

Annual Review of Linguistics Biased Polar Questions

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Keywords

bias, polar question, original speaker bias, contextual evidence bias, negation, high negation

Abstract

Although the following polar question forms raise the same issue, the positive question *Is Jane coming?*, the low negation question *Is Jane not coming?*, and the high negation question *Isn't Jane coming?* cannot be used interchangeably because they are sensitive to the expectations that the speaker may originally have (original speaker bias) and to contextual evidence that becomes available during the conversational exchange (contextual evidence bias). This article summarizes the aspects of these constructions on which agreement has been reached and identifies central points of empirical and theoretical divergence in the literature; further, it critically reviews current attempts to derive original speaker bias in high negation questions as well as the asymmetry between positive questions and low negation questions with respect to contextual evidence bias.

1. INTRODUCTION

Polar question (PQ) forms 1–3 raise, intuitively, the same issue. For a given proposition p (= "Jane is coming" in our examples), they raise the issue of which one of the possible resolutions in { $p, \neg p$ } is true:

(1)	Is Jane coming?	Positive question (PosQ)
(2)	Is Jane not coming?	Low negation question (LoNQ)
(3)	Isn't Jane coming?	High negation question (HiNQ)

Yet, despite arguably having the same truth-conditional content (à la Karttunen 1977, Groenendijk & Stokhof 1984), forms 1–3 cannot be used interchangeably: They differ in terms of bias. For instance, in an unbiased context like example 4, a PosQ can be felicitously used, but LoNQs and HiNQs are infelicitous:

(4)	[Scenario: An immigration officer in Europe welcomes the next traveler, about whose
	citizenship he has no previous expectations or contextual cues, and asks:]

(4a)	Are you a European citizen?	PosQ
(4b)	# Are you not a European citizen?	LoNQ
(4c)	# Aren't you a European citizen?	HiNQ

Two kinds of bias have been identified as relevant to the choice of PQ form in the literature: original speaker bias and contextual evidence bias (Ladd 1981, Büring & Gunlogson 2000, Romero & Han 2004).¹ Since these pioneering works, a lively debate has ensued in the literature, resulting in partial and at times divergent empirical characterizations and a wealth of competing theoretical approaches. This review cannot do proper justice to them all; rather, it presents the chief advances in the literature and focuses on the current main theoretical contenders, identifying the most important open issues at the present time.

The rest of the review is structured as follows. Section 2 presents the basic empirical distinctions brought to light in early work, both for original speaker bias and for contextual evidence bias, and summarizes important points in which consensus has been reached in the literature. Section 3 focuses on original speaker bias in HiNQs and critically discusses current open issues: the status of Ladd's inner negation reading (Section 3.1), the dimension of meaning responsible for the bias (Section 3.2), and the derivation of the existence and orientation of the bias (Section 3.3). Section 4 turns to contextual evidence bias in PosQs and LoNQs, identifies points of empirical disconnection (Section 4.1), and presents current theoretical approaches (Section 4.2). Section 5 concludes.

2. FUNDAMENTAL EMPIRICAL DISTINCTIONS

We start with original speaker bias. This kind of bias concerns the speaker's original expectations before the current conversational exchange, defined as follows:

¹For original speaker bias, this review focuses on epistemic modality (based on knowledge or belief) because this has been the main concern in the literature. For other perspectives, readers are referred to Huddleston & Pullum (2002) and Reese (2007) on original speaker bias featuring bouletic modality (based on desires) or deontic modality (based on rules or laws).

(5) Original speaker bias for a proposition *p*:

Belief or expectation of the speaker that *p* is true, based on her epistemic state prior to the current situational context and conversational exchange.

(Domaneschi et al. 2017)

PosQs of shape [p?] can be used in neutral contexts, as shown in example 4a. Among the negative versions, HiNQs of shape [n't p?] mandatorily convey original speaker bias for p (Ladd 1981), as in example 6. In contrast, LoNQs of shape [not p?] can be used by a neutral speaker that had no original expectation for or against p (Han 1999, Romero & Han 2004); witness the contrast in example 7:²

- (6) A: OK, now that Stephan has come, we are all here. Let's go!
 S: Isn't Jane coming? ~~ Bias for "Jane is coming" (Romero & Han 2004)
- Scenario: S is in charge of supplying the nonalcoholic beverages for a party. S is going through the list of guests. S has no previous belief or expectation about their drinking habits.
 A: Jane and Mary do not drink.
 - S: a. OK. What about John? Does he not drink? \cdots No bias for "John drinks" b. # OK. What about John? Doesn't he drink? \cdots Bias for "John drinks"

(Shortened from Romero & Han 2004)

While being biased for *p*, Ladd (1981) argues that HiNQs are ambiguous between an outer and an inner negation reading. In the outer negation reading, illustrated in example 8, the speaker double-checks the positive proposition *p* (= "that there is a vegetarian restaurant around here"). In the inner negation reading, the speaker intuitively double-checks the negative proposition $\neg p$ (= "that there isn't a vegetarian restaurant around here"), as in example 9. The presence of positive polarity items (PPIs) like *someone*, *already*, and *too* disambiguates toward the outer reading, while the presence of negative polarity items (NPIs) like *anyone*, *yet*, and *either* is said to enforce the inner reading (Ladd 1981), as in example 10:³

(8) A: You guys must be starving. You want to get something to eat?
S: Yeah, isn't there a (/some) vegetarian restaurant around here?
(Ladd 1981) Outer-HiNQ (in suggestion scenario)

- (i) A: After all the studying he did, Tom got an A in Ling106.
 - S: a. Did he really study for that class? \rightarrow Bias for "¬(Tom studied for Ling106)"
 - b. DID he study for that class? \rightarrow Bias for "¬(Tom studied for Ling106)"

²There also exist positive PQs that mandatorily convey original speaker bias. This is, for instance, the case of *really*-PosQs of shape [*really p?*], which mandatorily convey original bias for $\neg p$, as illustrated in example i.S.a (Romero & Han 2004). PosQs with focal accent on the tensed auxiliary can be used in a parallel way to *really*-PosQs to express original speaker bias for $\neg p$, as in example i.S.b (Focus-PosQs). However, as this focal accent may have other functions (e.g., simple polarity contrast à la Rooth 1992, dictum focus à la Creswell 2000), this bias is not mandatory (Romero & Han 2004, fn. 14; Goodhue 2018, 2022a) (we leave these two forms out of this review due to space limitations):

³For a discussion of NPIs versus the related phenomenon of negative concord, readers are referred to Zeijlstra (2016).

	PosQ	LoNQ	Hil	NQ
Original speaker bias	p?	Not p?	Outer <i>n't</i> p _{PPI} ?	Inner <i>n't p</i> _{NPI} ?
Bias for <i>p</i>	Not tested	\checkmark	\checkmark	\checkmark
Neutral	~	\checkmark	*	*
For $\neg p$	\checkmark	Not tested	*	*

Table 1 Summary of Ladd (1981) and Romero & Han (2004) on original speaker bias

Abbreviations: HiNQ, high negation question; LoNQ, low negation question; NPI, negative polarity item; PosQ, positive question; PPI, positive polarity item.

(9)	S: I'd like to take you guys out to dinner while around here before the evening session tonigh A: I guess, but there's not really any place to g	e I'm her 1t, don't 70 in Hyd	re—we'd have you think? de Park.	e time to go somewhere
	S: Oh, really, isn't there a (/any) vegetarian res (Ladd 1981)	staurant Inner-F	around here? HiNQ (in con	tradiction scenario)
(10a) (10b)	Hasn't Ariel danced with someone/already/to Hasn't Ariel danced with anyone/yet/either?	* •	√Outer [∗] Outer	*Inner √Inner

The main observations about original speaker bias are summarized in Table 1.4

We now turn to contextual evidence bias (Büring & Gunlogson 2000). This second kind of bias is concerned with expectations triggered in the speaker by evidence arising in the current conversational exchange (possibly contradicting the original expectation of the speaker), defined as follows:

(11) Contextual evidence bias for a proposition *p*:

Expectation that *p* is true (NB: possibly contradicting prior belief of the speaker) induced by evidence that has just become mutually available to the participants in the current discourse situation.

