Preposed negation questions with strong NPIs*

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1. Introduction

Polar interrogatives (henceforth PQs) can convey various kinds of biases. For instance, PQs with preposed negation (henceforth PNQs) necessarily convey positive epistemic bias of the speaker (Ladd 1981, Romero and Han 2004), as shown in (1a). In contrast, PQs with strong NPIs such as (prosodically stressed) *ANYTHING* or *lift a finger* (henceforth SNPI-Qs) necessarily convey some kind of negative speaker bias and often have a rhetorical flavor (Borkin 1971, Krifka 1995, Guerzoni 2004), as shown in (1b).

(1) a. *Didn't Mr. Tansley bring something?* PNQs
$\rightsquigarrow$ *Sp* believes/ed that Mr. Tansley likely brought something.

b. *Did Mr. Tansley bring ANYTHING (at all)?* SNPI-Qs
$\rightsquigarrow$ *Sp* believes/ed that Mr. Tansley likely did *not* bring anything.

Given this, one might expect preposed negation and strong NPIs to *not* be able to co-occur in PQs, as they would end up signaling two contradictory biases. However, such a combination (henceforth SNPI-NPQs) is perfectly felicitous, as exemplified in (2).

(2) *Didn't Mr. Tansley bring ANYTHING (at all)?* SNPI-PNQs

While examples of this complex question type appear in work as early as Borkin (1971), not much has been said about how this potential conflict is resolved and what types of biases end up being conveyed by SNPI-PNQs. Instead, Borkin (1971) and van Rooy (2003) suggest that SNPI-PNQs convey essentially the same kind of negative bias as simple SNPI-Qs (cf. Asher and Reese 2005), leading to the prediction that (2) would be functionally equivalent to (1b).

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The empirical goal of this paper is to demonstrate that SNPI-PNQs are in fact associated with more complex, dual dimensions of biases, originating from SNPIs on the one hand and preposed negation on the other. In the process of elucidating the nature of the biases associated with SNPI-PNQs, the paper also clarifies the contextual conditions for felicitous utterances of SNPI-PNQs, which are shown to be systematically more constrained than those for simple PNQs and those for simple SNPI-Qs.

The theoretical goal of this paper is to capture these new empirical observations by proposing a compositional analysis. The analysis adapts Romero and Han (2004)'s analysis of PNQs and van Rooy (2003) and Krifka (1995)'s analyses of SNPI-Qs. The target data for the analysis will come to include not just questions with strong NPIs but also questions with *even* which associates with low endpoints (henceforth $even_L$-(PN)Qs), such as (3). This extension follows naturally from the assumption that SNPI-(PN)Qs convey the same kind of presupposition as *even*-(PN)Qs (Schmerling 1971, Heim 1984).

(3) a. *Did Mr. Tansley even show an INKLING of appreciation?* $even_L$-Qs
$\rightsquigarrow$ *Sp* believes/ed that Mr. T likely did *not* show appreciation.

b. *Didn't Mr. Tansley even show an INKLING of appreciation?* $even_L$-PNQs

The emerging analysis supports a *non*-scopal analysis of the *even*-type presupposition (Kay 1990, van Rooy 2003; see also: Krifka 1995, Lahiri 1998, Abels 2003, Chierchia 2006) over scopal ones (Karttunen and Peters 1979, Wilkinson 1996, Guerzoni 2004). It also makes a case that in order to derive the observed biases in SNPI-PNQs and $even_L$-PNQs, we need an underspecified semantics for *even* that encodes the settledness of alternative issues.

2. Empirical observations

SNPI-PNQs are more restricted in their distributions and more multi-dimensional in their resulting biases than both simple PNQs and simple SNPI-Qs (cf. Borkin 1971, van Rooy 2003; see also: Asher and Reese 2005). Examples in (4) and (5) demonstrate this state of affairs. They instantiate minimal pairs between SNPI-PNQ and PNQ on the one hand, and SNPI-PNQ and SNPI-Q on the other.

First, as demonstrated by (4), SNPI-PNQs are infelicitous in certain contexts that license simple PNQs.

(4) Context: Cam tells Prue that most of the guests forgot to bring food to the potluck party. Prue thinks that Mr. Tansley probably brought food even if others forgot, as he is the most polite.

a. *Didn't Mr. Tansley bring* {*something*|*anything*}*?* PNQ

b. *#Didn't Mr. Tansley bring ANYTHING (at all)?*[1] SNPI-PNQ

[1] Prosodic stress is important – *anything* without stress would be a weak NPI and the PNQ containing it is felicitous, as shown in (4a).

Intuitively, SNPI-PNQs like (4b) appear to be infelicitous in contexts like (4) because they cannot function as out-of-the-blue questions and require specific contexts of use. Asher and Reese (2005) make a similar point for simple SNPI-Qs.

