Did anyone lift a finger to help you?

I am trying to buy coffee at a vending machine that takes only coins. I need just one more penny to get my coffee. Bill comes by and I ask him:

a.  Do you have any pennies?
b.  # Do you have a red cent?

Jen is the administrative secretary of the department of linguistics. She is preparing a document for the department archives that lists current students and their official advisors. Stephanie is helping her out. Miss Calendar is a new faculty member and Jen doesn’t know which students she is advising, if any. Thus Jen has no expectations as to whether she has started advising already or not. She asks Stephanie:

a.  Is Miss Calendar advising any students?
b.  # Is Miss Calendar advising a single student?

However, the infelicity of questions with minimizers in contexts like the ones above does not suffice to support the claim that these questions are negatively biased, unless one shows that the reason why they are infelicitous is precisely that a negative answer is expected. Stronger evidence suggesting that this is what these questions convey comes from Ladusaw’s (2002) observation that while questions with any, ever, and yet can be answered affirmatively with a simple yes, questions with minimizers call for some “further expansion” in case the hearer wants to answer them affirmatively. Crucially, when the answer is negative, no further expansion is needed:

4 Again, this question is perfectly fine when Miss Calendar has been around for a while already but actually Jen suspects that she is very lazy with students.
5 I would like to thank an anonymous NALS reviewer for pointing this out to me.
Example (6) suggests that an affirmative answer to a question with a minimizer is acceptable only insofar as it contains some form of more or less explicit indication that the person who answers disagrees with the negative expectation conveyed by the question.

Given that judgments of this sort are quite robust, we can conclude that a minimizer in a question obligatorily signals the speaker’s expectation of a negative answer, whether or not the question under consideration is also used to elicit information; any and ever, on the other hand, do not generate this flavor. Let us attempt to make sense of this difference.

3. **Even in Questions**

As mentioned above, my account of the bias of questions with minimizers will exploit Heim’s (1984) stipulation that these items involve a possibly hidden *even*. Besides containing a covert *even*, minimizers like *lift a finger* clearly denote the low endpoint of the contextually relevant pragmatic scale (cf. Horn 1989, p. 399).

Interestingly, the semantic effect of *even* in questions depends precisely on the position of its focus on the contextually relevant scale. When the focus is the low endpoint, the question has the same rhetorical flavor to it as questions with minimizers; when it’s the high endpoint the question is neutral.

Consider, for example, a question like (7) uttered in a context where the relevant alternatives to the focused element (*add 1 and 1*) are various mathematical calculations, which can be ranked on a scale of ‘difficulty’. On such a scale, *add 1 and 1* is clearly the low endpoint and the question is felt to be biased.

(7)  Can you even [add 1 and 1]?  negatively biased
On the other hand, if the expression associated with *even* denotes the high end value on that scale (as in (8)), the question can be used as a disinterested request for information.6

(8) Can you *even* solve this very difficult equation? neutral

Finally, when the position of the focus of *even* on a scale is still to be determined, the question appears to be ambiguous between a neutral and a biased reading, accordingly. This is shown in (9). (9a) is a biased question, if the relevant pragmatic scale in the utterance context is (9b). On the other hand, the same question is neutral if Problem 2 is the high endpoint of the contextually relevant scale, as in (9c).

(9) a. Can Sue *even* solve [Problem 2]? ambiguous
   b. (the most difficult problem, problem n, . . . , Problem 2) negatively biased
   c. (Problem 2, problem n, . . . , the easiest problem) neutral

Notice that if we assume that minimizers involve a hidden *even*, the similarity between questions containing them (repeated below) and questions where *even* associates with the low endpoint of a scale, as in (7) and (9b), is fully predicted.

(2) a. Did anyone (even) lift a finger to help you? negatively biased
   b. Does John have (even) the least bit of taste? negatively biased
   c. Do you have (even) the faintest idea of how hard I’m working? negatively biased

This is so because, as often pointed out, it is a property of the meaning of these idiomatic expressions that they always occupy the low endpoint of

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6 An anonymous reviewer objects that questions like (8) are not perceived as completely neutral either. Importantly, however, the effect one detects in (8) is different in nature from bias as characterized above. The following contrasts shows that just like questions with minimizers, (7) cannot be answered affirmatively with plain falling intonation and without further comments, while (8) can:

(i) Can you even add 1 and 1?
   # Yes, (I can even do that)
   YES, (of course) I can! (rising intonation)

(ii) Can you even solve this difficult equation?
    Yes, I can even do that.

I will return to this point in footnote 13 and provide an understanding of why (8) doesn’t sound entirely neutral and why this effect should be expected to be different from bias as characterized above.
their respective scales. For example, in each context, the overt portion of *lift a finger* will denote the lowest value on a scale where different actions are ranked with respect to how helpful they turn out to be in that context.

\[ 10 \] (be the most helpful..., 
    do the dishes and carry all the shopping bags, 
    drive the car and open the door, 
    open the door, 
    ..., 
    lift a finger)

Given this, an account of the biased reading of questions like (7) with *even* will automatically extend to the systematic bias of questions with minimizers like those in (2). Sections 5 and 6 of this paper will propose such an account.

Before turning to this proposal, however, in the next section I will illustrate one further puzzling correlation between the position of the focus of *even* on the relevant scale and the effect of *even* in a question.

