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Focused NPIs in Statements and Questions

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Abstract

Negative Polarity Items (NPIs) with emphatic prosody such as ANY or EVER, and minimizers such as lift a finger or sleep a wink are known to generate particular contextual inferences that are absent in the case of non-emphatic NPIs such as unstressed any or ever. It remains an open question, however, what the exact status of these inferences is and how they come about. In this paper, we analyze these cases as NPIs bearing focus, and examine the interaction between focus semantics and the lexical semantics of NPIs across statements and questions. In the process, we refine and expand the empirical landscape by demonstrating that focused NPIs give rise to a variety of apparently heterogeneous contextual inferences, including domain widening in statements and inferences of negative bias in questions. These inferences are further shown to be modulated in subtle ways depending on the specific clause-type in which the NPI occurs (e.g., polar questions vs. wh-questions) and the type of emphatic NPI involved (e.g., ANY vs. lift a finger). Building on these empirical observations, we propose a unified account of NPIs which posits a single core semantic operator, EVEN, across both focused and unfocused NPIs. What plays a central role in our account is the additive component of EVEN, which we formulate in such a way that it applies uniformly across statements and questions. This additive component of EVEN, intuitively paraphrased as the implication that all salient focus alternatives of the prejacent of the operator must be settled in the doxastic state of the speaker, is selectively activated depending on the presence of focus alternatives, and is shown to be able to derive all the observed contextual inferences stemming from focused NPIs, both in statements and in questions.

1 INTRODUCTION

Negative polarity items (NPIs) owe their name to the fact that, on a first approximation, they can be used in negative statements but not in positive ones. For instance, the English NPI ever is licensed in (1) but not in (2).

(1) a. I don’t think Robin ever goes to the gym.
   b. Nobody has ever seen Robin at the gym.

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(2)  
   a. *I think Robin ever goes to the gym.  
   b. *Mary has ever seen Robin at the gym.

Besides in negative statements, however, NPIs can also be used in questions. For instance, ever is felicitous in the polar question in (3a) and the wh-question in (3b).

(3)  
   a. Have you ever seen Robin at the gym?  
   b. Who has ever seen Robin at the gym?

Most theories of NPIs concentrate on their behavior in statements. The present paper contributes to a relatively small body of work which aims to achieve a uniform characterisation of the behavior of NPIs across both statements and questions. In particular, it addresses puzzles concerning the interaction between NPIs and focus in both sentence types.

**Emphatic NPIs in statements: domain widening effects**

An influential idea in the literature, originating in the work of Kadmon & Landman (1993), is that NPIs like ever and any are so-called ‘domain wideners’. That is, they are existential quantifiers which quantify over a domain (of individuals in the case of any, and of time intervals in the case of ever) which is wider than some contextually salient domain of quantification.

Kadmon & Landman (1993, §2.3) hold that NPIs like any involve domain widening no matter whether they are emphatic or not. However, Krifka (1995) and van Rooij (2003) among others, have argued that domain widening effects are only obligatory for emphatic NPIs.

Evidence for the latter position can in fact already be found in Kadmon and Landman’s work (although they themselves did not present it as evidence for this position). First, the primary examples that they provide to illustrate domain widening effects involve emphatic NPIs. For instance, they point out that the response in (4) (their example (30)) conveys that B does not have any potatoes suitable for making French fries, but leaves open the possibility that B has other kinds of potatoes (e.g., decorating potatoes). On the other hand, the response in (5), with an emphatic NPI, conveys that B doesn’t have potatoes at all, not even decorating ones.

(4)  
   A: I want to make French fries. Do you have cooking potatoes?  
   B: No, I don’t have potatoes.

(5)  
   A: I want to make French fries. Do you have cooking potatoes?  
   B: No, I don’t have ANY potatoes.

Second, Kadmon & Landman (1993) also explicitly note that domain widening effects seem absent in the following examples (their examples (34) and (35)), which involve non-emphatic NPIs.

(6)  
   A: Why don’t we make some French fries?  
   B: We don’t have any potatoes.

(7)  
   A: Are you prepared for school tomorrow?  
   B: Yes. We didn’t get any homework.

To this evidence, we add the minimal pair in (8)-(9), which brings out the subtle difference between emphatic and non-emphatic NPIs particularly clearly. Statements with non-
emphatic *any* such as B’s statement in (8) allow the addressee to ask follow-up questions that relax the relevant domain, whereas statements with emphatic *any* such as B’s statement in (9) do not.

(8) A: I need some fresh vegetables for a soup.
   B: I’m afraid we don’t have any vegetables.
   A: Canned ones perhaps?

(9) A: I need some fresh vegetables for a soup.
   B: I’m afraid we don’t have ANY vegetables.
   A: #Canned ones perhaps?

These observations give rise to the following question, which, to the best of our knowledge, has not yet been addressed in any depth in the literature.

(10) **Question 1**: Why do emphatic NPIs in statements give rise to domain widening effects?

**Emphatic NPIs in questions: negative bias** Many authors have observed that emphatic NPIs in questions typically convey a negative bias (Abels, 2003; Asher & Reese, 2005; Borkin, 1971; Guerzoni, 2004; Heim, 1984; Krifka, 1995; van Rooij, 2003, among others). To illustrate this, consider the following minimal pair.

(11) Does Bill know anything about cars?

(12) Does Bill know ANYTHING about cars?

The question in (12), where the NPI is emphatic, conveys a belief on the part of the speaker that Bill doesn’t know a lot about cars, if he knows anything at all. On the other hand, the question in (11), where the NPI is not emphatic, does not convey such a belief. This gives rise to the following question:

(13) **Question 2**: Why do emphatic NPIs in questions convey a negative bias?

This question has been addressed quite extensively in previous work (see the references above; a more detailed survey will be provided later). However, there is no general consensus yet on the precise nature of the negative bias involved and the way in which this should be derived from general properties of focus, the lexical semantics of NPIs, and the semantics of questions. Moreover, as we will observe later, negative bias appears to be missing in certain wh-questions with emphatic NPIs, leading to the issue of how the presence of a negative bias depends on question type (polar vs. wh-questions), an issue which, to our knowledge, has not yet been addressed in previous work.

**Proposal in a nutshell** Following Lee & Horn (1994), Lahiri (1998), Crnić (2014b, 2019), and Roelofsen (2018), among others, we assume that NPIs like *any* and *ever* generally involve an operator whose semantics is similar to that of the particle *even*. We will denote this operator as *even*. A sentence like (14), with the overt particle *even*, has both a scalar component—‘Mary was relatively unlikely to leave’—and an additive component—‘someone other than Mary left as well’ (Karttunen & Peters, 1979; Wilkinson, 1996, among others).
Interestingly, only the scalar component of even has played a significant role in even-based theories of NPIs. The additive component only plays a minor role in Lahiri (1998) and no role at all in Crnić (2014b, 2019) and Roelofsen (2018). We propose that the additive component also has a crucial role to play. We suggest that it is strictly focus-sensitive, i.e., it is only activated when the NPI is focused, which requires prosodic emphasis. When activated, it is responsible both for domain widening effects in statements and for conveying a negative bias in questions.

To develop this idea, the semantic treatment of the additive component of even must be generalized. After all, it is normally assumed that ‘even S’ presupposes that some contextually salient focus alternative of S is true, but this does not make sense when S and its focus alternatives are questions, which cannot be true or false. However, a natural generalization of this requirement, which applies no matter whether S is a statement or a question, can be formulated in inquisitive semantics (Ciardelli et al., 2018). In this framework, the semantic value of a sentence is not identified with the conditions under which the sentence is true in a given situation, but rather with the conditions under which it is settled in a given information state. Both statements and questions can be settled in an information state. For instance, the statement Sue left is settled in a state s if it follows from the information available in s that Sue left. Similarly, the question Where did Sue go? is settled in s if it follows from the information in s where Sue went. Returning to the additive component of even, the idea is that ‘even S’ requires that some salient focus alternative of S be settled in the speaker’s information state. This, we argue, is a key step toward a uniform theory of focused NPIs in statements and questions.

Let us now give a sketch of our answers to Questions 1 and 2 above. As for Question 1, we propose that ‘domain-widening effects’ are in fact better thought of as ‘anti-domain-restriction effects’. Semantically, the lexically specified domain of any is the set of all entities, just like the domain of some and every. This lexically specified domain can in principle be contextually restricted. For instance, in B’s statement in (8), any vegetables can be contextually interpreted as ‘any fresh vegetables’. However, when any is focused, as in (9), such contextual domain restriction is blocked. Why? We argue that this is because of the additive component of the even operator that the NPI contributes, which is activated by focus. Specifically, the additive component of even requires that its prejacent have a contextually salient focus alternative which is supported by the speaker’s information state. This alternative, in order to count as a proper alternative, must of course be different from the prejacent of even itself. Now, this is possible if the domain of any is kept wide. In that case, a suitable contextually salient focus alternative of ‘we don’t have ANY vegetables left’ is ‘we don’t have fresh vegetables left’. However, if any vegetables is contextually interpreted as ‘any fresh vegetables’ through domain restriction, then there is no distinct focus alternative which is contextually salient, which means that the additive requirement of even cannot be satisfied. This, we propose, is how an anti-domain-restriction effect arises.

Let us now turn to Question 2. Why does a question like (12) convey a belief on the part of the speaker that Bill doesn’t know a lot about cars? Again, we argue that this is because of the additive component of the even operator contributed by anything. As noted above, even requires that its prejacent have a contextually salient focus alternative which is supported by the speaker’s information state. Assuming that the prejacent of even is the
entire question ‘Does Bill know anything about cars?’ (we will show later that other scopal possibilities for even are ruled out), the relevant focus alternatives are other questions, such as ‘Does Bill know a lot about cars?’. Indeed, (12) cannot be felicitously uttered out of the blue, but requires that such a focus alternative be already contextually salient. Further, it is required that the contextually salient focus alternative be already supported by the speaker’s information state. Now, there are two possibilities. Either the speaker believes that Bill knows a lot about cars, or she believes that Bill does not know a lot about cars. However, if the speaker already believed that Bill knows a lot about cars, there would be no point in asking (12), for the answer would already be known. So, if the speaker behaves in a rational way, it must be the case that she believes that Bill does not know a lot about cars. This, in a nutshell, is how focus on NPIs in questions can convey a negative bias.

With regard to wh-questions, more possibilities exist. It will be shown that depending crucially on whether they are interpreted exhaustively or not, the emerging chain of reasoning does not always give rise to an inference of negative bias.

The paper is structured as follows. Section 2 provides some further background and delineates the empirical scope of the paper in more detail. Section 3 discusses the empirical properties of focused NPIs in statements and questions, adding some new observations along the way. Section 4 provides the necessary theoretical background for our proposal, and Section 5 presents the proposal itself. Section 6 illustrates the predictions of the analysis in some detail, and Section 7 concludes. Appendix A discusses related work, and Appendix B presents some technicalities of the proposal which are suppressed in the main text.

2 BACKGROUND AND SCOPE OF THE PAPER

Approaches to NPIs in questions Broadly speaking, two kinds of approaches have been taken in the analysis of the behavior of NPIs in questions. Reductive approaches assume that the logical forms of questions like those in (3), repeated in (15) below, involve certain covert operators which are known to license NPIs in statements.

\[(15)\]
\[\begin{align*}
  \text{a.} & \quad \text{Have you ever seen Robin at the gym?} \\
  \text{b.} & \quad \text{Who has ever seen Robin at the gym?}
\end{align*}\]

For instance, Guerzoni & Sharvit (2014) assume that the logical form of (15a) contains a covert negation operator, and Nicolae (2013) assumes that the logical form of (15b) contains a covert operator whose semantic contribution is similar to that of the particle only (which licenses NPIs in statements).

Non-reductive approaches on the other hand do not try to reduce the problem of NPI licensing in questions to the problem of NPI licensing in statements, but rather attempt to formulate a theory of NPIs in terms that are general enough to apply to both statements and questions in a uniform way. To get an idea of what this involves, note that theories of NPI licensing in statements are often formulated in terms of truth-conditional semantic notions, such as truth-conditional entailment. As such they do not straightforwardly apply to questions, since the meaning of a question cannot be characterized in terms of truth-conditions. Rather, for a theory of NPIs to apply uniformly to statements and questions, it needs to be formulated in more general terms. For instance, the approach of van Rooij (2003) and Schwarz (2014a,b) is based on the notion of entropy from information theory.
(Shannon, 1948; Bar-Hillel & Carnap, 1953), the proposal of Barker (2018) is based on a generalized notion of entailment from the semantic literature on questions (Ciardelli et al., 2018; Groenendijk & Stokhof, 1984), and the proposal of Roelofsen (2018) is based on a notion of strength defined in terms of likelihood (based on Crnić, 2014b; Heim, 1984; Lahiri, 1998, among others).

The present paper contributes to the second line of work, i.e., to the development of a uniform, non-reductive theory of the behavior of NPIs in statements and questions.

**Strong versus weak NPIs** The contribution that the paper makes to this line of work concerns a subclass of English NPIs which are referred to as *weak* NPIs. Let us briefly review the distinction between weak NPIs such as *ever* and *any*, and strong ones such as *in years* and *until June*. This distinction is based on the observation that the former have a much wider distribution than the latter. For instance, weak NPIs are not only licensed under negation and in the scope of negative quantifiers like *nobody* and *never*, as was illustrated in (1), but also in the antecedent of a conditional and in the restrictor of a universal quantifier. By contrast, strong NPIs are not licensed in the latter environments. They only appear in DE (downward entailing) environments that are more overtly negative, characterized by the logical property of anti-additivity. Crucially, they are not licensed in questions either, as exemplified in (16), and therefore do not fall under the purview of the present paper.

(16) a. *Have you seen Robin at the gym in years?*
   b. *Who has seen Robin at the gym in years?*

In sum, our paper is concerned only with weak NPIs, in particular emphatic ones. For brevity, we will from now on often refer to ‘weak NPIs’ simply as ‘NPIs’.

**Contingently versus inherently emphatic NPIs** We distinguish two kinds of emphatic NPIs. The first are emphatic occurrences of NPIs like *any* and *ever*. We refer to such occurrences as **contingently emphatic** NPIs, because the lexical items involved can also occur without emphasis. Examples of contingently emphatic NPIs in various environments are given in (17)–(21), where we use capitalization to indicate prosodic emphasis.

(17) a. I don’t think Robin EVER talked about this in public. [negation]
   b. Robin didn’t tell ANYONE about this.

(18) a. If he EVER talks about this in public, he will be fired. [conditional]
   b. If he tells ANYONE about this, he will be fired.

(19) a. Everyone who EVER talks about this in public will be fired. [universal]
   b. Everyone who tells ANYONE about this will be fired.

(20) a. Did Robin EVER talk about this in public? [polar question]
   b. Did Robin tell ANYONE about this?

(21) a. Who would EVER talk about this in public? [wh-question]
   b. Who would tell ANYONE about this?
The second class of emphatic NPIs are so-called **minimizers**, such as *lift a finger* and *sleep a wink*. Following Krifka (1995), Asher & Reese (2005) and others, we assume that minimizers always bear focus prosody, i.e., that they are **inherently emphatic**. Their use in various environments is exemplified in (22)-(24).\(^1\) Examples of their use in conditionals and under universal quantifiers will be discussed later in Section 3.1.1, as this usage has been a matter of some debate.

(22) a. Robin didn’t lift a finger to help when Mary was in trouble. [negation]
    b. Robin didn’t sleep a wink the night after 9/11.

(23) a. Did Robin lift a finger to help when Mary was in trouble? [polar question]
    b. Did you sleep a wink the night after 9/11?

(24) a. Who lifted a finger to help when Mary was in trouble? [wh-question]
    b. Who slept a wink the night after 9/11?

The overall classification of NPIs that we assume is depicted in Figure 1.

Finally, we should note that the empirical scope of the present paper is restricted to English. Examining the cross-linguistic validity of the empirical observations that we will make and the theoretical analysis that we will propose is an important task for future work.

### 3 EMPIRICAL PROPERTIES OF EMPHATIC NPIS

We begin by examining the distribution and interpretation of emphatic NPIs in statements and in questions, clarifying the main explananda of our analysis. We demonstrate that, broadly, the distribution of emphatic weak NPIs is similar to that of non-emphatic ones: they are licensed in a variety of downward entailing environments in statements, as well as

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\(^1\) Even though minimizers bear focus prosody, we will not capitalize them, to enhance readability. We will only use capitalization to distinguish emphatic from non-emphatic occurrences of *any* and *ever*.
in certain types of questions. At the same time, we also show that emphatic weak NPIs give rise to additional contextual inferences absent in utterances with non-emphatic weak NPIs. At the base level, we consolidate and recast various observations made in previous work as follows: (i) statements with contingently emphatic NPIs give rise to domain widening effects, and (ii) questions with emphatic NPIs give rise to an inference of negative bias. Building on (i), we also further clarify the notion of ‘domain widening effects.’ In addition, building on (ii), we make two new empirical observations about variation in the presence/strength of the induced negative inference: we argue that the presence and the strength of this inference varies depending on question type (polar vs. wh-questions) and NPI type (contingently vs. inherently emphatic).

3.1 **Emphatic NPIs in statements**

3.1.1 **Distribution**

It is widely established that strong NPIs are more restricted in their distribution than non-emphatic weak NPIs. Broadly speaking, the former require an anti-additive environment, whereas the latter are licensed more generally in Strawson downward entailing (DE) environments, including in the antecedent of a conditional and in the restrictor of *every*.

However, it has not been settled in the literature where emphatic weak NPIs are situated with regards to their distribution. Eckardt & Csipak (2013) argue that minimizer NPIs such as *lift a finger* behave like strong NPIs, and are thus not licensed in certain contexts that do license non-emphatic weak NPIs. In particular, they argue that minimizer NPIs are infelicitous in the restrictor of *every* and in the antecedent of a conditional (unless the statement at hand has a law-like interpretation, see also Heim, 1984). In a similar vein, Hoeksema (2013) argues that minimizer NPIs are infelicitous in certain Strawson DE contexts such as under superlatives.

(25) From Heim (1984); originally from Linebarger (1980)

a. Every restaurant that charges so much as a dime for iceberg lettuce ought to be closed down.

b. ??Every restaurant that charges so much as a dime for iceberg lettuce actually has four stars in the handbook.

(26) From Eckardt & Csipak (2013)

a. If a restaurant charges so much as a red cent for tap water, it ought to be closed down.

b. ??If a restaurant charges so much as a red cent for tap water, its name starts with the letter ‘L’.

(27) From Hoeksema (2013)

a. ?She was the most beautiful woman I have cared a pin about.

b. ?Fred is the smartest man who ever lifted a finger to help.

We argue, however, that minimizer NPIs are in fact not generally infelicitous in the environments mentioned above. This is supported by data from the Corpus of Contemporary American English (COCA), as well as by the results of an experiment reported in Jeong & Roelofsen (2022). The examples in (28) show that minimizer NPIs can be felicitous in non-law-like conditional antecedents, (28a), comparative constructions, (28b), and in the
restrictors of the only, the first, and the last, (28c)-(28e). The data in (29) suggest that minimizer NPIs are also felicitous in restrictors of universals, even when they do not give rise to law-like interpretations.

(28) a. If anyone will lift a finger to help me, it will be Prue.
   b. Too weak to lift a finger, Nikolayev lay in a listless rage, feeling the cat eyeing him from the stove. (from COCA)
   c. The only one to lift a finger was a photographer who sold the New York Post horrifying photos of the [. . .]. (from COCA)
   d. This is the first project she has cared a pin about.
   e. Fred Sullivan was the last CEO of the company who cared a pin about his employees.

(29) From the experiment reported in Jeong & Roelofsen (2022)
   a. Everyone who slept a wink was excluded from the test phase.
   b. At the end of the party, Susan thanked everyone who had lifted a finger to help.

Based on these observations, we conclude that it is not a general property of minimizers that they are infelicitous in these environments. In cases where they are, the infelicity must arise not from the interplay between the semantics of minimizers and the logical properties of the relevant environments, but rather from pragmatic or contextual factors (see Jeong & Roelofsen 2022, which tests one such potential factor, and Crnić 2014a and Eckardt & Csipak 2013 for relevant discussion).

Turning now to contingently emphatic NPIs, we illustrate in (30) and (31) that these, too, are generally licensed in non-anti-additive Strawson DE contexts. We should note that this is compatible with the positions of Eckardt & Csipak (2013) and Hoeksema (2013), whose focus is on minimizer NPIs rather than contingently emphatic NPIs.

(30) a. If he EVER talks about this in public, he will be fired. [conditional]
   b. If he tells ANYONE about this, he will be fired.

(31) a. Everyone who EVER talks about this in public will be fired. [universal]
   b. Everyone who tells ANYONE about this will be fired.

In sum, both contingently and inherently emphatic NPIs are licensed in Strawson DE environments in statements. Our analysis should be able to capture this basic distributional pattern.

3.1.2 Interpretation and contextual requirements We have so far examined the distributional patterns of emphatic weak NPIs in statements, which are similar to those of non-emphatic weak NPIs. At the same time however, emphatic vs. non-emphatic weak NPIs differ in their discourse effects when they are used in statements. Specifically, we argue that contingently emphatic NPIs give rise to what Kadmon & Landman (1993) refer to as domain widening effects. Kadmon and Landman observe that the response in (32) (their example (30)) just conveys that B does not have any potatoes suitable for making French

2 Hoeksema (2013) acknowledges that minimizers can appear in the restrictor of the only and provides an example from his corpus.
fries, while the response in (33), with an emphatic NPI, conveys that B doesn’t have any kind of potatoes, not even inedible ones.

(32) A: I want to make French fries. Do you have cooking potatoes?
    B: No, I don’t have potatoes.

(33) A: I want to make French fries. Do you have cooking potatoes?
    B: No, I don’t have ANY potatoes.

Kadmon & Landman (1993, §2.3) hold that both emphatic and non-emphatic any convey domain-widening, although they acknowledge that with non-emphatic any the presumed effects of domain-widening are not always perceived. In particular, they note that domain-widening effects seem absent in the following examples (their examples (34) and (35)).

(34) A: Why don’t we make some French fries?
    B: We don’t have any potatoes.

(35) A: Are you prepared for school tomorrow?
    B: Yes. We didn’t get any homework.

We argue that while contingently emphatic NPIs necessarily give rise to a domain widening inference, this inference is only optional in the case of non-emphatic NPIs. The minimal pair given in (8)-(9) in the Introduction, repeated in (36)-(37) below, brings out this subtle divergence between emphatic vs. non-emphatic NPIs particularly clearly. Statements with non-emphatic any such as B’s statement in (36) allow the addressee to ask follow-up questions that relax the relevant domain, whereas statements with emphatic any such as B’s statement in (37) do not.