Rendering this intuition more precise, SNPI-PNQs (but not PNQs) seem to require that there be mutually available contextual evidence/assumptions that $\neg p'$, for all p' that are salient, non-minimal alternatives to p. For instance, a speaker can use a SNPI-PNQ such as (4b) *Didn't Mr. Tansley bring ANYTHING?* (with prosodic emphasis on *anything*), only when it is contextually established that Mr. Tansley did *not* bring something of significance. Borkin (1971) and van Rooy (2003) associate essentially the same type of negative contextual condition with simple SNPI-Qs. In sum, the contextual condition argued to be associated with simple SNPI-Qs appears to carry over to the complex question, SNPI-PNQs. In contrast, simple PNQs like (4a) are not subject to this type of contextual constraint, hence its felicity in (4).[2]

In addition, (4) suggests that SNPI-PNQs often convey a kind of negative bias absent in simple PNQs. In particular, the SNPI-PNQ in (4b) likely signals that the speaker is currently more or less resigned to the answer to her question being negative, (i.e., Mr. Tansley did not bring anything; bias towards $\neg p$). This goes against the positive speaker belief contextually specified in (4), hence the added sense of infelicity.[3] In contrast, simple PNQs necessarily convey a positive epistemic bias, which matches the belief description in (4).

For the sake of exposition, the epistemic biases of interlocutors have been folded in as a part of contextual information in (4) and (5). We will nevertheless assume that the biases conveyed by different types of polar questions can be teased apart from the felicity/contextual conditions for these questions, and likely occupy a different level of the explanandum.

Turning now to the contrast between SNPI-PNQs and SNPI-Qs, SNPI-PNQs are also infelicitous in certain contexts that license simple SNPI-Qs. This state of affairs is captured by examples such as (5).

(5) Context: Cam tells Prue that Mr. Tansley forgot to bring his backpack and his binoculars to their yearly expedition. Prue expected this and isn't surprised at all, as she is well accustomed to Mr. Tansley being a huge scatterbrain. But Prue is still curious about whether Mr. Tansley forgot absolutely everything.

a. *Did Mr. Tansley bring ANYTHING (at all)?* SNPI-Q
b. *#Didn't Mr. Tansley bring ANYTHING (at all)?* SNPI-PNQ

[2] This intuition is carried over even when we acknowledge the existence of Ladd (1981)'s ON vs. IN ambiguity, and disambiguate PNQs such as (4a) as IN-PNQs (see sec. 3.1 for more discussion). It is worth noting that IN-PNQs are also argued to be associated with some kind of negative evidential bias (Büring and Gunlogson 2000, Romero and Han 2004), and not just with positive speaker epistemic bias. However, the characterization of this negative bias differs from the distinctive negative bias of SNPI-PNQs outlined here: IN-PNQs do *not* require that all p' alternatives to p be resolved to negative answers; roughly speaking, they instead presume a weak addressee/contextual bias towards $\neg p$ itself.

[3] As will be shown later, this kind of negative epistemic bias is not always or irrevocably conveyed by SNPI-PNQs or simple SNPI-Qs. However, it often emerges as a byproduct of the negative context condition. See sec. 4.2 for more discussion.

Intuitively, the SNPI-PNQ in (5b) is infelicitous because it necessarily conveys some kind of previous speaker expectation towards *p* (the positive answer), which goes against the negative prior belief contextually specified in (5). In particular, the SNPI-PNQ appears to generate the inference that the speaker's *prior* expectation was as follows: Mr. Tansley brought, or at least should have brought something.

Combined with the negative context condition we observed in (4), SNPI-PNQs often end up conveying surprise, incredulity, or violation of speaker expectation. This kind of 'contra the (epistemic or deontic) prior expectation' inference is systematically lacking in simple SNPI-Qs. These merely convey negative bias, and the speaker's prior expectation is often understood to be in alignment with her current expectation: both are biased towards the negative answer. This unilateral negative bias facilitates rhetorical interpretations of them, whereas such interpretations become more difficult or at least more nuanced in the case of SNPI-PNQs.

To summarize, SNPI-PNQs like *Didn't Mr. Tansley bring ANYTHING?* are associated with a particular kind of negative bias absent in simple PNQs, as well as with positive (prior) epistemic bias absent in simple SNPI-Qs. These observations carry over to SNPI-PNQs involving minimizer NPIs, such as *Didn't Mr. Tansley lift a finger to help?* The main intuitions outlined in this section have been corroborated by multiple native speakers as well as by data from a pilot experiment.[4]

3. Pieces that come together

Having established the empirical generalizations, the next question that emerges is how the dual biases observed in SNPI-PNQs can be systematically derived. Given a SNPI-PNQ like the one in (6), we want the analysis to be able to derive both the negative bias in (6a) and the positive bias in (6b).