(Büring & Gunlogson 2000)

To see how this second kind of bias affects PQ forms, consider a scenario where S and A want to go out for dinner. Depending on whether A's intervention provides contextual evidence for p (= "there is a vegetarian restaurant around here"), as in example 12, no evidence on p, as in example 13, or evidence against p, as in example 14, different PQ forms are felicitous:⁵

- (12) A: I bet you can find any type of restaurant you can think of in this city. Make your choice! (Contextual evidence for *p*)
 - S: a. Is there a vegetarian restaurant around here?
 - b. # Is there no vegetarian restaurant around here?
 - c. # Isn't there a vegetarian restaurant around here?

⁴With the right intonation, a PosQ [p?] can be used to convey original speaker bias for $\neg p$, for instance, with focal accent on tense auxiliary, as noted in footnote 2. Similarly, a LoNQ [$\neg p$?] with, for instance, focus on *not* can be used to convey original speaker bias for p (Romero & Han 2004).

⁵Büring & Gunlogson (2000) check PosQs, LoNQs, and outer-HiNQs but not inner-HiNQs. In examples 12– 14, the LoNQs and HiNQs in subexamples b and c of each example are theirs; the PosQs in subexample a of each example are mine but reflect the judgment that the authors illustrate with other examples.

Table 2 Summary of Büring & Gunlogson (2000) on contextual evidence bias

	PosQ	LoNQ	Outer-HiNQ
Contextual evidence	p?	Not p?	n't ppp1?
For <i>p</i>	\checkmark	#	#
Neutral	\checkmark	#	√
Against p	#	\checkmark	√

Abbreviations: HiNQ, high negation question; LoNQ, low negation question; PosQ, positive question; PPI, positive polarity item.

(13) A: Where do you want to go for dinner?

(No contextual evidence on *p*)

- S: a. Is there a vegetarian restaurant around here?
 - b. # Is there no vegetarian restaurant around here?
 - c. Isn't there a vegetarian restaurant around here?
- (14) A: Since you guys are vegetarian, we can't go out in this town, where it's all meat and potatoes. (Contextual evidence against *p*)
 - S: a. # Is there a vegetarian restaurant around here?
 - b. Is there no vegetarian restaurant around here?
 - c. Isn't there a vegetarian restaurant around here?

Table 2 summarizes Büring & Gunlogson's (2000) results.

After these pioneering works, the empirical characterization and the theoretical modeling of different PQ forms have received considerable attention in the literature, leading to the following empirical and theoretical picture.

On the empirical side, after some debates in the literature, consensus has been reached on several important generalizations and distinctions.

First, though most studies investigate only one type of bias—either original bias or evidence bias—there is now ample evidence that the bias profile of PQ forms 1–3 is a function of both kinds of bias (AnderBois 2011, Roelofsen et al. 2013, Sudo 2013, Domaneschi et al. 2017). For example, in a scenario crossing original bias for p and neutral contextual evidence on p, the optimal form is a HiNQ. The preferred PQ forms for each bias-crossing found in a production study by Domaneschi et al. (2017) are summarized in **Table 3**.

Second, while some authors initially treated all negative PQs as constituting one bias type (van Rooy & Šafářová 2003) or merged LoNQs and inner-HiNQs together (Krifka 2017), it is by now well established that LoNQs and HiNQs differ in terms of both original bias and evidence bias (Büring & Gunlogson 2000, Romero & Han 2004, Domaneschi et al. 2017). Example 7 above illustrates their divergent character with respect to original bias, and examples 13b and c argue

Table 3 Domaneschi et al.'s (2017) results of preferred polar question form per pragmatic cellin English

	Original bias			
Contextual evidence		p	Neutral	¬p
	p	Not tested	PosQ/really-PosQ	Really-PosQ
	Neutral	HiNQ	PosQ	Not tested
	¬p	HiNQ	LoNQ	Not tested

Abbreviations: HiNQ, high negation question; LoNQ, low negation question; PosQ, positive question.

against a complete merge of LoNQs and HiNQs with respect to evidence bias. Their different bias profile is also reflected in the preferred choices in **Table 3**: In terms of original bias, HiNQs are preferred when the original bias is for p, whereas LoNQs are preferred when there is no bias; in terms of evidence bias, HiNQs are the preferred form both with no bias and with bias for $\neg p$, while LoNQs are the preferred form only with $\neg p$ -bias.

Third, though (as we will see) the status of Ladd's intuitive inner reading of HiNQs is controversial, Ladd's outer negation interpretation is invariably considered a genuine reading of HiNQs.

Fourth and finally, leaving aside whether HiNQs have only the outer reading or both, there is ample agreement that HiNQs can appear in the following two crossed-bias scenarios (e.g., Ladd 1981; Büring & Gunlogson 2000; Romero & Han 2004; AnderBois 2011, 2019; Krifka 2015, 2017, 2021; Frana & Rawlins 2019; Goodhue 2022c; but see Trinh 2014, Northrup 2014, and Section 4.1). First, HiNQs are felicitous in so-called contradiction scenarios featuring original bias for p and evidence bias for $\neg p$. This compatibility is shown in example 9 for Ladd's intuitive inner reading and in example 15 for Ladd's outer reading. Second, HiNQs can be felicitously used in so-called suggestion scenarios showcasing original bias for p and neutral contextual evidence. This possibility is illustrated in example 8 for Ladd's outer reading:⁶

(15)	A: OK, now that Stephan has come	, we are all here. Let's go!	(=6)
	S: Isn't Jane coming too?	Outer-HiNQ in contradicti	on scenario

On the theoretical modeling side, a gamut of analyses have been advanced. Romero (2020) clusters them into three main lines, to be described below: the expressed proposition line (line a), the VERUM line (line b), and the speech act line (line c). Since this review cannot do proper justice to the insights and ideas in them all, it focuses on the most developed proposals within each line. For original speaker bias, to be discussed in Section 3, I critically review the work of AnderBois (2011, 2019) within line a, Romero & Han (2004), Repp (2013), Romero (2015), and Frana & Rawlins (2019) within line b, and Goodhue (2022c) within line c. For contextual evidence bias, the topic of Section 4, I examine the work of van Rooy & Šafářová (2003), AnderBois (2011, 2019), and Goodhue (2023) within line a and Krifka (2015, 2017), Krifka (2021), and Tabatowski (2022) within line c. Line b is not concerned with evidence bias; thus, it is not relevant to the discussion in Section 4.

3. ORIGINAL SPEAKER BIAS IN HIGH NEGATION QUESTIONS

We have seen that, of our three question forms—PosQ, LoNQ, and HiNQ—only HiNQs mandatorily convey original speaker bias. Following the literature, I concentrate on HiNQs in this section.