4. The Presuppositions of *Even* in Questions

It is uncontroversial that *even* does not contribute to the truth-conditional aspect of meaning, but introduces a presupposition (cf. Horn 1969). The goal of this section is to characterize what presuppositions are associated with a question when it contains *even*. Importantly, this result also depends on the position of its focus on the relevant scale (a problem previously addressed in Wilkinson 1996).

I will start by recalling some general known facts regarding *even* in declarative contexts, before turning to the more complex case of questions. In affirmative declarative sentences the contribution of *even* is a 'scalar' presupposition (ScalarP, henceforth) (and, possibly, an existential presupposition, which can be ignored here). Specifically, (11a) asserts (11b) and presupposes (11c):

\[ 11 \] a. Mary can even answer [this difficult question].
    b. Assertion (p): Mary can answer this difficult question.
    c. ScalarP: For any salient alternative x to this difficult question, it is MORE likely that M can answer x than that M can answer this difficult question, i.e. *p* is the LEAST likely proposition among the set of alternative propositions.

Let us suppose, in absence of evidence to the contrary, that we can treat this scalar presupposition as a logical presupposition. As a consequence, the
function of *even* in a declarative affirmative sentence like (11a) is to introduce partiality in meaning in the following way:\(^7\)

\[
\text{[[even]]} = \lambda C_{\text{salient}} \lambda p_{\text{salient}} : \forall q_{\text{salient}} \left[ q \in C \& q \neq p \rightarrow q \text{ is the }\text{MORE} \text{ likely proposition} \right] . p
\]

According to this lexical entry, *even* is a two-place partial function that takes a contextually salient set of alternative propositions (C) and a proposition (p) and returns the same proposition just in case the following condition is satisfied: that p is the least likely proposition among the alternatives in C.

When we turn to negative sentences, however, *even* appears to introduce a different scalar presupposition. This is shown in (13)

\[
\text{Sue cannot even } f. \\
\text{a. Assertion (not p): Sue cannot add 1 and 1.} \\
\text{b. ScalarP: For any alternative x to 'adding 1 and 1', that Sue can do x is LESS likely than that Sue can add 1 and 1, i.e.} \\
\text{p is the MOST likely proposition among the alternatives.}
\]

Surprisingly, the presupposition *even* seems to trigger in (13c) is that the proposition in its second argument position (p) is the most likely, rather than the least likely, among the alternatives – the opposite of what we just saw in (11). Since, as we will see below, the choice between these two presuppositions is not always determined by the presence vs. absence of an overt negation, it might be useful at this point to introduce two abbreviations. In the remainder of this paper I will refer to presuppositions that are typical of *even* in affirmative contexts (like (11c)) as *hardP* and to those that are typical of negative contexts ((13c)) as *easyP* presuppositions.

\[
\text{hardP} = p \text{ is the least likely proposition among the alternatives.} \\
\text{easyP} = p \text{ is the most likely proposition among the alternatives.}
\]

As things stand, the meaning for *even* given in (12) above predicts presuppositions of the *hardP* kind, but doesn’t suffice to account for *easyP* presuppositions. To resolve this ambiguity, two proposals have been made that I will summarize briefly here.

Karttunen and Peters (1979) and Wilkinson (1996) suggest an analysis in terms of scope. Specifically they explain the presupposition in (13) as a

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\(^7\) C in (12) the set of contextually salient alternative propositions (see Rooth 1996).
consequence of the scope of even with respect to negation: if even has wide scope, our lexical entry in (12) captures this presupposition as well. According to this view the LF for (13a) is (14a). The resulting presupposition (14b) is equivalent to (13c).

(14) a. LF: even [Sue cannot t [add 1 to 1]]
    b. ScalarP: For every contextually relevant alternative x, that S canNOT do x is MORE likely than that S canNOT add 1 and 1, i.e. not p is the LEAST likely among the alternatives $\Rightarrow p$ is the MOST likely.

Rooth (1985) proposes, instead, to stipulate a lexical ambiguity for even. According to this proposal there is one even which introduces the presupposition in (12) and a second even ("evenNPI") which introduces the opposite presupposition. The distribution of this second reading is confined to those contexts that typically license NPIs (negation, questions, etc.).

(15) $\left[\text{even}_{NPI}\right] = \lambda C_{(st,t)} \cdot \lambda p_{(t)} : \forall q_{(st)} [q \in C & q \neq p \Rightarrow q < \text{likely } p]. p$
    ScalarP: p is the MOST likely among the alternatives.

A detailed review of the arguments in favor and against each of these approaches is well beyond the scope of this paper. In what follows, however, I will endorse the scope theory, for reasons that will become clear at the end of section 6.

We can now finally turn to our original question. What presuppositions does even trigger in a question?

In interrogatives, the presupposition even introduces appears to depend on the position of its focus on the contextually relevant scale. Specifically, each question with even falls under one of the following three categories. When the focus of even is the high endpoint, the question comes with a presupposition that is typical of affirmative utterances (i.e. hardP). When the focus is the low endpoint, the presupposition is the one typically found in negative environments (easyP). Finally, a question is ambiguous if the position of the focus of even on the relevant scale is still to be established: it can be associated with a hardP or easyP presupposition, depending on the context.