(6) *Didn't Mr. Tansley bring ANYTHING (at all)?* SNPI-PNQs

a. *Sp* acknowledges that it is contextually established that Mr. T did *not* bring anything of significance. *negative*

b. *Sp* previously believed that Mr. T likely brought, or at least, should have brought something. *positive*

Given the minimal pairs we examined in (4) and (5), the distinctive negative bias of SNPI-PNQs must come from the strong NPI, and the distinctive positive bias of SNPI-PNQs must come from the preposed negation (PN). Our aim is thus to develop an analysis of SNPI-PNQs that correctly predicts the respective contributions of PN on the one hand and SNPI on the other, *and* captures the *co-existence* of the resulting biases.

Various analyses have been proposed to account for the positive bias of PNQs, and the negative bias of SNPI-Qs. The question that naturally follows, is which combinations of these analyses make correct predictions for the new data on SNPI-PNQs and which don't.

[4]The results of the experimental study are provided in Jeong (2019).

As we will see in more detail in sec. 4.2, the choice of the analysis for PNQs becomes somewhat orthogonal to capturing the data at hand (though see also sec. 4.3), as different analyses of PNQs (Romero and Han 2004, Krifka 2015, Goodhue 2018, Frana and Rawlins 2019) can derive essentially the same predictions (provided that they combine with a particular analysis of SNPI-Qs). For reasons of space and concreteness however, we will fix the analysis of PNQs by adopting the one by Romero and Han (2004), while also briefly noting how alternative analyses would arrive at similar predictions.

In contrast, different analyses of SNPI-Qs make diverging predictions about the new SNPI-PNQ data, and by extension, $even_L$-PNQs. The rest of the paper will be devoted to comparing these predictions and establishing that only a non-scopal analysis of *even*-type presuppositions can derive the observed dual biases of SNPI-PNQs.

In preparation for this, let us briefly examine the analysis of PNQs by Romero and Han (2004), as it will be adopted in the main analysis. We will then go over some shared assumptions and key differences that characterize contrasting analyses of SNPI-Qs.

3.1 The analysis of preposed negation questions

Many analyses of PNQs posit the presence of a covert conversational operator to derive the positive bias of PNQs. For Romero and Han (2004), the operator necessarily contributed by the preposed negation is VERUM, defined as in (7), where $\text{Epi}_x(w)$ stands for sets of worlds that reflect x's epistemic state, and $\text{Conv}_x(w)$ stands for sets of worlds that reflect x's conversational goals in w.

(7) $[\![\text{VERUM}_i]\!]^{gx/i} = \lambda p\, \lambda w. \forall w' \in \text{Epi}_x(w)[\forall w'' \in \text{Conv}_x(w')[p \in \text{CG}_{w''}]]$
$= \text{F}\textsc{or}\text{-S}\textsc{ure}\text{-CG}_x\text{-}p$

Following (7), VERUM(p) translates roughly onto: 'it is for sure that we should add p to the common ground (CG)', or 'we should really add p to the CG' (abbreviated as $\text{F}\textsc{or}\text{-S}\textsc{ure}\text{-CG}_x\text{-}p$).

Building on Ladd (1981)'s observations, Romero and Han (2004) additionally assume that PNQs by themselves are often ambiguous between ON-PNQs, where negation scopes over VERUM (outer negation), and IN-PNQs, where negation scopes below VERUM (inner negation). If we acknowledge the existence of this ambiguity, SNPI-PNQs would necessarily be cases of IN-PNQs, by virtue of the presense of the SNPI (whose licensing is argued to be dependent on an inner negation).

For now, we will therefore focus on examining how the positive speaker epistemic bias is derived from IN-PNQs. (Though see sec. 4.2 for an alternative, outer negation analysis.) According to Romero and Han (2004), a simple IN-PNQ like (8) would have an LF as in (8a) with an inner negation, and would yield the answer partition in (8b), given a standard polar question operator Q_{pol} defined as in (19a).

The partitions in (8b) are argued to be skewed, compared to the basic partitions generated by a simple polar question $\{p, \neg p\}$. Additionally, the pronounced cell of the partitions (underlined) is argued to instantiate the proposition that the speaker wants to double check. The biased partitions and the pronounced cell, together with some general epistemic and conversational principles, thus effectively end up conveying: *Should we really add* $\neg p$ *to the CG?* In short, the IN-PNQ has the function of double-checking the presumed addressee bias towards $\neg p$ and requiring further justification for it. This in turn signals that the speaker has some reason to doubt $\neg p$, namely, because she was previously (and perhaps is still) biased towards p.