As stated, there is consensus that Ladd's outer negation interpretation is a genuine reading of HiNQs. To model this reading, current analyses converge on the idea that outer negation is not part of the sentence radical's proposition. Rather, outer negation is negation scoping over an operator sitting high in the syntactic structure, like VERUM or ASSERT in structures 16 and 19, or

(ii) Suggestion scenario:

A: I need to find out what restaurants there are in this neighbourhood. S: Aren't there some/#any Chinese restaurants on a street near here? (Romero & Han 2004)

⁶Inner-HiNQs with NPIs are infelicitous in suggestion scenarios; witness example ii:

AT-ISSUE VERSUS NON-AT-ISSUE CONTENT

The literal meaning of a sentence often conveys several pieces of information distributed among different meaning dimensions. Some pieces of information address the current question under discussion (QUD) and are, thus, said to be at-issue. They constitute the proffered content dimension of the sentence. Other pieces of information do not address the current QUD and are, hence, non-at-issue. These include two main further dimensions: presuppositions—that is, propositions that the conversationalists mutually believe to be already in the shared pool of knowledge called the Common Ground (CG)—and conventional implicatures introducing side comments and connotations (Karttunen & Peters 1979, Potts 2005, Beaver et al. 2017).

outer negation is itself an operator high in the structure, like FALSUM or $\Sigma_{\rm neg}$ in structures 17 and $18.^7$

- (16) $[Q [\neg VERUM [SentenceRadical...]]]$ (Romero & Han 2004, within line *b*)
- (17) [Q [FALSUM [SentenceRadical...]]]
 (Repp 2013, Romero 2015, Frana & Rawlins 2019, within line b)
- (18) $\begin{bmatrix} Q \left[\sum_{\text{neg}} \left[\text{SentenceRadical} \dots \right] \right] \end{bmatrix}$ (AnderBois 2011, 2019, within line *a*)
- (19) [*Q* [¬ASSERT [SentenceRadical...]]] (Goodhue 2022c, within line *c*)

There is, however, wide disagreement on three capital points, sometimes even within the same line. The first point of disagreement, mentioned above, is the status of Ladd's intuitive inner negation interpretation. This is examined in Section 3.1. The second concerns the meaning dimension—at-issue proffered content versus different subtypes of non-at-issue content—to which the relevant operator contributes its meaning. This is reviewed in Section 3.2 (see also the sidebar titled At-Issue Versus Non-at-Issue Content). Finally, analyses differ in how to derive the existence and orientation of the bias in HiNQs. This is discussed in Section 3.3.

3.1. The Status of the Inner Negation Interpretation

Recall Ladd's (1981) intuitive outer versus inner negation interpretation of the HiNQs in examples 8 and 9 and the correlation in example 10 between outer readings and PPIs and between inner readings and NPIs in English. The literature modeling these effects is divided into two camps: (*i*) the ambiguity camp, which takes both interpretations by Ladd to be proper readings of HiNQs (Romero & Han 2004; Reese 2007; Walkow 2009; Repp 2013; Sudo 2013; Romero 2015; Krifka 2017, 2021; Frana & Rawlins 2019), and (*ii*) the nonambiguity camp, which considers only the outer negation reading a genuine reading of HiNQs (AnderBois 2011, 2019; van Rooy & Šafářová 2003; Northrup 2014; Goodhue 2018, 2022c; Tabatowski 2022).

We start with the ambiguity camp. Romero & Han (2004) propose that HiNQs—as opposed to run-of-the-mill PosQs and LoNQs—have a VERUM operator high in their syntactic structure and that the scopal interaction of negation with this operator leads to the ambiguity in example 20.

⁷The exact content of these operators is discussed in Section 3.2.

When negation scopes over VERUM, as in structure 20a, the outer reading obtains. VERUM acts as intervenor, and thus negation cannot license NPIs; in contrast, PPIs, shielded from negation by the intervening VERUM, are licensed. When VERUM scopes over negation, as in structure 20b, the inner reading results. In this configuration, NPIs are licensed and PPIs are antilicensed directly under negation. Parallel reasoning applies if, following Repp (2013), Romero (2015), and Frana & Rawlins (2019), structure 21a is adopted, where the operator FALSUM is argued not to license NPIs:

- (20) Ambiguous HiNQs:
- (20a) Outer reading: $[Q [\neg VERUM [... \sqrt{PPI/*NPI...}]]]$
- (20b) Inner reading: [Q [VERUM ¬[...*PPI/√NPI...]]] (Romero & Han 2004)
- (21) Ambiguous HiNQs:
- (21a) Outer reading: $[Q [FALSUM [... \sqrt{PPI/*NPI...}]]]$
- (21b) Inner reading: [Q [VERUM ¬[...*PPI/√NPI...]]] (Repp 2013, Romero 2015, Frana & Rawlins 2019)

We turn to the nonambiguity camp. AnderBois (2011, 2019) argues that HiNQs univocally have the outer negation structure (structure 22), where high negation contributes the operator Σ_{neg} outside of the sentence radical and allows for PPIs. The original speaker bias for *p* conveyed by this structure is, by default, considered to still hold at the present time. It is then proposed that NPIs—for instance, *any* and *yet*, which are licensed in PQs regardless of the presence of negation—indicate that the speaker is deviating from that default and currently leaning toward $\neg p$. The addition of this NPI-based pragmatic effect to the outer reading derived from structure 22 is said to correspond to Ladd's intuited inner negation reading. In a similar vein, Goodhue (2022c) maintains that HiNQs unambiguously have structure 23, where negation scopes over the speech act operator ASSERT, invariably leading to the outer negation reading:

- (22) Unambiguous NiHQs:
 Outer reading: [Q [Σ_{neg} [...√PPI/√NPI_{any/yet}...]]]
 (AnderBois 2011, 2019)
- (23) Unambiguous NiHQs:
 Outer reading: [Q [¬ASSERT [...√PPI/√NPI_{any/yet}...]]]
 (Goodhue 2022c)

To weigh in on this debate, authors have sought evidence for one camp or the other in different constructions.

There is, on the one hand, evidence potentially arguing for the nonambiguity camp. The first data point concerns the NPI *either*. Hartung (2006) found that *either* in English HiNQs receives lower naturalness ratings than LoNQs with *either* and HiNQs with *too*. Similarly, Sailor's (2013) experimental results show that *either* in HiNQs is somewhat degraded in American English, though he notes that it seems acceptable in Canadian and British varieties. Given the still ill-understood licensing conditions of *either* in (non-negative) PQs (see, e.g., Rullmann 2003) and its attested variability in HiNQs, it is difficult to assess whether this data point supports either camp.

A second piece of evidence concerns strict NPIs like punctual *until-* and *for-*phrases (Sailor 2013, Northrup 2014, Goodhue 2018). These are clearly unacceptable in English HiNQs, regardless of the dialect, as in example 24. Sailor (2013) leaves open whether example 24 tells us that HiNQs lack propositional (= inner) negation or rather that the licensing of punctual *until-* and *for-*phrases is subject to further requirements and thus cannot be used to diagnose the inner negation configuration. Goodhue (2018) takes it to argue against a genuine inner negation reading:

(24) # Doesn't John arrive until noon/for another hour?

Finally, Goodhue (2018, 2022c) provides a battery of additional tests to argue against the inner negation structure. He shows, for instance, that neither presupposition triggers like *again* nor conventional-implicature constructions like *as*-parentheticals can target the negative proposition in HiNQs, as illustrated in examples 25 and 26. This is unexpected if the inner negation structure (structures 20b and 21b) is available:

- (25) Didn't Lou come to class again?Presupposes: Lou came to class at least once before.Does not presuppose: Lou did not come to class at least once before.
- (26) Didn't Zoe win, as Joy predicted? Implicates: Joy predicted that Zoe won. Does not implicate: Joy predicted that Zoe did not win.

On the other hand, there is evidence potentially arguing for the availability of the inner negation structure and, hence, for the ambiguity camp. Arnhold et al. (2021) compared German HiNQs, which are widely acknowledged to unambiguously lead to the outer negation reading, with English HiNQs, whose underlying structure is under debate. The critical items depicted a speaker who was originally biased for p, received contextual evidence for $\neg p$, and then wanted to double-check either p (outer negation reading) or $\neg p$ (inner negation reading). German participants preferred a HiNQ when double-checking p and a LoNQ when double-checking $\neg p$, in consonance with the outer negation structure unambiguously assigned to German HiNQs in the literature. In contrast, English participants equally preferred HiNQs when double-checking $\neg p$; additionally, they produced $\neg p$ -checking HiNQs with a higher final rise than p-checking HiNQs. The authors use these findings to advocate for the ambiguity of English HiNQs, which can—in the absence of PPIs versus NPIs—be disambiguated by intonation.