(36) A: I need some fresh vegetables for a soup.
    B: I’m afraid we don’t have any vegetables.
    A: Canned ones perhaps?

(37) A: I need some fresh vegetables for a soup.
    B: I’m afraid we don’t have ANY vegetables.
    A: #Canned ones perhaps?

A similar minimal pair involving ever rather than any is given in (38)-(39).

(38) A: Before they got married, did Bill tell Mary about his father’s role in the war?
    B: No, I don’t think he ever told her.
    A: And after they got married?
    B: Yes, he did tell her eventually, when they were in their seventies and his father had long passed away.

(39) A: Before they got married, did Bill tell Mary about his father’s role in the war?
    B: No, I don’t think he EVER told her.
    A: #And after they got married?

In addition to triggering an obligatory domain widening inference, emphatic NPIs are also subject to stronger contextual constraints than non-emphatic ones, as exemplified in (40)–
(41). What we see here is that a statement with a non-emphatic NPI can function as a felicitous answer to a wider range of questions than the same statement with emphasis on the NPI.

(40) Did you remember to add some fresh oregano?
   a. Oh no! I didn’t add any oregano.
   b. Oh no! I didn’t add ANY oregano.

(41) Did you remember to add the herbs?
   a. Oh no! I didn’t add any oregano.
   b. # Oh no! I didn’t add ANY oregano.

To the best of our knowledge, the contrasts between emphatic and non-emphatic NPIs illustrated in (36)–(41), showing that only emphatic NPIs obligatorily induce a domain widening inference and involve stricter contextual requirements, have not been noted in previous literature.

In the analysis to come, we argue that both the obligatory domain widening inference and the specific contextual requirement observed here are byproducts of, and can be derived from, a more general semantic property of contingently emphatic NPIs. We also show that the same semantic component is present in minimizer NPIs, and explain why nevertheless they do not appear to give rise to strong domain widening effects.

3.2 Emphatic NPIs in questions

3.2.1 Distribution Besides in DE environments, emphatic NPIs can also be used in questions. For instance, (42)–(43) show that contingently emphatic NPIs are licensed both in polar questions and in wh-questions (though we will return to some constraints on the licensing of NPIs in certain kinds of wh-questions).

(42) a. Did Robin EVER help when Mary was ill? [polar question]
   b. Did the government do ANYTHING to avoid the disaster?

(43) a. What did Robin EVER do to help Mary? [wh-question]
   b. Who did ANYTHING to avoid the disaster?

Minimizer NPIs are also licensed in these environments, as illustrated by (44)–(45).

(44) a. Did Robin lift a finger to help when Mary was ill? [polar question]
   b. Did you sleep a wink the night after 9/11?

(45) a. Who lifted a finger to help when Mary was ill? [wh-question]
   b. Who slept a wink the night after 9/11?

Thus both contingently emphatic NPIs and minimizer NPIs are licensed in polar questions and wh-questions. In this regard, they again pattern like non-emphatic weak NPIs, which are also licensed in these types of questions.3

3 We leave alternative questions and other types of disjunctive questions out of consideration here. See Nicolae (2013), Schwarz (2017a), Roelofsen (2018), and Abenina-Adar & Sharvit (2020) for recent discussions of the distribution of non-emphatic weak NPIs in such questions.
3.2.2 Interpretation and contextual requirements  In terms of discourse effects, questions with emphatic NPIs differ from questions with non-emphatic NPIs in an important respect. Namely, the former typically give rise to a kind of negative inference and often have a rhetorical flavor, whereas the latter typically don’t.

Specifically, it has been observed that questions with minimizer NPIs cannot be used as neutral questions, and generally seem to convey that the speaker believes that the negative answer is true or at least very likely (Asher & Reese, 2005; Borkin, 1971; Guerzoni, 2004; Heim, 1984; van Rooij, 2003, among others). For instance, the question in (44a) conveys that the speaker thinks that Robin did not help when Mary was ill.

Questions with contingently emphatic NPIs also differ from their non-emphatic counterparts. Just like minimizer NPIs, they give rise to a kind of negative inference. This is exemplified in (46). The question in (46a), containing an emphatic NPI, seems to convey that the speaker is biased towards the negative answer, whereas the question in (46b), with a non-emphatic NPI, does not convey such a bias.

\[(46)\]
\[
a. \text{Did ANYONE tell Robin that there’s no class today?} \\
b. \text{Did anyone tell Robin that there’s no class today?}
\]

Based on these intuitions, it is usually assumed that both contingently emphatic NPIs and minimizers generally convey a negative speaker bias when appearing in questions. However, there are a few issues concerning the precise characterization of this negative bias which require careful consideration.

Strength of the negative bias First, characterizing the strength of the negative bias has been a matter of some debate. We identify two main views: strong vs. weak. The strong view (Asher & Reese, 2005; Guerzoni, 2004) is that the negative bias conveyed by questions with emphatic NPIs is categorical and that these questions inexorably give rise to rhetorical interpretations.4 More specifically, Asher & Reese (2005) claim that in uttering a polar interrogative \( \text{whether } p \) with an emphatic NPI a speaker makes a kind of hybrid speech act whose function overlaps with that of an assertion with content \( \neg p \) (the negative answer). In a similar vein, Guerzoni (2004) claims that polar interrogatives with minimizer NPIs convey that the speaker is only effectively entertaining the negative answer \( \neg p \). In sum, under both approaches, the negative speaker bias requires a belief on the part of the speaker in the negative answer to the question, \( \neg p \).

In contrast, on the weak view (Borkin 1971; van Rooij 2003), the negative inference is formulated in terms of negative answers to alternatives of the question at hand. That is, under this view, a polar interrogative \( \text{whether } p \) with an emphatic NPI presupposes that all relevant alternative issues \( \text{whether } p' \) have been settled negatively. For instance, the question in (44a) would presuppose that alternative issues such as \( \text{Did Robin help when Mary was ill?} \) have been answered negatively (No, she did not help; \( \neg p' \)). Importantly, the issue of \( \text{whether } p \) itself can remain open. For instance, the issue of \( \text{whether Robin lifted a finger to help} \) is predicted to remain open in (44a), where ‘lifting a finger to help’ is understood to

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4 It should be noted that Guerzoni (2004) is only concerned with minimizer NPIs. In particular, she does not explicitly commit herself to any particular view on the bias induced by contingently emphatic NPIs.
include doing things that fall short of properly helping, but can still be distinguished from doing nothing at all.

Regarding this issue, we argue that the empirical facts favor the weak, alternative-based view over the strong view. That is, questions with emphatic NPIs allow for genuine information-seeking readings, as exemplified in (47).

(47) [Context: A is at a small fruit stand at the market, looking for apples for a pie]
A: Do you have tart apples?
B: No, I'm afraid we don't.
A: Do you have gala apples?
B: No, sorry.
A: Do you have ANY kind of apples?

When asking the final question in (47), A may still be genuinely curious as to whether B has any kind of apples. This suggests that a positive answer to the question can still be actively entertained by the speaker. This is incompatible with the way in which the strong view characterizes the negative inference triggered by emphatic NPIs in questions. On the other hand, it is compatible with the weak view, because in this example the first two questions, which are naturally seen as the contextually relevant alternatives to the third question, have indeed already been settled negatively.

Presupposition or speaker belief? van Rooij (2003) and Borkin (1971) characterize the negative implication of emphatic NPIs in questions as presuppositional, i.e., imposing a requirement on the common ground. However, examples like (48) and (49) show that a question with an emphatic NPI can be felicitous even if the speaker does not take it for granted that the negative answers to the relevant alternatives of the question are already commonly presupposed.

(48) A: I really like Tom. He's always so kind and helpful to everyone around him.
B: I'm not so sure. Did he lift a finger when Sue was in trouble?

For instance, in (48), B does not appear to assume that it is mutually established that Tom did not help when Sue was in trouble. Rather, this information merely appears to reflect B's (possibly heretofore private) beliefs. This is problematic for van Rooij (2003) and Borkin (1971), and leads us to conclude that the negative implication is not presuppositional, but instead constitutes a non-at-issue implication about the speaker's doxastic state. Thus, to recapitulate, we characterize the negative inference triggered by a question with an emphatic NPI as a non-at-issue implication to the effect that the speaker believes the negative answers to the contextually relevant alternatives of the given question.

Having clarified how to characterize the negative bias conveyed by questions with emphatic NPIs (namely, negative speaker belief about alternative issues), we now turn to some additional empirical observations which to the best of our knowledge have not been made explicitly yet in the literature, and which show that the presence and exact nature of the negative bias crucially depends on the type of NPI (inherently emphatic vs. contingently emphatic) and the type of question (polar question vs. wh-question) involved.

Bias depends on NPI type First, we propose that the negative bias arising from questions with contingently emphatic NPIs differs in flavor from the bias arising from questions with minimizers. This point is worth explicitly establishing, as previous work either focuses
exclusively on one type of NPI, or assumes that both types give rise to the same kind of bias. For instance, Guerzoni (2004) restricts her attention to minimizer NPIs and does not take a stand on contingently emphatic NPIs. van Rooij (2003) also mainly focuses on minimizer NPIs, although he does briefly mention that his account would naturally extend to contingently emphatic NPIs. Krifka (1995) and Asher & Reese (2005) on the other hand, explicitly treat minimizer NPIs and contingently emphatic NPIs on a par, and suggest that both give rise to essentially the same kind of negative bias when they appear in questions.

We observe, however, that questions with contingently emphatic NPIs such as (42)–(43) and (47) generate systematically weaker negative inferences than questions with minimizer NPIs such as (44)–(45). More specifically, genuine information-seeking readings appear to be accessible for the former but not the latter. This intuition can be made more precise by considering examples like (49) and (50). Questions with contingently emphatic NPIs allow for follow-ups where the speaker explicitly acknowledges the possibility of a positive answer. This is exemplified in (49).

(49) Do you have ANY kind of apples?  
You must have SOME varieties, you’re a fruit stand!

In contrast, these types of follow-ups are degraded after questions with minimizer NPIs, as exemplified in (50).

(50) Did Ben lift a finger when Sue was ill?  
*#He must have helped her in SOME way, he’s her husband!*

Our proposal will capture the alternative-based negative inference triggered by questions with emphatic NPIs, as summarized in this section. It will also capture the subtle difference in behavior between questions with minimizer NPIs and questions with contingently emphatic NPIs. While the two will be given a unified semantic treatment, the difference between them will be derived from a difference in the types of alternatives that they evoke.

**Bias depends on question type** In addition to NPI type, we propose that question type (polar vs. wh-questions) also introduces variation in the negative bias that emphatic NPIs trigger. Namely, while polar questions with emphatic NPIs always give rise to some kind of negative inference, wh-questions with emphatic NPIs may lack such inferences. Specifically, we observe that, in contrast with previous examples such as (43), a negative inference is absent in cases like (51).

(51) [Context: An official is doing a background check of applicants for a certain benefit and needs to know which of them ever set foot in Siberia. An assistent notes that the applicants’ official travel documents, which go back up to 5 years, show that applicants A and B were in Siberia three years ago. The official says:]

Good to know. But (we still need to know) which applicants have EVER been to Siberia?

In this case, the salient alternative issue, *Which applicants have been to Siberia over the last five years?*, is already settled positively in the speaker’s doxastic state. Still, the use of a wh-question with an emphatic NPIs is felicitous, and receives a natural interpretation.
A similar example is given in (153).

(52) [Context: A healthcare worker is screening patients for a clinical trial and needs to rule out those who have even an inkling of rosacea. A nurse remarks that A and B demonstrated multiple symptoms of rosacea. The healthcare worker responds:]

Thank you. But how about weaker symptoms? Which patients have shown ANY symptoms of rosacea?

Our analysis will predict the absence of negative inferences in these cases. A crucial characteristic of these contexts is that they favor an exhaustive interpretation of the wh-question at hand. Our account will predict that, while a negative inference always arises when an emphatic NPI occurs in a polar question or in a wh-question that is interpreted non-exhaustively, it may be absent when the wh-question is interpreted exhaustively.

Summary of old and new empirical observations to be captured The empirical generalizations established in this section can be summarized as follows.

(53) Licensing
   a. Emphatic NPIs (both inherent and contingent) are licensed in Strawson DE environments in statements.
   b. Emphatic NPIs are licensed in polar questions and wh-questions.

(54) Interpretation and contextual requirements
   a. In statements, emphatic NPIs give rise to domain widening effects.
   b. In polar questions, emphatic NPIs give rise to an inference that the salient alternative issues are settled negatively in the speaker’s doxastic state.
   c. In wh-questions, emphatic NPIs give rise to an inference that the salient alternative issues are settled in the speaker’s doxastic state, but they may be settled either positively or negatively, depending on the context.
   d. Questions with contingently emphatic NPIs give rise to a weaker negative bias than ones with inherently emphatic NPIs, and as such, are licensed in a wider range of contexts, including not only rhetorical ones, but genuinely information seeking ones as well.

In the remainder of the paper, our aim will be to develop a unified analysis of emphatic NPIs in statements and questions which accounts for these empirical generalizations.

4 THEORETICAL BACKGROUND FOR THE PROPOSAL

The account that we will develop here falls within a general approach to NPIs whose main tenet is that NPIs associate with an operator whose semantics is close to that of the English particle even.5 We will denote the operator as even, and will, following Crnić (2019), refer

5 While many languages have particles that are similar in meaning to English even, there is also substantial semantic variation among such particles, both within and across languages (Gast & van der Auwera, 2011). Therefore, for theories which assume that NPIs associate with an operator whose semantics is close to that of English even, it is natural to assume that the semantics of the relevant operator and that of English even are not necessarily identical. Indeed, we will not be committed to such a semantic identity. That is, our analysis of the operator relevant for NPIs should not be taken as a semantics for English even.
to the approach as the **EVEN** approach. Within the **EVEN** approach, it is useful to distinguish two views. On the first view, emphatic NPIs (or in some cases only certain kinds of emphatic NPIs) associate with an **EVEN** operator, but non-emphatic NPIs don’t (Chierchia, 2013; Heim, 1984; Krifka, 1995; Schmerling, 1971; van Rooij, 2003). We call this the **divisive EVEN** approach. On the second view, both emphatic and non-emphatic weak NPIs associate with an **EVEN** operator (Crnić, 2014a,b, 2019; Lee & Horn, 1994). We call this the **inclusive EVEN** approach.

We will adopt the inclusive **EVEN** approach here. That is, we will assume that all NPIs associate with an **EVEN** operator, whether emphatic or not, and will attempt to derive the empirical differences between emphatic and non-emphatic NPIs from the fact that the former are emphatic and the latter are not. If successful, this will result in a more explanatory account than is provided by divisive **EVEN** accounts, which simply postulate that only emphatic NPIs associate with **EVEN**, leaving open **why** this would be the case.

As depicted in Figure 2, the earliest work within the inclusive **EVEN** approach (Lee & Horn, 1994) concentrated on non-emphatic NPIs in statements, leaving differences between emphatic and non-emphatic NPIs out of consideration, as well as the behavior of NPIs in questions (except for a very brief remark at the end of the paper). Crnić (2014a,b, 2019) also mainly concentrates on non-emphatic NPIs in statements, but discusses certain differences between emphatic and non-emphatic NPIs in some detail as well. He also highlights certain properties of NPIs in questions (see especially Crnić, 2014a), but does not develop a full account of these properties. Roelofsen (2018) pursues a more comprehensive analysis of NPIs in questions, but strictly focuses on non-emphatic NPIs, leaving differences between emphatic and non-emphatic NPIs out of consideration. The present account extends that of Roelofsen (2018) by bringing emphatic NPIs into the picture. The account incorporates a number of important insights from van Rooij (2003), who also pursues a uniform theory of NPIs in statements and questions, and who also assumes that emphatic NPIs associate with an **EVEN**-like operator. A crucial difference between our account and that of van Rooij (2003), not in empirical but in theoretical scope, concerns the relation between emphatic and non-emphatic NPIs. van Rooij postulates that the former but not the latter associate with an **EVEN**-like operator and shows that this can account for some of the differences in empirical behavior, but he leaves open **why** only emphatic NPIs would associate with the relevant operator, a limitation shared with other work within the divisive **EVEN** approach. We will attempt to overcome this limitation by showing how the empirical differences between emphatic and non-emphatic NPIs can be derived from their emphatic/non-emphatic nature.

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6 The **EVEN** approach is not the only approach to NPIs that has been pursued. Indeed, many other approaches can be found in the literature (see, among many others, Ladusaw, 1980; Giannakidou, 1998; Chierchia, 2013; and Barker, 2018). A comprehensive review of all these approaches is beyond the scope of this paper.

7 The work of Lahiri (1998) should be mentioned here as well, since it has made important contributions to the **EVEN** approach. We are not sure, however, which of the two views distinguished here applies best to Lahiri. He offers a general analysis of NPIs in Hindi as involving **EVEN**. However, he points out that such NPIs are always emphatic. He also discusses in some depth whether his analysis may be applied to emphatic and/or non-emphatic NPIs in English, but ultimately leaves this question open. Thus, he does not commit to the assumption that both emphatic and non-emphatic NPIs involve an **EVEN** operator, but does not conclude the opposite either.
In order to spell out our account we will need to make some basic assumptions concerning the semantics of statement and questions. We will formulate these basic assumptions in inquisitive semantics (Ciardelli et al., 2018). This framework is useful for our purposes here, because it allows for a uniform semantic treatment of statements and questions, which in turn facilitates a uniform treatment of NPIs across the two sentence types. Inquisitive semantics is similar in this respect to Hamblin semantics (Hamblin, 1973). The differences between the two frameworks are not essential for our purposes here, and our analysis could straightforwardly be translated into Hamblin semantics. Indeed, we will attempt to formulate things in such a way that readers more familiar with Hamblin semantics than inquisitive semantics will immediately recognize how such a translation would go. Our choice for inquisitive semantics over Hamblin semantics is based on considerations orthogonal to the treatment of NPIs (see Ciardelli, 2017; Ciardelli et al., 2017, 2018; Ciardelli & Roelofsen, 2017; Roelofsen, 2013, for discussion).

The remainder of this section is organized as follows. Section 4.1 provides the necessary notions from inquisitive semantics, Section 4.2 spells out our background assumptions about the semantics of statements and questions, and Section 4.3 reviews the treatment of non-emphatic NPIs developed in Lee & Horn (1994), Crnič (2014a,b, 2019), and Roelofsen (2018). With this background in place, our account of emphatic NPIs will be presented in Section 5.

4.1 Relevant notions from inquisitive semantics

Informative and inquisitive content While in truth-conditional semantics, the meaning of a sentence $\varphi$ is taken to capture just the information conveyed by $\varphi$, in inquisitive semantics it is intended to capture the issue expressed by $\varphi$ as well. The information that is conveyed by a sentence is called its informative content, and the issue expressed by it its inquisitive content. To encode both kinds of content at once, the semantic value of a sentence is construed as a set of propositions, no matter whether the sentence is a statement or a question. By uttering a sentence $\varphi$ with semantic value $[\varphi]$, a speaker is taken to raise an issue whose resolution requires establishing one of the propositions in $[\varphi]$, while simultaneously providing the
information that the actual world is contained in the union of these propositions, \( \bigcup [\varphi] \). Thus, \( \bigcup [\varphi] \) is the informative content of \( \varphi \), and is therefore also written as \( \text{info}(\varphi) \).

**Downward-closure and elementary resolutions** The semantic value of a sentence in inquisitive semantics is always downward closed: if \( p \in [\varphi] \) and \( q \subset p \), then also \( q \in [\varphi] \). This captures the intuition that, if a proposition \( p \) resolves a given issue, then any stronger proposition \( q \subset p \) will also resolve that issue. As a limit case, it is assumed that the inconsistent proposition, \( \emptyset \), trivially resolves all issues, and is therefore included in the semantic value of every sentence. For any set of propositions \( P \), we write \( P \downarrow \) for the downward closure of \( P \):

\[
(55) \quad P \downarrow := \{ q \mid q \subset p \text{ for some } p \in P \}
\]

The maximal elements of \( [\varphi] \), which we will denote as \( [\varphi]^{\text{max}} \), are those propositions that contain precisely enough information to resolve the issue expressed by \( \varphi \).\(^8\) Non-maximal elements of \( [\varphi] \) also resolve the issue expressed by \( \varphi \) but provide more information than is strictly necessary to do so. In this sense, the propositions in \( [\varphi]^{\text{max}} \) can be thought of as the elementary resolutions of \( \varphi \).

**Truth and settledness** The semantic value of a sentence in inquisitive semantics determines whether the sentence is true in any given world and also whether it is settled in any given information state. Specifically, a sentence \( \varphi \) is said to be true in a world \( w \) just in case \( w \) is not ruled out by the information conveyed by \( \varphi \), i.e., \( w \in \text{info}(\varphi) \), and it is settled in an information state \( s \) (modelled in the usual way as a set of possible worlds) just in case (i) the information conveyed by \( \varphi \) is already available in \( s \), and (ii) the issue raised by \( \varphi \) is resolved by the information available in \( s \). These two conditions are satisfied just in case \( s \in [\varphi] \).

**Informative and inquisitive sentences** The informative content of \( \varphi \) is trivial if \( \text{info}(\varphi) \) covers the set of all possible worlds that are compatible with the presuppositions triggered by \( \varphi \), which we will denote as \( \text{pre}(\varphi) \). In this case, i.e., when \( \text{info}(\varphi) = \text{pre}(\varphi) \), \( \varphi \) is called non-informative. Conversely, \( \varphi \) is called informative if \( \text{info}(\varphi) \neq \text{pre}(\varphi) \). The inquisitive content of a sentence can also be trivial. This is the case if the issue expressed by \( \varphi \) is already resolved by the information provided by \( \varphi \) itself, i.e., if \( \text{info}(\varphi) \in [\varphi] \). In this case, \( \varphi \) is called non-inquisitive. Conversely, \( \varphi \) is called inquisitive if \( \text{info}(\varphi) \notin [\varphi] \). If \( \varphi \) is non-inquisitive, its semantic value always has a unique maximal element, namely \( \text{info}(\varphi) \). Vice versa, if \( [\varphi] \) contains multiple maximal elements, it is always inquisitive.

These are all the notions from inquisitive semantics that are needed for our purposes here.