(8) Didn't Mr. Tansley bring anything?

a. LF: $[_{CP}\ Q_{pol}$ VERUM [not $[_{IP}$ Mr. Tansley brought anything]]]

b. $[\![\mathrm{CP}]\!](w_0)$ = {<u>It is for sure that we should add to CG that Mr. Tansley did *not* bring anything</u>, It is not for sure that we should add to CG that Mr. Tansley did *not* bring anything}

Sec. 4.2 demonstrates that this analysis extends naturally to derive the positive bias of the complex question construction: SNPI-(IN)-PNQs.

3.2 Analyses of *even*-type questions with strong NPIs

Let us now turn to the analyses of SNPI-Qs. In accounting for SNPI-Qs, most analyses share the core assumption that strong NPIs contribute a kind of covert $[\![$*even*$]\!]$ operator and/or share their presuppositions with *even* (Schmerling 1971, Heim 1984, Krifka 1995, Lahiri 1998). SNPI-Qs are thus often considered to be a subtype of *even*-questions where *even* associates with a focused element that denotes minimal values, which in this case is the strong NPI.[5] Such an assumption is corroborated by the observation that SNPI-Qs with or without *even* are functionally equivalent and generate the same kind of presupposition, as shown in (9).

(9) a. *Did Mr. Carmichael lift a finger to help?*
b. *Did Mr. Carmichael even lift a finger to help?*

In particular, both questions in (9) appear to presuppose that lifting a finger to help is the easiest, or the most likely action that Mr. Carmichael could have taken, given contextually salient alternatives. But what of the distinctive negative bias shared by them? How do we derive this from $even_L$-Qs? The issue is part of the broader question of why *even*-Qs in general can be ambiguous between two contrary presuppositions (easyP vs. hardP; see below), and why only those with the easyP presupposition convey negative bias.

More specifically, when it isn't clear from the context/content whether the focused element that associates with *even* denotes the highest or lowest endpoint of a contextually salient scale (e.g., *problem 2* in (10)), *even*-Qs can be ambiguous in terms of their presupposition, as exemplified in (10). Following Guerzoni (2004), we paraphrase the two contrary presuppositions as hardP and easyP.

[5] Though unlike regular $even_L$-(PN)Qs, SNPI-(PN)Qs will be argued to be associated with an additional property of domain widening; see sec. 4.2.

(10) *Can Lily even solve PROBLEM 2?*
$\rightsquigarrow$ P2 is the least likely (hardest) problem that Lily can solve (**hardP**)
$\rightsquigarrow$ P2 is the most likely (easiest) problem that Lily can solve (**easyP**)

When context/content clarifies whether the focused element denotes the highest vs. lowest endpoint, the ambiguity goes away, as shown in (11). Crucially, the distinctive negative bias (bias towards $\neg p$) arises only when the *even*-Q associates with a lowest endpoint and conveys the easyP presupposition. As mentioned earlier, SNPI-Qs like (11c) can be construed as a subtype of these $even_L$-Qs.

(11) a. *Can Lily even solve <u>this challenging problem</u>?* HIGH endpoint
$\rightsquigarrow$ **hardP**, no bias

b. *Can Lily even solve <u>2+2</u>?* LOW endpoint
$\rightsquigarrow$ **easyP**, negative bias

c. *Did Lily (even) bring <u>ANYTHING</u> (at all)?* LOW endpoint
$\rightsquigarrow$ **easyP**, negative bias

Accounts of SNPI-Qs and *even*-Qs diverge as to (i) how the ambiguity between easyP and hardP is derived, and (ii) how the negative bias of $even_L$-Qs is accounted for. Here, we focus on (ii) and contrast two types of account. The first is a scopal account, which directly encodes hardP as a part of the meaning of *even* and derives easyP from *even* scoping over certain operators like negation. The second is a non-scopal account, which posits a more underspecified, informativity-based meaning for *even*. The next section compares the two types of approaches as a way of working towards a successful analysis of SNPI-PNQs.[6]

4. Analysis

We first aim to construct an analysis of SPNI-PNQ based on a scopal account of *even*-Qs, and demonstrate that it runs into problems. We then establish a successful analysis of SNPI-PNQs, which crucially relies on an informativity based account of *even*-Qs.

4.1 Can a scopal account capture the SNPI-PNQ data?

Perhaps the most widely adopted analysis of *even* is the likelihood-based one by Karttunen and Peters (1979). The analysis essentially posits hardP (lower likelihood of p) as the core meaning of *even*.[7] Guerzoni (2004)'s adaptation of this account is provided in (12).