In a second study, Romero et al. (2017) tested the PQ form choice in English when the biases are inverted, that is, when the speaker is originally biased for $\neg p$ and receives contextual evidence for p. Ambiguity approaches predict a different realization choice depending on whether the speaker is double-checking her original belief $\neg p$ or the addressee's implication p: In the former case a stacked negation HiNQ like *Didn't John not drink?* is expected, while in the latter case a PosQ with *really* and/or focus on the auxiliary like *DID John drink?* is predicted (see footnote 2 regarding *really*-PosQs and Focus-PosQs), as sketched in the following structures:

(27) Predictions of ambiguity approaches:

(27a)	Outer reading: $[Q [FALSUM/\neg VERUM [\neg p]]]$	\rightarrow Stacked negation HiNQ
(27b)	Inner reading: [Q [VERUM [p]]]	\rightarrow Focus-PosQs

In contrast, nonambiguity approaches have only the outer negation structure at their avail and thus predict the same realization choice regardless of what proposition is being checked, as sketched in structure 28:

(28)	Predictions of nonambiguity approaches:	
	Outer reading: $[Q [\Sigma_{neg}/\neg ASSERT [\neg p]]]$	\rightarrow Stacked negation HiNQ

The experimental results obtained by Romero et al. (2017) show a significant difference in realization choice between the $\neg p$ -checking and p-checking conditions in the direction predicted in the structures shown in example 27, thus lending support to the ambiguity line.

Finally, Jeong (2021) tested HiNQs with minimizers, illustrated in sentence 29. In contrast to the degraded status of *either*-HiNQs, these minimizer-HiNQs are generally found to be perfectly felicitous and, crucially, to be allowed in contradiction but not in suggestion scenarios. To derive this limited distribution, Jeong argues that HiNQs are ambiguous between the outer and inner negation reading and that the minimizer structure disambiguates toward the inner negation configuration:

(29) Didn't Mrs. Tansley lift a finger to help?

In sum, as the current empirical evidence weighs in two opposite directions, no consensus has been reached as to the status of Ladd's (1981) inner negation interpretation of HiNQs.

3.2. Content and Meaning Dimension of the Operator

In the initial analysis of HiNQs within the VERUM line (line *b*), Romero & Han (2004) define VERUM as in definition 30, where, roughly, [VERUM $_X p$] expresses the proposition "x is sure that *p* should be added to the Common Ground (CG)" (cf. Höhle 1992).⁸ The authors take this meaning to be part of the at-issue, propositional content of the sentence:

```
(30) \llbracket \text{Verum}_i \rrbracket^{gx/i} = \lambda p_{\langle s,t \rangle}, \lambda w. \forall w' \in \text{Epi}_x(w) \ [\forall w'' \in \text{Conv}_x(w') \ [p \in \text{CG}]]
```

Two empirical arguments have been put forward against an at-issue, propositional treatment of the content of this operator. The first one concerns the answer pattern (Romero 2006, Gutzmann & Castroviejo-Miró 2011). Consider, for instance, the HiNQ (example 31a) and its outer negation structure (example 31b). If VERUM contributed to the propositional content of the question, this structure would lead to the partition in example 31c. The negative answer in example 31e could then be understood as selecting the negative proposition from the partition, that is, as expressing the proposition "x (= the addressee) is not sure that [λw . Mary visit Sue in w] should be added to the CG." This would commit the addressee to a lack of full certainty about accepting p into the CG. But the meaning of the negative answer (example 31e) is stronger than that: Example 31e directly commits the addressee to [λw . ¬(Mary visit Sue in w)]. In contrast, if VERUM is treated as not contributing to the propositional content of the question, the outer-HiNQ structure (example 31b) leads to the simpler partition (example 31d), and the negative answer (example 31e) is correctly predicted to express [λw . ¬(Mary visit Sue in w)]:

⁸For the interested reader, in definition 30 and in subsequent definitions, $\operatorname{Epi}_x(w)$ is the set of epistemic alternatives of x at w, and $\operatorname{Conv}_x(w')$ is the set of worlds where all the conversational goals of x at w' are fulfilled.

- (31a) Didn't Mary visit Sue?
- (31b) LF: [Q ¬VERUM [Mary visited Sue]]
- (31c) {"x is not sure that [λw. Mary visit Sue in w] should be added to the CG",
 "x is sure that [λw. Mary visit Sue in w] should be added to the CG"}
- (31d) {[λw . Mary visit Sue in w], [λw . ¬(Mary visit Sue in w)]}
- (31e) No (..., she didn't).

The second argument stems from conditional clauses featuring high (= outer) negation, as in sentence 32, for which Romero (2015) proposes a verum-based analysis. Again, if verum contributed to the propositional content of the antecedent clause, the conditional would invoke counterfactual worlds in which x (= the speaker) is not fully certain about adding to the CG the proposition "there was some oil in the tank." The consequent would then assert that the furnace exploded in the closest of those worlds. But this is not what sentence 32 intuitively means. Rather, the sentence asks us to consider worlds where there was indeed no oil in the tank—regardless of whether the speaker was certain about it or not—and asserts that in the closest of those worlds, the furnace exploded. Hence, again, the correct meaning is derived if the content of verum is not part of the propositional content of the sentence:

(32) If there hadn't_{High} been some_{PPI} oil in the tank, the furnace would have exploded.

These empirical arguments have led researchers within the VERUM line (line *b*) to move the import of VERUM/FALSUM from the at-issue content to some non-at-issue dimension, albeit to a different non-at-issue dimension depending on the author. Repp (2006, 2013) and, following her, Romero (2015) map it to the so-called CG-management content. This is shown for FALSUM in definition 33, where [FALSUM_X *p*] conveys the information "*x* is sure that *p* should not be added to the CG" at the CG-management level:

(33) [FALSUM	<i>ا_i]]^{gx/i}</i>
----------------------	---------------------------------------

(33a)	At-issue content:	$\lambda p_{\langle s,t \rangle}$. $\neg p$
(33b)	CG-management content:	$\lambda p_{< s,t>}, \lambda w. \ \forall w' \in \operatorname{Epi}_x(w) \ [\forall w'' \in \operatorname{Conv}_x(w') \ [p \notin \operatorname{CG}]]$
	(Repp 2013, Romero 2015)	

In contrast, Frana & Rawlins (2019) tentatively propose to treat the content of this operator as a presupposition, as in definition 34. As suggestive evidence, they show that, in conditional environments like example 35, the original speaker bias contributed by FALSUM in HiNQs is filtered in the way that presuppositions typically are: Sentence 35.S does not presuppose that the speaker has an original bias for p (= "that the party will be indoors") but rather that the speaker will have a bias for p in case it rains, thus leading to the conditionalized presupposition (example 35a):

(34) $\llbracket FALSUM_i \rrbracket^{c,w}$

.....

(34a)	At-issue content:	$\lambda p_{\langle s,t \rangle}$. $\neg p$
(34b)	Presupposition:	The at-issue content is defined f

D)	Presupposition:	The at-issue content is defined for p, w, and c only if
		$\forall w' \in \operatorname{Epi}_{\operatorname{Origo}(c)}(w) \ [\forall w'' \in \operatorname{Conv}_{\operatorname{Origo}(c)}(w') \ [p \notin \operatorname{CG}]]$

(Frana & Rawlins 2019)

1 . .

- (35) A: It might rain later; you should bring a rain jacket.S: If it rains, won't the party be indoors?
- (35a) Conditionalized presupposition of sentence 35.S: "If it rains, the speaker has the expectation that the party will take place indoors."

Finally, Gutzmann & Castroviejo-Miró (2011), distancing themselves from the quantificational skeleton in definition 30, model the special effect of VERUM as a conventional implicature expressing the speaker's desire to downdate the current question under discussion (QUD) $\{p, \neg p\}$, that is, the speaker's desire to resolve and thus eliminate the question $\{p, \neg p\}$ from the stack of questions to be addressed (QUD stack). Their proposal is given in definition 36:

- (36) **[**[VERUM_i]]^c
- (36a) At-issue content: $\lambda p_{\langle s,t \rangle}$. p
- (36b) CI: $\lambda p_{< s, t>}$. λw . Speaker wants at w to downdate ?p from the QUD stack. (Gutzmann & Castroviejo-Miró 2011)

In all of these implementations (definitions 33, 34, and 36) of line *b*, given that the at-issue content excludes the epistemic and conversational components, the answer pattern in question–answer pairs and the truth-conditional content in high negation conditionals are correctly derived.