An example of the first type is given in (16). The hardest problem is the high endpoint on the scale of problems ranked by difficulty, and the question comes with a hardP presupposition.
(16) a. Can Sue even solve [the hardest problem]?
   b. ScalarP: For any alternative problem x, it is MORE likely
      that S can solve x than that she can solve the hardest problem.
      p is the LEAST likely among the alternatives.  \(\text{(hardP)}\)

No matter which of the two theories for even one adopts, this presupposition is expected, as there is no negation in (16a).

Example (17) shows a case of the second type: add 1 and 1 is the lower endpoint of the scale, thus the presupposition in this case is easyP.

(17) a. Can Sue even [add 1 and 1]?
   b. For any alternative x to ‘adding 1 and 1’, that Sue can do x is
      LESS likely than that Sue can add 1 and 1.  p is the MOST likely
      among the alternatives. \(\text{(easyP)}\)

It’s worth noticing that Rooth’s lexical ambiguity hypothesis can easily account for the presence of an easyP presupposition in cases like (17a). This is so because the one even which triggers this presupposition (i.e. (15) above) is expected to be licensed in (17a), by whatever factor licenses NPIs in questions. In addition, since the focus of even is the lower endpoint, the other reading of even, which generates a hardP presupposition, is pragmatically excluded. As we will see below, however, the ambiguity theory fails to predict the systematic co-occurrence of easyP presuppositions with the negative bias of the question.

Finally, there is an ambiguity in (18a): this question can be associated with a hardP or easyP presupposition, depending on what the contextually relevant scale is.

(18) a. Can Sue even solve [Problem 2]?
   b. (Problem 2, Problem 5, Problem 3, . . . , the easiest problem)
      ScalarP: For any alternative x, it is MORE likely that S can solve x than that Sue can solve Problem 2.  p is the LEAST likely among the alternatives. \(\text{(hardP)}\)
   c. (the most difficult problem, Problem 3, Problem 5, . . . , Problem 2)
      ScalarP: For any salient alternative x to Problem 2 it is LESS likely that Sue can solve x than that Sue can solve Problem 2.  I.e.  p is the MOST likely among alternatives. \(\text{(easyP)}\)
4.1. *Interim Summary*

In the last two sections, two aspects to the ‘ambiguity’ of questions with *even* emerged. First, these questions can be neutral or biased. Second, they can be associated with the presuppositions that are typical of affirmative or of negative sentences containing *even*. In both cases, how the ambiguity is resolved depends on the position of the focus of *even* on the contextually salient pragmatic scale. Table I summarizes the relevant correlations.

Since in minimizers *even* associates with the low endpoint of a scale, a question hosting one of these items will be a question of type A, in Table I. The goal of this work is to understand the bias readings of questions of this type. However, an analysis that provides a unified explanation of both this rhetorical effect and of the unexpected presupposition of these questions (i.e. easyP) is clearly to be preferred to any account of only one of these two puzzling but related phenomena. The remainder of this paper will show that, of the two above-mentioned theories of *even*, the scope theory proves more suitable to the task: an explanation based on a single meaning for *even* (as in (12)) and the syntactic (scope) configurations in which it is interpreted accounts for both the presence of easyP and its co-occurrence with the rhetorical flavor.

<table>
<thead>
<tr>
<th>Yes/no Questions with <em>Even</em></th>
<th>A: Low endpoint</th>
<th>B: High endpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interpretation</td>
<td>Biased</td>
<td>Neutral</td>
</tr>
<tr>
<td>Presuppositions</td>
<td>easyP</td>
<td>hardP</td>
</tr>
</tbody>
</table>

5. **Scope Ambiguity of Questions with *Even***

If the scope theory of *even* is correct, the differences in Table I above should be the effect of a scope ambiguity. In this section, I will begin by showing how, besides accounting for the expected hardP presupposition, this hypothesis predicts the possibility of an easyP presupposition in questions with *even*.

In confronting the task of deriving easyP presuppositions, we can start by pointing out that easyP would be the presupposition of the negative answer if *even* was present in this answer and had wide scope over negation (the opposite scope relation would generate hardP instead).
(19) a. Q: Can Sue even solve [Problem 2]f?
b. A: No, Sue cannot even solve [Problem 2]f
c. LF1: even [NOT Mary can solve [Problem 2]f] (even > not)
   ScalarP: not p is the LEAST likely among the alternatives. ⇔ easyP
d. LF2: NOT even [Mary can solve t] [Problem 2]f (not > even)
   ScalarP: p is the LEAST likely among the alternatives. ⇔ hardP

The task ahead of us consists in showing that the two different presuppositions are actually due to different scope options for even in the question (19a) itself. In other words, the proposal is that questions involving even are scopally ambiguous; under one reading they presuppose hardP, under the other they presuppose easyP.

In order to entertain this hypothesis we will need to make two assumptions here. The first assumption is that a yes/no question always involves a hidden whether (previous approaches based on this stipulation are Bennett 1977; Higginbotham 1993).