4.2 **Assumptions about the semantics of statements and questions**

We use the term ‘statements’ here for declarative sentences with falling intonation. Following Ciardelli *et al.* (2018) and many others, we assume that such sentences are

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\(^8\) In the inquisitive semantics literature the maximal elements of \([\varphi]\) are usually referred to as the *alternatives* that \( \varphi \) introduces. We avoid this terminology here because we will be using the term ‘alternatives’ in a different sense below.
Figure 3  Statements and polar questions.

never inquisitive. That is, the semantic value of a statement $\phi$ always contains a single maximal element, which coincides with its informative content, $\text{info}(\phi)$. For example:

\begin{equation}
\llbracket \text{Ann left} \rrbracket = \{ \{w | \text{Ann left in } w\} \} \downarrow
\end{equation}

The semantic value in (56) is depicted in Figure 3a. In this Figure, $w_{ab}$ is a world in which both Ann and Bill left, $w_a$ one in which only Ann left, $w_b$ one in which only Bill left, and $w_\emptyset$ one in which neither Ann nor Bill left. The shaded rectangle contains the two worlds in which Ann left, thus representing the unique maximal element of $\llbracket \text{Ann left} \rrbracket$.

While statements are never inquisitive and typically informative (except when they are tautological), questions are never informative and typically inquisitive (again, except when they are tautological). This means that the semantic value of a question typically contains multiple maximal elements, ‘elementary resolutions’, which together cover the set of all possible worlds that are compatible with the question’s presuppositions.

For instance, the polar question Did Ann leave? has two elementary resolutions, the proposition that Ann left and the proposition that Ann did not leave. These two propositions together cover the set of all possible worlds. The question does not have any presuppositions.

\begin{equation}
\llbracket \text{Did Ann leave?} \rrbracket = \{ \{w | \text{Ann left in } w\}, \{w | \text{Ann didn’t leave in } w\} \} \downarrow
\end{equation}

Turning to wh-questions, consider the simple example in (52):

\begin{equation}
\text{Who left?}
\end{equation}

This question is usually assumed to have both an exhaustive and a non-exhaustive reading (also called a ‘mention-some’ reading). On an exhaustive reading, its resolution requires information determining for every person in the contextually given domain of quantification

\footnote{There is also work in inquisitive semantics that does not make this assumption (e.g., AnderBois, 2012; Coppock & Brochhagen, 2013; Groenendijk, 2009). This is possible when a different perspective is taken on what is encoded by the semantic value of a sentence. In particular, it requires a view under which uttering an inquisitive sentence does not necessarily involve issuing a request for information. See Ciardelli et al. (2012) for discussion.}
whether they left or not, while on a non-exhaustive reading, its resolution merely requires information establishing for one person in the domain that he or she left.\footnote{We are restricting our attention here to matrix questions. It has been argued that when wh-questions are embedded, further levels of exhaustivity (i.e., weak exhaustivity and intermediate exhaustivity) may have to be distinguished. We refer to Dayal (2016, Ch.3) and Onea & Zimmermann (2019, p.22-27) for recent surveys of the literature concerned with this issue, and to Theiler et al. (2018) for a concrete proposal that is directly compatible with the analysis of matrix questions assumed here.}

There are different views in the literature as to whether the proposition that nobody left resolves the issue expressed by (58). Some authors assume that a question like (58) carries an existential presupposition, i.e., the presupposition that someone left. For these authors, the proposition that nobody left does not resolve the issue that the question expresses, but rather denies its presupposition (e.g. Keenan & Hull, 1973). Others assume that the question does not carry an existential presupposition, and accordingly classify the proposition that nobody left as a proper resolution of the question (e.g., Groenendijk & Stokhof, 1984). We will not take a stand here in this debate\footnote{See Dayal (2016, p.51-52) and Onea & Zimmermann (2019, p.20.22) for recent surveys of the debate and further references.}, but will simply consider both presuppositional and non-presuppositional readings of wh-questions like (58), and will spell out the predictions of the theory developed below for both types of readings.

This means that, in total, we will consider four readings: plus or minus exhaustive, and plus or minus existential presupposition. The semantic values encoding these four readings in inquisitive semantics are displayed in Figure 4, under the assumption that the domain of quantification consists of just two individuals, Ann (a) and Bill (b). We use dashed lines here to represent presuppositions. In Figures 4a and 4b the set of worlds enclosed by the dashed line is \(\{w_{ab}, w_a, w_b\}\), i.e., the set of worlds where at least one person left. This means that under these readings the question presupposes that someone left. On the other hand, in Figures 4c and 4d the set of worlds enclosed by the dashed line is the set of all worlds. Thus, under these readings, the presupposition of the question is trivial, i.e., satisfied in all worlds.

To see how the difference between exhaustive and non-exhaustive readings is represented, compare Figures 4a and 4b. The first displays an issue with two elementary resolutions, the proposition that Ann left and the proposition that Bill left. This is the issue expressed by Who left? on a non-exhaustive presuppositional reading. On the other hand, Figure 4b displays an issue with three elementary resolutions: the proposition that both Ann and Bill left, the proposition that only Ann left, and the proposition that only Bill left. This is the issue expressed by Who left? on an exhaustive presuppositional reading. The

![Figure 4](https://example.com/figure4.png)

**Figure 4** Four possible interpretations of Who left?.

[10:20]
difference between Figures 4c and 4d is parallel; only in these cases there is no existential presupposition and the proposition that no one left is included as an elementary resolution.

4.3 Non-emphatic NPIs

Having introduced the relevant notions from inquisitive semantics and our background assumptions about the semantics of statements and questions, we now summarize the account of non-emphatic NPIs developed in Roelofsen (2018), building on Lee & Horn (1994) and Crnič (2014a, b, 2019). In Section 5, we will propose an extension of this account to capture the behavior of emphatic NPIs.

4.3.1 Lexical semantics of NPIs

Weak NPIs are treated as existential quantifiers over a certain domain. That is, the lexical specification of an NPI involves two components, one that determines its existential quantificational force and one that determines its lexical domain of quantification. We denote these two components as $\exists$ and $D$, respectively. In the case of any, $D$ is the set of all entities $D_e$; in the case of ever it is the set of all time intervals. In general, the lexically specified quantificational domain of the kind of NPIs that we are analysing here is the set of all objects of a certain type (entities, time intervals, etc.).

\[(59)\] \text{any} = [\exists D_e]

When used in a particular context, the lexically specified domain of quantification is contextually restricted. Concretely, we assume that every context of utterance $c$ comes with a particular domain of discourse $D^c$, which is the set of all entities, time intervals, etc. that are deemed relevant in that context. The domain of quantification of any when used in context $c$ is the intersection $D_e \cap D^c$.

For concreteness, the semantic value of any relative to a context $c$ is spelled out in (60).

\[(60)\] \text{[\text{any}]}^c = \lambda P_{e(st)} \cdot \lambda P'_{e(st)} \cdot \lambda p_{st} \cdot \forall w \in p. \exists x \in D_e \cap D^c. P(x)(w) \land P'(x)(w)

In words: any combines with two properties $P$ and $P'$ of type $e(st)$, and yields the set of all propositions $p$ which consist of worlds in which there is at least one object in the contextually restricted domain $D_e \cap D^c$ that satisfies both $P$ and $P'$.

4.3.2 Lexically specified alternatives

The line of work that we build on further assumes that NPIs are lexically specified to generate certain alternatives, which serve as input for the even operator that they associate with. Given their treatment as existential quantifiers over a domain consisting of all objects of a certain type (possibly restricted contextually), they are naturally assumed to generate two types of alternatives: quantifier alternatives and domain alternatives. Quantifier alternatives are obtained by replacing the existential quantifier by other quantifiers that form a scale with it, either the proportional scale (\text{some}, \text{many}, \text{all}) or the numerical scale (\text{one}, \text{two}, \text{three}, \ldots). Since quantifier alternatives are defined in terms

12 The line of work that we are building on here makes the basic assumption that indefinite NPIs like any are existential quantifiers, even though the quantificational analysis of indefinites is known to face many challenges, and alternative analyses of indefinites have been developed to overcome these challenges, especially in dynamic semantics (see Heim, 1982; Kamp, 1981, and much subsequent work). We adopt the quantificational analysis of indefinites here. In principle, we think it should be possible to reformulate the approach to NPIs that we build on in such a way that it no longer relies on a quantificational treatment of indefinites, but we leave such a reformulation for another occasion.
of scales they are also often referred to as \textit{scalar alternatives} (e.g., Chierchia, 2013). Domain alternatives, on the other hand, are obtained by replacing the lexically specified domain $D$ by another domain $D'$ of the same type.

Some theories of non-emphatic NPIs assume that \textsc{even} only associates with quantifier alternatives (e.g., Crnić, 2014b; Lahiri, 1998), others assume that it only associates with domain alternatives (Crnić, 2019; Roelofsen, 2018), and yet others assume that it can associate with both types of alternatives (Lee & Horn, 1994). The repercussions of this choice are not directly relevant here. In reviewing the \textsc{even} approach to non-emphatic NPIs we will concentrate on domain alternatives. In Section 5, where we extend the approach to emphatic NPIs, we will return to quantifier alternatives.

The set of domain alternatives generated by \textit{any} in a context $c$ is specified in (62).\footnote{It is worth noting that such repercussions have in fact not been discussed extensively in the literature, though see Crnić (2019), fn.12, for an argument in favor of assuming that \textsc{even} associates only with domain alternatives.}

\begin{equation}
(61) \quad \{\text{any}\}_c = \{\lambda p_e(s) \cdot \lambda p'_e(s) \cdot \lambda p_{st} \cdot \forall w \in p. \exists x \in D' \cap D_c. P(x)(w) \land P'(x)(w) \mid D' \subset D_e\}
\end{equation}

In words: for every $D' \subset D_e$ there is one domain alternative, namely a function that takes two properties $P$ and $P'$ of type $e(st)$ as its input, and yields as its output the set of all
propositions \( p \) which consist of worlds in which there is at least one object in the domain \( D' \subset D_e \) that satisfies both \( P \) and \( P' \).

When an NPI is part of a larger constituent, the alternatives generated by that constituent are computed by composing the alternatives generated by the NPI in a point-wise manner with the semantic values of the other lexical items in the larger constituent. For instance:

\begin{equation}
[\text{Bill saw anything}]^c = \lambda p_{st}. \forall w \in p. \exists x \in D_e \cap D^c. \text{saw}(x)(\text{Bill})(w)
\end{equation}

\begin{equation}
[\text{Bill saw anything}]^c_{alt} = \{ \lambda p_{st}. \forall w \in p. \exists x \in D' \cap D^c. \text{saw}(x)(\text{Bill})(w) \mid D' \subset D_e \}
\end{equation}

In words: the semantic value of *Bill saw anything* in context \( c \) is the set of all propositions \( p \) which consist of worlds in which Bill saw at least one element of the contextually restricted domain \( D_e \cap D^c \). For each subdomain \( D' \) of \( D_e \), there is one domain alternative, namely the set of all propositions consisting of worlds in which Bill saw at least one element of \( D' \cap D^c \).

Making use of the \( \{ \} \downarrow \) operator, defined in Section 4.1, we can also write this as follows:

\begin{equation}
[\text{Bill saw anything}]^c = \{ \{ w \mid \exists x \in D_e \cap D^c. \text{saw}(x)(\text{Bill})(w) \} \} \downarrow
\end{equation}

\begin{equation}
[\text{Bill saw anything}]^c_{alt} = \{ \{ \{ w \mid \exists x \in D' \cap D^c. \text{saw}(x)(\text{Bill})(w) \} \} \downarrow \mid D' \subset D_e \}
\end{equation}

This notational variant will be especially convenient when we consider questions. To further simplify formulas we will henceforth often use as a shorthand for the contextually restricted domain of entities \( D_e \cap D^c \).

4.3.3 Semantics of EVEN

The alternatives generated by an NPI serve as input for the associated even operator. We now specify a basic treatment of this operator closely based on Crnić (2019) and Roelofsen (2018). In Section 5 this treatment will be extended to deal with emphatic NPIs.

Syntactically, Crnić (2019) argues that even is merged with the NPI but then moves to the left periphery of a full clause containing the NPI. Semantically, we assume for now that even requires its prejacent \( \varphi \) to satisfy two conditions. First, \( \varphi \) should not already be completely ruled out by the contextually available information. And second, it should be at most as likely as any of its alternatives in light of the contextually available information. If these requirements are met, then the semantic value of even \( \varphi \) is just that of \( \varphi \) itself. On the other hand, if these requirements are not met, then the semantic value of even \( \varphi \) is undefined.\(^{15}\)

This is captured formally by the following lexical entry for even, where we write \( \text{info}(c) \) for the set of worlds that are considered possible given the information available in \( c \).

\begin{equation}
\text{a. } [\text{even } \varphi]^c \text{ is defined only if:}
\begin{itemize}
  \item [i] \( \bigcup [\varphi]^c \cap \text{info}(c) \neq \emptyset \)
\end{itemize}
\end{equation}

\(^{15}\) The second definedness condition in (66) is taken from Roelofsen (2018). It differs slightly from that assumed in Crnić’s work. The latter requires that \( \varphi \) be strictly less likely than every alternative. Roelofsen (2018) allows for the possibility that some alternatives are equally likely as \( \varphi \). This does not seem to affect the predictions for NPIs in statements, but is crucial for questions. The first definedness condition in (66) is added here. As will become clear below, it avoids unwelcome predictions in certain boundary cases, specifically when the contextually available information is inconsistent. See, for instance, the discussion of (70) right below.
(ii) no \( A \in \llbracket \varphi \rrbracket_{alt} \) is such that \( \llbracket \varphi \rrbracket^c \succ_c A \)

b. If defined, \([\text{even } \varphi]_c^c = \llbracket \varphi \rrbracket^c\)

Note that the interpretation function \( \llbracket \cdot \rrbracket \) has a context parameter \( c \). To enhance readability, we will often suppress this parameter in what follows. It remains to be specified what \( \llbracket \varphi \rrbracket \succ_c A \) means exactly. We first consider the standard definition, which is adopted in Crnić’s work, and then a more general definition, proposed in Roelofsen (2018) in order to deal with questions.

For Crnić, both \( \llbracket \varphi \rrbracket \) and its alternatives are simple propositions, i.e., sets of possible worlds (rather than sets of propositions as in inquisitive semantics). For any context \( c \), let \( P^c \) denote the probability distribution over possible worlds such that for each world \( w \), \( P^c(w) \) is the likelihood that \( w \) is the actual world, given the information available in \( c \). Moreover, for any proposition \( p \), let \( P^c(p) \) be the sum of all the probabilities assigned by \( P^c \) to worlds in \( p \):

\[
P^c(p) := \sum_{w \in p} P^c(w)
\]

Then, \( \llbracket \varphi \rrbracket \succ_c A \) is naturally taken to mean that the probability assigned to \( \llbracket \varphi \rrbracket \) in \( c \) is greater than that assigned to \( A \):

\[
\llbracket \varphi \rrbracket \succ_c A \text{ if and only if } P^c(\llbracket \varphi \rrbracket) > P^c(A)
\]

This standard way to compare propositions in terms of a contextual probability distribution works well when \( \llbracket \varphi \rrbracket \) and its alternatives are propositions, which can be assumed if we restrict our attention to statements. But what if \( \varphi \) is a question? Then its semantic value is not a single proposition, but rather (at least in inquisitive semantics as well as many other semantic theories of questions) a set of propositions. In order to compare two such proposition sets in terms of a contextual probability distribution, the standard approach given above needs to be generalized.

Roelofsen (2018) describes one natural way to do this: when comparing \( \llbracket \varphi \rrbracket \) to an alternative \( A \), where both are sets of propositions, we simply check whether the sum of all the probabilities assigned by \( P^c \) to worlds in \( \bigcup \llbracket \varphi \rrbracket \) exceeds the sum of all the probabilities assigned by \( P^c \) to worlds in \( \bigcup A \). That is, we assess whether the cumulative likelihood of \( \llbracket \varphi \rrbracket \) exceeds that of \( A \):

\[
\llbracket \varphi \rrbracket \succ_c A \text{ if and only if } P^c(\bigcup \llbracket \varphi \rrbracket) > P^c(\bigcup A)
\]

Given the uniform treatment of statements and questions in inquisitive semantics, the definition in (69) applies not only when \( \varphi \) is a question, but also when it is a statement. In both cases, \( \llbracket \varphi \rrbracket \) is a set of propositions. In the case of statements, the generalized definition yields precisely the same results as the standard definition, because when \( \varphi \) is a statement, \( \bigcup \llbracket \varphi \rrbracket \) amounts to the unique maximal element of \( \llbracket \varphi \rrbracket \), which is just the set of all worlds in which \( \varphi \) is true, i.e., the proposition that \( \varphi \) is classically taken to express.

Recall that \( \bigcup \llbracket \varphi \rrbracket \) amounts to the informative content of \( \varphi \), i.e., the set of worlds that are compatible with the information conveyed by \( \varphi \), denoted as \( \text{info}(\varphi) \) (see page 16). Similarly for every alternative \( A \), \( \bigcup A \) is the set of worlds that are compatible with the information conveyed by \( A \). So, conceptually, the definition of \( \llbracket \varphi \rrbracket \succ_c A \) in (69) says that \( \llbracket \varphi \rrbracket \) is more likely than \( A \) in context \( c \) if and only if, given what is known in \( c \), the probability that the actual world is one that is compatible with the information conveyed by \( \varphi \) is greater than the probability that the actual world is one that is compatible with the information
conveyed by A. Thus, Roelofsen’s definition of $[\varphi]_A >_c \varphi$ in (69) stays very close to the standard definition in (68). In both cases, $[\varphi]_A >_c \varphi$ means that $\text{info}(\varphi)$ is more likely than $\text{info}(A)$. Characterized in these terms, the two definitions are exactly the same. Only, in a truth-conditional setting the informative content of $\varphi$ is simply $[\varphi]$, whereas in inquisitive semantics it is $\bigcup[\varphi]$, and similarly the informative content of $A$ is $\bigcup A$.

While Roelofsen’s definition of $[\varphi]_A >_c \varphi$ is thus a very conservative extension of the standard definition to inquisitive semantics, where it can apply to both statements and questions, one might worry that it is perhaps too conservative. After all, in comparing the likelihood of $[\varphi]$ and $A$, it only looks at $\text{info}(\varphi)$ and $\text{info}(A)$, just like the standard definition, and completely disregards the inquisitive content of $\varphi$ and $A$. In other words, the issues that $\varphi$ and $A$ express, and the ways in which these issues may be resolved, are not taken into consideration when comparing the contextual likelihood of $\varphi$ and $A$ according to (69). One could easily imagine natural extensions of the standard definition of $[\varphi]_A >_c \varphi$ that do take inquisitive content into account. One might say, for instance, that $[\varphi]_A >_c \varphi$ holds if and only if every elementary resolution of $\varphi$ is more likely than some elementary resolution of $A$. Such definitions, however, yield highly undesirable predictions for NPI licensing in questions. As shown in Roelofsen (2018) and briefly reviewed in Section 4.3.5, defining $[\varphi]_A >_c \varphi$ purely in terms of $\text{info}(\varphi)$ and $\text{info}(A)$ does yield satisfactory predictions for NPI licensing in questions.

4.3.4 Main predictions for statements We now briefly summarize the predictions of the account for statements (and in Section 4.3.5 we do the same for questions). We refer to Crnić (2014a, b, 2019) for more extensive discussion.

First consider the positive statement in (70) and its presumed logical form in (71):

(70) *Bill saw anything.

(71) [EVEN [\varphi Bill saw anything]]

The semantic value of the constituent labeled as $\varphi$, the prejacent of EVEN, was given in (62) above, and the alternatives it generates in (63). $\bigcup[\varphi]$ is the set of worlds in which Bill saw at least one element of $D_\psi$. [EVEN $\varphi$] is defined only if $\bigcup[\varphi] \cap \text{info}(c) \neq \emptyset$. This means that there must be at least one element $x$ of $D_\psi$, which is such that $P^c$ assigns non-zero probability to the proposition that Bill saw $x$.

Now, let $D'$ be the set $D_\psi \setminus \{x\}$, and let $A_{D'}$ be the domain alternative of $\varphi$ corresponding to $D'$. Then it must be the case that $[\varphi]_A >_c A_{D'}$, because $P^c(\bigcup[\varphi])$, i.e., the likelihood that Bill saw some individual in $D_\psi$, must be greater than $P^c(\bigcup A)$, i.e., the likelihood that Bill saw some individual in $D_\psi \setminus \{x\}$. This means that the second definedness condition of EVEN is not satisfied. Thus, the prediction is that the semantic value of (71) is undefined in any context. A similar prediction is made for NPIs in other upward entailing environments.

Now consider the negative statement in (72) and its presumed logical form in (73):

(72) Bill didn’t see anything.

(73) [EVEN [\varphi NEG Bill saw anything]]

We have that:

(74) $[\varphi] = \{ w \mid \exists x \in D_\psi, \text{saw}(x)(\text{Bill})(w) \}$
\[ [\varphi]_{\text{alt}} = \{ \{ w \mid \neg \exists x \in D'.\text{saw}(x)(\text{Bill})(w) \} \}^\dagger \mid D' \subset D_c' \]

\( \bigcup [\varphi] \) is the set of worlds in which Bill didn’t see any element of \( D_c' \). For any alternative \( A \), \( \bigcup A \) is the set of worlds in which Bill didn’t see any element of \( D' \), where \( D' \subset D_c' \). This means that for every alternative \( A \), it must be the case that \( \bigcup [\varphi] \subseteq \bigcup A \). But then it cannot be the case for any alternative \( A \) that \( [\varphi] >_c A \). This means that the second definedness condition posed by \( \text{even} \) is guaranteed to be satisfied. The first is also satisfied in any context in which the available information is consistent with the possibility that Bill saw something, i.e., in any context in which it would not be redundant to utter (72). So it is predicted that NPIs are licensed under negation, and a similar prediction is made for other downward entailing environments.

These basic predictions are not unique to \( \text{even} \)-based theories of NPIs. Indeed, they are shared by virtually all approaches to NPIs, though derived in different ways. However, when it comes to non-monotonic environments, i.e., environments that are neither upward nor downward entailing, \( \text{even} \)-based theories have a distinct advantage (Crnić, 2014b). In such environments, NPIs are sometimes licensed, but not always (Gajewski, 2008; Linebarger, 1980, 1987; Rothschild, 2006). This is illustrated in (76):

(76) There were twenty guests at the potluck.

a. Exactly two of them brought any food.

b. *Exactly eighteen of them brought any food.

(76a) is predicted to be acceptable in a context \( c \) if the proposition that exactly two of the twenty guests brought any kind of food is at most as likely as the proposition that exactly two of the twenty guests brought a starter / a main dish / a desert, etc. This contextual assumption is easy to accommodate given our general expectations about potlucks. On the other hand, (76b) is predicted to be acceptable in a context \( c \) if the possibility that exactly eighteen of the twenty guests brought any kind of food is at most as likely as the possibility that exactly eighteen of the twenty guests brought a starter / a main dish / a desert, etc. This contextual assumption is very difficult to accommodate.