We turn to line *a*, the expressed proposition line. Using an Inquisitive Semantics framework (Ciardelli et al. 2013), AnderBois (2011, 2019) implements the idea that, beyond the at-issue contribution of a question (the so-called main issue), the specific proposition used in the sentence radical highlights alternatives (called projected issues) that the speaker is potentially interested in talking about. For example, the PosQ, LoNQ, and HiNQ in example 37 all raise the same issue {Amelia brought a Mexican dish, ¬(Amelia brought a Mexican dish)}. But they differ in their projected issues: The PosQ (example 37a) projects a set of positive propositions, whereas the LoNQ (example 37b) projects the corresponding set of negative propositions.⁹ Crucial for us now is the job of outer negation, defined as the negative closure operator Σ_{neg} in example 38: Operation 38a builds a proposition negating all the alternatives highlighted by its sister IP-node as part of the main issue—resulting in ¬(Amelia brought a Mexican dish) in our example—and operation 38b passes up an empty set of projected issues. The former operation derives the correct answer pattern and the correct truth conditions for high negation conditionals. The latter operation signals that the speaker has no interests beyond resolving the main issue, thus emphasizing the interest in the truth of *p* or ¬*p*:

(37) Projected issues:

(37a) PosQ: Did A bring a Mexican dish? {A brought tamales, A brought tacos}

- (37b) LoNQ: Did A not bring a Mexican dish? {¬(A brought tamales), ¬(A brought tacos)}
- (37c) HiNQ: Didn't A bring a Mexican dish? (AnderBois 2019)

{}

⁹The projected issues of PosQs and LoNQs will be key to derive contextual evidence bias under AnderBois's (2011, 2019) approach, as discussed in Section 4.2.

 $(38) \quad \llbracket \Sigma_{neg} \text{ IP} \rrbracket$

- (38a) Main issue: $\{\lambda w. \forall q \in \llbracket IP \rrbracket [w \notin q]\}$
- (38b) Projected issue: {} (AnderBois 2019)

Finally, we come to line *c*, the speech act line. Goodhue (2018, 2022c) takes outer negation to scope over the ASSERT operator, defined in example 39, where [ASSERT *p*] conveys that the speaker believes (or is committed) to p:¹⁰

(39)
$$[ASSERT] = \lambda p_{}, \lambda w. \forall w' \in Dox_x(w) [p(w')]$$
$$= \lambda p_{}, \Box_x p$$
(Abbreviation)

Crucially, ASSERT is assumed to contribute to the at-issue content of the sentence. The answer pattern is elegantly derived if, as argued by Krifka (2013), response particles like *yes* and *no* can take as antecedents only propositional discourse referents introduced below the speech act operator of the sentence. This means that the answer *No* in example 40c can serve to negate the discourse referent *p* but not to negate [ASSERT *p*]. However, it is unclear how this approach can handle high negation conditionals. The predicted truth conditions for sentence 32 would be those shown in example 41, which roughly say that, in the closest worlds in which the speaker does not believe (or is not committed) to the proposition $[\lambda w']$. there was some oil in the tank at w'], the furnace exploded. These truth conditions wrongly establish a conditional relation between the speaker not believing (or not being committed to) there being oil in the tank and the furnace exploding. But, as discussed above, what sentence 32 intuitively expresses is a conditional relation between the absence of oil in the tank and the explosion:

- (40a) Didn't Mary visit Sue?
- (40b) LF: [Q ¬ASSERT [Mary visited Sue]]
- (40c) No $(\ldots, \text{she didn't})$.
- (41) λw_0 . $\forall w \in \text{Sim}_{w_0}$ ($\neg \Box_{\text{speaker}}$ (there was some oil in the tank)): the furnace would have exploded at w.

In sum, while current approaches agree that high negation and its associated operator do not contribute to the propositional content of the question, different approaches treat this contribution differently: as CG-management or presupposed content in line b, as part of a more complex semantic-pragmatic representation in Inquisitive Semantics in line a, and as speech act-related content in line c.

3.3. Derivation of the Existence and Orientation of Original Speaker Bias

Different approaches try to derive the existence of original speaker bias in HiNQs and its orientation for p (as opposed to against p) in different ways. For the sake of comparison, it will suffice to demonstrate how competing analyses derive these effects for the universally acknowledged outer

¹⁰For a more elaborated treatment of ASSERT within a commitment space semantics, readers are referred to Krifka (2015, 2017) and Goodhue (2022b). For a related, yet interestingly different analysis where outer negation scopes over the entire question denotation conceived—as we will see in Section 4.2—as an attitudinal proposition, readers are referred to Tabatowski (2022).

reading of HiNQs, which we have seen is compatible with contradiction scenarios (example 15) and with suggestion scenarios (example 8).

We start with Repp's (2013) and Romero's (2015) combined implementation of the VERUM approach within line *b*. Sentence 42 is assigned logical form (LF) structure 42a and produces partition 42b, rendered here using Potts's (2005) \bullet -notation to separate at-issue content (before \bullet) from non-at-issue conventional-implicature-like content (after \bullet):

- (42) Isn't Jane coming (too)? (where p = "that Jane is coming")
- (42a) [Q [FALSUM [Jane is coming]]]
- (42b) $\{\neg p \bullet \lambda w. \forall w' \in \operatorname{Epi}_{\operatorname{Addressee}}(w) \ [\forall w'' \in \operatorname{Conv}_{\operatorname{Addressee}}(w') \ [p \notin \operatorname{CG}]],\\ p \bullet \lambda w. \neg \forall w' \in \operatorname{Epi}_{\operatorname{Addressee}}(w) \ [\forall w'' \in \operatorname{Conv}_{\operatorname{Addressee}}(w') \ [p \notin \operatorname{CG}]]\}$

To derive the mandatory existence of original speaker bias, the Economy Principle in example 43 is proposed, prohibiting meta-conversational moves introduced by VERUM/FALSUM unless needed to resolve a bias conflict or to confirm a bias:

(43) Economy Principle: Do not use a meta-conversational move unless necessary [to resolve epistemic conflict or to ensure Grice's (1975) Maxim of Quality].

To derive the orientation of the bias, Romero & Han (2004) use the notion of the "intent" of a question, parallel to the special status that line *a* assigns to the sentence radical proposition. We apply this notion here to outer-HiNQs with FALSUM: By choosing to pronounce the boldfaced proposition in partition 42b, the speaker indicates her interest in the questions in example 44. Crucially, the expressed intent is compatible with the speaker's originally assuming *p* and incompatible with the speaker's originally assuming $\neg p$, as shown in the pragmatic reasoning in example 45 for contradiction scenarios and in example 46 for suggestion scenarios:

(44) Intent of the outer-HiNQ (example 42):

"Are you sure we should not add *p* to the CG?"

"Do you have any (strong or weak) **doubts about** p?"

"Can you provide information—and, if so, what info—that would make me doubt p?"

- (45) Intent of an outer-HiNQ in a contradiction scenario:
- (45a) \checkmark Given that I assume *p* and that you implied $\neg p$, can you provide information—and, if so, what information—that would make me **doubt** *p*?
- (45b) # Given that <u>I assume ¬p</u> and that you implied p, can you provide information—and, if so, what information—that would make me **doubt** p?
- (46) Intent of an outer-HiNQ in a suggestion scenario:
- (46a) \checkmark Given that <u>I assume p</u> and that p is a possible answer to *R*, can you provide information—and, if so, what information—that would make me **doubt** p and would prevent us from adding p to the CG?
- (46b) # Given that <u>I assume ¬p</u> and that ¬p is a possible answer to R, can you provide information and, if so, what information—that would make me **doubt** p and would prevent us from adding p to the CG?