In this paper I will take this silent whether to mirror other wh-words in its syntax and semantics. Within a Karttunen-style semantics of wh-words, this amounts to saying that whether denotes an existential quantifier. Differently from the garden variety wh-words, however, whether quantifies over functions of type (st, st) and comes with an implicit restrictor: the set containing the identity (k p) and the negation (k p). This amounts to

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8 The careful reader has probably already noticed that (19b) doesn’t seem to have a reading where negation has scope over even. Given this, an LF like (9d) should be ruled out. However, the absence of this reading is due to the fact that English even is generally infelicitous in the immediate scope of negation, a restriction that has often been attributed to a Positive Polarity nature of even. Clearly such a restriction cannot be due to semantic factors, since the problematic reading is definitely available when negation occurs in a higher clause: No, it is not the case that Sue can even solve [problem 2]f. In any event, I will not entertain the hypothesis that we can derive the above ambiguity between hardP and easyP presuppositions in (19a) from a scopal ambiguity of even in answer (19b), because the hypothesis of a scopally ambiguous answer to a scopally unambiguous question would be per se implausible. Instead, the analysis that will be presented below attributes the possibility of the two presuppositions of (19c) and (19d) to a scope ambiguity of even with respect to the trace of whether in the question, rather than relative to the negation in the LFs of the answers. The restriction on the LF occurrences of the English lexical item even relative to negation, which blocks (19d), will not affect the analysis. The easyP and hardP presuppositions will be shown to be the result of this scope ambiguity, because in the two different scope configurations the definedness conditions even imposes on the negative answers are computed on mutually complementary sets of worlds.

9 The proposal that whether should denote a higher order quantifier of this kind is already in Bennett (1977); cf. also Krifka (2001).
saying that *whether* can be paraphrased roughly by *which of yes or no* just as *who* is equivalent to *which person.*

(20) \[
[\text{whether}] = \lambda_f([\text{st, st}], f) \cdot \exists h([\text{st, st}]) ([h = \lambda p.p \lor h = \lambda p.\neg p] \land f(h) = 1)
\approx \text{which of \textquoteleft yes\textquoteright{} or \textquoteleft no\textquoteright{}}
\]

(21) \[
[\text{who}] = \lambda P([e, x]). \exists x \cdot [\text{person } (x) \land P(x) = 1]
\approx \text{which person}
\]

In the syntax, *whether* moves over the set-creating *Q* morpheme, leaving a trace of type \((\text{st, st})\) in its base position. The resulting denotation for a yes/no question will be a 
Hamblin-set, namely the set containing the affirmative and the negative answer. It might be useful to see how this works for a simple yes/no question like (21a).

a. Did John leave?

b. \[
\begin{array}{c}
\text{Whether} \\
\lambda \text{f}_{\text{st, st}, \{f(p)\}}
\end{array}
\begin{array}{c}
\lambda \text{g}(1)(p)
\end{array}
\text{Q} \\
\begin{array}{c}
t_1 := \text{p = that John left}
\end{array}
\begin{array}{c}
\text{t}_1 < \text{st, i} > \text{John left}
\end{array}
\]

As shown in (21b), the semantic composition proceeds in the usual manner. The denotation of the proto-question (the phrase headed by the *Q* morpheme) contains the variable over propositional functions, denoted by the trace of *whether*. At the next higher node the \(\lambda\)-abstraction rule applies and binds this variable. Then, the resulting \(\lambda\)-abstract is combined with the quantifier denoted by *whether*, by an application of the Wh-Quantification Rule (see Karttunen 1977 and fn. 10 above for this rule). The output of this operation is a set of propositions that contains, for each \((\text{st, st})\) function in the restrictor of *whether*, the value of this function applied to the proposition \('that John left'.

10 Here I follow Karttunen’s assumption that all *wh*-words are existential quantifiers combined with their sister in the syntax by the following Wh-Quantifying Rule:

(i) Karttunen’s Wh-Quantification Rule (generalized):

If \(a\) has daughters \(\beta\) and \(\gamma\), where

\([\beta]\) is type \((\text{st, t})\) and \([\gamma]\) is type \((\text{st, st})\), then for every world \(w\) and assignment \(g\):

\[\text{[}\forall^\beta \equiv (p : [\beta] = (\lambda x. p \in [\gamma]_{w}(x)) = 1)\text{]}

Alternatively, one could view *wh*-words as ‘question quantifiers’ (as shown in (ii)) and do away with the Wh-Quantifying Rule.

(ii) \[\text{[who]} = \lambda Q_{\text{st, st}, \{f : \exists x [\text{person}(x) \land p \in Q(x)]\}}\]

\[\text{[whether]} = \lambda Q_{\text{st, st, st, i}, \{f : \exists h \cdot [h = \lambda t.t \lor h = \lambda t.t = 0] \land p \in Q(h)\}}\]
As there are only two of these functions (identity and negation), the propositions in the set will be ‘that John left’ and ‘that John didn’t leave’, as desired.

The second assumption needed for the present purposes is that even can have narrow or wide scope relative to the trace of whether. This assumption is an implicit consequence of endorsing a scope theory of even. The two LFs of (19) are, thus, (22a) and (22b).

(22) a. [Whether(1) [Q, t1, even [Sue solved [Problem 2]]]]  [whether > even]
   b. [Whether(1) [Q, even, t1, [Sue solved [Problem 2]]]]  [even > whether]

As an effect of the presence of even, the elements of the set denoted by each of these structures are partial propositions: each proposition is defined only for those worlds in which the presupposition introduced by even is satisfied. However, given that the scope of even is different in the two structures, these presuppositions will in turn be different. Specifically, those propositions in the two sets corresponding to the negative answers are distinct partial propositions: the negative answer to (22a) presupposes hardP, while the negative answer to (22b) presupposes easyP. Let’s see how this difference follows from a scope ambiguity of even relative to the trace of whether.