Presumably, the harder it is to accommodate the presuppositions of a sentence, the lower its acceptability rate will be (Crnić, 2014b). This gives the \( \text{even} \)-based approach an interesting handle on the variable acceptability of non-emphatic NPIs in non-monotonic environments, a phenomenon that is problematic for other approaches to NPIs.

4.3.5 Main predictions for questions We now summarize the main predictions of the account for polar questions and wh-questions, referring to Roelofsen (2018) for more extensive discussion.

First consider the polar question in (77) and its presumed logical form in (78):

(77) Did Bill see anything?

(78) \[[\text{even} \ [\varphi \ \text{INT} \ did \ Bill \ see \ anything]]\]

We have that:

\[ [\varphi] = \left\{ \{ w \mid \exists x \in D_c'.\text{saw}(x)(\text{Bill})(w) \}, \{ w \mid \neg \exists x \in D_c'.\text{saw}(x)(\text{Bill})(w) \} \right\}^\dagger \]
Now note that \( \bigcup \mathbb{P} = W \), the set of all possible worlds. For every alternative \( A \), \( \bigcup A = W \) as well. This means that \( \mathbb{P}(\bigcup \mathbb{P}) = 1 \), and that \( \mathbb{P}(\bigcup A) = 1 \) as well, for every alternative \( A \). As a consequence, the requirements posed by \textit{even} are guaranteed to be satisfied, and therefore it is predicted that NPIs are licensed in polar questions like (77). While the way in which this correct prediction is derived may appear trivial at a first glance, it actually highlights an important conceptual motivation noted in Section 4.3.3: The comparative requirement seems to be attuned to only the informative aspect of the prejacent of \textit{EVEN}, be it a statement or a question.

Next, consider the wh-question in (81) and its presumed logical form in (82):

\[
\text{(81)} \quad \text{Who saw anything?}
\]

\[
\text{(82)} \quad \text{[even } \varphi \text{ int who saw anything]}
\]

For simplicity, let’s assume that \textit{who} ranges over just two individuals, Ann and Bill. Recall that we have to consider four possible readings: plus or minus exhaustive, and plus or minus presuppositional. On any of the two non-presuppositional readings (either exhaustive or non-exhaustive), we have that \( \bigcup \varphi = W \), which means that the cumulative likelihood of \( \varphi \) amounts to 1, and the same holds for each domain alternative \( A \). The requirements posed by \textit{even} are satisfied in this case. So it is predicted that the NPI is licensed on these readings.

On a presuppositional reading, the cumulative likelihood of \( \varphi \) is the likelihood that the presupposition of the question is satisfied, i.e., the presupposition that someone saw something in \( D_\varepsilon \). The cumulative likelihood for the domain alternatives is the likelihood that someone saw something in \( D' \), where \( D' \subset D_\varepsilon \). In order for the first requirement posed by \textit{even} to be satisfied, \( \bigcup \varphi \subset D_\varepsilon \) must be compatible with the contextually available information. This means that there must be at least one object \( x \) such that the likelihood that someone saw \( x \) is non-zero. Let \( D' \) be the domain \( D_\varepsilon \setminus \{ x \} \), and let \( A_D' \) be the corresponding domain alternative. Then the cumulative likelihood of \( A \) will be strictly lower than the cumulative likelihood of \( \varphi \). This means that the second requirement posed by \textit{even} is not satisfied. So it is predicted that NPIs are not licensed in wh-questions under a presuppositional reading, no matter whether the question is interpreted exhaustively or non-exhaustively.

The account thus predicts that NPIs can be licensed in wh-questions, but only if a non-presuppositional reading is possible. If such a reading is blocked, NPIs are predicted to be unacceptable. This prediction can be tested in a number of ways. For instance, singular \textit{which} questions like (83) are usually taken to carry an obligatory existential presupposition.

\[
\text{(83)} \quad \text{Which boy left?} \quad \implies \text{presupposes that some boy left}
\]

To the extent that the existential presupposition is indeed obligatory in such questions, it is predicted that the NPI in (84) is not licensed:

\[
\text{(84)} \quad * \text{Which boy saw anything?}
\]

While this prediction has not been tested systematically yet, Schwarz (2017b) reports that some of his informants indeed find cases like (84) unacceptable, but others don’t. He further
suggests, based on his informants’ reports, that the existential presupposition of singular which questions like (84) can in fact be suspended, and that it is exactly in these cases that the NPI becomes acceptable. This finding is in line with the above account, though more empirical work is needed to further corroborate it.

Another way to test the prediction of the account, suggested in Roelofsen (2018), is to look at embedded wh-questions in environments where non-presuppositional readings are blocked. For instance, it has been argued in the literature that emotive factive predicates like surprise can only embed wh-questions that carry an existential presupposition (d’Avis, 2002; Roelofsen, 2019; Roelofsen et al., 2019). This is illustrated by the unacceptability of (86), in which the embedded question is explicitly non-presuppositional.

\[(85)\] It surprised Bill which Dutch mountaineers climbed Mount Everest this year.

\[(86)\] *It surprised Bill which Dutch mountaineers, if any, climbed Mount Everest this year.

Therefore it is predicted that NPIs are not licensed in wh-questions embedded under surprise and other emotive factives. This is indeed the case, as has been observed by Guerzoni & Sharvit (2007) and Nicolae (2015), and is illustrated in (87):

\[(87)\] *It surprised Bill who ever climbed Mount Everest.

This concludes our summary of the even-based account of non-emphatic NPIs in statements and questions that serves as our starting point. We now turn to emphatic NPIs.

### 5 PROPOSAL FOR EMPHATIC NPIS

The basic idea underlying our proposal is that the even operator, just like the particle even, not only contributes a comparative requirement (the cumulative likelihood of the prejacent should not exceed that of its domain alternatives), but also an additive requirement. In the case of the overt particle even, this additive component is traditionally taken to require, roughly, that some contextually salient focus alternative of the prejacent be true (Karttunen & Peters, 1979, among others). The work of Crnić (2014a, b, 2019) and Roelofsen (2018) reviewed above does not associate such an additive requirement with the covert operator even involved in NPIs. Rather, it focuses exclusively on the comparative requirement.

We will reinstall the additive requirement and, furthermore, building on van Rooij (2003), generalize the formulation of this requirement in such a way that it applies uniformly to cases in which even occurs in statements as well as cases in which it occurs in questions. Such a generalization is needed because if the prejacent of even is a question, the focus

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16 Guerzoni & Sharvit (2007) and Nicolae (2015) propose to capture the unacceptability of (87) in a way that differs considerably from the one presented here. Namely, they posit that (i) wh-questions only license NPIs under a strongly exhaustive interpretation, and (ii) wh-questions embedded under emotive factives only admit a weakly exhaustive interpretation. We refer to the appendix of Roelofsen (2018) for a comparison between this proposal and the current approach.

17 Wilkinson (1996) and Francis (2018) explicitly argue in favour of this additive component of even, and address possible objections to it.

18 Crnić (2014a) does briefly mention that the additive requirement might play a role in deriving correct exhaustified readings, but does not use it to capture the range of inferences that characterize emphatic NPIs, as we will do here.
alternatives of that question are also questions, and these cannot be required to be true—after all, questions are not naturally thought of as being either true or false. We therefore do not formulate the additive requirement in terms of truth, but rather in terms of settledness,\textsuperscript{19} the counterpart of truth in inquisitive semantics (see Section 4.1). Using this notion, we will argue that the additive component of \textit{even} is the main source of the inferences associated with emphatic NPIs, including domain widening inferences in statements and negative biases in questions.

This approach will deliver a unified treatment of emphatic and non-emphatic weak NPIs as involving the same \textit{even} operator. At the same time, however, it will be able to derive the core empirical differences between emphatic and non-emphatic uses of weak NPIs from two assumptions: (i) only emphatic NPIs involve focus, and (ii) the additive component of \textit{even} operates on focus alternatives. As a consequence, when \textit{even} associates with a non-emphatic NPI, its additive component is vacuous because the NPI does not generate focus alternatives. From this, it will follow that non-emphatic NPIs do not semantically trigger domain widening effects in statements or negative biases in questions.

Since focus alternatives play a key role in the account, we start in Section 5.1 by making our general assumptions about focus semantics explicit. After that, Section 5.2 spells out our treatment of \textit{even}, and Section 5.3 discusses the lexical semantics of emphatic NPIs and the focus alternatives they give rise to in more detail.

5.1 General assumptions about focus semantics

Following Rooth (1985) and many others, we assume that every constituent \( \varphi \) has a focus semantic value \([\varphi]_{\text{foc}}\), in addition to its ordinary semantic value \([\varphi]\) and its alternative semantic value \([\varphi]_{\text{alt}}\). The latter contains domain/quantifier alternatives that may be generated by certain lexical items in \( \varphi \), such as NPIs, independently of the presence of focus.\textsuperscript{20}

The focus semantic value of a constituent \( \varphi \) is always a set of objects that have the same semantic type as the ordinary semantic value of \( \varphi \). The members of this set are called the focus alternatives generated by \( \varphi \). Recall that in inquisitive semantics the ordinary semantic value of a sentence is a set of propositions, no matter whether the sentence is declarative or interrogative. Let us call such a set of propositions an inquisitive proposition. The focus semantic value of a declarative or interrogative sentence, then, is a set of inquisitive propositions. For instance, the focus alternatives generated by the declarative sentence \textit{John introduced SUE to Fred} are inquisitive propositions expressed by sentences of the form \textit{John introduced x to Fred}, for some individual \( x \).

\textsuperscript{19} It is worth noting that in the literature on inquisitive semantics the term ‘support’ is used interchangeably with the term ‘settledness’. Indeed, ‘support’ is the more commonly used term. We use ‘settledness’ here because we feel that it is particularly intuitive in the present setting.

\textsuperscript{20} For notational simplicity, we continue to assume here that every constituent has just one alternative semantic value \([\varphi]_{\text{alt}}\), which keeps track of both domain alternatives and quantifier/scalar alternatives. Ultimately, these should be kept separate (see, e.g., Chierchia, 2013), but for our current purposes this simplification is harmless.
Similarly, the focus alternatives generated by the question *Did John introduce SUE to Fred?* are inquisitive propositions expressed by sentences of the form *Did John introduced x to Fred?*, for some individual x.

\[
\begin{align*}
\llbracket \text{Did John introduced SUE to Fred} \rrbracket_{\text{foc}} &= \left\{ \\
&\quad \llbracket \text{Did John introduced Mary to Fred?} \rrbracket \\
&\quad \llbracket \text{Did John introduced Joan to Fred?} \rrbracket \\
&\quad \llbracket \text{Did John introduced Alex to Fred?} \rrbracket \\
&\quad \ldots \\
\right\}
\end{align*}
\]

What the focus semantic value of a sentence is depends on which constituent in that sentence is focussed. We assume, again following standard practice, that if a constituent \( \psi \) is focused (which in English is reflected by a prominent pitch accent and other prosodic properties, see e.g. Büring, 2016) then its focus semantic value consists of all objects that are of the same semantic type as its ordinary semantic value. On the other hand, if \( \psi \) is not focused and does not contain a focused sub-constituent either, then its focus semantic value is a singleton set, containing only the ordinary semantic value of \( \psi \). Finally, the focus semantic value of a constituent which has both focused and unfocused sub-constituents is composed in a point-wise manner.

Focus alternatives play several grammatical roles. What is particularly relevant for our purposes here is that certain operators, including particles like *only* and *even*, are sensitive to the focus alternatives that are generated by their prejacent. To illustrate this, consider (90):

(90) a. John only introduced SUE to Fred.
    b. John only introduced Sue to FRED.

The statements in (90a) and (90b) are truth-conditionally distinct, because *only* is sensitive to the focus alternatives generated by its prejacent. Roughly, *only* says that its prejacent is true and that all focus alternatives of its prejacent that are not entailed by the ordinary semantic value of the prejacent are false. In the case of (90a), this means that John did not introduce anyone other than Sue to Fred. In the case of (90b), it means that John did not introduce Sue to anyone other than Fred.

With these basic assumptions about focus in place, we now turn to the *even* operator, whose comparative component we will characterize as being focus-sensitive.21

21 Two remarks are in order about the assumptions we are making here about focus. First, for simplicity, we present focus association as a ‘direct’ operation in the sense that it is not mediated by a general focus interpretation operator (also known as the ‘squiggle’ operator), as is the case in Rooth (1992) and much subsequent work. Such a general focus interpretation operator has advantages for dealing with focus in the absence of explicit focus-sensitive operators, but this is orthogonal to our purposes here. Second, again for simplicity, we present focus association as being ‘unselective’ in the sense that a focus-sensitive operator always associates with the focus alternatives generated by all focused constituent within its scope. It has been argued in the literature however (e.g., Krifka, 1991; Wold, 1996) that this is not always the case. Sometimes, focus association is selective. As long as we restrict ourselves to cases not involving multiple focussed constituents, which we will do in this paper, a
5.2 **EVEN**

First recall the entry for even in (66) above, repeated in (91):

\[(91)\]

a. \([\text{even } \varphi]^c\) is defined only if:

(i) \(\bigcup[\varphi]^c \cap \text{info}(c) \neq \emptyset\)

(ii) no \(A \in [\varphi]_{\text{alt}}^c\) is such that \([\varphi]^c >^c A\)

b. If defined, \([\text{even } \varphi]^c = [\varphi]^c\)

This entry only captures the comparative requirement that **EVEN** contributes: the cumulative likelihood of the prejacent \(\varphi\) in the context of utterance \(c\) is required not to exceed that of any of its alternatives.

Let us highlight two aspects of this comparative requirement. First, it is presuppositional in nature. That is, if the requirement is not met, \([\text{even } \varphi]^c\) is undefined. Second, as discussed above, the alternatives involved are ones that are generated by the NPI that **EVEN** associates with as part of its lexical semantics. In particular, they are not focus alternatives; they are generated both in the presence and in the absence of focus on the NPI.

We propose that the additive requirement of **EVEN** differs from the comparative requirement in these two respects. First, as we argued on the basis of example (48) above, the additive requirement is not presuppositional, i.e., it does not require that certain information is already present in the common ground, but rather involves a non-at-issue implication about the speaker’s doxastic state. More specifically, we argued that it implies that the contextually salient alternatives are already settled in the speaker’s doxastic state.

Second, we propose that the alternatives that the additive requirement of **EVEN** targets are not the alternatives that the associated NPI generates as part of its lexical semantics, but rather its focus alternatives. As a consequence, it only manifests itself when such focus alternatives are present.\(^{22}\)

This leads to the semi-formal lexical entry in (92) below, where we write \([\cdot]^c\) for at-issue ordinary semantic content and \([\cdot]_{\text{f}}^c\) for non-at-issue ordinary semantic content, both relative to a context \(c\) (as we have done above, the context parameter \(c\) will sometimes be omitted in what follows to simplify notation). For succinctness, we refer to ‘focus alternatives of \(\varphi\) that do not contextually entail the ordinary semantic value of \(\varphi\)’ simply as ‘non-entailing focus alternatives of \(\varphi\)’ in this entry.

\[\text{mechanism for selective focus association is not necessary. But in general, our theory of NPIs does require such a mechanism. We provide a possible implementation of the theory with selective focus association in Appendix B.}\]

\(^{22}\) This aspect of our proposal is inspired by Lahiri (1998), who analyses NPIs in Hindi consisting of indefinite expressions in combination with the particle *bhii*. Lahiri (1998) proposes that the semantics of *bhii* is very close to that of English *even*, with both a comparative and an additive component. Moreover, Lahiri suggests that only one of these components is focus sensitive, just like we are proposing for **EVEN**. However, Lahiri (1998) proposes that in the case of *bhii* it is the additive component that is always active, no matter whether the associated element is focused, while the comparative component is only active if the associated element is focused. We propose exactly the opposite for the *EVEN* operator. Lahiri assumes that in the case of ‘bhii-indefinite’ NPIs the indefinite is always focused, so both meaning components of *bhii* are always active in this case. Our proposal, for now, is restricted to English. Extensions to capture cross-linguistic variation are left for future work.
(92) a. **At-issue content**

\[ [\text{even } \varphi]_+^c = \begin{cases} 
[\varphi]_+^c & \text{if (i) the information conveyed by } \varphi \text{ is consistent with what is known in } c, \text{ and (ii) the contextual cumulative likelyhood of } \varphi \\
& \text{does not exceed that of any of its alternatives} \\
\text{undefined otherwise} 
\end{cases} \]

b. **Non-at-issue content**

\[ [\text{even } \varphi]_-^c = \begin{cases} 
\text{trivial} & \text{if the NPI associated with even is not focused} \\
\text{all salient non-entailing focus alternatives of } \varphi \text{ are settled in the speaker's doxastic state} & \text{if the NPI is focused and some non-entailing focus alternatives of } \varphi \text{ are salient} \\
\text{undefined} & \text{if the NPI is focused and no non-entailing focus alternatives of } \varphi \text{ are salient} 
\end{cases} \]

Let us go through the entry step by step. First, the (a) part corresponds directly to the entry for even in (91) above. It specifies the at-issue content of even \( \varphi \), which is only defined if the comparative requirement of even, characterized informally in (92) and formally in (91), is met. When defined, the at-issue content of even \( \varphi \) is simply that of \( \varphi \) itself.

The (b) part of the entry in (92) specifies the non-at-issue content of even \( \varphi \). In this case, there are three possibilities. The first possibility is that the NPI that even associates with is not focused. In this case, the non-at-issue content of even \( \varphi \) is trivial. Formally, it amounts to \( \top \) in this case, which in inquisitive semantics is the set of all propositions.

The second possibility is that the NPI associated with even is focused, and at least one of the non-entailing focus alternatives of \( \varphi \) is contextually salient. If this condition is met, the non-at-issue implication of even \( \varphi \) is that all salient non-entailing focus alternatives of \( \varphi \) are settled in the speaker’s doxastic state. Formally, this amounts to (93), where we write \( \text{DOX}_w^{Sp} \) for the speaker’s doxastic state in world \( w \).

\[
\{ w \mid \forall \alpha \in [\varphi]_{\text{loc}}.((\alpha \not\subseteq [\varphi]_+^c \land \alpha \text{ is salient in } c) \rightarrow \text{DOX}_w^{Sp} \in \alpha)\} \]

Let us unpack this. First, note that the non-at-issue implication is characterized as a downward closed set of propositions, just like ordinary semantic values of sentences in inquisitive semantics. This set contains all the propositions that consist of worlds \( w \) such that, for every focus alternative \( \alpha \) of \( \varphi \), if \( \alpha \) does not entail the ordinary semantic value of \( \varphi \) and \( \alpha \) is salient in \( c \), then \( \text{DOX}_w^{Sp} \in \alpha \), which means that \( \alpha \) is settled in the speaker’s doxastic state in \( w \).

This, we propose, is the additive requirement contributed by even \( \varphi \) when the associated NPI is focused and the saliency requirement is met. Let us discuss three aspects of it in some more detail. First, while we do not take the additive requirement of even to presuppose that certain information is already established in the common ground, note that we do take it to be anaphoric, in the sense that it requires one of the focus alternatives of \( \varphi \) to be salient in the given context. This is a property that is commonly ascribed to additive particles, motivated by examples like (94) from Kripke (2009).

\[ \text{SAM is having dinner in New York tonight, too.} \]
As Kripke (2009) notes, this sentence is not felicitous if uttered without any preceding discourse, despite the fact that on any given night, many people besides Sam will be having dinner in New York, and this fact can be assumed to be common ground in any typical conversation. This shows that for the additive requirement of *too* to be satisfied it does not suffice that one of its prejacent’s focus alternatives be common ground—it is crucial that such a focus alternative be contextually *salient*. We assume that *even* imposes this requirement on the context as well.

Second, we assume that the salient focus alternative in question should not be one that *entails* the ordinary semantic value of \( \varphi \). This requirement has also already been discussed in previous work on additive particles (e.g., Beaver & Clark, 2008; Theiler, 2019). To see why it is needed for additive particles like *too* and *even*, observe that *too* is infelicitous in (95) and the same holds for *even* in (96).

(95)  Sam ate an apple. *He ate some FRUIT too.

(96)  Sam ate an apple. *He even ate some FRUIT.

In fact, it has been argued for additive particles like *too* and *also* that entailment in the other direction is not allowed either (Beaver & Clark, 2008; Theiler, 2019). In this respect, however, *even* behaves differently, as illustrated in (97) and (98).

(97)  Sam ate some fruit. *He ate an APPLE too.

(98)  Sam ate some fruit. He even ate an APPLE.

We assume that the additive component of *even*, just like that of the particle *even*, only requires that the relevant salient focus alternative does not entail the ordinary semantic value of its prejacent, while in principle allowing for entailment in the other direction.

Third, we assume that the additive inference contributed by *even* is universal rather than existential in force, i.e., it conveys that *all* contextually salient alternatives are settled in the speaker’s doxastic state (rather than just some). For the purpose of most of the examples discussed in this paper, this choice is not central to deriving the correct predictions, as the examples often involve a unique contextually salient focus alternative (resulting in converging predictions). Our choice is motivated by examples like (99), where a universal assumption seems necessary in order to derive the correct strength of bias (see also van Rooij, 2003 for a similar outlook).

(99)  [Context: Tom and Peter are flatmates. On a Sunday morning, Peter comes back from a 3-day work trip and finds Tom having a cup of coffee in the kitchen, which is a complete mess. Tom tells Peter that he had a dinner party the previous night with Sue, Mark, and Joan. Then he complains about Sue:]

Tom: As always, Sue left early and didn’t help with the cleanup.

Peter: Did ANYONE help with the cleanup?

If the additive implication induced by the focused NPI in Peter’s question were merely existential in force, then we would fail to predict that Peter’s question conveys a strong negative bias, i.e., the belief that neither Sue nor Mark nor Joan helped with the cleanup: The existential requirement would be satisfied just by virtue of Peter acknowledging that Sue didn’t help (while leaving open the possibility of Mark or Joan helping), as it is merely
predicted to convey that a salient alternative issue, e.g., ‘Did Sue help?’ is settled. On the other hand, assuming that the additive implication is universal in force, we correctly predict that all contextually salient focus alternatives (‘Did Sue help with the cleanup?’, ‘Did Mark help with the cleanup?’, ‘Did Joan help with the cleanup?’) are settled in Peter’s doxastic state, and pragmatic reasoning yields the enriched inference that these questions must be settled negatively.

A related prediction of our account, which would not be obtained if the additive implication were assumed to have existential force, is that Peter’s question in (100) is infelicitous: it conveys that Peter believes nobody helped with the cleanup (which is predicted from the universal assumption), but the context in this case does not provide any reason to believe this—the kitchen is all tidy and clean.

