

Expectation Biases and Context Management with Negative Polar Questions

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Abstract

This paper examines certain distinctive discourse properties of preposed negative *yes/no* questions (NPQs), like *Isn't Jane coming too?*: NPQs, unlike positive polar questions, invariably express the speaker's expectation toward a particular answer, and, in particular, toward the answer whose polarity is opposite of the polarity of the question. The aim of the paper is to develop an improved account of such *speaker expectation biases* within one broad family of approaches to NPQs, what I call *context-management approaches*, as developed in work by Romero, Han, and Repp. The principal challenges for existing accounts, I argue, are (i) to provide an empirically adequate formalization of the proposed context-managing operators, (ii) to motivate treating the expressive/context-managing roles of NPQs as interestingly different from those of uses of language generally, and (iii) to explain the discourse differences between NPQs $\neg p?$ and associated epistemic possibility questions $\diamond_e \neg p?$ (EPQs). I argue that we can capture the roles of NPQs in expressing speakers' states of mind and managing the discourse common ground without positing special epistemic context-managing operators or treating NPQs as fundamentally about the context. For concreteness I follow Romero & Han in treating preposing of negation as introducing an additional epistemic operator. However, I suggest that we treat this operator (roughly) as a conventionally subjective epistemic necessity modal, and assimilate the expressive/context-managing roles of NPQs to a more general kind of discourse-oriented use of context-sensitive language. Drawing on independently motivated resources from the semantics/pragmatics of modals and an adapted general principle of discourse Relevance, I show how we can distinguish the interpretations of NPQs and associated EPQs and predict their contrasting discourse properties and epistemic implicatures. The distinctive expectation biases of NPQs can be derived from independently attested features of their semantics and general principles of interpretation and conversation. I close by briefly (re)considering alternative speech act approaches, the syntactic/semantic effects of preposed negation, and answer patterns with NPQs.

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1 Introduction

Yes/no questions with preposed negation, or *negative polar questions* (NPQs), such as (1), have raised various challenges for formal semantics for questions.

- (1) Isn't Jane coming to the party later?

For instance, whereas positive *yes/no* questions can sometimes express the speaker's expectation that a particular answer is correct — a point which itself requires explanation — NPQs seem distinctive in *necessarily* expressing such an expectation (e.g., LADD 1981, HAN 1999, BÜRING & GUNLOGSON 2000, ROMERO & HAN 2004):

- (2) [Context: We are wondering who is coming to the party. A mentions that John is coming. S happens to know that Jane is good friends with John, and so is likely to come. S says:]
a. Isn't Jane coming too?
b. Is Jane coming too? (*Positive speaker expectation*)
- (3) [Context: We are wondering who is coming to the party. A mentions that John is coming. We have no idea if Jane was invited, if she is friends with John, what her plans are, etc. S says:]
a. #Isn't Jane coming too?
b. Is Jane coming too? (*Neutral speaker expectation*)
- (4) [Context: We are wondering who is coming to the party. A mentions that John is coming. S happens to know that Jane has an important competition tomorrow morning, and so is unlikely to come. S says:]
a. #Isn't Jane coming too?
b. #Is Jane coming too? (*Negative speaker expectation*)

Uttering *Is Jane coming too?* is compatible with the speaker's having no prior expectation about whether Jane is coming; and if it expresses any expectation, it is toward the pole corresponding to the polarity of the question, i.e. the positive answer. By contrast, with NPQs, the speaker's expectation bias is opposite to the polarity of the question: the polarity of the question is negative, but the bias is toward the positive answer. Further, this bias is invariable: using an NPQ (written $\neg p?$) is infelicitous if the speaker is neutral about whether p or would have expected $\neg p$. The negative question $\neg p?$ necessarily conveys the speaker's prior positive expectation that p . The challenge is to explain (i) why the NPQ necessarily conveys the speaker's expectation toward a particular answer, and, moreover, (ii) why this expectation is toward

the positive pole, the pole opposite of the polarity of the question.

This paper examines one dominant approach to these issues, as defended most extensively in ROMERO & HAN 2004 (R/H) as well as in subsequent work by Romero (2006) and Repp (2006, 2009, 2013). This *context-management* approach (as I will call it) attempts to capture the data about speaker expectation biases by encoding a direct context-managing role into the conventional meaning of NPQs. An NPQ $\neg p?$, on this view, isn't directly about whether p , but rather (roughly put) about whether it is certain that p is to be added to the discourse common ground — the body of information taken for granted for the purposes of conversation (STALNAKER 1974, 1978). Whereas ordinary polar questions are questions about the subject matter of the discourse, NPQs are questions about the discourse itself, specifically about the proper discourse status of p . To capture this, preposed negation is treated as contributing a context-managing operator to the syntax and semantics. NPQs are linguistically special in affording a conventional device for directly managing the discourse common ground.

This paper critically examines context-management approaches to NPQs. First, §2 describes the context-management approach to NPQs in greater detail. I focus primarily on the theory developed in ROMERO & HAN 2004, and its explanation of the distinctive speaker expectation biases with NPQs. Repp's account is also briefly considered. §3 raises challenges for R/H's and Repp's accounts. I start with worries concerning the technical details of R/H's and Repp's treatments of the posited context-managing operators, and of R/H's specific derivation of the speaker expectation biases seen with NPQs. I then raise more general worries for context-management approaches — that is, for any approach which treats NPQs, fundamentally, in terms of context-managing operators. The principal empirical challenge is to distinguish NPQs from associated epistemic possibility questions. The theoretical challenge is to motivate the selective introduction of context-managing operators into the grammar, given the general role of assertions and questions in expressing speakers' states of mind about the context and how it should evolve.