The semantic composition for (22a) is shown in (23a) below. (23b) and (23c) illustrate the denotations and presuppositions of the negative and the affirmative answers to the question under this reading.

(23) a. \[\{\text{even}(p), \sim \text{even}(p)\}\]

b. [no] = \sim [even] (‘that Sue can solve Problem 2’)  not > even

c. [yes] = [even] (‘that Sue can solve Problem 2’)

ScalarP: ‘That Sue can solve Problem 2’ is the LEAST likely proposition among the relevant alternatives. hardP

---

11 Since the analysis is compatible with any current view on phenomena of association with focus, to simplify matters a bit, I will leave out from the following structures the first argument of even, i.e. the set of contextually relevant alternatives C, and assume, for the moment, that even is a partial identity function over propositions.
In (23a) *even* composes directly with the proposition 'that Sue can solve Problem 2'. Therefore the presupposition it induces will be that this proposition is the least likely among the alternatives, no matter what value g(1) takes, i.e. no matter whether we talk about the negative or the positive answer.

Structure (24a) illustrates the semantic composition of (22b), the structure where *even* has wide scope with respect to the trace of *whether*.

**Example (24a).**

\[
\begin{align*}
&\text{\{[even]([p]), [even] (\sim p)\}} \\
&\text{Whether} \\
&\quad \lambda\text{f.e.s.t.s.} \{[[even](f(p))\}} \\
&\quad \quad \{[[even]((g1)(p))\}} \\
&\quad \quad Q \quad [\text{even}]((g1)(p)) \\
&\quad \quad even \quad [t_1](p) \quad \text{p = that Sue can solve Pr2} \\
&\quad \quad t_{\text{t.e.s.t.s}} \quad \text{Sue can solve Problem 2} \\
\end{align*}
\]

b. \[\text{[no]} = [\text{even}] (\sim (p)) \quad \text{even > not} \]
ScalarP: 'That Sue can’t solve Problem 2’ is b LEAST likely proposition among the alternatives. \[\Rightarrow \text{easyP}\]

c. \[\text{[yes]} = [\text{even}] (‘That Sue can solve Problem 2’) \]
ScalarP: 'That Sue can solve Problem 2’ is the LEAST likely proposition among the relevant alternatives. \[\text{hardP}\]

In this case the argument of *even* (i.e. (g1) (p)) contains the variable denoted by the trace of *whether*. At the top node, after the application of the Wh-Quantification Rule *whether* has been quantified—in this variable is bound by the existential quantifier. The resulting denotation for the structure is the set containing two partial propositions obtained by applying \[\text{[even]}\] to the value of the identity or of the negation function applied in turn to p (i.e. ‘that Sue can solve Problem 2’):

**Example (25).**

\[
\begin{align*}
&\{[[even] ([\lambda.p.p] (‘that Sue can solve Pr2’)), [even] (\lambda.p. \sim p] (‘that Sue can solve Pr2’))\} = \{[[even] (‘that Sue can solve Pr2’), [even]] \\
&\quad \sim (‘that Sue can solve Pr2’).\}
\end{align*}
\]

Consequently, in the case of negation, since \[\text{[even]}\] applies to the already negated proposition, the presupposition it induces will be of the \text{easyP} kind. i.e. ‘that Sue cannot solve problem 2’ is the least likely proposition among the alternatives, thus ‘that Sue can solve Problem 2’ is the most likely proposition. This is shown in (26).
(26)  
\[ \text{[even] ("that Sue can’t solve Pr2") } \]
\[ \text{(i) is defined iff for every } p \text{ in the set of relevant alternative propositions, } \]
\[ p > \text{likely that Sue can NOT solve Problem 2. } \leftrightarrow \text{easyP } \]
\[ \text{(ii) If defined, [even] ("that Sue can’t solve Pr2") } = \text{that Sue can’t solve Pr2. } \]

To sum up, a scope ambiguity of the sort postulated above for a question like (19a) generates the two LFs in (22) and predicts the negative answers to the questions expressed by these two LFs to be those in (27b) and (27c), respectively.

(27) a.  Can Sue even solve Problem 2?
   b.  no answer to (22a) = \sim \text{[even] ("that Sue can solve Problem 2")}
       ScalarP: \text{hardP}
   c.  no answer to (22b) = \text{[even] ("that Sue can’t solve Problem 2")}
       ScalarP: \text{easyP}

Recall that our goal in this section was to make sense of the intuition that when \text{even} associates with the low endpoint of the relevant pragmatic scale in a question, the question comes with an \text{easyP} presupposition. Let’s see how far we got in accounting for this phenomenon.

So far, I have merely shown how a scope theory of \text{even} predicts that one possible answer to these questions under one of their readings (\text{even} > \text{trace}_{\text{whether}}) is associated with an \text{easyP} presupposition. Since the presupposition of the other possible answer and of both answers under the other reading is \text{hardP}, this obviously doesn’t suffice to account for the intuition that the question as a whole unambiguously presupposes \text{easyP}.

In fact, following Bennett (1977), we can conceivably take a question denoting a set of partial propositions to presuppose the disjunction of the presuppositions of these propositions. Given this, as things stand right now, the above analysis still yields the incorrect prediction that, no matter what the position of the focused expression is on the relevant scale, a question with \text{even} can have one of two presuppositions: (i) \text{hardP}, under its surface scope reading, and (ii) \text{hardP or easyP}, under inverse scope of \text{even} with respect to the trace of \text{whether}.