(100) [Context: Tom and Peter are flatmates. On a Sunday morning, Peter comes back from a 3-day work trip and finds Tom having a cup of coffee in the kitchen, which is all tidy and clean. Tom tells Peter that he had a dinner party the previous night with Sue, Mark, and Joan. Then he complains about Sue:]

Tom: As always, Sue left early and didn’t help with the cleanup.
Peter: #Did ANYONE help with the cleanup?

If this assumption about even is on the right track, it suggests that while even is broadly analogous in semantics to the English particle even, there may also be subtle differences between the two: In the latter case, the additive component is standardly considered to be existential.

Returning now to the entry in (92), the third possibility in the (b) part is that the NPI associated with even is focused but non-on-entailing focus alternative is contextually salient in the context of utterance. In this case, the non-at-issue content of even $\varphi$ is undefined.

5.3 Lexical semantics and focus alternatives of emphatic NPIs

To complete the proposal we will now specify in more detail what we take to be the lexical semantics of emphatic NPIs (both contingently emphatic ones and minimizers) and the focus alternatives that they generate. As discussed in Section 4.3, under the approach that we are pursuing here (as well as many other approaches to NPIs) it is assumed that NPIs are existential quantifiers over a certain domain, which is in part lexically specified and in part contextually determined. It is further assumed that such quantifiers, as part of their lexical semantics, generate two types of alternatives, quantifier alternatives and domain alternatives. The former are obtained by replacing the existential quantifier by other elements belonging to the same scale, and the latter by replacing the lexically specified domain by other domains of the same type. Such lexical alternatives are generated both in the presence and in the absence of focus, and are targeted by the comparative component of even.

We provided a concrete lexical entry for any in Section 4.3 based on Roelofsen (2018), which builds on previous alternative-based approaches to NPIs (Chierchia, 2013; Crnić, 2014b; Krifka, 1995; Lahiri, 1998, among others), recast in inquisitive semantics. The specification of the ordinary semantic value of any is repeated in (101) below, and the domain alternatives that any is taken to generate are repeated in (102). Recall that in the case of any the lexically specified domain is assumed to be the set of all entities, $D_e$, and that the domain of discourse is denoted as $D^c$. 

(101) \[\text{[any]}^c = [\exists D_e]^c = \lambda x_e. \lambda p_{st}, \forall w \in p. \exists x \in D_e \cap D^c. P(x)(w) \land P'(x)(w)\]

(102) \[\text{[any]}_{alt}^c = [\lambda x_e. \lambda P_{e(st)}, \lambda p_{st}, \forall w \in p. \exists x \in D' \cap D^c. P(x)(w) \land P'(x)(w) | D' \subset D_e]\]

Now, what does it mean exactly for \textit{any} to be focused? This means, we propose, that either its quantificational parameter \(\exists\) or its domain parameter \(D\) carries a focus feature. In the first case, we speak of \textit{quantifier focus} and in the second case of \textit{domain focus}. Thus, a focused occurrence of \textit{any} is represented in one of the following two ways:

(103) a. Quantifier focus: \[\exists_F D_e\]

b. Domain focus: \[\exists D_{e,F}\]

In the case of quantifier focus, the focus alternatives of \textit{any} are quantifiers other than \(\exists\) ranging over the same domain \(D_e\). In the case of domain focus, the focus alternatives are existential quantifiers ranging over subdomains of \(D_e\). The focus alternatives that \textit{any} generates when focused are thus very similar to the alternatives that it generates as part of its lexical semantics. There are two differences, however. First, lexical quantifier alternatives are more constrained than focus quantifier alternatives. Namely, lexical quantifier alternatives involve quantifiers that form a scale with the existential quantifier expressed by \textit{any}, while focus quantifier alternatives can involve quantifiers that do not form a scale with the existential quantifier. A second important difference is that lexical alternatives are always generated, while focus alternatives are only generated in the presence of focus.

Let us now turn from contingently emphatic NPIs to minimizers like \textit{lift a finger} and \textit{sleep a wink}, which we have called \textit{inherently emphatic}. What is their lexical semantics? What kind of alternatives do they generate? And why are they inherently emphatic?

For concreteness, let us concentrate on a particular minimizer, \textit{lift a finger}. We will say that the ‘neutral counterpart’ of this minimizer is \textit{help}, which we take to be a gradable predicate. One can provide help to various degrees, and in each particular context there is a certain threshold \(d^c_{\text{min}} \geq 0\) such that providing help to a degree \(d > d^c_{\text{min}}\) counts as proper helping, but only providing help to a degree \(d \leq d^c_{\text{min}}\) does not count as such. We propose that \textit{lift a finger} is similar to \textit{help}, but with a threshold \(d_0\) which, in any context, gets the minimal value 0. One way of implementing this is to assume that \textit{help} involves a threshold parameter \(d_{\text{min}}\), which gets assigned some value greater than 0 in any context, whereas \textit{lift a finger} has a threshold parameter \(d_0\), which always gets assigned the minimal value 0.

(104) \[[\text{help } d_{\text{min}}]^c = \lambda x_e. \lambda p_{st}, \forall w \in p. \exists d > d^c_{\text{min}}. \text{help}(d)(x)(w)\]

(105) \[[\text{lift a finger}]^c = [\text{help } d_0]^c = \lambda x_e. \lambda p_{st}, \forall w \in p. \exists d > d^c_{\text{min}}. \text{help}(d)(x)(w) = \lambda x_e. \lambda p_{st}, \forall w \in p. \exists d > 0. \text{help}(d)(x)(w)\]

On this account, then, both \textit{help} and \textit{lift a finger} are existential quantifiers over a given domain, just like \textit{any}. However, in this case the domain does not consist of individuals but rather of degrees of helpfulness. In the case of \textit{help}, the domain is
While in the case of *lift a finger*, it is $[0, \infty)$. Note that, since $d_{\text{min}}^c$ is always greater than 0, the domain of *help* is always a subdomain of the domain of *lift a finger*.

We assume that *lift a finger*, just like *any* and *ever*, generates domain alternatives as part of its lexical semantics, each involving a subset of the domain $[0, \infty)$. These domain alternatives serve as input for the comparative component of the associated even operator.

However, when it comes to focus alternatives, we propose that there is an important difference between minimizers like *lift a finger* on the one hand and non-minimizer NPIs like *any* and *ever* on the other. This difference is rooted in the fact that *lift a finger* always contrasts with its neutral counterpart *help*. We assume that it obligatorily receives focus in order to mark this contrast. More precisely, we assume that its threshold parameter $d_0$ is always focused.

The marking of contrast by means of focus is a well-known and widespread phenomenon (see Rooth, 1992, and many others). To illustrate this outside the domain of minimizers, consider the following dialogue between A and B.

(106) A: Mary is quite tall.  
B: No, she is VERY tall.

In B’s response, the modifier *very* must be prosodically emphasised. The reason for this is that the phrase *very tall* contrasts with the phrase *quite tall* in A’s preceding utterance. Giving a precise formal definition of contrast and spelling out a concrete theory of when contrast should be marked by means of focus would take us too far afield here (see, e.g., Kratzer & Selkirk, 2018; Rooth, 1992). Informally, two constituents contrast with each other when they have common elements but differ in one or more parts as well. In (106), what the two phrases have in common is the predicate *tall*, and the part that differs is the modifier, *quite* versus *very*. If an utterance contains a phrase that contrasts in this sense with another contextually salient phrase, focus needs to be placed on the part in which the two phrases differ, here the preposition *very*.

Now let us return to minimizers like *lift a finger*. What is crucial is that *lift a finger* always contrasts in the above sense with its neutral counterpart *help*: the two share the same core predicate, but differ in their threshold parameter. We assume that the use of *lift a finger* automatically makes its neutral counterpart contextually salient. As a consequence, the contrast between the two needs to be marked by placing focus on the threshold parameter.

This is why, we propose, minimizers are inherently emphatic: they always involve focus on the threshold parameter in order to mark the contrast with their neutral counterpart, and consequently always bear focus prosody (as observed by Krifka, 1995 and Asher & Reese, 2005). For *lift a finger*, this means that we get the following focus semantic value:

(107) $[[\text{lift a finger}]]_{foc}^c = [[\text{help } d_0, F]]_{foc}$

$$= \{\lambda x. \lambda p. \forall w \in p. \exists d > d'. \text{help}(d)(x)(w) \mid d' \in [0, \infty)\}$$

This means that (i) the focus alternatives of *lift a finger* are exactly the same as its domain alternatives, and (ii) in every context, the ordinary semantic value of *help* is one of the focus alternatives of *lift a finger*. 
An important repercussion of the proposal that minimizers always involve focus on their threshold parameter is that the additive requirement of the associated even operator always comes into play in this case. Minimizers differ in this respect from NPIs like any, which are not always focused and therefore do not always activate the additive component of even.

We have laid out an account that uniformly treats inherently and contingently focused NPIs as generating both lexical and focus alternatives that serve as input for an associated even operator. The empirical differences between the two classes of NPIs should all follow from differences in the types of alternatives that they generate. In the next section, we examine the predictions of the account.

6 PREDICTIONS

Depending on whether a given NPI is focused or not, the additive requirement of the associated even operator is activated, in addition to the comparative requirement which is always in force. This additive requirement, we argue, is responsible for all the empirical properties that are characteristic for emphatic NPIs (as opposed to non-emphatic ones), both in statements and in questions. We start with a brief preview of the main predictions. Those concerning NPIs in statements are then discussed in detail in Section 6.1, those concerning polar questions in Section 6.2, and those concerning wh-questions in Section 6.3.

In statements, the additive requirement of even imposes certain constraints on the input context and can give rise to domain widening effects. In the case of contingently emphatic NPIs, the context needs to be such that a salient alternative is present, as the NPI by itself does not make any particular alternative salient enough to fulfill the additive requirement. Furthermore, when contingently emphatic NPIs occur in a DE environment and receive domain focus, the domain targeted by the actual statement must be wider than the domain targeted by the salient focus alternative, since the latter is required not to entail the former. This amounts to a domain widening effect.

In polar questions, the same additive requirement of even gives rise to an inference of negative bias, namely, that an alternative issue has been settled negatively in the speaker’s doxastic state. While the semantics of even in principle only requires that the alternative issue be settled either positively or negatively, the structure of the alternatives evoked by NPIs is such that a polar question containing an emphatic NPI can only be sincerely asked (i.e., without already knowing the answer) if the relevant alternative issue is settled negatively in the speaker’s doxastic state.

In wh-questions, by contrast, an inference of negative bias does not always arise from the additive requirement of even. What does always arise is the basic additive inference that the salient alternative issues are settled in the speaker’s doxastic state. But the derivation of the strengthened inference that the alternative issues are settled negatively will be shown to depend crucially on whether the question is interpreted exhaustively or non-exhaustively.

We now discuss these and further predictions of the account in more detail.

6.1 Emphatic NPIs in statements

6.1.1 Inherently emphatic NPIs in statements Consider the statement in (108), which contains an inherently emphatic minimizer under negation.

(108) Bill didn’t lift a finger.
The **even** operator contributed by *lift a finger* can in principle take scope over any clausal constituent of type \((s, t, t)\), denoting a set of propositions. That is, we do not stipulate any constraints on the position of **even** relative to other operators. However, it follows from the semantics of **even** (in particular its comparative requirement) and the kind of lexical alternatives generated by NPIs that **even** must always take scope over a downward entailment or non-monotonic operator—otherwise, it would result in undefinedness.

Let us illustrate this based on (108). The sentence has two possible LFs: one in which **even** scopes below negation (109a), and one in which it scopes over negation (109b).

\begin{equation}
\text{(109)} \quad \text{a. } [\chi \text{ NEG } \psi \text{ even } \chi \text{ Bill helped } d_{0,F}] \\
\text{b. } [\chi \text{ even } \psi \text{ NEG } \psi \text{ Bill helped } d_{0,F}]
\end{equation}

The semantic value of the LF in (109a) is undefined. To see this, first consider the prejacent of **even** in this LF, the constituent labeled as \(\psi\). The ordinary at-issue semantic value of this constituent is given in (110) and the domain alternatives that it generates are specified in (111).

\begin{equation}
\text{(110) } [\psi]_+ = \{ \{ w \mid \exists d \in [0, \infty). \text{helped}(d)(\text{Bill})(w) \} \}
\end{equation}

\begin{equation}
\text{(111) } [\psi]_{\text{alt}} = \{ \{ w \mid \exists d \in D'. \text{helped}(d)(\text{Bill})(w) \} \} \quad | \quad D' \subset [0, \infty) \}
\end{equation}

Now let us turn to the constituent in (109a) labeled as \(\psi\), which consists of **even** and its prejacent \(\varphi\). Recall from the entry in (165) that the at-issue component of \([\text{even } \varphi]\) has two definedness conditions:

\begin{equation}
\text{(112) Definedness conditions of the at-issue component of } [\text{even } \varphi]:
\begin{enumerate}
\item \(\bigcup [\varphi] \cap \text{info}(c) \neq \emptyset\)
\item \(\text{no } A \in [\varphi]_{\text{alt}}^c \text{ is such that } [\varphi]_c^e > c A\)
\end{enumerate}
\end{equation}

Suppose that condition (a) is satisfied, which means that the context of utterance \(c\) does not completely rule out the possibility that **Bill** helped to some degree. Now, let us show that condition (b) cannot be satisfied in \(c\). Since condition (a) is satisfied, there must be a degree \(d^\ast\) such that the likelihood that **Bill** helped to degree \(d^\ast\) and not to any higher degree is non-zero in \(c\). Let \(d'\) be some degree higher than \(d^\ast\), \(D'\) the domain \([d', \infty)\), and \(A_{D'}\) the corresponding domain alternative \(\{ \{ w \mid \exists d \in D'. \text{helped}(d)(\text{Bill})(w) \} \}\). Then the cumulative likelihood of \(A_{D'}\) in \(c\) will be strictly lower than that of \([\varphi]_+\). This means that condition (b) in (112) is not satisfied. Thus, the LF in (109a) is ruled out on semantic grounds, a result that the present account directly inherits from Crnić (2014b). 23

Let us now turn to the LF in (109b). Consider the prejacent of **even** in this LF, the constituent labeled as \(\psi\). The ordinary at-issue semantic value of this constituent is given in (113a), the domain alternatives that it generates are specified in (113b), and its focus semantic value is given in (113c).

\begin{equation}
\text{(113) a. } [\psi]_+ = \{ \{ w \mid \neg \exists d \in [0, \infty). \text{helped}(d)(\text{Bill})(w) \} \}
\end{equation}

\begin{equation}
\text{b. } [\psi]_{\text{alt}} = \{ \{ w \mid \neg \exists d \in D'. \text{helped}(d)(\text{Bill})(w) \} \} \quad | \quad D' \subset [0, \infty) \}
\end{equation}

\begin{equation}
\text{c. } [\psi]_{\text{foc}} = \{ \{ w \mid \neg \exists d \in [d', \infty). \text{helped}(d)(\text{Bill})(w) \} \} \quad | \quad d' > 0 \}
\end{equation}

23 See also Xiang (2020) for a similar approach to minimizer licensing in certain constructions in Mandarin.
Note that the domain alternatives and the focus alternatives are almost, but not exactly the same. Domain alternatives involve subsets of the domain \([0, \infty)\), while focus alternatives involve different values \(d'\) for the threshold degree, which result in domains \([d', \infty)\). The latter domains never have a finite upper bound, while some domain alternatives do.

Now consider the constituent in (109b) labeled as \(\chi\), which consists of \textsc{even} and its prejacent \(\psi\). In this case, the definedness conditions of \textsc{even} can be satisfied. The first condition is satisfied as long as \(\bigcup [\psi] \cap \text{info}(c) \neq \emptyset\) which means that the information available in the context of utterance \(c\) should be compatible with the possibility that Bill did not help at all. The second condition will automatically be satisfied in any context because the ordinary semantic value of \(\psi\) entails all its domain alternatives and can therefore never be more likely than any of these alternatives. So the at-issue semantic content of \(\chi\) is well-defined, and is the same as that of its prejacent \(\psi\), i.e., the set of propositions \(p\) consisting only of worlds \(w\) in which Bill did not help to any degree \(d \in [0, \infty)\). Thus, the sentence conveys the at-issue information that Bill did not help at all. Again, this prediction of the account is inherited from Crnić (2014b).

What about the non-at-issue content of \(\chi\)? This is where our proposal goes beyond that of Crnić (2014b). Since the NPI is focused, the additive component of \textsc{even} is in force, and requires that the prejacent \(\psi\) have a contextually salient focus alternative which does not entail its ordinary semantic value. This requirement is clearly satisfied if the preceding discourse makes a suitable alternative salient, as in (114).

\[(114)\]
\begin{align*}
A: & \text{ I heard that Bill didn’t help a lot with the cooking.} \\
B: & \text{ Indeed, he didn’t lift a finger to help with the cooking.}
\end{align*}

Importantly, however, the requirement is also satisfied if the preceding discourse does not explicitly make such an alternative salient. This is because \textit{lift a finger} is assumed to always make its neutral counterpart \textit{help} salient. Therefore, the focus alternative of \(\psi\) corresponding to ‘Bill didn’t help’, i.e., \([\{w \mid \neg \exists d \in [d^c_{\text{min}}, \infty) . \text{helped}(d)(\text{Bill})(w)\}]\downarrow\) will be contextually salient. Moreover, this focus alternative does not entail the ordinary semantic value of \(\psi\), \([\{w \mid \neg \exists d \in [0, \infty) . \text{helped}(d)(\text{Bill})(w)\}]\downarrow\), because even if Bill did not help to any degree in \([d^c_{\text{min}}, \infty)\) he may still have helped to some degree in \([0, d^c_{\text{min}}]\). Thus, (115), where the context does not make any suitable focus alternative salient, is correctly predicted to be felicitous.

\[(115)\]
\begin{align*}
A: & \text{ I heard that Bill was at the dinner.} \\
B: & \text{ Yes, but he didn’t lift a finger to help with the cooking.}
\end{align*}

The non-at-issue implication of \(\chi\) is that the salient, non-entailing focus alternatives are already settled in the speaker’s doxastic state, i.e., that the speaker believes that Bill did not help to any degree in \([d^c_{\text{min}}, \infty)\) (and possibly other salient subdomains of \([0, \infty)\). Note that this implication is weaker than the Quality implicature that (108) gives rise to, which is that the speaker believes that Bill did not help to any degree in \([0, \infty)\). So the non-at-issue implication generated by the additive component of \textsc{even} does not convey anything about the speaker’s doxastic state beyond what can already be derived pragmatically in this case. In this sense, it is vacuous here. We will see below that in the case of questions it is not vacuous, but rather plays a crucial role in the derivation of biases.
6.1.2 Contingently emphatic NPIs in statements  
Now consider the statement in (116), which contains a contingently emphatic NPI under negation.

(116)  Prue didn’t buy ANY apples.

Just like in the case of (108), the even operator contributed by the NPI can in principle take scope either above or below negation, but due to its comparative requirement, the LF in which it scopes below negation is ruled out on semantic grounds due to the comparative requirement of even, a result that we inherit from Crnić (2014b). Thus, the only viable LF is (117).

(117)  \[ χ \text{ even } [φ \text{ neg } [ψ \text{ Prue bought ANY apples}]]\]

Recall that the lexical specification of any involves an existential quantifier \(∃\) and a lexical domain \(D_e\). Either of these may carry a focus feature. We will mainly concentrate on the case of domain focus, highlighting along the way points at which the predictions arising from quantifier focus differ from those arising from domain focus. In the case of domain focus, the ordinary at-issue semantic value of \(ψ\), the prejacent of even, is as specified in (118a), the domain alternatives it generates are given in (118b), and its focus semantic value in (118c).

(118)  a. \( [ψ]_+ = \{ \{ w \mid ∃ x ∈ D_e \cap D^r . \text{apples}(x)(w) \land \text{bought}(x)(\text{Prue})(w) \} \uparrow \}

b. \( [ψ]_\text{alt} = \{ \{ \{ w \mid ∃ x ∈ D' \cap D^r . \text{apples}(x)(w) \land \text{bought}(x)(\text{Prue})(w) \} \uparrow \mid \text{D}' \subset \text{D}_e \}

c. \( [ψ]_\text{foc} = \{ \{ \{ w \mid ∃ x ∈ D' \cap D^r . \text{apples}(x)(w) \land \text{bought}(x)(\text{Prue})(w) \} \uparrow \mid \text{D}' \subset \text{D}_e \}

Note that the focus alternatives are identical in this case to the lexically generated domain alternatives.

Now consider the root constituent in (117), labeled as \(χ\), which consists of even and its prejacent \(ψ\). It can be verified that the definedness conditions of the at-issue component of even can be satisfied in this case, just as in the parallel case involving lift a finger discussed above. So the at-issue semantic content of \(χ\) is well-defined, and is the same as that of its prejacent \(ψ\), namely the set of propositions \(p\) consisting only of worlds \(w\) in which Prue did not buy any apples in \(D^c_e\). Thus, the sentence is correctly predicted to convey the at-issue information that Prue did not buy any apples in the contextually restricted domain \(D^c_e\).

What about the non-at-issue content? This is again where the predictions of our account go beyond those of previous work. Since the NPI is focused, the additive component of even is in force, and requires that the prejacent \(ψ\) have a contextually salient focus alternative which does not entail its ordinary semantic value. This requirement is satisfied if the preceding discourse makes a suitable alternative salient, as in (119).

(119)  A: It appears that Prue didn’t buy organic apples.
B: She didn’t buy ANY apples.

Similarly, in the case of quantifier focus rather than domain focus, the context needs to make a suitable quantifier alternative salient, as in (120).

(120)  A: It appears that Prue didn’t buy a lot of apples.
B: She didn’t buy ANY apples.
However, if the context does not make any suitable domain/quantifier alternatives salient, then the additive requirement of even is not satisfied and the sentence is predicted to be infelicitous. This prediction is borne out, as illustrated in (121).24

(121)  
A: It appears that Prue didn’t buy all the ingredients for the cake.
B: #That’s right, she didn’t buy ANY apples.

Note that the infelicities here are due to the emphasis on ANY; without such emphasis, the sentences are fine, as exemplified in (122).

(122)  
A: It appears that Prue didn’t buy all the ingredients for the cake.
B: That’s right, she didn’t buy any apples.

The same line of reasoning captures the contrast in (141), discussed in Section 3 and reproduced in (123) below.

(123)  
Did you remember to add the herbs?
   a. Oh no! I didn’t add any oregano.
   b. # Oh no! I didn’t add ANY oregano.

Also note that ANY differs in this respect from lift a finger, which does not require the preceding discourse to make a specific alternative salient. This was exemplified in (115), repeated in (124).