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[6]Yet another type of analysis is the lexical ambiguity account (Rooth 1985, Giannakidou 2007), which argues that there exists two types of *even*; one in (12) with the hardP presupposition, and the other ($even_{NPI}$) with the opposite easyP presupposition. For reasons of space, we will not go over them in detail here.

[7]In addition to a scalar presupposition along the line of (12), Karttunen and Peters (1979) also posits an existential presupposition which we will not concern ourselves with here.

(12) *The semantics of 'even': the scopal account*

$[\![even]\!] = \lambda C.\lambda p : \forall q [q \in C \wedge q \neq p \rightarrow q >_{likely} p]. p$ (Guerzoni 2004: p. 326)

where C is a set of contextually defined alternative propositions

In order to account for the existence of the apparently contrary presupposition, namely, easyP, Karttunen and Peters (1979), Wilkinson (1996), and Guerzoni (2004) provide a scopal account of $[\![even]\!]$, which builds on the lexical entry in (12). When $[\![even]\!]$ in (12) scopes over certain operators like negation, we arrive at the contrary inference: easyP, as exemplified in (13). In sum, even(p) results in hardP, and even($\neg p$) results in easyP, given (12).

(13) *Lily Briscoe didn't even pick up her paint brush.* $\rightarrow [\![even]\!](\neg p)$

a. L not picking up the brush ($\neg p$) is the least likely **hard($\neg$P)**

b. L picking up the brush (p) is the most likely **easyP**

The derivation of easyP from the single core meaning of hardP goes some way towards capturing the easyP vs. hardP ambiguity. However, it cannot by itself account for: (i) the presence of this ambiguity in *questions*, and (ii) the negative bias of *even$_L$*-Qs, of which SNPI-Qs are a subtype. In order to address these issues, Guerzoni (2004) extends the scopal account as follows. First, she posits a covert *whether* operator in (14a) for polar interrogatives. Its function can be roughly translated as: which of yes or no.[8]

(14) a. $[\![whether]\!] = \lambda f_{\langle\langle st,st\rangle,\langle st,t\rangle\rangle}.\{p : \exists h_{\langle t,t\rangle}[(h = \lambda p.p \vee h = \lambda p.\neg p) \wedge p \in f(h)]\}$

b. $[\![Q]\!] = \lambda q.\{q\}$

The trace of this *whether*, namely, t_1 in (15b), may scope over or below *even*. When it scopes above *even*, the resulting answer partition is $\{[\![even]\!](p), \neg[\![even]\!](p)\}$, where both 'yes'/'no' answers convey the hardP presupposition. When it scopes below *even*, the resulting partition is $\{[\![even]\!](p), [\![even]\!](\neg p)\}$, where the 'yes' answer conveys hardP and the 'no' answer conveys easyP presupposition.

Guerzoni then argues that in the case of *even$_L$*-Qs and SNPI-Qs, only the negative answer in one of the two possible LFs ($[\![even]\!](\neg p)$ in (15b)) satisfies the contextual presupposition presumed by the questioner. This is because when the focused element (NPI in the case of SNPI-Qs) denotes the lowest endpoint of a contextually salient scale, it generates the easyP presupposition. In sum, in *even$_L$*-Qs and SNPI-Qs, only the negative 'no' answer, $[\![even]\!](\neg p)$, is effectively entertained by the speaker, as it is the only answer that satisfies the presupposition conveyed by the question.

(15) *Did Mr. Tansley bring ANYTHING at all?*

a. [Whether$_1$ [Q [$t_{1\langle st,st\rangle}$ [*even* [Mr. Tansley brought ANYTHING (=p)]]]]]

$= \{\cancel{[\![even]\!](p)}, \cancel{\neg[\![even]\!](p)}\}$

[8] For the sake of simplicity, we do away with the *wh*-quantifying rule that Guerzoni (2004) adopts from Karttunen (1977), and instead treat *wh*-words as question quantifiers. This calls for (14b).

b. $[\text{Whether}_1\,[Q\,[t_{1\langle st,st\rangle}\,[\textit{even}\,[\text{ Mr. Tansley brought anything } (=p)\,]]]]]$
$= \{\cancel{[\![\textit{even}]\!](p)}, [\![\textit{even}]\!](\neg p)\}$

The analysis by Guerzoni provides a unified account that can capture both the potential ambiguity of *even* questions, and the negative bias of $\textit{even}_L$-Qs. It also has the advantage of capturing the asymmetry in bias between $\textit{even}_L$ vs. $\textit{even}_H$-Qs. *Even*-questions that associate with high endpoints such as (11) is naturally predicted to not convey any bias, because in this case, there exists an LF that results in a partition in which both answers satisfy the contextual presupposition: hardP (the partition of type $\{[\![\textit{even}]\!](p), \neg[\![\textit{even}]\!](p)\}$).