In order for an \text{easyP} presupposition to be the presupposition of a question with \text{even}, one of the two readings (i.e. \text{trace}_{\text{whether}} > \text{even}) and one of the answers to the other reading (\text{even} > \text{trace}_{\text{whether}}) should be excluded, at the stage where the presupposition of the whole question is determined. Section 6 shows that this is precisely what happens in the cases where the focus of \text{even} is the low endpoint on the scale.
6. **Presuppositions and Possible Answers in a Given Context**

In the previous section we saw that the Hamblin set of a question with *even* contains only partial propositions, i.e. propositions whose felicity in a context will be restricted by the presuppositions introduced by *even*. We can make some speculations about how this affects the interpretation in a given context of a question containing *even*.

I will follow Stalnaker (1978) and view the context as the set of possible worlds in which all the propositions presupposed by the participants to a conversation are true. Since answers with false presuppositions are presupposition failures, it is reasonable to assume that a speaker uttering a question in a context \( c \) is biased towards those answers whose presuppositions are true in all the worlds in \( c \) (‘true in \( c \)’ henceforth). This section illustrates in more detail how this effect comes about.

Let’s call \( Q/c \) the subset of the Hamlin set \( Q \) containing only those possible answers the speaker is presenting as live alternatives in a context \( c \), i.e. the answers whose presuppositions are true in \( c \) (Irene Heim, p.c.).

On the one hand, when all the answers to a question have the same presuppositions only two options are possible: \( Q/c \) can be identical to \( Q \) or empty. The latter situation results in a presupposition failure. Consider the famous example in (28).

\[
(28) \quad \text{Have you stopped beating your wife?}
\]

If the utterance context is such that the hearer has never beaten his wife, \( Q/c \) is empty and the question infelicitous. This is so because both its answers (and therefore the question itself) presuppose a proposition that is not true in \( c \).

On the other hand, in cases where different elements in the Hamblin set \( Q \) have different presuppositions, there will be also contexts (say \( C \)) where the set of possible answers (\( Q/C \)) is a non-empty proper subset of \( Q \). For example, if some possible answers to a question presuppose \( p \) and others presuppose \( q \), and if \( p \) is true in \( C \) but \( q \) is not, the situation will be as follows:

\[
(29) \quad \begin{align*}
P\text{-answers} &= \text{answers presupposing } p \\
q\text{-answers} &= \text{answers presupposing } q \\
\exists = Q/C \\
\Box = q\
\end{align*}
\]
Given our considerations in the previous section, this is precisely the kind of situation we expect to find when even occurs in a question. What I will show now is that, in contexts of the sort just described, the question will come with bias towards the p-answers.

Consider once more our question (19a), repeated in (30) below. The utterance context has the important function of providing the information as to how high on a pragmatic scale the denotation of the focused expression (Problem 2) is ranked with respect to the relevant alternatives. The contexts that interest us, given our present purpose, are those in which Problem 2 is very easy to solve, i.e. where Problem 2 denotes the low endpoint of the scale (30b below).

(30) a. Can Sue even solve Problem 2?
   b. C': (the most difficult problem. . . . Problem 2)

In a context of this sort, a hardP presupposition is false and an easyP one is true, thus Q/C' contains only easyP-answers.

\[
\begin{array}{c}
\text{easyP-answers} \\
\text{hardP-answers}
\end{array}
\]

This situation has two important consequences. The first consequence regards reading (22a) (trace whether > even), repeated here as (32a). Recall that under this reading both answers to the question presuppose hardP. Therefore, this reading is absent in C', where all its answers would be infelicitous, because they all presuppose hardP. This is shown in (32b) and (32c).

(32) a. [Whether, Q t even S. solved [Pr2]] = \{[[even](p), \sim [even](p)]\}
   b. Since yes presupposes hardP, \[yes\] \notin \{32a\}/C'
   c. Since no also presupposes hardP, \[no\] \notin \{32a\}/C' \rightarrow \{32a\}/C' = \emptyset

The second consequence is that the set of those answers to the second reading (i.e. (22b), repeated in (33a)) that are possible according to the speaker’s presuppositions, i.e. the set \{33a\}/C', contains only the negative answer. This is so because only this answer comes with a presupposition that is true in C'.
The conclusion is that, in contexts where \( \text{even} \) associates with the low endpoint of the relevant scale, the question hosting it will be unambiguously interpreted under the wide scope reading of \( \text{even} \) and only its negative answer will qualify as ‘possible’ (Table II).

This accounts for both the puzzling phenomena related to questions of this type that were discussed in the previous sections.

First, we can now understand why a question containing \( \text{even} \) is felt to be biased towards a negative answer, in contexts where the focus of \( \text{even} \) is the low scale endpoint. If the speaker decides to formulate a question in a way that, given the context, excludes the possibility of an affirmative answer, he must be biased towards the negative one. Second, as the singleton of the possible answers in these contexts contains the answer presupposing easyP, the question unambiguously presupposes easyP in these contexts.