(124)  
A: I heard that Bill was at the dinner.
B: Yes, but he didn’t lift a finger to help with the cooking.

This difference between ANY and lift a finger is explained on our account by the fact that the use of lift a finger automatically makes its neutral counterpart help contextually salient, while the use of ANY does not in itself make any focus alternative particularly salient. As a consequence, the salience requirement of lift a finger does not impose any constraint on the input context, while that of ANY does.

Domain widening effects  
Let us now zoom in on how the analysis accounts for domain widening effects. Recall that ψ in (117) conveys the at-issue information that Prue did not buy any apples in $D_e \cap D_c$. Its focus alternatives convey the information that Prue did not buy any apples in $D' \cap D_c$, where $D'$ is a subdomain of $D_e$. So what the additive component of even requires is that at least one focus alternative which involves a subdomain of $D_e$ is

24 Note however, that a salient focus alternative need not have been explicitly mentioned in the prior discourse, as long as it is easily recoverable. This is exemplified in (i). See also (100) on page 30 for another case in point.

(i) [Context: In a hospital, all personnel is aware that they need to be very cautious when screening patients for symptoms of rosacea. A nurse just checked patient B and then reports to the doctor, without any previous discourse:]
   Patient B does not show ANY symptoms of rosacea.

In such scenarios, we predict that the use of a contingently emphatic NPI is felicitous, as a relevant alternative (in this case, ‘Patient B does not show significant/noticeable symptoms of rosacea’ is easily recoverable, i.e., can be assumed to be sufficiently salient given the particular scenario.
salient in the context of utterance. Compared to this salient focus alternative, then, \( \psi \) widens the domain of quantification. This is the domain widening effect.\(^{25, 26}\)

Note that we only predict domain widening effects to occur in cases of domain focus. In cases of quantifier focus, such as (120), the focus alternatives involve different quantifiers rather than different domains, so in this case domain widening effects are correctly predicted not to arise.

Also note that in the case of minimizers, there is always domain widening w.r.t. the neutral counterpart. For instance, *lift a finger* quantifies over a larger domain than *help*. However, in cases where this alternative is not already salient in the input context but is made salient by the minimizer itself, the domain widening effect is qualitatively different in that it does not involve a contrast with an explicit, pre-existing alternative rather than an induced one. As such, it may be perceived as a weaker contrast.

Under our account, domain widening effects arise as a by-product of the additive requirement of emphatic NPIs. This approach has more explanatory value than ones that directly build domain widening into the semantics of NPIs (most notably, that of Kadmon & Landman, 1993). As we have argued, following Krifka (1995), van Rooij (2003) and others, only emphatic NPIs persistently give rise to domain widening effects. This cannot be captured if domain widening is built into the semantics of NPIs, disconnected from focus. On the other hand, on our analysis, only emphatic NPIs contribute a non-trivial additive requirement, and this can give rise to domain widening effects. Furthermore, our analysis predicts that even in the case of emphatic NPIs, domain widening effects do not always arise. Specifically, this happens only in cases involving domain focus; not in ones involving quantifier focus.

We have discussed at some length what the context must be like in order for the non-at-issue content of (116) to be well-defined. If it is well-defined, then the non-at-issue implication is that all the salient, non-entailing focus alternatives are already settled in the speaker’s doxastic state, i.e., the speaker believes that Prue did not buy any apples in salient subdomains of \( D^e \). Just as we saw in the case of *lift a finger*, this implication is weaker than the Quality implicature that (116) gives rise to, which is that the speaker believes that Prue did not buy any apples in \( D^e \). So, again, the non-at-issue implication generated by the additive component of *even* does not convey anything about the speaker’s doxastic state beyond what can already be derived pragmatically in this case. As mentioned above, we will see below that in the case of questions it is not vacuous, but plays a crucial role in the derivation of biases.

Before moving on, let us briefly comment on the fact that the additive component of *even* requires its prejacent \( \psi \) to have a contextually salient focus alternative which *does*...
not entail ψ itself, but may be entailed by ψ, or logically independent of ψ. This aspect of the semantics of even was motivated by observations concerning the English particle even, repeated below. This particle also requires that its prejacent ψ has a contextually salient focus alternative which does not entail ψ but may be entailed by ψ or be logically independent of it (in contrast with particles like too which strictly require logical independence, i.e., non-entailment in both directions).

(125) a. Sam ate an apple. *He even ate some FRUIT.
    b. Sam ate an apple. *He ate some FRUIT too.

(126) a. Sam ate some fruit. He even ate an APPLE.
    b. Sam ate some fruit. *He ate an APPLE too.

Note that in (116), as well as in all other cases where the NPI occurs in a downward entailing environment, all domain focus alternatives are necessarily entailed by the prejacent of even. So we see here that it is a good feature of our semantics for even that it allows for entailment in this direction. In this sense, even indeed patterns with even, and contrasts with other additive particles in English such as too.

One may wonder whether there are also cases where the prejacent of even, ψ, and its focus alternatives are logically independent. Indeed, such cases exist, as exemplified in (127), where the NPI occurs in the scope of a non-monotonic operator.

(127) [Context: A and B are two experienced librarians working at the same library. A point at a book in their collection and says:]
   A: That book is not particularly well-read.
      Exactly two people took it out over the last five years.
   B: It’s worse actually. Exactly two people EVER took it out.

This shows that, as predicted by the account, entailment between the prejacent of even and its salient focus alternatives in either direction is not necessary.

6.1.3 Commonalities and differences: Inherently vs. contingently emphatic NPIs in statements

Let us summarize the main commonalities and differences between inherently and contingently emphatic NPIs in statements. What the two types of emphatic NPIs have in common with each other, as well as with non-emphatic weak NPIs, is that they express existential quantification over a certain domain (of individuals, degrees of helpfulness, time-intervals, etc.). The most important difference between them is that inherently emphatic
NPIs like *lift a finger*, unlike contingently emphatic NPIs like *ANY*, always make their neutral counterpart salient. Other differences follow from this basic contrast. In particular, this explains why inherently emphatic NPIs are inherently emphatic: their degree parameter is obligatorily focused in order to mark the contrast with the neutral counterpart. A further consequence of this is that the focus alternatives of inherently emphatic NPIs are always domain alternatives, while those of contingently emphatic NPIs can be either quantifier alternatives or domain alternatives.

What are the repercussions of these differences in terms of empirical predictions? First, contingently emphatic NPIs impose a salience requirement on the context of utterance: at least one non-entailing focus alternative must already be salient in the input context. Inherently emphatic NPIs do not impose this requirement on the input context, because they themselves always make one of their focus alternatives particularly salient.

A second difference concerns domain widening effects. In the case of contingently emphatic NPIs, domain widening effects arise with domain focus but not with quantifier focus. With domain focus, such NPIs always widen the domain of quantification w.r.t. a focus alternative that is already salient in the input context. By contrast, inherently emphatic NPIs always come with domain focus and therefore always involve domain widening. In this sense, domain widening is more persistently tied to inherently emphatic NPIs than to contingently emphatic NPIs. However, inherently emphatic NPIs do not necessarily widen the domain of quantification w.r.t. a focus alternative that is already salient in the input context. They may only do so w.r.t. their neutral counterpart, which they themselves make salient. In this sense, the domain widening effect induced by inherently emphatic NPIs is qualitatively different, and may be perceived as ‘weaker’, than that induced by contingently emphatic NPIs with domain focus. A summary of these differences is given in Table 1.

### 6.2 Emphatic NPIs in polar questions

#### 6.2.1 Inherently emphatic NPIs in polar questions

Consider the polar question in (128), which contains an inherently emphatic minimizer.

(128) Did Charles lift a finger?

We maintain the assumption that the *even* operator contributed by *lift a finger* can in principle scope over any constituent of type \(\langle s, t \rangle, t \rangle\), denoting a set of propositions. This allows for two possible LFs, one in which even scopes below int (129a), and one in which even scopes over it (129b). Given our semantics, \(\phi\) in (129a) and \(\psi\) in (129b) both denote a set of propositions, and can function as the prejacent of even, though the former is informative and the latter is inquisitive.

(129) a. \([\chi \text{ int } [\psi \text{ even } [\psi \text{ Charles helped } d_{0,F}]]]]\)

It is technically possible to assume that, in addition to domain focus, inherently emphatic NPIs may optionally also involve quantifier focus. The quantifier focus alternative for *lift a finger*, for instance, would be obtained by replacing the existential quantifier in its lexical semantics (ranging over degrees) by a universal quantifier. This alternative would then be paraphrasable as ‘help to every possible degree’ in \([0, \infty)\). However, such a meaning is semantically odd and not lexicalized in English, which makes it unlikely for any context to be such that this alternative is particularly salient. We therefore assume that quantifier focus does not play a significant role in the case of inherently emphatic NPIs.
b. \[ χ \text{ EVEN } [ψ \text{ INT } [ϕ \text{ Charles helped } d_{0,F}]] \]

However, we already saw in Section 6.1.1 (in particular, (109a)) that LFs in which EVEN scopes over non-downward-entailing, informative prejacents like \( ϕ \) in (129a) are effectively ruled out: in such cases, the comparative requirement of EVEN, repeated in (130), cannot be satisfied, resulting in undefinedness. This prediction of our account is inherited from Roelofsen (2018).

(130) Definedness conditions of the at-issue component of [EVEN ϕ]:

a. \( \bigcup [ϕ] \cap \text{info}(c) \neq \emptyset \)

b. no \( A \in [ϕ]_{\text{alt}} \) is such that \( [ϕ]^c >_c A \)

How about the LF in (129b), where EVEN scopes over a prejacent \( ψ \) that denotes an inquisitive issue? Can it satisfy the definedness conditions the at-issue component of EVEN? To probe this, the ordinary at-issue semantic value of \( ψ \) is given in (131a), the domain alternatives that it generates are provided in (131b), and its focus semantic value is given in (131c).

(131) a. \[ [ψ]^+ = \left\{ \begin{array}{l} \{w \mid ∃d ∈ [0,∞).\text{helped}(d)(Charles)(w)\} \ \\ \{w \mid ¬∃d ∈ [0,∞).\text{helped}(d)(Charles)(w)\} \end{array} \right\} \]

b. \[ [ψ]_{\text{alt}} = \left\{ \begin{array}{l} \{w \mid ∃d ∈ D'.\text{helped}(d)(Charles)(w)\} \ \\ \{w \mid ¬∃d ∈ D'.\text{helped}(d)(Charles)(w)\} \end{array} \right\} \bigg| D' \subset [0,∞) \]

c. \[ [ψ]_{\text{foc}} = \left\{ \begin{array}{l} \{w \mid ∃d ∈ [d',∞).\text{helped}(d)(Charles)(w)\} \ \\ \{w \mid ¬∃d ∈ [d',∞).\text{helped}(d)(Charles)(w)\} \end{array} \right\} \bigg| d' > 0 \]

In this case, the definedness conditions of the at-issue component of EVEN can indeed be satisfied straightforwardly: (130a) is satisfied as long as there’s some information available in the context of utterance, since \( \bigcup [ψ] = W \), and (130b) is automatically satisfied in any context because \( \bigcup [ψ] = W \) and, for every alternative \( A \), \( \bigcup A = W \) as well. Consequently, the cumulative likelihood of \( ψ \), \( P^c(\bigcup [ψ]) \), cannot be greater than the cumulative likelihood of \( A \), as both are 1.

In sum, the prejacent \( ψ \) of EVEN in the LF in (129a) satisfies the comparative requirement of EVEN. As a result, the at-issue content of \( χ \) in (129b) is the same as that of its prejacent \( ψ \), namely the issue of whether or not Charles helped at all. This result is again inherited from Roelofsen (2018).

What about the non-at-issue content of \( χ \) in (129b)? Here, our proposal goes beyond that of Roelofsen (2018). Since the NPI is inherently focused, the additive component of EVEN is activated, and requires that the prejacent \( ψ \) have a contextually salient focus alternative. As we saw in the case of statements, this requirement is guaranteed to be satisfied irrespective of context, because lift a finger always makes its neutral counterpart help salient. Therefore, the focus alternative of \( ψ \) given in (132), which corresponds intuitively to the issue ‘Did Charles help?’, will automatically become contextually salient.

(132) \[ \left\{ \begin{array}{l} \{w \mid ∃d ∈ [d_{\text{min}},∞).\text{helped}(d)(Charles)(w)\} \ \\ \{w \mid ¬∃d ∈ [d_{\text{min}},∞).\text{helped}(d)(Charles)(w)\} \end{array} \right\} \bigg| \]

Examples like (133) are thus correctly predicted to be felicitous, even though the unmarked alternative issue, ‘Did Charles help?’ was not explicitly broached prior to the target utterance.
46

A: A lot of people stayed after the party for the cleanup.

B: Did Charles lift a finger?

The non-at-issue implication of \( \chi \) in (129b) is that the salient alternative issue (132) is already settled in the speaker’s doxastic state. This in principle allows for two possible scenarios. First, the speaker could believe the positive answer: *Charles helped to some degree* \( d \in [d_{\text{min}}^c, \infty) \); i.e., the alternative issue is settled positively. Second, the speaker could believe the negative answer: *Charles did not help to any degree* \( d \in [0, \infty) \); i.e., the alternative issue is settled negatively. However, pragmatic reasoning leads to the enriched inference that the speaker must in fact believe the negative answer.

Namely, if the speaker believed the positive answer *Charles helped to some degree* \( d \in [d_{\text{min}}^c, \infty) \), then she would not be in a position to sincerely raise the issue of *whether Charles helped to some degree* \( d \in [0, \infty) \). This is because the domain of *help*, \( [d_{\text{min}}^c, \infty) \), is a subdomain of the domain of *lift a finger*, \( [0, \infty) \). Therefore, if Charles helped, then it follows that he lifted a finger, as the former entails the latter. Consequently, if the speaker believed in the positive answer to the alternative issue, she would inevitably also believe the positive answer to the issue she actually raised, in which case there would be no point in raising it. Therefore, it can be inferred that the alternative issue must be settled negatively in the speaker’s doxastic state. This derives the negative bias that the question conveys.

The main insight behind this result is due to van Rooij (2003), extended informally in Jeong (2021), but the derivation given here is more explicit and more principled, relying on the same additive requirement that also derives domain widening effects of focused NPIs in statements.

6.2.2 Contingently emphatic NPIs in polar questions Now consider the polar question in (134), which contains a contingently emphatic NPI, namely, a prosodically stressed occurrence of ANY.

(134) Did Prue buy ANY apples?

As we saw in (128), while the EVEN operator contributed by the NPI can in principle scope over or below the INT operator, the only LF that can satisfy the comparative requirement of EVEN is the one in which EVEN scopes over INT and thus takes an inquisitive prejacent, as in (135), a result inherited from Roelofsen (2018).

(135) \[ \chi \text{EVEN} \left[ \psi \text{ INT } \left[ \psi \text{ Prue bought ANY apples} \right] \right] \]

Since there are two components of ANY that can carry a focus feature, the existential quantifier \( \exists \) and the domain parameter \( D_e \), the case in (135) may again involve either domain focus or quantifier focus. As before, we concentrate primarily on domain focus, while also highlighting points of divergence between domain and quantifier focus.

The ordinary at-issue semantic value of the prejacent \( \psi \) of EVEN is provided in (136a), the domain alternatives that it generates are presented in (136b), and its focus semantic value in the case of domain focus is given in (136c).

(136) a. \( \llbracket \psi \rrbracket_+ = \{ w | \exists x \in D_e \cap D^e.\text{apples}(x)(w) \land \text{bought}(x)(\text{Prue})(w) \}, \)

\[ \{ w | \neg \exists x \in D_e \cap D^e.\text{apples}(x)(w) \land \text{bought}(x)(\text{Prue})(w) \} \]
As in the case of the inherently focused NPI lift a finger discussed above, the definedness condition of the at-issue component of even is satisfied here, because the cumulative likelihood of $[\psi]_+$ is necessarily 1, and that of any given domain alternative is also necessarily 1. Therefore, the at-issue semantic content of $\chi$ in (135) is well-defined, and identical to that of its prejacent $\psi$. The sentence is therefore correctly predicted to express the issue of whether Prue bought any apples in $D_c^e$, a prediction that is inherited from Roelofsen (2018).

What about non-at-issue content? This, again, is where the predictions of our proposal go beyond previous work. Since ANY is focused, the additive component of even comes into play, and requires that the prejacent $\psi$ has a contextually salient focus alternative. This requirement is satisfied in contexts like (137) below, repeated with slight adjustments from (47), where a suitable alternative, in this case multiple of them, have been made salient.

(137) [Context: A plans to bake an apple pie with some friends; Prue was in charge of buying the ingredients]

A: Did Prue buy tart apples?
B: No, she didn’t.
A: Did she buy gala apples?
B: No.
A: Did she buy ANY apples?

In contrast, it would not be satisfied in contexts like (138), where a suitable alternative is not readily recoverable. Cases like (138) are thus correctly predicted to be infelicitous.

(138) [Context: A saunters into a fruit stand and asks out of the blue:]

A: #Do you have ANY apples?

Note again that the infelicity arises from the prosodic emphasis on ANY, as the sentence would be felicitous without such emphasis, as predicted by the analysis.

The non-at-issue implication that arises in (137), where the contextual requirement is satisfied, is that the salient focus alternatives are settled in the speaker’s doxastic state, i.e., the speaker believes that Prue did not buy any tart apples or gala apples. In the case of statements like (119), additive inferences like the speaker believes that Prue didn’t buy organic apples are not only contextually salient, but also entailed by the at-issue utterance (e.g., Prue didn’t buy ANY apples entails that Prue didn’t buy organic ones). The additive implications are therefore predicted to be active, but trivial in their effects. In contrast, in the case of questions like (137), inferences like the speaker believes that Prue did not buy tart or gala apples are not entailed by the question that is asked. The additive implications are therefore not trivial: by choosing to utter a question containing a contingently emphatic NPI in (137), the speaker is effectively highlighting/publicizing her updated belief that Prue did not buy tart or gala apples. The fact that the speaker chose to actively publicize this updated belief as a non-at-issue implication, and chose to jump from posing specific questions to the most general one, may give rise to enriched affective inferences like indignation or disbelief via pragmatic
reasoning (e.g., the speaker could have asked ‘Did Prue buy Fuji apples?’, etc.; perhaps she
didn’t because she is beginning to suspect that Prue might not have bought any apples in the
first place).

Importantly, the inference of negative bias that arises from polar questions with con-
tingently emphatic NPIs is predicted to be heavily context-dependent and in many cases,
much weaker than the bias derived from polar questions with inherently emphatic NPIs.
This follows naturally from the fact that the former implicates that the speaker believes the
negative resolutions of contextually salient alternative issues, whereas the latter necessarily
implicate that the speaker believes the negative resolution of their neutral counterpart.

6.2.3 Commonalities and differences: Inherently vs. contingently emphatic NPIs in polar
questions

Let us recapitulate the main commonalities and differences between inherently
and contingently emphatic NPIs in polar questions. Recall that both types of emphatic NPIs
are analyzed as expressing existential quantification over certain objects, be they individuals
(any), degrees of helpfulness (lift a finger), time-intervals (ever / sleep a wink), etc. Much
like in the case of statements, the observed differences between the two can all be derived
from the core difference in the types of salient alternatives that can be associated with them:
inherently emphatic NPIs like lift a finger always make their neutral counterpart salient,
whereas contingently emphatic NPIs like ANY require context to provide appropriate focus
alternative(s). In the case of statements, the repercussions of this contrast manifested as
(a) differences in contextual salience requirements, as well as (b) differences w.r.t. domain
widening effects. In the case of polar questions, they manifest as (a) again, differences in
contextual salience requirements, and (b) differences w.r.t. the nature and strength of the
negative bias that is conveyed.

The differences in contextual salience requirements is derived in the same way as in the
case of statements. Differences w.r.t. the negative bias is predicted in the following way.

In the case of polar questions with inherently emphatic NPIs, such as (139), the NPI
automatically makes its neutral counterpart help salient.

(139) Did Paul lift a finger when Minta was ill?

The additive component of even therefore requires that the issue ‘Did Paul help when
Minta was ill?’ is already settled for the speaker—and furthermore, settled negatively, given
pragmatic considerations. This inexcusably derives a very strong negative bias: The speaker
is effectively signaling that she believes that Paul did not do anything that is considered as
properly ‘helping’; the only open issue is whether he did anything that falls short of helping
(i.e., below the critical threshold). This method of inquiring about degrees of helpfulness
that are usually deemed negligible, in addition to implicating negative speaker belief w.r.t.
degrees above the critical threshold, constitutes a natural way of posing a rhetorical question.
The account thus correctly predicts that follow-ups which appears to leave the general issue
open, exemplified in (140), are infelicitous.

(140) Did Paul lift a finger when Minta was ill?

#He must have helped her in SOME way, he’s her husband!

By contrast, in the case of polar questions with contingently emphatic NPIs, such as (141),
repeated from (49), a salient focus alternative is determined by the context. Therefore,
the perceived strength of the negative bias is heavily context-dependent, and oftentimes
relatively weak. In particular, the perceived strength of the negative bias is predicted to
Table 2  Inherently vs. contingently emphatic NPIs in polar questions

<table>
<thead>
<tr>
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<th>Contingently emphatic NPIs</th>
<th>Inherently emphatic NPIs</th>
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<tbody>
<tr>
<td>Salience requirement</td>
<td>Must be satisfied by input context</td>
<td>Satisfied by neutral counterpart, so need not be satisfied by input context</td>
</tr>
<tr>
<td>Settledness implication</td>
<td>Implicates speaker belief in the negative resolution of context-dependent salient alternative(s); often results in weak negative bias</td>
<td>Implicates speaker belief in the negative resolution of the neutral counterpart issue, which results in a strong negative bias</td>
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</tbody>
</table>

depend on how wide the domain associated with the contextually salient alternative(s) is/are (or in the case of quantifier alternatives, how small the quantity denoted by the salient alternative(s) is/are). In the case of (141) for instance, the resulting additive implication is merely that the speaker believes that the addressee does not have some specialty apples like tart apples or gala apples.

(141)  
A: Do you have tart apples or gala apples?  
B: No, I’m sorry.  
A: Do you have ANY kind of apples?  
You must have SOME varieties, you’re a fruit stand!

Therefore, the issue of whether the addressee has any other kinds of apples, perhaps less specialized ones, is correctly predicted to remain open. This in turn predicts that follow-ups like You must have SOME varieties can be felicitous. A summary of these differences is given in Table 2.

6.3 Emphatic NPIs in wh-questions

We now turn to wh-questions. In this case, we examine contingently emphatic NPIs first, and inherently emphatic NPIs second. As will become clear, switching the order facilitates the relevant exposition in the case of wh-questions.