However, as it stands, a scopal account of *even* like that of Guerzoni cannot predict the dual biases of SNPI-PNQs. The reason for this is as follows. Under this account, the introduction of preposed negation in SNPI-PNQs would give way to 24 (= 4!) logically possible orderings of four relevant operators, namely: VERUM, $\neg$, $[\![\textit{even}]\!]$, and trace t_1 of *whether*. The main problem is that no matter which of these ordering we adopt, we can only derive a uni-dimensional bias from a given LF.

For instance, let us assume an intuitive ordering where $[\![\textit{even}]\!]$ scopes below the trace of *whether* and VERUM, as in (16).

(16) $[\text{whether}_1\,[Q\,[t_1\,[\text{VERUM}\,[\textit{even}\,[\text{not}\,[\text{Mr. T brought anything } (=p)]]]]]]]$
$= \{\underline{[\![\text{FOR-SURE-CG-}\textit{even}(\neg p)]\!]}, [\![\neg\text{FOR-SURE-CG-}\textit{even}(\neg p)]\!]\}$

From this LF, only the positive bias can be predicted. This is because both Yes/No answers are now predicted to be effectively entertained by the speaker, as both cells satisfy the easyP presupposition.[9] Since the resulting question denotation is essentially the same as that of simple IN-PNQs, the question ends up merely conveying: *should we really add* $\neg p$ *to the CG?*, and presupposing: *p is most likely*, resulting in a uni-dimensional positive bias.

In a parallel fashion, consider an alternative ordering where $[\![\textit{even}]\!]$ scopes above the trace of *whether*.

(17) $[\text{Whether}_1\,[Q\,[\text{VERUM}\,[\textit{even}\,[t_1\,[\text{not}\,[\text{ Mr. brought anything } (=p)\,]]]]]]]$
$= \{\underline{\text{FOR-SURE-CG-}[\![\textit{even}]\!](\neg p)}, \cancel{\text{FOR-SURE-CG-}[\![\textit{even}]\!](p)}\}$

This time, only the negative bias is predicted.[10] This is because only the 'No' answer is predicted to be effectively entertained by the speaker (the 'Yes' answer is categorically crossed out), as this is the only cell that satisfies the easyP presupposition presumed by the question/context. Even with the presence of an extra VERUM operator, the question thus merely ends up conveying what is denoted by the negative answer, namely, *We should really add* $\neg p$ *to the CG*, resulting in a uni-dimensional negative bias.

[9] This follows from *even* scoping over the inner negation in both answers.
[10] The latter answer cell in (17) is derived from VERUM($[\![\textit{even}]\!](\neg\neg p)$).

To recapitulate, a scopal account of *even*-type presuppositions in *even*-Qs and SNPI-Qs can be adapted to provide an intuitive analysis of their negative bias. However, it cannot be extended to capture the new SNPI-PNQ data. The main issue that it faces is that the co-existence of two types of biases in SNPI-PNQs cannot be derived from any given LF. This problem persists even when we adopt alternative analyses of PNQs (Krifka 2015, Goodhue 2018), although space limitations prevent us from going over these in detail.[11]

4.2 The proposed analysis of SNPI-PNQs

The discussion from the previous section suggests that the way in which the scopal account derives the negative bias of $even_L$-Qs is not flexible enough to derive the co-existence of positive and negative biases in SNPI-PNQs. This section argues that deriving the negative bias in a different way, crucially by positing a different kind of semantics for the (covert) *even*, helps us get out of this bind.

The present analysis of SNPI-PNQs is inspired by Borkin (1971), Kay (1990), Kadmon and Landman (1993), Krifka (1995), Lahiri (1998), Abels (2003), van Rooy (2003), Guerzoni (2004), and Chierchia (2006). Its main explanatory power comes from a settledness-based approach to *even*-type presupposition, akin to the one proposed in van Rooy (2003) (see also Borkin (1971)).

More specifically, the analysis assumes that SNPIs contribute a silent *even* operator, which generates a not-at-issue, presuppositional meaning. The entry for this SNPI-*even* is defined as in (18).[12]

(18) *The semantics of $even_{SNPI}$: the current account*

$$[\![even_{SNPI}]\!] = \lambda C.\lambda p : \forall q\,[q \in C \wedge q \neq p \rightarrow q \in \text{CG} \vee \neg q \in \text{CG}].\, p$$

where C is a set of contextually defined alternative propositions

Following Guerzoni (2004), we assume that *even* is a two-place partial function that takes p and returns the same proposition if certain conditions are met. Unlike Guerzoni (2004) however, these conditions are not defined in terms of lower likelihood but rather in terms of informativity, as follows: for all q that are contextually salient alternatives to p, the issue of whether q has been resolved, such that either $\neg q$ or q is already in the common ground (CG). This entry for *even* builds on van Rooy (2003)'s idea that SNPI-Qs come with a presupposition that the issues concerning all contextually salient alternatives to the SNPI have been settled (see also Borkin (1971) and Abels (2003)).