The central positive aim of the paper is to develop an improved account of the roles of NPQs in expressing speakers' epistemic biases and managing the discourse common ground. §4 argues that we can capture the intuitions motivating context-management approaches without positing special context-managing operators or treating NPQs as directly about the context. The goal is to derive the expressive/context-managing roles of NPQs from independently motivated features of their semantics and general interpretive and conversational principles. For the sake of argument I follow R/H in treating the preposing of negation as introducing a broadly epistemic operator. However, I suggest that we treat this operator as a conventionally

subjective epistemic necessity modal (in roughly the sense of LYONS 1977, 1995), and assimilate the discourse-oriented properties of NPQs to those associated with subjective uses of modal expressions generally (SILK 2016). I then offer a revised semantics for (epistemic) possibility and necessity modals; this semantics enriches the structure of information states in such a way that distinguishes associated positive and negative updates, and thereby distinguishes the meanings and “intents” of NPQs and associated epistemic modal questions. Drawing on a general principle of discourse relevance (adapted from ROBERTS 1996, SIMONS ET AL. 2010), I show how this revised semantics helps capture the relevant discourse differences between NPQs and epistemic modal questions, and predict the distinctive speaker expectation biases seen with NPQs. We can derive the expressive and context-managing roles of NPQs utilizing general resources from the semantics and pragmatics of modals, and principles of interpretation and conversation.

§5 concludes and considers several additional issues concerning NPQs and the account developed in §4: §5.1 briefly compares the proposed account with certain alternative speech-act approaches to NPQs. §5.2 reexamines the assumption, following R/H, that preposing negation introduces an additional operator into the syntax and semantics. I briefly outline an alternative approach that treats preposed negation as itself having a (conventionally subjective) modal semantics. §5.3 considers prima facie puzzling features of answer patterns with NPQs, and suggests how the proposed treatment of NPQs may help provide an improved account of qualified and unqualified answer patterns.

I won't be arguing that no other type of theory can capture the distinctive discourse properties of NPQs. The aim is to develop an account within one broad approach to NPQs which improves in empirical coverage and explanatory power, and to begin investigating its prospects. I leave further developments and comparisons with alternative approaches for future research.

The project of this paper isn't to provide a comprehensive account of NPQs or biases in questions. Before getting started I would like to make five brief remarks on the scope of the present discussion. First, our focus is on polar questions with preposed negation — in English, questions of the form *Aux+n't p?*. Questions with non-preposed negation arguably don't raise the same issues. For instance, they needn't express a prior expectation that the positive answer is correct: they can be epistemically unbiased, and can express a prior expectation in the negative answer $\neg p$:

- (5) [Context: *S* is interviewing *A*, a professional athlete, about *A*'s training regimen. *S* has no prior beliefs about *A*'s schedule or habits. *S* says:]
- a. Tell us about your training. Do you wake up early? Do you not eat sweets?

- b. Tell us about your training. Do you wake up early? #Don't you eat sweets?
(*Neutral speaker expectation*)
- (6) [Context: S is interviewing A, a professional athlete, about A's training regimen. Vegetable and dessert platters are on the table. S thinks it unlikely that A would have sweets during training; indeed, A is having some vegetables but none of the desserts. S says:]
- a. Tell us about your training. I notice you're just eating the vegetables. Do you not eat sweets during the season?
- b. Tell us about your training. I notice you're just eating the vegetables. #Don't you eat sweets during the season?
(*Negative speaker expectation*)

This contrast between polar questions with preposed vs. non-preposed negation is cross-linguistically robust (ROMERO & HAN 2004).

Second, it is well-known that NPQs are ambiguous between so-called “outer-negation” and “inner-negation” readings — intuitively, readings which double-check p , and readings which double-check $\neg p$, respectively. These readings have interestingly different grammatical and discourse properties (LADD 1981, BÜRING & GUNLOGSON 2000, ROMERO & HAN 2004, REESE 2007). They can be disambiguated with positive vs. negative polarity items, as reflected in (7)–(8), respectively. While in both cases the speaker conveys a prior expectation in the positive answer (that Jane is coming to the party), the readings differ in their constraints on the prior context.

- (7) A: John just got here, so it looks like we're all ready to go to the party.
S: Isn't Jane coming too? (*outer-negation reading*)
- (8) A: John isn't coming to the party. So it looks like no one from our class will be there.
S: Isn't Jane coming either? (*inner-negation reading*)

It is contentious whether inner- and outer-negation readings are to be given a uniform linguistic analysis. For instance, REESE 2007 argues that inner-negation readings of NPQs are just ordinary questions about whether $\neg p$, and that it is only outer-negation readings which call for a distinctive discourse representation. Since outer-negation readings of NPQs pose the strongest challenges to classic formal semantics for questions, I will focus exclusively on these readings — the readings which license positive polarity items, and which, intuitively, are used to double-check the speaker's initial expectation of the positive answer. I leave open how the account of NPQs developed in §4 may generalize to inner-negation readings. Hereafter by ‘NPQ’ I will

mean “polar question with preposed negation that licenses positive polarity items.”