6.3.1 Contingently emphatic NPIs in wh-questions  
Consider the wh-question in (142), which contains a contingently emphatic NPI.

(142)  
Who showed ANY symptoms of rosacea?

Following the same reasoning as the one adopted in the case of polar questions (Section 6.2), we arrive at the conclusion that the only viable LF for (142) is one in which EVEN scopes over INT, as in (143). The inverse ordering is predicted to violate the comparative requirement of EVEN, resulting in undefinedness. 28

(143)  
[\chi \text{ EVEN } [\psi \text{ INT } [\varphi \text{ who showed ANY symptoms of rosacea}] ]]

28 We assume a division of labor between INT and the wh-element in deriving the question interpretation; see Roelofsen (2018) for more details.
is the set of propositions that resolve the question of who has symptoms of rosacea in the contextually restricted domain $D$. For each subdomain $D'$ of $D$ there is a domain alternative, namely the set of propositions resolving the question who has symptoms of rosacea in $D'$.

Which propositions count as resolutions depends on (i) whether the question is taken to carry an existential presupposition or not, i.e., whether it is taken to presuppose that at least one person showed symptoms of rosacea, and on (ii) whether the question receives an exhaustive interpretation (mention-all) or a non-exhaustive interpretation (mention-some). We will consider all four possibilities.

We will first consider the at-issue content of the question under all four readings, turning to non-at-issue content in a moment. We predict that the at-issue content of (143) is only well-defined under non-presuppositional readings, since under presuppositional readings, the NPI is not licensed. This result is independent of the emphasis on any and is inherited directly from Roelofsen (2018). We refer to Section 4.3.5 for details.

Assuming, then, that (143) has non-presuppositional readings, either because the existential presupposition only arises optionally in the first place, or because it can be contextually suspended, our account predicts that the at-issue content of $\chi$ is well defined. As in the case of statements and polar questions, it is the same as that of its prejacent $\psi$, and the sentence is correctly predicted to express the issue of who showed symptoms of rosacea in the contextually restricted domain $D$, leaving open the possibility that nobody did.

What about non-at-issue content? Since ANY bears prosodic focus, the additive component of even is activated, and requires that its prejacent $\psi$ have a contextually salient focus alternative, just like in the case of statements and polar questions. When this contextual requirement is satisfied, the non-at-issue implication that arises from wh-questions like (142) is predicted to be the same core additive implication we have discussed with regards to statements and polar questions, namely, that the salient focus alternatives are settled in the speaker’s doxastic state. However, the inferences that ultimately result from this core implication depend on whether the question is interpreted exhaustively or non-exhaustively.

Recall from Section 4.2 that under an exhaustive reading a wh-question requires a mention-all answer of the form ‘X, Y, and Z showed symptoms of rosacea, and no one else did’, while under a non-exhaustive reading a wh-question admits a mention-some answer of the form ‘X, Y, and Z showed symptoms of rosacea, and possibly others did as well.’ Let us consider the non-exhaustive reading first. Under such a reading, a derivation similar to the one for polar questions predicts that an inference of negative bias arises. For instance, in the case of (142), a salient alternative could be *Who showed significant symptoms of rosacea?*, interpreted non-exhaustively. The additive implication requires that this issue must be settled in the speaker’s doxastic state. Now suppose that the speaker believes in a proposition that resolves the alternative issue positively, e.g., the proposition that Bill showed significant symptoms of rosacea. This proposition also resolves the question in (142), *Who showed ANY symptoms of rosacea?*, under a non-exhaustive interpretation: If Bill showed significant symptoms of rosacea in $D'$, then he definitely also showed (any) symptoms of rosacea in $D$ (since $D' \subset D$). So the question in (142) would not be sincerely utterable for the speaker. Therefore, we can conclude that the salient alternative issue must be settled negatively in the speaker’s doxastic state. That is, the speaker must believe that nobody showed significant symptoms of rosacea.
Interestingly, the situation is different in the case of exhaustive readings. This is because, unlike in polar questions and in wh-questions under a non-exhaustive reading, a non-negative answer to a salient alternative issue no longer automatically resolves the question that was actually asked. For instance, consider a variant of (142) below, which favors an exhaustive interpretation.

(144) Which of our patients showed ANY symptoms of rosacea?

Suppose that the contextually salient alternative issue is *Which of our patients showed significant symptoms of rosacea?*, interpreted exhaustively (and still without existential presupposition). Let us refer to the proposition that *none* of our patients showed significant symptoms of rosacea as the *negative* answer to this question, and to resolutions implying that some patients did show symptoms as *non-negative* answers. Suppose that the speaker believes a non-negative answer to the alternative issue, namely, that Ann and Bill showed significant symptoms of rosacea and nobody else did. In this situation, the speaker may very well still be curious about who exactly showed *any* symptoms of rosacea, including insignificant ones. After all, it may be that Ann and Bill were the only patients who showed any symptoms, but it may also be that patients besides Ann and Bill showed symptoms as well. So, the question in (144), under an exhaustive interpretation, need not be settled yet in the speaker’s doxastic state.

Thus, under an exhaustive interpretation, questions like (144) can be sincerely uttered even if the contextually salient alternative issues are settled *non-negatively* in the speaker’s doxastic state. Since the additive requirement for *even* merely dictates that the salient alternative issues be settled (not that they be settled negatively), we predict that questions like (144) are perfectly compatible with situations in which the salient alternative issues are non-negatively settled. Furthermore, we predict that in such cases, no inference of negative bias arises. This prediction is borne out in examples like (145), as well as in (146), a parallel example involving *EVER* rather than *ANY*.

(145) [Context: A researcher is screening patients for a clinical trial and needs to rule out all patients with rosacea. A nurse reports that A and B demonstrated multiple symptoms of rosacea. The researcher responds:]

Thank you, but I need to be very careful here . . .

Which patients have shown ANY symptoms of rosacea?

(146) [Context: An official is doing a background check of applicants for a certain benefit and needs to know which of them ever failed to pay a bill. An assistant has acquired data from various sources covering the last two years, and reports on the basis of these data that, of all the applicants, only A and B failed to pay at least one bill over the last two years. The official says:]

Thank you, that is good to know. But we need to dig deeper . . .

Which applicants have EVER failed to pay a bill?

To our knowledge, examples like these, where emphatic NPIs are used in questions without giving rise to any inference of negative bias, have not been actively discussed in previous work. While their existence is unexpected from the perspective of accounts that directly tie emphatic NPIs in questions to negative bias, it follows naturally from our settledness-based account.
Inherently emphatic NPIs in *wh*-questions

Consider the *wh*-question in (147), which contains an inherently emphatic minimizer.

(147) Who lifted a finger to help when Mary was in trouble?

As already established in Section 4.3.5 and reiterated in Section 6.3.1, the only viable LF for (147) is the one in (148).

(148) \[ \chi \text{ even } [\psi \text{ int } [\varphi \text{ who helped } d_{0,F}]] \]

\[ [\psi]_+ \] is the set of propositions resolving the question of who helped to some degree \( d \in [0, \infty) \); for every subdomain \( D' \) of \( [0, \infty) \), the associated domain alternative is the set of propositions resolving the question who helped to some degree \( d \in D' \); and for every degree of helpfulness \( d' \), the associated focus alternative is the set of propositions resolving the question of who helped to some degree \( d > d' \).

As before, what counts as a resolution of the question depends on whether the question is taken to carry an existential presupposition and on whether it is interpreted exhaustively or not. Extrapolating from the discussion in Section 6.3.1, we again predict that presuppositional readings are ruled out because under such readings, the comparative requirement of *even* is violated. Assuming that a question like (147) allows for non-presuppositional readings, we predict that its at-issue content is well-defined, and is the same as that of the constituent \( \psi \) in (148), namely, the issue of who helped to some degree \( d \in [0, \infty) \).

What about the non-at-issue content? Since the NPI in (147) is focused, the additive component of *even* comes into play, and requires that there be a contextually salient focus alternative of \( \psi \). As in the case of statements and polar questions, this requirement is guaranteed to be satisfied because inherently emphatic NPIs always render their neutral counterpart, in this case, *help*, salient.

The non-at-issue content of (147) is thus predicted to be well-defined in any context. What is its meaning contribution then? As in the case of contingently emphatic NPIs, at a fundamental level it amounts to the implication that the salient alternative issues are already settled in the speaker’s doxastic state. This holds in particular for the alternative issue which concerns the minimizer’s neutral counterpart, *Who helped when Mary was in trouble*.

What it means for this issue to be settled in the speaker’s doxastic state depends on whether it is interpreted exhaustively or non-exhaustively. Our proposal therefore generates distinct predictions depending on whether the question at hand is taken to be interpreted exhaustively or not, although the difference turns out to be less easily discernible than in the case of contingently emphatic NPIs. We show below that this is due to the specific relationship that holds between minimizers and their neutral counterparts.

Let us first consider **non-exhaustive readings**. Under such a reading, a derivation analogous to the one outlined for polar questions and in Section 6.3.1 yields an inference of negative bias, namely, that the speaker believes that *nobody* helped when Mary was in trouble. After all, if the alternative issue had been settled positively in the speaker’s doxastic state, then the question that was actually asked, interpreted non-exhaustively, would also already be settled in the speaker’s doxastic state, which would make it insincere for the speaker to ask the question.

Now consider **exhaustive readings**. In line with the discussion in Section 6.3.1, the basic prediction of our proposal is that it would in principle be possible for the speaker to
sincerely ask the question in (147) under an exhaustive interpretation, not only when she believes the negative answer to the neutral-counterpart-focus-alternative, i.e., that nobody helped when Mary was in trouble, but also when she believes a non-negative answer to this question, e.g., that Bill helped when Mary was in trouble and nobody else did. This is because such a non-negative answer, strictly speaking, does not resolve the question asked, interpreted exhaustively. While already knowing that Bill was the only person who helped to any significant degree when Mary was in trouble, the speaker might in principle still be interested in knowing who exactly provided non-significant but non-zero amount of help (i.e., who lifted a finger without really helping). In this case, the additive requirement would be satisfied and (147) would be sincerely utterable despite the absence of any negative speaker bias.

However, in practice, it is unlikely that a speaker would find any sort of utility in figuring out who exactly provided non-significant amounts of help when she already knows exactly who provided significant amounts of help. This applies more generally to other minimizers as well: for instance, when would it ever become useful for a speaker to inquire about who exactly experienced some negligible amount of sleep (i.e., who slept a wink), if she already knows that A and B, and nobody else, experienced non-negligible amounts of sleep? Such situations are difficult to imagine. Moreover, if such a scenario were to occur, it would be more cooperative for the speaker to formulate her question as in (149) or (150).

(149) Who, except for A and B, lifted a finger to help when Mary was in trouble?

(150) Who, except for A and B, slept a wink?

These formulations make clear that the speaker is already very close to having a complete answer to the questions at hand, since the possibility that some people provided non-significant but non-zero amounts of help, or experienced non-negligible but non-zero amounts of sleep is unlikely. Thus, these formulations would be preferred over ones like (147), if it is indeed the case that the speaker believes an exhaustive, non-negative answer to the neutral-counterpart-focus-alternative (Who helped when Mary was in trouble? and Who slept?, respectively). In sum, while exhaustively interpreted wh-questions with minimizers may in principle allow for interpretations lacking negative bias, likelihood considerations make it more natural for them to be interpreted as signalling that the neutral-counterpart-alternative has been settled negatively.

Nevertheless, the unlikely scenarios mentioned above may in fact be devised with careful manipulations of the context. One example that comes close to achieving the desired effect is the following.

(151) [Context: A researcher is screening hospital patients for a very important clinical trial and needs to rule out anyone who slept or dozed off (even just for seconds without properly falling asleep) during their overnight stay in an observation room. Patients were monitored by a very sensitive sleep detection equipment, as well as by two nurses. In the morning, without having checked the sleep detection data yet, the nurses report that they saw patients A and B fall asleep during the night. The researcher responds:]

Thank you, but please check the sleep detection data as well. I really need to know . . .

Which patients slept a wink?
As predicted, (151) demonstrates that in principle, under exhaustive interpretations, wh-questions with inherently emphatic NPIs may be asked in the absence of a negative bias. Just like the parallel examples we saw in (145)–(146) with contingently emphatic NPIs, examples like (141) have not, to our knowledge, been discussed in previous work. Their existence is unexpected from the standpoint of theories directly tying minimizers in question to negative bias, but again follow naturally from our settledness-based account.

6.3.3 Commonalities and differences: Inherent vs. contingently emphatic NPIs in wh-questions

As we did in cases of statements and polar questions, we will now briefly summarize the commonalities and differences between inherently and contingently emphatic NPIs in wh-questions. These are summarized in Table 3. The first two rows of the table correspond to the main commonalities and differences between the two types of NPIs in polar questions, summarized in Table 2, which we will not revisit in detail here.

The third row of Table 3 concerns the ‘settledness implication’ triggered by the additive component of EVEN, in cases where the wh-question in which the NPI appears is interpreted exhaustively. We have seen that in such cases, both contingently and inherently emphatic NPIs are predicted to generate the implication that the contextually salient alternative issues are already settled, either negatively or non-negatively, in the speaker’s doxastic state. If the salient alternative issues are settled non-negatively in the speaker’s state, there is no ground for assuming that the speaker is biased towards the negative answer to the question that she asked. For contingently emphatic NPIs, such cases are indeed straightforward to find, as was illustrated in examples (145) and (146). In the case of inherently emphatic NPIs, the prediction is more subtle, because the neutral-counterpart-alternative is assumed to always be contextually salient. If the neutral-counterpart-alternative is settled non-negatively in the speaker’s doxastic state, then the question she asked, containing an emphatic NPI, is very unlikely to have any utility for her, because it is very likely to have exactly the same answer as its neutral-counterpart-alternative, which she already knows the exhaustive answer to. Although it is possible to construct very specific contexts in which the question asked still has some utility, as illustrated in example (151), we predict that inherently emphatic NPIs
Table 4  Interpretations of emphatic NPIs in wh-questions

<table>
<thead>
<tr>
<th>[+pre, −exh]</th>
<th>[+pre, +exh]</th>
<th>[−pre, −exh]</th>
<th>[−pre, +exh]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not licensed</td>
<td>Licensed; ends up implicating that alternatives are negatively settled</td>
<td>Licensed; merely implicates that alternatives are settled</td>
<td></td>
</tr>
</tbody>
</table>

in wh-questions are most likely to be interpreted as implying a negative speaker bias, more so than contingently emphatic NPIs.

6.3.4 Summary: Emphatic NPIs in wh-questions  We have seen that our proposal makes different predictions for emphatic NPIs in wh-questions depending on whether the question is interpreted as carrying an existential presupposition or not, and on whether it is interpreted exhaustively or not. Having gone through these different predictions in some detail, let us now take a moment to compare each of the four cases more directly. A summary of this comparison is provided in Table 4.

Our proposal predicts that emphatic NPIs are not licensed under presuppositional readings of wh-questions, be they exhaustive or non-exhaustive. This prediction is straightforwardly inherited from the even-based account of non-emphatic NPIs in questions that we build on here Roelofsen (2018), as summarized in Section 4.3.5. On our account, the distribution of all weak NPIs is governed by the comparative component of the associated even operator, no matter whether the NPI is focused or not. And the comparative component of even is predicted to be satisfied in wh-questions only when the question is interpreted as not carrying an existential presupposition. This is reflected by the first two columns, [+pre, −exh] and [+pre, +exh], of Table 4.

Our proposal further predicts that the implications triggered by an emphatic NPI in a wh-question depend on whether the question is interpreted exhaustively or non-exhaustively. Under a non-exhaustive reading, we predict that an inference of negative bias is inevitable (although its strength may vary depending on whether the NPIs are inherently or contingently emphatic), just as in the case of polar questions. This is because, if the salient alternative issues were settled positively in the speaker’s doxastic state, the question that she asked would already be resolved for her as well. This is reflected by the third column, [−pre, −exh], of Table 4.

Under an exhaustive reading, we predict that that a weaker inference arises, namely that the salient alternative issues are settled either negatively or non-negatively in the speaker’s doxastic state. This is because, even if the salient alternative issues are settled non-negatively in the speaker’s state, this does not mean that the question she asked, interpreted exhaustively, is already resolved for her. However, we also predict that for inherently emphatic NPIs, an inference of negative bias is very likely to arise, given additional utility-based considerations. This is summarized in the fourth column, [−pre, +exh], of Table 4.

6.4 Commonalities and differences: emphatic NPIs in polar questions vs. wh-questions

Before closing this section on the predictions of the proposed account, let us briefly compare the differences between polar questions and wh-questions regarding the effects of emphatic NPIs. It is well-known that questions with emphatic NPIs often convey some
Table 5  Emphatic NPIs in polar questions vs. wh-questions

<table>
<thead>
<tr>
<th>Commonalities</th>
<th>In polar questions</th>
<th>In wh-questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Differences</td>
<td>Always implicate that the salient alternative issues are settled negatively; obligatory negative bias, strength depending on type of NPI</td>
<td>May implicate that the salient alternative issues are settled either negatively or non-negatively; in this case no negative bias is derived</td>
</tr>
</tbody>
</table>

kind of negative bias. Our account, however, makes more fine-grained predictions. In particular, whether an inference of negative bias arises is predicted to depend on the type of question involved, and in the case of wh-questions, on whether the question is interpreted exhaustively or not.

As summarized in Table 5, in the case of polar questions we predict that some form of negative bias is always implied, though its strength will depend on the type of NPI. The same prediction is made for wh-questions under a non-exhaustive interpretation. However, for wh-questions which are interpreted exhaustively, we predict that an inference of negative bias need not necessarily arise.

7 CONCLUSION

We examined the behavior of emphatic NPIs across statements and questions. On the empirical front, we demonstrated that emphatic NPIs give rise to a variety of apparently heterogeneous inferences and contextual requirements, depending on the type of clause in which they occur (statements, polar questions, wh-questions) and the type of emphatic NPI involved (inherently vs. contingently emphatic). On the theoretical front, we proposed a non-reductive, unified account of emphatic and non-emphatic NPIs which derived all of these apparently disparate effects from a single core semantic operator, EVEN.

The crux of the analysis is a particular formulation of the additive component of EVEN, intuitively paraphrased as the implication that all contextually salient focus alternatives of the prejacent, which may either be declarative or interrogative, are settled in the doxastic state of the speaker. We demonstrated that, together with general pragmatic assumptions, this additive component of EVEN can account for all the observed inferences contributed by emphatic NPIs, including domain widening in statements and inferences of negative bias in questions.

The emerging account succeed in capturing both similarities and differences between emphatic and non-emphatic NPIs, and resolves some outstanding puzzles regarding emphatic NPIs, maintaining a general semantic entry that applies uniformly across statements and questions.

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A Comparison with other approaches

In this appendix, we discuss how our account diverges from several alternative accounts, and in what respect we think it achieves better empirical and/or theoretical coverage. Since many different influential analyses of NPIs have been proposed in previous literature, we cannot present a comprehensive survey of all of them. We therefore focus on two specific analyses which are most closely related to the current account: that of van Rooij (2003) and that of Crnić (2019). Before discussing these, however, we first consider a potential alternative, purely pragmatic account of the negative bias triggered by emphatic NPIs in polar questions.

A.1 Challenges for a purely pragmatic account of negative bias

One may attempt to derive the negative bias of polar questions with emphatic NPIs on purely pragmatical grounds, without relying on the conventionalized additive component of even that our account postulates. In particular, one could claim that in asking a polar question involving a term that denotes a minimal amount, or the lowest endpoint of a salient scale, a speaker implicates a negative bias (Fauconnier, 1980 considered an account in this vein). Let us illustrate how such an implicature may arise on the basis of (152).

(152) Did Tansley show an inkling of appreciation?

Note that (152) includes a ‘minimal amount denoting (m.a.d.) expression’, namely *inkling*, and that it tends to convey a negative bias, even though it does not contain an emphatic NPI, nor the particle *even* for that matter. One might suggest that this negative bias could be inferred pragmatically in roughly the following way: the fact that the speaker didn’t choose to ask a question involving a more neutral, less marked expression (e.g., *Did Tansley show some appreciation?*), suggests that such questions were not sincerely utterable, likely because they are already settled in the speaker’s doxastic state. And if they are indeed already settled, then they must be settled negatively, otherwise the question that the speaker did ask would not have been sincerely utterable either.

A tacit assumption needed for this type of explanation is that the alternative question would have been in some relevant sense a better choice than the question that was actually asked. The reason as to why this may be is not elaborated explicitly in Fauconnier, but may be found in utility-based accounts of NPIs in questions such as Krifka (1995) and van Rooij (2003). Krifka (1995) notes that more balanced polar questions (where the likelihood of each possible answer is a priori roughly equal) generally have higher expected utility. Likewise, van Rooij (2003) shows that questions with greater entropy (a measure which keeps track of the average informativity of the possible answers) are generally more useful. For instance, in a 20 questions game, where nothing is known about the answer a priori, it would be a better strategy to start with general questions like *Is it alive?* than very specific questions like *Is it a long-tailed wombat?* Thus, it is generally better to frame a polar question in such a way that the positive and the negative answers have comparable a priori probability. Questions involving a m.a.d. expression like (152) however, as well as questions involving NPIs, are framed in such a way that the positive answer is easier to satisfy and thus becomes a priori more likely to hold. Therefore, if there were no negative speaker bias, polar questions involving such terms would be suboptimal, as their more balanced variants...
would have greater expected utility. The fact that these variants were not chosen, points towards a negative speaker bias.

This pragmatic account is compelling, and provides a natural way of accounting for the inference of negative bias in questions like (152). It may therefore be tempting to conclude that essentially the same mechanism is at play for emphatic NPIs, which also denote minimal amounts (e.g., *lift a finger*) and/or increase the a priori likelihood of the positive answer (e.g. *ANY apples*). However, as van Rooij (2003) noted, an inference of negative bias does not always arise for questions which merely contain a m.a.d. expression (in the absence of the particle *even*). The negative bias is often weak, and can be entirely absent depending on the context. For instance, in contexts like (153), when all that matters is whether the prospective patient displayed a degree of rosacea greater than zero, the inference of negative bias goes away.

(153) [Context: Anyone with rosacea (both mild and serious) can sign up for a test study; the screener for the study is asking a nurse about patient X, and has no prior expectation about his health condition.]

How about this patient? Did he show an inkling/a hint of rosacea?

Furthermore, van Rooij (2003) notes that certain m.a.d. expressions such as *a tad* do not even give rise to an inference of negative bias in neutral contexts such as (154).

(154) [Context: As part of a product development study, Susan tastes two diet versions of a new softdrink. After tasting the second version she asks:]

Does this one contain a tad bit of sugar?