Overall, this implementation correctly derives the orientation of the bias. However, the Economy Principle (example 43) lacks, at this point, independent motivation; it would be desirable to derive the existence of bias from general pragmatic mechanisms. Still within line *b*, Frana & Rawlins's (2019) presuppositional version of VERUM/FALSUM, mostly aimed at Italian negative PQs hosting the particle *mica*, leads to the LF and denotation shown in example 47 for English HiNQs:

- (47) Isn't Jane coming (too)?
- (47a) [Q [FALSUM [Jane is coming]]]
- (47b) $\llbracket (47a) \rrbracket$ is defined if $\forall w \in \text{Epi}_{\text{Addressee}}(w_0) \forall w' \in \text{Conv}_{\text{Addressee}}(w) [p \notin CG_{w'}].$ If defined, $\llbracket (47a) \rrbracket = \{p, \neg p\}$ (where p = ``that Jane is coming'')

The mandatory existence of bias is derived from the Economy Principle (example 43), as above: Since the speaker chose a question with FALSUM instead of a simpler question without it, she must be facing a dilemma. To derive the orientation of the bias, the presupposition introduced by FALSUM is used, which ensures that it is in the CG that the addressee is sure that *p* should not be added to the CG. This public discourse state of the addressee allows, in turn, for two possibilities: possibility i, that the addressee is sure that $\neg p$ should be added to the CG; and possibility ii, that the addressee has not taken a stance, for instance, that he has professed discourse neutrality with respect to the issue {*p*, $\neg p$ }. The first possibility arises in contradiction scenarios, where it leads to speaker original bias for *p*, as sketched in example 48:

(48) Possibility i:

A indicated that A has evidence for $\neg p$.

S has a bias (in principle, toward p or toward $\neg p$) leading to a dilemma.

To have a dilemma, S's bias must be contrary to A's position, that is, it must be for p.

However, in the current version of the proposal, it is not clear how possibility ii can secure the correct orientation of the bias in suggestion scenarios. One could try to reduce suggestion scenarios to contradiction scenarios as follows. Consider example 8 above, in which p (= "there is a/some vegetarian restaurant around here"), if true, would be highly relevant to the conversation, since the conversationalists are trying to determine where to eat. The addressee's not offering pbut remaining neutral about it could then be taken to conversationally implicate that the addressee believes $\neg p$. This implicature, in turn, would lead to the contradiction setup in example 48, and the correct orientation of the bias would be derived. However, Goodhue (2022c) objects to this reduction of suggestion scenarios to contradiction scenarios because the addressee's failure to mention p does not count as the addressee's implying $\neg p$ in other constructions, for instance, in the case of LoNQs.¹¹

We turn now to line *a*. AnderBois (2011, 2019) tentatively proposes a way to derive the existence and orientation of the bias in HiNQs from the projected issues (example 37) and the Utility Principle (example 49). The derivation, which the author only sketches, consists of two steps: step i, competition between HiNQs with a PosQ; and step ii, competition between HiNQs and LoNQs, as outlined in example 50. In step 50.i, HiNQs are said to convey "Just tell me whether *p* holds, especially if the answer is negative." The exclusive concern over whether *p* holds nicely follows from the lack of projected issues in example 37c. The special interest in the negative answer is said to arise from competition with the simpler PosQ form, but, unfortunately, the author does not spell out how:

¹¹This reduction—explicitly proposed by Trinh (2014)—and Goodhue's counterargument are revisited in Section 4.1.

(49) Utility Principle for projected issues:

Where possible, cooperative speakers choose projected issues whose resolution is expected to be useful in the discourse.

 i. HiNQ ≈ "Just tell me whether p holds," (from lack of projected issues in example 3 ", especially if the answer is negative" (from competition with Pos ii. HiNQ ≈ "S is especially interested in the answer being negative" (from step "but S signals that the negative answer is not more expected or desired than the positive one" (from competition with LoN) 	(50)	AnderBois's	(2011, 2019) steps:			
", especially if the answer is negative" (from competition with Post ii. HiNQ ≈ "S is especially interested in the answer being negative" (from ster "but S signals that the negative answer is not more expected or desired than the positive one" (from competition with LoN		i. HiNQ \approx	"Just tell me whether <i>p</i> holds,"	(from lack of	projected issues in o	example 37c)
 ii. HiNQ ≈ "S is especially interested in the answer being negative" (from step "but S signals that the negative answer is not more expected or desired than the positive one" (from competition with LoN") 			", especially if the answer is negative	ive"	(from competition	n with PosQ)
"but S signals that the negative answer is not more expected or desired than the positive one" (from competition with LoN		ii. HiNQ \approx	"S is especially interested in the answ	ver being nega	ative"	(from step i)
desired than the positive one" (from competition with LoN			"but S signals that the negative and	swer is not m	ore expected or	
			desired than the positive one"		(from competition	with LoNQ)

We turn to step 50.ii. As shown below in Section 4.2, a LoNQ, in virtue of projecting negative issues as in example 37b, signals that the speaker has contextual evidence (or a bouletic preference) for $\neg p$. By not choosing a LoNQ, the speaker conversationally implicates that this is not the case; that is, she signals that she has no contextual evidence (or bouletic preference) for $\neg p$. This, in combination with the results of step i, is argued to derive the existence and orientation of the bias. However, note that the conversational implicature arising from competition with LoNQs predicts that HiNQs cannot be used in contradiction scenarios, where the speaker has indeed received contextual evidence for $\neg p$. This prediction is contrary to fact, as shown in example 15.

Finally, we turn to Goodhue's (2022c) analysis within line c. He presents an important, workedout attempt at deriving bias existence from general pragmatic mechanisms based on Grice's (1975) Maxim of Quantity. The heart of the proposal is the competition between PosQs and HiNQs. Given the pragmatic partitions (examples 51c and 52b) and the definition of informativity (example 53), a PosQ always comes out as more informative than the corresponding HiNQ:

- (51) Did Jane eat? PosQ
- (51a) LF: [*Q* [Jane ate]]
- (51b) Denotation: {Jane ate, ¬Jane ate}
- (51c) Set of answers to *Did Jane eat?* to be asserted by A: $\{\Box_A \text{ Jane ate}, \Box_A \neg \text{Jane ate}\}$
- (52) Didn't Jane eat?
- (52a) LF: $[Q [\neg ASSERT [Jane ate]]]$
- (52b) Denotation: $\{\neg \Box_A \text{ that Jane ate}, \Box_A \text{ Jane ate}\}$
- (53) Q_1 is more informative than Q_2 if and only if the following two conditions are satisfied:

HiNQ

- (53a) $\exists p \in Q_1 \ [\exists p' \in Q_2 \ [p \subset p']]$
- (53b) $\forall p \in Q_1 \ [\neg \exists p' \in Q_2 \ [p' \subset p]]$

Once we have this fact, the pragmatic reasoning in example 54 ensues whenever a speaker uses a HiNQ instead of the more informative PosQ. This secures the lack of speaker ignorance and, thus, the existence of speaker bias in HiNQs:

(54)	Premise 1:	If S (= the speaker) is ignorant of whether <i>p</i> or $\neg p$ (and if the truth of <i>p</i> / $\neg p$ is relevant), S's goal is to gain information.
	Premise 2:	If S wants to gain information, S will use the more informative question strategy, that is, a PosQ.
	Conclusion:	Since S used a HiNQ and not the more informative PosQ, the following is not the case: that S is ignorant of whether p or $\neg p$.