Third, I will focus specifically on NPQs in English. ROMERO & HAN 2004 observe that the distinctive speaker expectation biases seen with English preposed negative polar questions arise across a wide variety of languages. This supports the broadly conversational strategy of explaining expectation biases with NPQs pursued in §4. That said, SUDO 2013 catalogues various idiosyncrasies of negative polar questions in Japanese formed with different question particles (see also REESE 2007). However, Sudo notes that Japanese NPQs needn't be regarded as the same construction as English NPQs given relevant grammatical differences between Japanese and English. Additional cross-linguistic investigation, not only of preposed negative polar questions but of biased questions more generally, is needed.

Fourth, NPQs aren't the only kind of question that seems to “bias,” or highlight, one answer over others. For instance, there are also rising declaratives (questions with declarative syntax and rising prosody; GUNLOGSON 2001), incredulity-contour declaratives (questions with declarative syntax and fall-rise prosody; REESE 2007, KRIFKA 2012), and reversed-polarity tag questions (SADOCK 1971), among others. Reversed tag questions with a negative tag, like (9), are particularly interesting in the present context, as they seem to have the same intuitive discourse function as NPQs.

(9) Jane is coming too, isn't she?

ROMERO & HAN (2004: 655–656) tentatively suggest extending their analysis of NPQs to reversed tag questions, and REESE 2007 defends a uniform analysis in depth within a speech-act framework (though contrast KRIFKA 2015). I leave open how the account of NPQs developed in §4 might apply to questions like (9) and other kinds of biased questions.

Fifth, the speaker expectation bias described above isn't the only kind of broadly epistemic bias discussed in the literature on polar questions. BÜRING & GUNLOGSON (2000) observe that polar questions are also associated with the following sort of “contextual evidence bias.” Using a positive polar question $p?$ is infelicitous if there is (salient, available, compelling) evidence for $\neg p$ in the discourse context; and using a negative polar question $\neg p?$ (on any reading, with or without preposed negation) is infelicitous if there is (salient, available, compelling) evidence for p .¹ These points are reflected in (10)–(11), respectively.

¹Inner-negation readings are also infelicitous in neutral contexts where the contextual evidence doesn't favor either answer (though cf. KRIFKA 2012). Outer-negation readings, by contrast, pattern with positive polar questions in being felicitous in neutral contexts.

- (10) [Context: *A* enters *S*'s windowless computer room wearing a dripping wet raincoat. *S* says:]
- a. Is it raining outside?
 - b. #Is it sunny outside? (cf. BÜRING & GUNLOGSON 2000: ex. 18)
- (11) [Context: Same as (10).]
- a. #Is it not raining?
 - b. #Isn't it raining?

In both cases the polarity of the contextual evidence bias (if there is one) is parallel to the polarity of the question. What is interesting about the speaker expectation bias is that with NPQs, unlike with positive polarity questions, the polarity of the bias is *opposite* to the polarity of the question: using a *negative* polar question $\neg p$? (necessarily) expresses the speaker's prior expectation in the *positive* answer *p*. It is this latter sort of bias — bias concerning the speaker's individual prior expectations about the correct answer — that will concern us here.

2 NPQs and context-managing operators

This section describes two versions of the context-management approach to NPQs, as developed in work by Romero, Han, and Repp. These theories attempt to explain the distinctive speaker expectation biases in NPQs by treating preposed negation as contributing a context-managing operator. I will focus primarily on Romero & Han's (2004) VERUM-based account, as it provides the most extensively developed treatment of speaker expectation biases (see also ROMERO 2006). The worries raised in §3 will apply equally to both accounts.

2.1 Romero & Han: VERUM

Romero & Han (R/H) treat NPQs as interpreted with respect to a covert conversational epistemic operator. This operator, VERUM, is hypothesized as being the same operator introduced by polarity focus (HÖHLE 1992) and epistemic *really*, as in (12)–(13). It is defined in (14) — abbreviated 'FOR-SURE-CG_{*x*}', where CG_{*w*} is the discourse common ground in *w*, Epi_{*x*}(*w*) is *x*'s epistemic alternatives in *w* (the set of worlds compatible with what *x* knows), and Conv_{*x*}(*w*) is the set of worlds where all of *x*'s conversational goals in *w* are satisfied (*x* is a free variable whose value is contextually identified with the speaker/addressee).

- (12) [Is]_F Jane coming?
(13) Is Jane *really* coming?
(14) $\llbracket \text{VERUM}_i \rrbracket^{w,g[x/i]}$
 $= \lambda p_{st}. \forall w' \in \text{Epi}_x(w): \forall w'' \in \text{Conv}_x(w'): p \in \text{CG}_{w''}$
 $= \text{FOR-SURE-CG}_x$ (ROMERO & HAN 2004: 627)

(14) says that $\text{VERUM } p$ is true iff for all x 's epistemic alternatives w' , p is part of the discourse common ground $\text{CG}_{w''}$ in every world w'' in which all of x 's conversational goals in w' are satisfied. Informally, “ VERUM is used not to assert [p , or] that the speaker is entirely certain about the truth of p , but to assert that the speaker is *certain* that p *should be added to the Common Ground (CG)*” (ROMERO & HAN 2004: 627).

R/H posit that the preposing of negation introduces VERUM into the syntax and semantics. This yields the logical form for NPQs in (16) (again, focusing exclusively on outer-negation readings), where Q is the question morpheme, given a standard partition semantics of the sort in (15).