[11] Detailed discussions are presented in the NELS handout and Jeong (2019).

[12] While (18) focuses primarily on capturing the bias of SNPI-(PN)Qs, the central idea behind it can be extended to provide a unified account of SNPIs in both statements and questions. Informally speaking, the settledness condition when applied to statements is predicted to target the propositional issue $\{\neg p\}$ (a negative/DE statement that licenses the SNPI), thereby conveying the settledness of $\{\neg p'\}$ alternatives; when applied to questions as in (18), it is predicted to target the inquisitive issue $\{p, \neg p\}$ (*whether p*), thereby signaling the settledness of alternative questions $\{p', \neg p'\}$ (*whether p′*). I am indebted to Floris Roelofsen for suggesting this line of extension. More details can be found in Jeong (2019).

Following Kadmon and Landman (1993) and van Rooy (2003), the analysis also posits that SNPIs have a domain widening effect. Finally, as mentioned earlier, it also posits that the preposed negation contributes a silent VERUM operator, repeated in (19b), and assumes a standard Hamblin-style polar interrogative operator in (19a).

(19) a. $[\![Q_{pol}]\!] = \lambda p \lambda w \lambda q\,[q = p \vee q = \neg p]$ (Hamblin 1971)

b. $[\![\text{VERUM}_i]\!]^{gx/i} = \lambda p\, \lambda w. \forall w' \in \text{Epi}_x(w)[\forall w'' \in \text{Conv}_x(w')[p \in \text{CG}_{w''}]]$
$= \text{FOR-SURE-CG}_x\text{-}p$ (Romero and Han 2004)

Equipped with these components, let us see if both the positive and the negative bias can be derived from an SNPI-PNQ like the one in (20a). Assuming that the LF of (20a) is as in (20b), we end up with the answer partition in (20c).

(20) a. *Didn't Mr. Tansley (even) bring ANYTHING (at all)?*

b. $[\,Q_{pol}\,[\,$VERUM$\,[\,$*even*$\,[\,\neg\,[$ Mr. Tansley brought ANYTHING at all (= p)]]]]]

c. $\{\underline{[\![\text{FOR-SURE-CG-}even(\neg p)]\!]}, \neg\text{FOR-SURE-CG-}[\![even(\neg p)]\!]\}$

Given our theory of preposed negation and *even*, both the negative bias and the positive epistemic bias can now be derived. Let us begin with the negative bias. From (18), it follows that all issues involving alternatives to $\neg p$, namely, *whether* $(\neg)p'$, have been settled.[13] If *whether* $(\neg)p'$ were settled to p', then *whether* $(\neg)p$ would not have been questionable. This is because by definition, the SNPI in p denotes the lowest endpoint of the contextually salient scale (i.e., minimum value in the alternative set).

For instance, if the issue concerning a non-minimal alternative, namely, 'whether Mr. T brought something' (p') were settled to yes, then the issue concerning the SNPI itself, namely, 'whether Mr. T brought anything' (p) would have been automatically settled to yes as well. Therefore, the very fact that *whether p* is questionable suggests that all *whether* p' issues have been settled to $\neg p'$. We have thus successfully derived the distinctive negative context conditions that characterize SNPI-PNQs. The reasoning outlined here is analogous to van Rooy (2003)'s account of simple SNPI-Qs.

The frequent negative speaker bias that accompanies SNPI-PNQs can also be predicted. By her choice of the SNPI, the speaker additionally made the move of actively widening the domain of x for the issue of *Did Mr. T bring x?* Combined with her assumption that the answer to all *whether x* questions prior to domain widening have been settled with negative answers, the speaker is likely somewhat resigned to the answer to the question after the domain widening being negative as well. However, such a negative bias is not expected to arise inexorably from SNPI-PNQs, and genuine information-seeking questions are correctly predicted to be available for SNPI-PNQs. We saw one such example in (4a).

Let us now turn to positive (prior) epistemic bias. This can be derived in the same way as in simple (IN-)PNQs, because the LFs in the two cases are essentially identical. As the meaning contributed by *even* is assumed to be not-at-issue and not a target of the meta-conversational move arising from VERUM, the SNPI-PNQ in (20a) can be construed as

[13] Given (19a), *whether* $\neg p'/\neg p$ is equivalent to *whether* p'/p.

having functionally equivalent answer partitions as simple (IN-)PNQs. It is thus predicted to convey the same type of question as simple (IN-)PNQs, namely, 'Should we really add $\neg p$ to the CG?' This then naturally predicts a prior epistemic or deontic bias towards p.