Importantly, when the question contains an overt *even* alongside the m.a.d. expression, as in (155), a negative bias *is* conveyed.

(155) Does this one contain even a tad bit of sugar?

This question conveys that Susan doesn’t believe that the second version of the drink contains any significant amount of sugar (perhaps, after tasting the first zero sugar version she had asked for a sweeter version, and now she doesn’t believe that the new version actually contains any sugar). Generally, in the presence of *even*, polar questions with m.a.d. expressions convey a negative speaker bias that can no longer be canceled. Put differently, while m.a.d. expressions on their own can in some contexts give rise to negative speaker bias inferences through pragmatic enrichment, in the presence of *even* such inferences appear to be conventionalized and no longer context dependent.

Polar questions containing emphatic NPIs behave similarly to ones with m.a.d. expressions and *even*. The inference of negative speaker bias is strictly enforced, irrespective of context, as illustrated in (156).

(156) [Context: Only patients who did not sleep at all the previous day can participate in a test study; the screener for the study is asking a nurse about patient X, and has no prior expectation about this patient’s sleep status the day before.]

a. Did he take a nap?

b. #Did he sleep a wink?

This suggests that the semantics of m.a.d. expressions in combination with the pragmatics of question utility is *not* sufficient to derive the observed negative bias of questions with
emphatic NPIs, nor of questions with overt even for that matter. This suggests that the even operator and even semantically contribute to this bias as well. We have argued that it is the additive component of these operators which provides precisely the required piece for deriving the bias.

At this point, one may ask whether it is possible to rely solely on the comparative semantics of even and nevertheless derive the negative bias. Such an account has indeed been pursued in Guerzoni (2004). However, this proposal involves a non-standard semantics of polar questions, and wrongly predicts that the resulting negative bias is categorical, rather than formulated around alternative issues. This, as we noted in Section 3.2, is not what is observed (see Jeong, 2021, for more discussion).

Note that in a polar question with a contingently emphatic NPI (e.g., Do you have ANY apples?), we have argued that the nature of the negative bias is context-dependent, but some form of negative bias is always present. In contrast, negative bias in questions like (152) may be entirely absent depending on the context. Note also that non-emphatic NPIs behave more similarly to these questions (e.g., Do you have any apples?). Thus, the parallel between m.a.d. expressions with overt even on the one hand and non-emphatic NPIs on the other breaks down in this respect, which is potentially problematic for other even based accounts of NPIs, but not for ours (see Section A.3 for more discussion): in the case of non-emphatic NPIs, the additive component is semantically vacuous, given its focus-sensitivity.

One final point about the purely pragmatic approach is worth making. Under Krifka (1995), the notion of question utility does double duty: it is intended to capture both the distribution of NPIs in questions (an NPI is licenced only when the resulting question has greater utility than alternative questions), as well as the negative bias of questions. Under van Rooij (2003), the analogous notion of entropy (a counterpart of strengthening in statements) is utilized to capture the distribution of NPIs (more on this in the next section), but a separate mechanism akin to our additive component derives the negative bias. This is because van Rooij was aware of the indefeasible (context-independent), alternative-based nature of the negative bias generated by emphatic NPI questions. Our account utilizes the comparative component of even to capture the bulk of the licensing conditions, and the additive component to capture the negative bias.

To summarize, there certainly exist independent pragmatic processes that can derive negative biases in polar questions. However, these mechanisms are geared towards deriving context-dependent, defeasible negative biases. They are not sufficient to capture the negative bias that is characteristic for polar questions with emphatic NPIs, suggesting that this needs to be derived in part from a conventional additive component contributed by even.

A.2 Comparison with van Rooij (2003)

Our approach to emphatic NPIs capitalizes on a generalized formulation of the additive component of even in terms of settledness in the speaker’s doxastic state. In this respect, our analysis is inspired by that of van Rooij (2003), who also posits that NPIs involve an additive even operator. While he does not provide an explicit entry for this operator, his characterization of it is similar to our formulation. Namely, he proposes that even, when scoping over a question $Q$ gives rise to the presupposition that salient alternative questions $Q’, Q’’$, etc. have already been settled in the common ground of the conversation.

Our analysis diverges from that of van Rooij (2003) in a few respects. First, the current account assumes an explicit notion of ‘settledness’ from inquisitive semantics, which applies uniformly across statements and questions. In comparison, the account of van Rooij (2003)
focuses primarily on questions with emphatic NPIs and does not explicitly discuss statements with emphatic NPIs. Without further assumptions, it thus remains unclear how his analysis would extend to statements. Our semantic framework enables a straightforward unified formulation of the additive component, and allows the same mechanism that yields bias in questions to yield domain widening effects and pertinent contextual requirements in statements.

Second, the current account characterizes the additive component of \textit{even} as a not-at-issue implication about the speaker’s doxastic state. In comparison, the account of van Rooij (2003) encodes it as a presupposition. Our choice is in part motivated by the observation that emphatic NPIs do not give rise to contextual constraints that would have been triggered by a presuppositional component. In particular, examples like (48) suggest that speakers can use questions with minimizer NPIs fairly out-of-the-blue, without necessarily assuming that the relevant alternative issues are already settled in the common ground. Put differently, the additive meaning component does not appear to function as a definedness condition, but rather as new, not-at-issue information about what the speaker believes.

Third, the current account does not separately stipulate ‘domain widening’ as part of the semantics of emphatic NPIs. In comparison, the account of van Rooij (2003) does posit domain widening, in the sense of Kadmon & Landman (1993), to be a central semantic contribution of emphatic NPIs. As we saw in Section 6.1 however, domain widening effects can be derived from the basic semantics of NPIs, and arise only in the case of domain focus, and not in the case of quantifier focus.

Finally, in the current approach, the licensing of NPIs (across statements and questions) and the characteristic behavior of emphatic NPIs (e.g., negative bias in questions) are explained under the unified umbrella of \textit{even}. The bulk of the former explananda is captured by the comparative component of \textit{even}, whereas the latter is captured by the additive component. In comparison, the account of van Rooij (2003) focuses solely on the additive component of \textit{even}, which derives the negative bias of questions with emphatic NPIs. Meanwhile, the licensing of NPIs in questions is taken care of separately by the notion of entropy, which keeps track of the average informativity of possible answers to questions, and as noted before, is a counterpart notion to strengthening in statements.

Here, we would like to point out that the additive component of our analysis can be decoupled, and can easily combine with certain alternative accounts of NPI licensing such as the entropy-based one of van Rooij (2003). We identify two main advantages to maintaining our current comparative-based account of NPI-licensing in questions: First, it is theoretically appealing to have everything in terms of the \textit{even} operator. This is particularly so since cross-linguistically NPIs are often noted to be morphologically derived from \textit{even} (see, e.g., Haspelmath, 1997; Lahiri, 1998). Second, as already noted in Roelofsen (2018), the entropy-based account of NPI-licensing generates the incorrect prediction that NPIs in general are licensed only in contexts involving negative bias. This, as we saw, is not the case for questions containing non-emphatic NPIs.

\textbf{A.3 Comparison with Crnič (2014a,b, 2017, 2019)}

Our analysis builds on and preserves the general spirit of the account of Crnič (2014a,b, 2017, 2019). In particular, both analyses provide an inclusive \textit{even}-based account of NPIs. However, our analysis also diverges from that of Crnič in a few respects.

First, as summarized in Figure 2, our analysis is broader in scope and has a different empirical focus. Crnič’s main goal is to capture the behavior of weak NPIs in \textit{statements}. 

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The current account on the other hand, aims to capture the behavior of weak NPIs across both statements and questions. Furthermore, Crnić concentrates primarily on *non-emphatic* NPIs. While he does consider the licensing conditions of emphatic NPIs, his main concern in this regard is to explain why they appear to be infelicitous in certain DE contexts (such as the antecedent of non-lawlike conditionals). We have argued that these limitations are not due to general semantic properties of emphatic NPIs but must involve contextual/pragmatic factors. On the other hand, we have focused on pointing out and accounting for certain contextual requirements arising from emphatic NPIs in statements, and have derived their domain widening effects, both of which are beyond the scope of Crnić’s work. In addition, while the current account focuses on emphatic NPIs, it enables a unified analysis of weak NPIs which can derive the observed differences between emphatic and non-emphatic NPIs based on the prosody-sensitive, selective activation of the additive component of *even*.

Our analysis resolves one specific puzzle that Crnić brings up. The puzzle is described as follows: if the semantics of a weak non-emphatic NPI is essentially the same as that of a minimal amount denoting (m.a.d.) expression in combination with the particle *even* (e.g., *even a single person*), which is what Crnić assumes, why do the two constructions sometimes show different behavior? In particular, Crnić (2019) identifies the following contrast:

(157) In questions, non-emphatic weak NPIs do not necessarily give rise to an inference of negative bias, whereas m.a.d. expressions with *even* do.

This is exemplified in (158a-b):

(158) a. Has Peter read any biology papers? → no negative bias
   b. Has Peter read even a SINGLE biology paper? → negative bias

Our analysis provides an explanation of this contrast: Questions like (158a) with non-emphatic NPIs do not prompt the additive component of *even* (this happens only when the NPI is focused). Consequently, only the comparative component of *even* is active here. On the other hand, questions like (158b) involve a focused m.a.d. expression in combination with the particle *even*, such that not only the comparative component, but also the additive component of the particle make a semantic contribution. And as we saw, it is the additive component that is the source of the negative bias.

More generally, our account predicts that m.a.d. expressions in combination with the particle *even* are more similar to *emphatic* NPIs than to non-emphatic ones. For instance, (158b) is more similar to (159) than to (158a):

(159) Has Peter read ANY biology papers? → negative bias

The problematic parallel between non-emphatic NPIs and m.a.d. expressions with *even*, as characterized by Crnić, thus stems from his assumption that only the comparative component is relevant in capturing the behavior of *even* and weak NPIs.29 Including the additive component, as we have proposed, makes it possible not only to maintain Crnić’s

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29 Crnić does mention that the additive component may be needed to explain why examples such as *Every student who read even ONE book passed the exam* obtains a stronger interpretation than *Every student who even read exactly one book passed the exam*, which is what his analysis positing covert exhaustionification predicts.
insight that in most respects, non-emphatic NPIs behave similarly to m.a.d. expressions with 
*even* (since both share the same comparative semantics), but also to explain differences 
between the two (the particle *even* when combined with a focused m.a.d. expression has 
a non-trivial additive component, while non-emphatic NPIs don’t). Furthermore, it predicts 
a more direct parallel between emphatic NPIs and m.a.d. expressions with *even*, and achieves 
all of this under the umbrella of a unified account of weak NPIs, both emphatic and non-
emphatic.

**B Implementation with selective focus association**

In the main text, we adopted a standard focus semantics based on *Rooth (1985)*. However, 
as remarked in footnote 21, this standard approach assumes that association with focus is 
*unselective*. While this often suffices for the purposes at hand, the approach has been argued 
to run into trouble when applied to sentences with multiple focused elements and multiple 
focus-sensitive operators (*Jacobs, 1983; Krifka, 1991*). To see this, consider (160):

(160)  
(a) John only introduced SUE to Fred.  
(b) He also only introduced SUE to BILL.

Intuitively, in (160b) *only* associates with the focus alternatives generated by SUE, while *also* 
associates with the focus alternatives generated by BILL. This cannot be captured on 
a Roothian approach, because only one set of focus alternatives is generated, namely the 
set of propositions expressed by sentences of the form *John introduced x to y*, where *x* and 
*y* range over individuals. The focus-sensitive operators can only be applied to this set as 
a whole, rather than to subsets of it where *x* or *y* is kept fixed. In short, focus-sensitive 
operators can only associate unselectively with all foci in their scope.

This point is relevant in the present setting because, when there are multiple foci in the 
scope of our *even* operator, as exemplified in (161b).

(161)  
(a) Peter didn’t lift a finger to help us with the cooking.  
(b) He also didn’t lift a finger to help us with the CLEANUP.

The operator should only target focus alternatives that are generated by the associated 
NPI, not those introduced by other focused elements. This requires a theory that allows for 
*selective* focus association. In this appendix, we outline a possible implementation of our 
account with selective focus association.

**B.1 A theory of selective focus association**

The theory of selective focus association that we will adopt here is that of *Wold (1996)*. We 
will briefly review the two main ingredients of this theory. The first ingredient concerns the 
syntactic representation and the semantic interpretation of focused constituents. Following 
*Kratzer (1991)*, *Wold (1996)* assumes that focused constituents carry an *indexed* focus 
feature *Fi*, where *i* ∈ {1, 2, …}. They are interpreted relative to an assignment function *g*, as 
follows:

\[
[a F_i]^g = \begin{cases} 
[a]^g & \text{if } i \not\in \text{Dom}(g) 
g(i) & \text{if } i \in \text{Dom}(g) 
\end{cases}
\]

If the focus index *i* is not in the domain of the assignment function *g*, then 
\([a F_i]^g\) amounts 
to the ordinary semantic value of *a*, \([a]^g\). On the other hand, if the focus index *i* is in
the domain of \( g \), then \( \llbracket \alpha_F \rrbracket^g \) gets the value that \( g \) assigns to \( i \). This value, \( g(i) \), is a focus alternative for \( \alpha \). The set of all focus alternatives for \( \alpha \) can be obtained by considering all assignment functions that have \( i \) in their domain.

The second main ingredient of Wold (1996)’s theory concerns the interpretation of focus-sensitive operators. A possible entry for \( \text{only} \) is given in (163), where we write \( g'[i]g \) to mean that \( g' \) is just like \( g \) except that \( i \) is added to its domain. The entry is cast in a standard truth-conditional framework, not in inquisitive semantics.

\[
(163) \quad \llbracket \text{only}_i \varphi \rrbracket^g = \begin{cases} 
\{ w \mid \forall g'[i].g.(\{ w \in \llbracket \varphi \rrbracket^g \leftrightarrow \llbracket \varphi \rrbracket^g \subseteq \llbracket \varphi \rrbracket^{g'} \}) \text{ if } i \notin \text{Dom}(g) \\
\text{undefined otherwise}
\end{cases}
\]

According to this entry for \( \text{only} \), the operator requires that its prejacent be true, and that all focus alternatives which are not entailed by the ordinary semantic value of the prejacent be false. The details of this particular treatment of \( \text{only} \) are not important here. What matters is that we can now treat focus-sensitive operators like \( \text{only} \) as associating selectively with focus alternatives generated by co-indexed focused constituents. This approach makes it possible to derive adequate interpretations of sentences with multiple focus-sensitive operators like (160), repeated in (164) with appropriate indexing.

\[
(164) \quad \begin{array}{l}
a. \text{John only}_i \text{ introduced SUE}_F \text{ to Fred.} \\
b. \text{He also}_j \text{ only}_i \text{ introduced SUE}_F \text{ to BILL}_F \text{.}
\end{array}
\]

For instance, the denotation of \( \text{BILL}_F \) is correctly predicted to remain fixed across the alternatives that \( \text{only} \) quantifies over. For \( \llbracket (164b) \rrbracket^g \) to be defined, we must have that \( i, j \notin \text{Dom}(g) \). This also means that for any \( g' \) such that \( g'[i]g \), we must have that \( j \notin \text{Dom}(g') \), and thus for any such \( g' \) it holds that \( \llbracket \text{BILL}_F \rrbracket^{g'} = \llbracket \text{BILL} \rrbracket^g = \text{Bill} \).

With this in place, we can now turn to our \( \text{even} \) operator. Analogous to the index-sensitivity displayed in (164), \( \text{even} \) should only target focus alternatives generated by the associated NPI, which, when focused, will carry a co-indexed focus feature. \(^{30}\)

\textbf{B.2 Selective \textit{EVEN}}

A selective entry for \( \text{even} \) is given in (165) below. Here we write \( \llbracket \cdot \rrbracket^g_{+} \) for ordinary at-issue semantic content relative to assignment \( g \) and context \( c \), and \( \llbracket \cdot \rrbracket^g_{-} \) for ordinary non-at-issue semantic content relative to assignment \( g \) and context \( c \). Furthermore, as before, we write \( \text{DOX}_{w}^{d} \) for the speaker’s doxastic state in world \( w \), and \( \top \) for the tautological sentence meaning, which in inquisitive semantics is the set of all propositions.

\(^{30}\) Note that on the theory of focus summarized here, focus association is ‘direct’ in the sense that it is not mediated by a general focus interpretation operator (also known as the ‘squiggle’ operator), as is the case in Rooth (1992) and much subsequent work. Wold (1996) shows how a mediating squiggle operator can be added to his analysis in a natural way. Doing so has advantages for dealing with focus in the absence of explicit focus-sensitive operators, but this is orthogonal to our purposes here. We have therefore omitted it.
Let us go through this entry step by step. First, in the (a) part, which specifies the at-issue content of \( \text{EVEN}_i \varphi \), there are three definedness conditions. The ones in (i) and (ii) reflect the comparative requirement of \( \text{EVEN}_i \), which is just as before. The one in (iii) reflects the fact that we treat \( \text{EVEN}_i \) as a selective focus-sensitive operator here—it parallels the definedness condition in the entry for \( \text{ONLY}_i \) in (163). When defined, the at-issue content of \( \text{EVEN}_i \varphi \) is simply that of \( \varphi \) itself.

The (b) part specifies the non-at-issue content of \( \text{EVEN}_i \varphi \). In this case, there are three possibilities. The first obtains when for every assignment \( g' \) such that \( g'[i]g \) we have that \( \llbracket \varphi \rrbracket^\text{EVEN}_i_+ \subseteq \llbracket \varphi \rrbracket^\text{EVEN}_i_+ \). This condition is satisfied if and only if the NPI that associates with \( \text{EVEN}_i \) is not focused. After all, if the NPI is not focused, it does not carry an \( i \)-indexed focus feature, and interpreting \( \varphi \) relative to any \( g' \) such that \( g'[i]g \) will yield exactly the same result as interpreting it relative to \( g \) itself. In this case, the non-at-issue content of \( \text{EVEN}_i \varphi \) amounts to \( \top \), the set of all propositions. That is, if the NPI is not focused, the non-at-issue content of \( \text{EVEN}_i \varphi \) is trivial.\(^{31}\)

The second possibility obtains when there is at least one assignment \( g'[i]g \) such that \( \llbracket \varphi \rrbracket^\text{EVEN}_i_+ \not\subseteq \llbracket \varphi \rrbracket^\text{EVEN}_i_+ \) and \( \llbracket \varphi \rrbracket^\text{EVEN}_i_+ \) is salient in the context of utterance \( c \). This condition is satisfied if and only if the NPI that \( \text{EVEN}_i \) associates with is focused, and at least one of the focus alternatives of \( \varphi \) does not entail the ordinary semantic value of \( \varphi \) and is contextually salient. If the condition is met, the non-at-issue content of \( \text{EVEN}_i \varphi \) relative to \( g \) is the set of all propositions consisting of worlds \( \omega \) such that the speaker’s doxastic state in \( \omega \) settles every focus alternative generated by \( \varphi \) which does not entail the ordinary semantic value of \( \varphi \) and is contextually salient, i.e., such that \( \forall g'[i]g. (((\llbracket \varphi \rrbracket^\text{EVEN}_i_+ \not\subseteq \llbracket \varphi \rrbracket^\text{EVEN}_i_+) \land (\llbracket \varphi \rrbracket^\text{EVEN}_i_+ \text{is salient in } c)) \rightarrow \ldots \).

\(^{31}\) Recall that an \( \text{EVEN} \) operator is always initially merged with an NPI, and then moves to the left periphery of a clausal constituent to take sentential scope. We assume an \( \text{EVEN} \) operator can only be co-indexed with the NPI that it is initially merged with. Details on the interpretation of indexed F-features on NPIs are given in Section B.3 below.
(DOX<sub>Sp</sub> ∈ [ϕ]<sup>g</sup><sub>c</sub>). This, on our proposal, is the additive implication of even<sub>c</sub> ϕ if the associated NPI is focused and the contextual saliency requirement is met.

Finally, the third possibility in (165b) obtains when neither of the first two do. This happens when the NPI associated with even is focused but no focus alternative of ϕ is contextually salient, or the salient focus alternatives are all entailed by ϕ itself. In this case, the non-at-issue content of even<sub>c</sub> ϕ is undefined.

B.3 Interpretation of indexed focus features on NPIs

To complete the implementation of the proposal under a selective theory of focus association, we specify how indexed focus features on NPIs are interpreted. Recall that, when any is focused, we assume that either its quantificational parameter ∃ or its domain parameter De carries a focus feature. In the first case, we speak of quantifier focus and in the second case of domain focus. Thus, with indexed focus features, a focused occurrence of any is represented in one of the following two ways:

\[(166)\] a. Quantifier focus: [∃<sub>Fi</sub> De]  
b. Domain focus: [∃ De<sub>Fi</sub>]

Focus features are interpreted as specified in (162) above, which means that:

\[(167)\] [∃<sub>Fi</sub>]\[g\] = \[∃\]\[g\] if \(i \notin \text{Dom}(g)\]  
g(\(i\)) if \(i \in \text{Dom}(g)\]

In this case, focus alternatives g(\(i\)) will be semantic objects of the same type as ∃, i.e., other quantifiers. Similarly:

\[(168)\] [De<sub>Fi</sub>]\[g\] = \[De\]\[g\] if \(i \notin \text{Dom}(g)\]  
g(\(i\)) if \(i \in \text{Dom}(g)\]

In this case, focus alternatives g(\(i\)) will be semantic objects of the same type as De, i.e., other domains. Other contingently emphatic NPIs are treated analogously.

Now recall that on our account inherently emphatic NPIs like lift a finger always carry a focus feature on their threshold parameter in order to mark the contrast with their neutral counterpart. In a theory that assumes selective focus association, they are interpreted as follows:

\[(169)\] [lift a finger]<sup>g,c</sup> = [help d<sub>0,Ft</sub>]<sup>g,c</sup>  
= \[\lambda x.e.\lambda p,w.\forall w \in p.\exists d > d<sub>0</sub>. help(x)(d)(w)\] if \(i \notin \text{Dom}(g)\]  
\[\lambda x.e.\lambda p,w.\forall w \in p.\exists d > g(\(i\)).help(x)(d)(w)\] if \(i \in \text{Dom}(g)\]

where for any g that has i in its domain, g(\(i\)) is some degree of helpfulness, just like d<sub>0</sub><sup>c</sup>.

For all examples discussed in the present paper, the predictions of the account specified above, with selective focus association, match those of the implementation given in the main text, with unselective focus association. The selective account is only needed for cases with multiple foci, like (161).

References


Theiler, N. (2019), ‘When additive particles can associate with wh-phrases’. In *Sinn und Bedeutung*.