- (15) $\llbracket Q \rrbracket^{w,g} = \lambda p_{st}. \lambda q_{st}. q = p \vee q = \neg p$
(16) LF: [Q not [VERUM [p]]]

Given this logical form, the denotation of an NPQ generates an “epistemically unbalanced” partition between certainty about adding p to the CG and any other credence about adding p to the CG, as reflected in (18). This is in contrast to an ordinary positive polar question $p?$, which yields a balanced partition between p and $\neg p$, as reflected in (17). Letting j be the proposition that Jane is coming:²

- (17) a. Is Jane coming?
b. LF: [Q [Jane is coming]]
c. $\llbracket (17b) \rrbracket$
 $= \lambda q. q = j \vee q = \neg j$
 $= \{j, \neg j\}$
(18) a. Isn't Jane coming (too)?
b. LF: [Q not [VERUM [Jane is coming (too)]]]
c. $\llbracket (18b) \rrbracket$
 $= \lambda q. q = \text{FOR-SURE-CG}_x j \vee q = \neg \text{FOR-SURE-CG}_x j$
 $= \{ \text{FOR-SURE-CG}_x j, \neg \text{FOR-SURE-CG}_x j \}$

²For convenience I will often omit the parameters on the interpretation function, and I couch the discussion using both function-based and set-based question denotations.

R/H explain the data concerning expectation biases with NPQs in two stages. First, they attempt to derive the *existence* of an expectation bias as an implicature from the question’s unbalanced partition denotation. R/H posit a pragmatic “economy principle” governing the felicitous use of context-managing operators (“meta-conversational moves” in R/H’s terms):

- (19) *Principle of Economy:*
 Do not use a meta-conversational move [i.e., context-managing operator] unless necessary (to resolve epistemic conflict or to ensure Quality).
 (ROMERO & HAN 2004: 629)

The unbalanced partition in (18) targets whether or not one is certain that j should be added to the CG. By the Principle of Economy, using a question with this denotation is felicitous only if the speaker has reason to question the discourse move of adding j to the CG — e.g., if the speaker disagrees with a previous assertion about whether j (i.e., to resolve epistemic conflict), or if the speaker has views on whether j but lacks sufficient grounds to assert it (i.e., to avoid violating the Maxim of Quality). Hence a cooperative speaker will use an NPQ $\neg p?$ only if she has a prior epistemic bias about whether p . In this way, R/H attempt to derive that NPQs are invariably associated with a speaker expectation bias from (i) the context-managing operator VERUM in their semantics, which generates an epistemically unbalanced partition denotation about the discourse move of adding the embedded proposition p to the discourse common ground, and (ii) a pragmatic principle governing the felicitous use of discourse moves about other discourse moves.

Next, R/H attempt to explain the specific *positive polarity* of the expectation bias — the bias toward the positive answer — by appealing to the notion of a question’s “intent,” i.e. which cell in the partition is pronounced. Though R/H don’t attempt to provide a formal account of “intent,” the intuitive idea is that the pronounced cell sets the “topic” for the conversation, and expresses which proposition “the speaker is interested in pursuing a conversation about” (ROMERO & HAN 2004: 642).³ For instance, a request for help can be made by asking the positive polar question in (20a), but not by asking the negative polar question in (20b) or the alternative question in (20c):

- (20) Request for help:

³See VAN ROOY & ŠAFÁŘOVÁ 2003 for a decision-theoretic account which treats the pronounced cell as the cell with greater conversational utility (cf. ROMERO & HAN 2004: 617n.6, 643n.18, ROMERO 2006).

- a. Will you please help me?
- b. #Will you please not help me?
- c. #Will you please help me or not? (cf. BOLINGER 1978)

R/H’s explanation of the expectation bias toward the positive answer proceeds roughly as follows. (A more detailed reconstruction will be given in §3.3.) In using an NPQ the speaker chooses to pronounce the negated cell $\neg\text{FOR-SURE-CG}_x p$ in the question’s denotation, as reflected in (21).

- (21) “Intent” (denotation and pronounced cell) for $\neg p$?:
 {FOR-SURE-CG_x p , $\neg\text{FOR-SURE-CG}_x p$ }

Pronouncing the $\neg\text{FOR-SURE-CG}_x p$ cell constitutes a request for possible grounds for doubting p . Such a request would be infelicitous if the speaker was biased toward $\neg p$; after all, if the speaker expected $\neg p$, she would already have reasons to doubt p . So, in pronouncing the $\neg\text{FOR-SURE-CG}_x p$ cell, the speaker “suggest[s] that p be added to the Common Ground unless the addressee has reasons to doubt p ” (ROMERO & HAN 2004: 649). Such a suggestion would be infelicitous if the speaker antecedently expected $\neg p$, but felicitous if the speaker antecedently expected p . So, since an NPQ is felicitous only if the speaker has *some* epistemic bias or other about whether p (as explained above), this bias must be toward accepting the positive answer p . Or so R/H argue.

2.2 Repp: FALSUM

REPP (2006, 2009, 2013) follows R/H in treating NPQs as interpreted with respect to a context-managing operator. Since Repp’s primary focus isn’t on explaining speaker expectation biases, I will only briefly describe her view here.