In sum, the current analysis correctly captures the following observations: By uttering SNPI-NPQs, the speaker presumes $\neg p'$ for all p' that are contextually salient alternatives to p, thereby often conveying some current bias towards $\neg p$ as well. At the same time, by uttering SNPI-NPQs, the speaker also makes the meta-conversational move of requesting further justification for adding $\neg p$ to the CG, thereby signaling attitudes in the vein of incredulity or indignation about adding $\neg p$ to the CG.

While we have adopted Romero and Han (2004)'s analysis to capture the contribution of PN, the predictive power of the analysis does not hinge critically on which type of analysis we adopt for PNQs. For instance, let us consider an alternative analysis by Goodhue (2018), based on Krifka (2015), which argues against the ON vs. IN-PNQ ambiguity and proposes a high negation analysis. Under this analysis, no separate conversational operator is introduced by the PN, and the bias is derived from the interaction of PN with ASSERT, or equivalently, $\Box$. Adopting this analysis, our SNPI-PNQ would result in the LF in (21a).[14]

(21) a. $[Q_{pol}\,[\neg\,[\Box\,[\textit{even}\,[\text{Mr. Tansley brought ANYTHING at all } (=p)]]]]]$
b. $\{\neg\Box[\![\textit{even}]\!](p), \Box[\![\textit{even}]\!](p)\}$

The negative context conditions can again be derived from (18) in the same way: the very fact that *whether p* is questionable signals that all *whether p′* issues have been settled to negative. This in turn often ends up signaling bias towards $\neg p$ as well. The positive epistemic bias can also be derived, this time via a different mechanism. (21a) yields the partition in (21b), where both answer cells are compatible with p. Goodhue (2018) demonstrates that if the speaker did not have epistemic bias towards p, this would be a suboptimal way of asking a question about p, hence the inference of positive bias.

Our analysis extends straightforwardly to the general case of $\textit{even}_L$-PNQs like (22).

(22) *Didn't Mr. Tansley even show an INKLING of appreciation?*

Here again, the positive epistemic bias can be derived from any of the PNQ analyses mentioned above. The negative bias can be derived in the same way as in (20a)-(21a), as long as we assume that the following information is lexically or contextually provided: the focused element that associates with *even* (e.g., *inkling*) denotes a minimum/weakest value compared to its alternatives. An open question is whether this information needs to be provided by *even* (in addition to the settledness condition), or whether it can be provided by the context and/or the semantics of the focused element (see sec. 4.3 for more discussion).

To recapitulate, the current analysis demonstrates that adopting a settledness-based account of *even*-type presuppositions in SNPIs enables us to derive the dual biases of SNPI-PNQs and $\textit{even}_L$-PNQs.

[14] Substituting $\Box$ with VERUM in (21a) gives us Romero and Han (2004)'s analysis of ON-PNQs.

4.3 Extending the account of *even*

We have seen that the settledness-based approach to *even* is crucial in predicting the biases of *even*-type SNPI-PNQs. We have also been able to extend our explananda to not just SNPI-PNQs with covert *even*, but also $even_L$-PNQs with overt *even*.

However, this extension required an additional step. The inference that the focused value is weaker (i.e., less likely) than its alternatives also needed to be provided somehow. In the case of SNPI-PNQs, it is natural to assume that such an inference is independently and lexically encoded in the NPI. For instance, *anything* and the non-negated proposition containing it denotes the weakest, most general item/proposition among its alternatives. In the case of 'overt *even* + focused item' however, this strength/likelihood based inference is most likely contributed by *even* rather than the focused item. For instance, in (23), nothing about landscapes or watercolors suggests that they are intrinsically weaker or stronger (less likely or more likely) than their conceivable alternatives.

(23) a. *Lily can even paint LANDSCAPES.*
b. *Lily can't even paint WATERCOLORS.*

In sum, while the settledness-based semantics of *even* is a crucial and necessary meaning component in accounting for the biases of SNPI-(PN)Qs and $even_L$-(PN)Qs, it may need to be complemented by a strength- or likelihood-based meaning component in order to adequately capture cases of overt *even* (see for instance Karttunen and Peters (1979), Kay (1990), and Chierchia (2006) for possible analyses of this component).

5. Conclusion

This paper made a case that SNPI-PNQs are a genuine hybrid of SNPI-Qs and PNQs, which ends up signaling multi-faceted biases. It argued that deriving these dual biases calls for an underspecified entry for *even*, and a non-scopal account of its presupposition. The current analysis provides yet another instance where question biases emerge primarily from informativity related considerations and pragmatic reasoning, rather than being lexically encoded or compositionally enforced.

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