As mentioned above, the analysis presented here for questions with \( \text{even} \) extends automatically to minimizers. Recall that these items involve a hidden \( \text{even} \). In addition, given their idiomatic nature, in every context the overt portion involved in their structure denotes the low endpoint of the relevant pragmatic scale. As a consequence, the present proposal correctly predicts that these items will always impose a negative bias effect on questions.

### 6.1. Conclusions

In this section we have seen how a scope theory of \( \text{even} \) provides a unified account of both of the peculiar properties that questions with \( \text{even} \) exhibit in contexts where the focus of \( \text{even} \) is the low endpoint of the scale. Let’s see how Rooth’s lexical ambiguity thesis copes with the same set of empirical...
observations. On the one hand, as noted above, this thesis correctly predicts that these questions have an easy presupposition. On the other hand, however, it doesn’t seem to make any prediction with respect to the bias effect of these questions.

In the contexts we are considering, the hard presupposition is infelicitous, while the easy presupposition is true. According to the ambiguity view, this simply means that the non-NPI meaning of even (in (12) above), which triggers hard, is excluded; thus the only possible reading for even is the NPI one (given in (15) above), which triggers easy in both answers. Given this, the choice of the NPI-even, which is licensed by whatever factor licenses NPIs in questions, does not predict the affirmative answers to be infelicitous, and the bias effect remains unexplained.

Defenders of this view might object that this effect could be independent of the presuppositions triggered by even. Instead, they might argue, it is due to one of the two following factors: the presence of an NPI (i.e. even) or the presence of an expression denoting the low endpoint of a pragmatic scale. Recall, however, that the occurrence of an NPI in a question is not sufficient to force this effect: questions with any and ever can be used to disinterestedly elicit information. Nor does the presence of expressions that contextually represent the low endpoint of a scale, by itself, account for the rhetorical meaning of the questions under consideration. In fact, the same questions without even, when uttered in the same contexts, are not biased. Compare the effect of (34a) with that of (34b), in a context where the relevant pragmatic scale is (34c).

(34) a. Can Sue even solve Problem 2? biased
   b. Can Sue solve Problem 2? unbiased
   c. (the most difficult problem, problem n, . . . , Problem 2)

On the basis of these considerations, the conclusion we can draw is that the facts discussed in this paper provide indirect empirical support for a scope theory of even.

Notice, in passing, that Han’s (1998) analysis of this contrast between any/ever and minimizers does not seem to be more satisfying. Han adopts Zwarts’ (1993) distinction between Weak and Strong NPIs and claims that while any is a Weak NPI, minimizers are Strong NPIs and because of this they induce a bias effect in questions. Since it is unclear how NPI strength should generate a bias flavor in questions, this view does not really provide an explanation of this effect.
The above proposal makes another desirable prediction. The prediction concerns contexts where the focus of *even* denotes the high scale endpoint, like $C^0$ below:

(35) a. Can Sue even solve Problem 2?  
    b. $C^0$: (Problem 2, Problem 5, . . . , the easiest problem)

In contexts of this kind, the question in (35) is not obligatorily biased towards either answer.\(^{13}\) According to the proposal made above, bias towards one of the answers is generated when the addressee is given no choice but that answer to reply, because only that answer is felicitous.

\(^{13}\) As mentioned in footnote 5, an anonymous reviewer reports that questions where *even* is associated with the high endpoint of the contextually relevant scale, like those discussed in this section, are not neutral and therefore objects that there is a clear difference between (i) and (ii):

(i) Can you even solve this very difficult equation?  
(ii) Can you even solve the easiest equation?

In that footnote I pointed out that the effect perceived in (i) is very different from the negative bias in (ii). Let us see why. The presence of *even* in (i) generates the presupposition that solving the difficult equation is less likely than solving other equations. Since the affirmative answer to (i) conveys that the addressee can indeed solve the difficult equation, this answer, unlike the negative answer, conveys “surprising” information, hence the intuition that the question is not neutral. This, however, does not exclude this answer in the context under consideration above where its presupposition is satisfied and therefore does not implicate that a speaker uttering (i) expects a negative answer. Notice, indeed, that in a context where the addressee has proven to be able to solve all the other equations, the two possible answers to (i) are equally likely and the speaker has no expectation as to what the true answer will be.

(iii) The instructor of an advanced math class is testing Mary’s math proficiency to decide whether to admit her in his class. Mary did great on all the problems so far. The instructor says:

    You did an excellent job so far. You solved correctly all the equations I gave you. Let’s see now: Can you even solve this very difficult equation? If you can, I will admit you in my class with no reservations.

On the other hand, (ii), which carries the opposite presupposition (see section 4), is still odd when pronounced in the following context:

(iv) The same instructor is testing Mary’s math proficiency but this time Mary has failed to solve all the problems so far. The instructor says:

    You did not do a very good job so far. You failed to solve all the equations I gave you. # Can you even solve the easiest equation/ add 1 and 1? If you can, I will admit you in my class anyway.
When the context is like $C_0$, this is never the case. Although one of the readings of (35) (i.e. (36)) has only one answer that is felicitous in $C_0$, another reading of the question is available where both answers are felicitous (i.e. (37)):

$$\text{(36)} \quad \begin{align*}
&\text{a. } [\text{Whether, Q even t}_1 \text{ M. solved [Pr2]}] = \{[\text{even}](p), [\text{even}](\sim p)\} \\
&\text{b. } \text{Since yes presupposes hardP, } [\text{yes}] \in [36a]/C_0^\prime \\
&\text{c. } \text{Since no presupposes easyP, } [\text{no}] \notin [36a]/C_0^\prime \\
\end{align*}
$$

$$\text{(37)} \quad \begin{align*}
&\text{a. } [\text{Whether, Q even t}_1 \text{ M. solved [Pr2]}] = \{[\text{even}](p), \sim [\text{even}](p)\} \\
&\text{b. } \text{Since yes presupposes hardP, } [\text{yes}] \in [37a]/C_0^\prime \\
&\text{c. } \text{Since no presupposes hardP, } [\text{no}] \in [37a]/C_0^\prime \\
\end{align*}
$$

This situation is not symmetrical to the one emerging in contexts where Problem 2 is the easiest problem. The asymmetry is illustrated in Table III.

In $C_0^\prime$, unlike in $C_0$, two ways are given to the addressee to answer the question felicitously and therefore no biased interpretation is enforced.

<table>
<thead>
<tr>
<th></th>
<th>Tracewhether &gt; Even</th>
<th>Even &gt; Tracewhether</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C’$ (Pr 2 is the easiest)</td>
<td># Yes</td>
<td># Yes</td>
</tr>
<tr>
<td></td>
<td># No</td>
<td>No</td>
</tr>
<tr>
<td>$C''$ (Pr 2 is the easiest)</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td># No</td>
</tr>
</tbody>
</table>

8. Conclusions, Problems, and Open Questions

This paper has provided a unified perspective on two puzzling properties of yes/no questions with minimizers and, more generally, on questions with even when associated with a focused expression denoting the low endpoint of the contextually salient pragmatic scale: a rhetorical effect and an unusual presupposition. Adopting Heim’s (1984) hypothesis that NPIs of the above variety contain a hidden even, I argued that the two above properties follow from the scope theory of even and very natural and simple assumptions regarding what should count as a possible answer in a context.

The focus of this paper is entirely on yes/no questions. However, since wh-questions behave just like yes/no questions with respect to bias and presuppositions (cf. Ladusaw 1979; Guerzoni 2003), a uniform analysis accounting also for wh-questions with minimizers and even is called for.
Notice that, even though I did not offer such a uniform account explicitly here, the proposal in this paper is actually promising in this respect. Indeed, in Guerzoni (2003), I show that if we endorse Higginbotham’s (1993) assumption that wh-questions contain an unpronounced whether as well, the analysis I suggested for yes/no questions in this paper can be easily extended to wh-questions.

Before concluding, it is worthwhile to mention one possibly undesirable aspect of the analysis, which regards the movement of even. While the option of scoping even over the trace of whether is essential for the proposed analysis, this option should be executed when other scope-bearing elements such as quantifiers are considered. This is exemplified in (38), where it is shown that scoping everybody over the trace of whether produces an unattested interpretation for the question.

\[
\begin{align*}
(38) \quad a. & \text{ Did everybody come?} \\
& \sqrt{[\text{ whether }, [Q \left[ t_1 \text{ everybody } [\text{ came}]]]]} \\
& \lnot[\text{ whether }, [Q \left[ t_1 \text{ everybody } [\text{ came}]]]] \\
& \text{ Denotation: } \{\text{that everybody came, that everybody didn’t come}\} \\
& \text{ Predicted direct answer: Nobody came.}
\end{align*}
\]

Given this, the proposal made in this paper is contingent on the possibility that the movement of even obeys weaker constraints than XP-movement operations of a more familiar type do. It is worth noticing that this peculiarity of even is already implicit in the scope theory of even in general. This has been argued to be one of the weaknesses of this theory by the defenders of the alternative lexical ambiguity view (a recently articulated defense of this position can be found in Rullmann 1997, see also Barker and Herburger 2000). Schwarz (2000) shows, however, that such an argument is not conclusive. He lists a set of facts (some of which were presented first in Heim 1984) that can be explained only by assuming the scope theory of even with its inherent assumption that even can move outside of well-known islands for QR. The presupposition that even triggers when it occurs in the antecedent of a conditional illustrates this point quite clearly (Lahiri p.c.). The apodisis in these cases contributes to the content of this presupposition. This can be accounted for if even scopes outside the if-clause.

\[
\begin{align*}
(39) & \text{ If you even read [the Claremont Courier], you are well informed.} \\
& \text{ LF: even [if you read [the Claremont Courier], you are well informed]} \\
& \text{ Presupposition: To be well informed by reading the Claremont Courier is LESS likely than being well informed by reading any other newspaper.}
\end{align*}
\]
On the other hand, if the scope of *even* is inside the *if*-clause, as the ambiguity thesis has it, the correct presupposition is never generated, no matter which lexical entry of *even* is chosen:

\[(40) \ a. \ \text{LF1: } [\text{if even you read [the Claremont Courier]}] \text{ you are well informed}\]

Presupposition: Reading the Claremont Courier is less likely than reading any other newspaper.

\[b. \ \text{LF2: } [\text{if even np you read [the Claremont Courier]}] \text{ you are well informed}\]

Presupposition: Reading the Claremont Courier is more likely than reading any other newspaper.

Given this, as far as the theory of *even*, is concerned, the phenomena discussed in this paper add one more case to Schwarz’s list, thereby providing an indirect argument for the scope theory of *even*.

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