Whereas R/H treat the preposing of negation as introducing an additional context-managing operator, VERUM, which interacts with negation, Repp treats the preposed negation as a context-managing operator itself. This operator, FALSUM, defined in (22), is argued to be the same operator contributed in denials; for convenience I abbreviate its meaning with ‘FOR-SURE-NOT-CG’, to parallel R/H.⁴

⁴Repp also posits distinct discourse conditions for FALSUM as used in declarative denials and questions. These won’t be important in what follows. (For NPQs $\neg p$?, the condition is that the immediately preceding context not entail p . This is to reflect the “contextual evidence bias” (BÜRING & GUNLOGSON 2000) described in §1.)

$$\begin{aligned}
(22) \quad & \llbracket \text{FALSUM}_i \rrbracket^{w,g[x/i]} \\
& = \lambda p_{st}. \forall w' \in \text{Epi}_x(w): \forall w'' \in \text{Conv}_x(w'): p \notin \text{CG}_{w''} \\
& = \text{FOR-SURE-NOT-CG}_x \qquad \qquad \qquad (\text{REPP 2013})
\end{aligned}$$

Informally, whereas **VERUM** p says (roughly) that it's certain that p should be added to the CG, **FALSUM** p says (roughly) that it's certain that p shouldn't be added to the CG, or that "there are zero degrees of strength for sincerely adding [p] to the CG" (REPP 2013: 240). The logical form and resulting denotation for an NPQ is as follows:

$$\begin{aligned}
(23) \quad & \text{a. Isn't Jane coming (too)?} \\
& \text{b. LF: [Q [FALSUM [Jane is coming (too)]]]} \\
& \text{c. } \llbracket (23\text{b}) \rrbracket \\
& \quad = \lambda q. q = \text{FOR-SURE-NOT-CG}_x j \vee q = \neg \text{FOR-SURE-NOT-CG}_x j \\
& \quad = \{ \text{FOR-SURE-NOT-CG}_x j, \neg \text{FOR-SURE-NOT-CG}_x j \}
\end{aligned}$$

Repp characterizes the meaning in (23), and its relation to speaker expectation biases, as follows: In using an NPQ $\neg p$?

the speaker conveys a previous epistemic bias towards p and wishes to double-check that p is part of the CG. This is done by using **FALSUM**.... The speaker s wishes to double-check p , so s asks the addressee [sic] a whether in all the worlds that conform to a 's knowledge in w and fulfil [sic] all the conversational goals of a in w' , the proposition p is not in the CG... [T]he addressee is expected to determine whether or not there are zero degrees of strength for adding p to CG. (REPP 2013: 243, 240)

Though Repp doesn't say more about why using a question with the denotation in (23) amounts to "double-checking p ," or why double-checking p in this way necessarily conveys a "previous epistemic bias towards p ," perhaps she might follow R/H's appeal to notion of "intent." However, observe that the pronounced cell in (23), **FOR-SURE-NOT-CG** $_x p$, is strictly stronger than the pronounced cell, \neg **FOR-SURE-CG** $_x p$, in R/H's denotation in (18). This predicts that the intent of the question would be concerned not just with providing grounds for doubting p , but with providing conclusive evidence against p . Conversely, the cell corresponding to a *yes*-answer, \neg **FOR-SURE-NOT-CG** $_x p$, is quite weak: it says only "that there are non-zero degrees of strength" for adding p to CG (REPP 2013: 241).⁵

⁵Repp cites the felicity of answers like A 's in (i) as evidence for treating the cell corresponding to a *yes*-answer as semantically weak in this way.

3 Challenges

We have seen two ways of treating NPQs as conventional context-managing devices. The basic intuition driving these views is that NPQs $\neg p$? question the appropriateness of a certain discourse move, namely of adding p to the discourse common ground. In this section I will raise several worries for R/H's and Repp's ways of technically implementing this idea. The next section develops an alternative account that avoids these worries. I will argue that we can capture the apparent context-managing role of NPQs without treating them as directly *about* the discourse context. However, we will see that there are more general challenges facing context-management accounts, even when understood in the proposed broader way. For concreteness, unless otherwise noted, I will continue to couch the discussion primarily in terms of R/H's account, assuming that preposing negation introduces VERUM; the points can be adapted straightforwardly to Repp's FALSUM-based account.

3.1 VERUM and epistemic operators

First, an important aspect of R/H's view is that VERUM is *not* an ordinary epistemic operator. R/H observe that VERUM isn't interchangeable with epistemic expressions like *be sure*, as reflected in (24)–(25). (Again, R/H treat the VERUM operator in NPQs as the same operator arising from the lexical item *really*.)

- (24) a. ?I am sure I am tired.
b. I really am tired.
- (25) [Context: S is a lawyer questioning a witness, A , who claims to have seen Mrs. Rumpel the night of the crime. S wants to check A 's degree of certainty about this, but without conveying any disbelief. S asks:]
- a. Are you sure that you saw Mrs. Rumpel leave the house that night?
b. #Did you really see Mrs. Rumpel leave the house that night?
c. #Didn't you not see Mrs. Rumpel leave the house that night?
- (ROMERO & HAN 2004: 626)

However, R/H's formalization obscures such contrasts. Given common assumptions

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- (i) S: Isn't Jane coming?
A: I think she is, but I'm not sure.

She claims that a *yes*-answer can be strengthened in context, though she leaves open how exactly the strengthened asserted meaning is derived. We will return to issues concerning answer patterns and qualified answers in §5.3.

about the nature of (information-sharing) discourse, R/H’s formalization predicts that `VERUM` and *know* are contextually equivalent.