However, while this proposal nicely derives bias existence from general pragmatic reasoning, it is too strong in its present form. If instead of Premise 1 above we take Premise 1' below—which also feels true—the same derivation steps would lead to Conclusion' in example 55:

(55)	Premise 1':	If S (= the speaker) is biased for <i>p</i> or for $\neg p$ but not certain about it (and if the truth of $p/\neg p$ is relevant), S's goal is to gain information.
	Premise 2:	If S wants to gain information, S will use the more informative question strategy, that is, a PosQ.
	Conclusion':	Since S used a HiNQ and not the more informative PosQ, the following is not the case: that S is biased for p or for $\neg p$ but not certain about it.

Putting the two conclusions together suggests that, because S used a HiNQ instead of the corresponding PosQ, S is not ignorant about $p/\neg p$ and is not just biased for p or for $\neg p$. This means that S is certain about p or about $\neg p$. This is, unfortunately, the wrong empirical result.

To conclude Section 3, we have seen that current approaches converge in treating outer negation in HiNQs as being or as scoping over an operator high in the structure. Disagreement persists on the status of Ladd's (1981) inner negation interpretation, on the dimension to which this high operator contributes its meaning, and on the exact derivation of the existence and orientation of original speaker bias.

4. CONTEXTUAL EVIDENCE BIAS

After Büring & Gunlogson's (2000) seminal work, there is universal consensus in the literature that PQ forms are sensitive to contextual evidence bias. There exist, though, some empirical points of disconnection (Section 4.1) and several competing theoretical approaches within the expressed position line (line a) and within the speech act line (line c) (Section 4.2).

4.1. Empirical Picture

Two main points of disconnection can be identified on the empirical side.

First, while the literature agrees on Büring & Gunlogson's (2000) conditions for PosQs and LoNQs (**Table 2**), there has been disagreement on the exact evidence bias conditions for outer-HiNQs. Two contexts have been under contention: neutral contexts and contexts with evidence for p, as summarized in **Table 4**.

With respect to neutral contexts, Trinh (2014) claims that the examples that motivated Büring & Gunlogson's (2000) felicity judgment—like examples 8 and 13.S.c above—do not depict truly neutral scenarios. He argues that A's failure to mention p can be understood as some minimal evidence that p is false, thus aligning these examples with evidence against p. However, as Goodhue (2022c) notes, this potential minimal evidence against p does not suffice to render LoNQs felicitous, as shown in example 13.S.b. This means that we still need a "neutral" context—characterized

Büring & Gunlogson	ı (2000)	Trinh (2014) and Northrup (2014)		Goodhue (2023)	
Contextual evidence	HiNQ	Contextual evidence	HiNQ	Contextual evidence	HiNQ
For <i>p</i>	#	For <i>p</i>	#	For <i>p</i>	~
Neutral	\checkmark	Neutral	#	Neutral	~
Against p	\checkmark	Against p	\checkmark	Against p	\checkmark

Table 4	Contextual evidence	e bias for outer	r-HiNQs accord	ling to Bürin	g & Gunlogso	on (2000),
Trinh (2	014) and Northrup (2014), and Go	odhue (2023)			

Abbreviation: HiNQ, high negation question.

as truly neutral or as evidentially too weak to count—to distinguish the evidence bias profile of LoNQs and HiNQs. In the same vein, Northrup (2014) argues for the infelicity of HiNQs in neutral scenarios based on examples like example 56. However, note that the infelicity of this example may be due to other factors (e.g., relevance): It is not clear why the issue {Jessup will be late, ¬(Jessup will be late)} needs to be resolved between N and his classmate in example 56, whereas the resolution of the issue {there is a vegetarian restaurant, ¬(there is a vegetarian restaurant)} directly advances the resolution of the conversationalists' QUD "Where should we eat?" in the felicitous examples 8 and 13.S.c. Overall, recent literature adheres to Büring & Gunlogson's (2000) felicity judgment on neutral contexts:

(56) Ned but not Prof. Hemanti knows that Jessup is habitually late to class. There is still time until the appointed start time, but class can't begin until everyone is there.

H: We have such a busy day ahead!

(Neutral: no contextual evidence)

N: (turning to a classmate): # Won't Jessup be late?

With respect to contexts providing evidence for p, Büring & Gunlogson (2000) consider outer-HiNQs infelicitous in such contexts based on examples like example 12.S.c. Goodhue (2023) recently has argued against this position based on example 57, where the outer-HiNQ seems compatible with contextual evidence for p. If this judgment is confirmed upon close scrutiny in the future literature, this will mean that HiNQs are compatible with any kind of contextual evidence (for, against, or neutral with respect to p). In other words, this will mean that the evidential condition can be simplified as to apply only to PosQs and LoNQs and not to HiNQs, as Goodhue (2023) aims:

(57) Context [simplified here]: A and B are two enlightened villagers in colonial Salem, Massachusetts, and they are trying to save their friends from being denounced as witches. The primary identifier of witches is left-handedness. A thinks but isn't sure that Mo is left-handed [= original speaker bias for *p*]. While A and B are observing their friends, A sees Mo cutting bread with her left hand [= contextual evidence for *p*] and whispers to B:

A: Isn't Mo left-handed?

The second point of disconnection concerns the empirical delimitation of the explanandum. Some authors concentrate on the canonical, information-seeking illocutionary use of PQs and on the contextual evidence conditions governing this use (e.g., Northrup 2014; Krifka 2015, 2017; Goodhue 2023). Some others consider this evidence-based behavior part of a larger illocutionary pattern and take this larger pattern as the object to be explained (e.g., AnderBois 2011, 2019; Krifka 2021; Tabatowski 2022). Indeed, beyond their simple information-seeking use, PQs can in principle serve as requests, offers, conversation starters, rhetorical questions, etc., but the type

of PQ used—PosQ, LoNQ, HiNQ—matters, as illustrated in examples 58 and 59 [van Rooy & Šafářová (2003) and Tabatowski (2022), elaborating on Bolinger (1978)]:¹²

- (58) [As a request:]
- (58a) Do you have sparkling water?
- (58b) # Do you not have sparkling water?
- (58c) # Don't you have sparkling water?
- (59) [S sees that her friend A is attempting something insane and rhetorically asks:]
- (59a) Are you crazy?
- (59b) # Are you not crazy?
- (59c) # Aren't you crazy?

4.2. Theoretical Analyses

Given that the evidence bias conditions for HiNQs are at present not fully clear, I mostly concentrate here on PosQs and LoNQs. To tackle their evidence-based conditions and/or their larger illocutionary pattern, current approaches need to introduce some asymmetry in the modeling of PosQs and LoNQs. Approaches differ as to how this asymmetry is cast: by keeping a uniform semantics $\{p, \neg p\}$ for both forms but bestowing special status on the sentence radical proposition, as in line *a*, or by enriching the semantics with speech act(-related) operators so as to generate different semantics, as in line *c*.

The central idea behind the expressed proposition line (line *a*) is that, when raising an issue $\{p, \neg p\}$, the speaker chooses to express in the sentence radical whichever one of the two propositions is more "useful," either for the speaker herself or for general discourse purposes.

Van Rooy & Šafářová (2003) implement this idea as a general pragmatic constraint using the notion of utility value from Decision Theory given in definition 60. Regardless of whether *p* is positive or negative, [p?] is used in requests like example 58 because p (= "you have sparkling water") is more desirable to the speaker than $\neg p$, per definition 60.i; similarly, [p?] is used in rhetorical questions like example 59 because p (= "you are crazy") is more surprising/informative for the speaker and thus has higher utility than $\neg p$, as per definition 60.ii:

(60) A proposition *p* has a high utility value if:

i. p becoming true brings the speaker closer to her goal or desires, or

ii. the addition of p to the speaker's belief state would trigger a wide revision of it.