Recall the definition of `VERUM` in (14): `VERUM` p is true iff for all x ’s epistemic alternatives w' , p is included in the common ground CG in every world w'' in which all of x ’s conversational goals in w' are satisfied. It is generally accepted that a primary overarching goal of inquiry is to figure out how things are — formally, to winnow down the context set CS (the set of live possibilities, the set of worlds where all the propositions in CG are true) to a singleton set, whose only member is the actual world (e.g., STALNAKER 1978, ROBERTS 1996). Let a *normal* context be one in which the speakers are engaged in a cooperative information-sharing discourse, know that they are, and know their discourse goals. And assume that if one knows p , then one knows that one knows p — or, what may be weaker, that if one knows p , then one knows that one *Rs* p , where *R* is whatever attitude generally suffices for ensuring Quality (knowledge, justified belief, etc.). Then:

Proposition 1. For any normal context c , `VERUM` p is true in c (according to (14)) iff x *knows* p is true in c

For the left-to-right direction: Assuming normalcy, then for any epistemic alternative w' and proposition q , if q is included in $CG_{w''}$ for every $w'' \in Conv_x w'$, then q must be true at w' . For if q is false at w' , then $q \notin CG_{w''}$ for any $w'' \in Conv_x(w')$, given that a discourse goal in w' is to avoid adding falsehoods to the CG. So, if `VERUM` p is true, then p must be true at every world w' in x ’s epistemic alternatives, i.e. x *knows* p is true. For the right-to-left direction: Suppose x *knows* p is true, so that p is true at every world w' in x ’s epistemic alternatives. Given the above introspection principle, x knows that x bears *R* to p , hence x bears *R* to p in every such world w' . So, assuming normalcy, p must be included in the CG in any world in which all x ’s discourse goals in w' are satisfied. So, `VERUM` p is true. Putting these points together, it follows that for any world in the context set, `VERUM` p is true iff x *knows* p is true. This obscures R/H’s claim that `VERUM` is a distinctively context-oriented operator.

3.2 VERUM and conversational operators

Context-management approaches have been motivated by treating the proposed operators (`VERUM`, `FALSUM`) on the model of linguistic expressives (discourse particles, epithets, etc.) and other broadly context-oriented operators. This motivation is especially salient in Repp’s work (2006, 2009, 2013), but Romero (2006) endorses it as well. For instance, Repp (2006: 415-416) notes (following Krifka, Zimmermann,

a.o.) that illocutionary operators are often thought to have various embedding restrictions — e.g., that they cannot be embedded in conditional antecedents or under other (alleged) illocutionary operators.

(26) #If it is surely going to rain, we must take an umbrella.

(27) #He didn't surely leave the house but perhaps.

(REPP 2006: exs. 55, 58)

ROMERO 2006 treats certain readings of epistemic modals as expressive items (in the technical sense), and notes that *really* patterns with epistemic modals in allowing affirmations/denials to target the prejacent (embedded proposition) of a prior utterance:

(28) A: This professor must be very smart.

S: That's not true.

⇒ ¬(he's very smart)

? ¬(he must be very smart)

(29) A: This professor is obviously very smart.

S: That's not true.

(30) A: This professor really is very smart.

S: That's not true.

(ROMERO 2006: exs. 29–31)

Romero appeals to these data to help explain why answers to NPQs $\neg p?$ seem to target the embedded proposition p , rather than the context-oriented propositions (¬)FOR-SURE-CG p which comprise the semantic meaning of the question. (We will return to answer patterns with NPQs in §5.3.)

(31) Q: Didn't Mary visit Sue?

A: Yes, she did.

A': No, she didn't.

(ROMERO 2006: ex. 33)

There are reasons to question assimilating VERUM/FALSUM with linguistic expressives and illocutionary operators. First, though epistemic *really* may be awkward in certain embedded contexts, felicitous examples are possible, as in *S*'s replies in (32)–(33).

(32) S: Are you sure it's not going to rain? I hate getting caught without an umbrella.

A: Yeah, it looks fine out to me. And I don't want to lug that thing around for no reason.

S: OK, if it's really not going to rain, I won't take the umbrella. But if maybe it will, let's take it just in case.

(33) A: John is the best runner in the school.

S: If he's really the best, why did he lose to Jane?

Second, biased polar questions with multiple (alleged) epistemic conversational operators are also possible, as in S's replies in (34)–(35):

(34) A: The butler is surely the killer. He had the motive.

S: i. Must it really have been the butler? Did he have the wherewithal to pull it off?

ii. Are you sure? Isn't the gardener really the killer? Wasn't he the one who was there the night of the crime?

iii. Couldn't the gardener have done it? Wasn't he also there the night of the crime?

(35) A: The moment we walked into Disneyland was the one that matters.

S: Couldn't any moment with your child really be the one that matters?
(cf. SWANSON 2010: 3–4)

S's reply in (34-i) includes epistemic *must* and *really*, both of which Romero treats as expressive items; (34-ii) includes *really* and the VERUM arising from preposing negation; (34-iii) includes epistemic *could* and VERUM; and (35) includes all three types of items. One might respond to such examples by denying that the overt epistemic expressions are in fact expressive/illocutionary operators (more on which below). But this would undercut much of the alleged independent motivation for treating NPQs as having a distinctive context-oriented semantics.

Third, Romero's attempt to treat answer patterns with NPQs on the model of affirmations/denials with epistemic modals obscures important differences between them. First, as the literature on epistemic modals has emphasized, though affirmations/denials can sometimes target the prejacent of a modal claim, they also often target the modal claim itself.

(36) A: The keys might be on the table

B: You're right, they might be. Let me check.

(cf. VON FINTEL & GILLIES 2011: 114–116)

(37) A: The keys can't be on the table.

B: You're right, they can't be. I never put them there.

B's agreements in (36)–(37) aren't with the prejacent proposition that the keys are on the table; in (36) *B* is uncertain about this proposition, and in (37) *B* rejects it. However, answers to NPQs don't just sometimes target the embedded proposition; they *always* do. It would be odd to reply like *A* or *A'* in (38), with a claim about (roughly) whether the embedded proposition is certainly to be added to the CG.

- (38) S: Isn't Jane coming later?
A: ?Yes, it's certain that we should accept that she is.
A': ?No, it isn't certain that we should accept that she is.

This puts pressure on the claim that such context-oriented epistemic propositions constitute the meaning of the question, understood as the set of its possible answers. One might attempt to explain the anomalousness of the replies in (38) on the ground that explicitly meta-conversational moves are generally anomalous. Replies which simply use epistemic vocabulary are improved:

- (39) S: Isn't Jane coming later?
A: Yes, she certainly is.
A': No, maybe she isn't.

However, this won't provide independent support for treating NPQs as having a distinctive epistemic context-oriented semantics, for such answers are possible with ordinary polar questions as well (more on which in §5.3).

- (40) S: Is Jane coming later?
A: Yes, she certainly is.
A': No, maybe she isn't.

Examples with propositional anaphora raise similar concerns.

- (41) S: Isn't Jane coming later?
A: John thinks so.
A': John thinks not.

The replies in (41) ascribe to John attitudes about the embedded proposition *j* that Jane is coming to the party later. There are no readings of these replies which ascribe attitudes about any sort of epistemic or context-oriented proposition (whether about the discourse status of *j* in the global context, or in the local context characterizing John's doxastic state). Notably there is no reading of *A'*'s reply which ascribes to John

a belief that it isn't certain that Jane is coming later, i.e. a belief corresponding to the pronounced cell of *S*'s question denotation. This seems surprising on R/H's and Repp's accounts; indeed it seems especially surprising given how deeply embedded *j* is in the semantic representation of the question's possible answers.

3.3 NPQs, epistemic questions, and “intent”

A third challenge for context-management approaches to NPQs is to distinguish NPQs from associated epistemic modal questions. I regard this challenge as particularly pressing. We will see that it arises not only for accounts, like R/H's and Repp's, which introduce distinctive context-managing operators into the semantics, but for any account which treats NPQs in broadly epistemic terms.

Recall R/H's derivation of the polarity of the speaker expectation biases with NPQs (§2.1). Central to this derivation is an appeal to the “intent” of the question, as determined by the combination of the (unbalanced) partition constituting the question's denotation, and which cell in the partition is pronounced. It is worth quoting R/H's explanation of the intent of an NPQ, and how it generates the positive speaker expectation bias, largely in full:

Since the pronounced cell is the \neg FOR-SURE- CG_x *p* cell, the intent of the question is concerned with pursuing the topic “lack of complete certainty about *p*” or “possible (weak or strong) doubts about *p*”... Since the intent of the question is to ask the addressee to provide reasons — if any — to doubt *p*, ...*p* must be the original belief of the speaker... If, contrary to fact, the speaker believed $\neg p$ to a high degree, the speaker would already have evidence to doubt *p*... Therefore, [NPQs] have the positive epistemic implicature that the speaker believed *p*.

The “intent” of the [NPQ $\neg p$?] is to suggest that *p* be added to the Common Ground unless the addressee has reasons to doubt *p*. This is a licit suggestion if the speaker endorses *p*..., but it violates the spirit of the Maxim of Quality if the speaker believes $\neg p$.

(ROMERO & HAN 2004: 646-647, 649)

I can discern two possible lines of argument in these passages, reconstructed in (42).

- (42) i. Pronouncing the cell \neg FOR-SURE- CG_x *p* constitutes a request for grounds for doubting *p*.

- ii. Requesting grounds for doubting p would be contrary to one's conversational goals (e.g., contrary to Quantity), hence infelicitous, if one initially expected $\neg p$.
- ii'-a. In requesting grounds for doubting p one "suggest[s] that p be added to the Common Ground unless the addressee has reasons to doubt p ."
- ii'-b. Such a suggestion would be contrary to one's conversational goals (e.g., contrary to Quality), hence infelicitous, if one initially expected $\neg p$.
- iii. Using a question, like an NPQ, with an epistemically unbalanced partition would be contrary to the Principle of Economy, hence infelicitous, if one was neutral about whether p .
- iv. So, using an NPQ, and pronouncing the \neg FOR-SURE-CG _{x} cell in its denotation, is felicitous only if the speaker initially expected p . So, assuming the speaker is being cooperative, using an NPQ invariably conveys that the speaker had a prior expectation toward p .

Both arguments assume R/H's previous argument (stated in (iii)) that using a question with an epistemically "unbalanced" partition is infelicitous unless the speaker has some antecedent epistemic bias about the embedded proposition. And both arguments start with the idea in (i) that pronouncing the cell \neg FOR-SURE-CG _{x} p of the denotation of an NPQ $\neg p?$ constitutes a request for grounds for doubting p . The first argument proceeds that requesting grounds for doubting p would be infelicitous if the speaker antecedently expected $\neg p$, in which case she would already have grounds for doubting p ; hence, requesting doubts about p would be contrary to the spirit of the Quantity maxim (claim (ii)). The second argument takes as basic that requesting grounds for doubting p constitutes a defeasible suggestion that p be added to CG (claim (ii'-a)). Such a suggestion would be contrary to the spirit of the Quality maxim, hence infelicitous, if the speaker antecedently expected $\neg p$ (claim (ii'-b)). Both arguments conclude that using an NPQ is felicitous only if the speaker antecedently expected p , and thus that NPQs necessarily carry a positive speaker expectation bias (claim (iv)). So, whereas the second argument takes (ii'-a) — that pronouncing the \neg FOR-SURE-CG _{x} p cell involves defeasibly suggesting that p be added to CG — as a premise in deriving the positive speaker expectation bias with NPQs, the first argument would derive the claim in (ii'-a) from the independently derived positive speaker expectation bias. It won't be important for our purposes which line of argument R/H may have had in mind. What will be important are simply the claims in (ii), (ii'-a), and (iii). Each of these claims is problematic.