AnderBois (2011, 2019) offers a second implementation of the idea (see Section 3.3). The semantic-pragmatic representation of PosQs and LoNQs is enriched so that, besides all raising the same main issue $\{p, \neg p\}$, each of them has a different set of projected issues, as shown in the representations in example 37. These correspond to potential future QUDs that the speaker is interested in. A PosQ [p?] signals interest in positive subset-alternatives to p. For instance, in example 37a, the PosQ *Did A bring a Mexican disb?* invokes the alternatives in {A brought tamales,

¹²Bolinger (1978) only compares PosQs [*p?*] to alternative questions [*p or not?*]. Examples 58a and b are from Tabatowski (2022), and example 58c is mine. Example 59a is from van Rooy & Šafářová (2003), and examples 59b and c are mine.

A brought tacos}, where each of these alternatives is a subset of p (= "A brought a Mexican dish"). These subset-alternatives will be relevant only if the correct answer is p, thus deriving evidential or bouletic bias for p. In contrast, a LoNQ [*not* p?] indicates interest in negative superset-alternatives to $\neg p$. For instance, in example 37b, the LoNQ *Did A not bring a Mexican dish*? raises the alternatives in {¬(A brought tamales), ¬(A brought tacos)}, each of which is a superset of $\neg p$ (= "A did not bring a Mexican dish"). These superset-alternatives are argued to derive evidential or bouletic bias for $\neg p$ and, since superset-alternatives constitute only partial answers, to signal that some protracted discussion may be needed.

A third implementation is proposed by Goodhue (2023). He assigns the same denotation $\{p, \neg p\}$ to PosQs and LoNQs and derives the asymmetry from the usefulness of maximizing contextual relations in discourse: Just as an optimal discourse maximizes anaphoricity by using pronouns and presupposition triggers [cf. Heim's (1991) Maximize Presupposition], the optimal PQ form must be anaphoric to the proposition made salient by the contextual evidence. That is, regardless of whether *p* is positive or negative, if the immediate context provides evidence for *p*, the form [*p*?] must be used to maximize anaphoricity with the context. To operationalize this idea, an operator *O* is posited that syntactically combines with the question radical IP and with a *pro*_{1,<s,t>} anaphoric to the proposition made salient by the evidence, as in structure 61a; this *O* presuppositionally requires that [*pro*_{1,<s,t>}] entail [**IP**], as defined in the felicity condition (example 61b):

- (61a) LF: [? [O pro1,<s,t> [IP...]]]
- (61b) $[[O pro_{1,< s,t>} IP]]$ is felicitous only if $[[pro_{1,< s,t>}]]$ entails [[IP]].

We turn to line *c*. While developing a general framework of commitment spaces for a variety of discourse moves, Krifka (2015, 2017) tackles contextual evidence bias in PosQs, LoNQs, and HiNQs. Different question forms are assigned different underlying structures, which in turn lead to different proffered contents. Unbiased PosQs have the question operator qu in their structure, as in configuration 62a, allowing the addressee to equally choose between two potential continuations. In contrast, biased PosQs and LoNQs feature the stacked operators [REQUEST [ASSERT...]], as in structures 62b and c, so that the resulting proffered content is a request that the addressee assert (or commit to) $p/\neg p$. These monopropositional moves are licit when the context presents evidence for $p/\neg p$ and the speaker wants to check whether to commit to $p/\neg p$. Finally, negation in outer-HiNQs is taken to scope over ASSERT, as in structure 62d. The resulting proffered content is a request that the addressee abstain from asserting (or commit to) p. This weaker request is said to be incompatible with contextual evidence for p (since evidence for p provides no reason to check whether A would not commit to p) and felicitous otherwise:

(62a)	Unbiased PosQ:	[QU <i>p</i>]
(62b)	Biased PosQ:	[request [assert p]]
(62c)	LoNQ:	[request [Assert $\neg p$]
(62d)	Outer-HiNQ:	[request [\neg assert p]

In a later version, Krifka (2021) replaces REQUEST in structures 62b–d with the question operator ? and assumes that ? leads to monopropositional moves offering just one move to the addressee, as above. He then derives evidence bias in examples 12–14 and bouletic bias in example 58 from a general preference to avoid reversing—that is, rejecting—answers: In view of contextual evidence for p, the speaker offers the addressee the monopropositional move to assert p because the expected resolution p does not involve a reversing answer. Finally, Tabatowski (2022) investigates the larger illocutionary pattern of PosQs and LoNQs. His proposal posits an attitudinal semantics for PQs, by which [p?]—where p may be positive or negative—roughly expresses the proposition "If p is true, coming to believe (ctb) p is preferable to not coming to believe p given the speaker's informative and bouletic goals," as formalized in example 63:

(63)
$$\llbracket p? \rrbracket = \lambda w_0. \ \forall w \ [w \in \text{Dox}_x(w_0) \land p(w) \to \\ \text{Sim}_w(\lambda w'. \operatorname{ctb}_{w'}(x, p)) < \operatorname{Goals}_{x(w_0)} \text{Sim}_w(\lambda w'. \neg \operatorname{ctb}_{w'}(x, p))]$$

By making the preference to learn p relative to the speaker's goals, the author derives the asymmetry of PosQs and LoNQs in requests like example 58 as in van Rooy & Šafářová (2003). Contextual evidence conditions follow from the observation that, just like in Bolinger's (1978) inference-licensing use (example 64), the immediate goal of the speaker in evidence contexts is to find out why the evidence is what it is. In other words, just like the goal in Bolinger-style example 64 is to figure out why Ann missed the meeting, the goal in the positive and negative evidence contexts of examples 12 and 14 is to substantiate why the addressee claims, respectively, that there are plenty of restaurant choices and that there are no restaurant options for vegetarians:

- (64) Why did Ann miss the meeting?...
- (64a) ... Is she sick?
- (64b) ...# Is she not sick?

In sum, we have seen in Section 4 that there exists some disagreement on the contextual evidence conditions of HiNQs and on the empirical scope of the explanandum. Current theoretical approaches recruit different tools and insights from the expressed proposition line (line a) and from the speech act line (line c) to motivate an asymmetry between PosQs and LoNQs that derives the intended patterns.

5. CONCLUSIONS

This article has critically reviewed the state of the art on two kinds of bias—original (epistemic) speaker bias and contextual evidence bias—in three PQ forms: PosQs, LoNQs, and HiNQs.

We have seen that, after some discussion in the literature, convergence has been reached on several empirical points: PQ forms are sensitive to both kinds of bias, LoNQs and inner-HiNQs differ in their bias profile, Ladd's (1981) outer negation interpretation is a genuine reading of HiNQs, and HiNQs can be used in (at least) two crossed-bias scenarios (contradiction scenarios and suggestion scenarios).

However, authors still disagree on several empirical and theoretical aspects concerning both biases, leading to a variety of analyses that can be roughly clustered into three lines: (*a*) the expressed proposition line, (*b*) the VERUM line, and (*c*) the speech act line. For original speaker bias in HiNQs, the main debates concern the status of Ladd's inner negation interpretation of HiNQs, the content and meaning dimension of the operator in outer-HiNQs, and the derivation of the existence and orientation of the bias. For contextual evidence bias, besides some disagreement on the exact conditions for HiNQs and on the scope of the explanandum, authors differ on how to build an asymmetry between PosQs and LoNQs to derive the desired contextual evidence pattern.

Beyond the aspects covered in this review, there is much more to be said on bias in PQ forms. I have concentrated on the forms that have been most prominently discussed in the literature, leaving PosQs that host *really* and/or focal accent on the tense auxiliary for another occasion (see Romero & Han 2004; Wilder 2013; Goodhue 2018, 2022a; Gutzmann et al. 2020; Bill & Koev

2022). Additionally, this discussion has been mostly limited to English, but the expression of bias in PQ forms is pervasive in the languages of the world, and emerging studies paint what promises to be an interesting crosslinguistic picture (e.g., for a variety of languages, see Romero & Han 2004; for Japanese, see Sudo 2013; for Hungarian, see Gyuris 2017, Farkas 2023; for Italian, see Frana & Rawlins 2019; for Farsi, see Mohammadi 2024; for Russian, see Repp & Geist 2022). In sum, there remains much to be explored in the vast terrain of biased PQs.

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