Start with the assumption in (iii). Contrary to R/H, using a question with an

epistemically unbalanced partition is *not* sufficient for conveying an epistemic bias on the part of the speaker, as reflected in (43). (Cf. “[NPQ] LFs give rise to unbalanced partitions, *hence* to epistemic biases” (ROMERO 2006: 12; emphasis mine).) (Assume, following R/H’s and Repp’s remarks about similar expressions, that the epistemic expressions in these examples are expressive — “subjective” in the terminology of LYONS (1977, 1995) — in the sense that they express the speaker’s/addressee’s credences, and target what sorts of credences to adopt for the purposes of the conversation. More on this shortly.)

- (43) [Context: Same as in (3): We are wondering who is coming to the party later. I mention that John is coming. We have no idea if Jane was invited, if she is friends with John, what her plans are, etc. You say:]
- a. Maybe Jane is coming too?
 - b. Perhaps Jane is coming too?
 - c. Might Jane be coming too?
- (Unbalanced partition; No speaker expectation bias)*

The partitions for the epistemic possibility questions in (43) would seem to involve a “choice between... certainty [against] adding p to CG... and any other degree of certainty” (ROMERO & HAN 2004: 628), and yet the questions needn’t express a speaker expectation bias. So, it cannot be merely an epistemically unbalanced partition that is responsible for NPQs’ invariably expressing a speaker expectation bias.

Now turn to (ii) — that requesting reasons for doubting a proposition p would be infelicitous if one already expected $\neg p$. Suppose we grant (i) that pronouncing the \neg FOR-SURE-CG _{x} p cell amounts to asking the addressee for reasons to doubt p . Yet there is nothing incoherent in requesting reasons for doubting a proposition which one doubts oneself. Pretheoretically, one might even think that asking to pursue grounds for doubting p would express an antecedent bias *against* p . Indeed, questions with epistemic possibility modals seem to have precisely this function:

- (44) *Moore*: My hands hurt.
Skeptic: How do we know you have hands? Maybe/Perhaps you don’t have hands and you’re just a brain in a vat?

Or for a less fanciful example:

- (45) A: The butler is surely the killer.
 S: Are you sure? The butler has always seemed like such a nice guy. Might/Could it have been someone else? Maybe the gardener?

In (44), in raising the possibility that Moore is just a brain in a vat and requesting grounds for doubting the proposition *h* that Moore has hands, the skeptic expresses her epistemic bias *against h*. Likewise, in (45), in raising the possibility that the gardener was the killer, *S* expresses her prior expectation that someone *other* than the butler did it.

Examples such as (44)–(45) are especially problematic for R/H’s account. Though it is contentious precisely how to capture the apparent discourse-oriented role of epistemic modals, all parties agree that (at least on the readings in question) they play some role in managing the set of live possibilities, or discourse common ground.⁶ Suppose, first, that this is all there is to the semantics of such uses of *perhaps*, *maybe*, *might*, etc., as Romero and Repp themselves suggest, and that it is formalized, like VERUM/*really*, in terms of FOR-SURE-CG. Then, given the duality of epistemic \square and \diamond , the “intents” of an NPQ $\neg p?$ and an epistemic possibility question (EPQ) $\diamond\neg p?$ — the shape of their partitions and the pronounced cells — will be equivalent: the possible answers will imply (roughly) certainty vs. less-than-certainty in *p*, and the pronounced cell will be the \neg FOR-SURE-CG_{*x*} *p* cell, requesting grounds for doubting *p*. And yet the NPQ and EPQ have *opposite* epistemic biases and discourse functions: Unlike with NPQs, the polarity of an EPQ and the polarity of the speaker expectation bias (if there is one) are the *same*. Hence an EPQ $\diamond\neg p?$, unlike the corresponding NPQ $\neg p?$, cannot be used as a way of disagreeing with a previous implication that $\neg p$, as reflected in (46), or be used to suggest *p* as an answer to a relevant question, as reflected in (47):

- (46) A: The butler is surely the killer. ($\Rightarrow \neg$ gardener)
 S: Are you sure? Wasn’t it the gardener? *Aux+n’t gardener?*
 S’: #Are you sure? Maybe it wasn’t the gardener? *# $\diamond\neg$ gardener?*

- (47) [Context: Dialog between two editors of a journal in 1900:]
 A: I’d like to send this paper out to a senior reviewer, but I’d prefer somebody who has experience with our regulations.
 S: Hasn’t Frege reviewed for us? He’d be a good one.
 S’: #Maybe Frege hasn’t reviewed for us? He’d be a good one.
 (cf. ROMERO & HAN 2004: ex. 27)

In sum, contrary to claims (ii) and (ii’-a) above, using a question to request grounds for doubting *p* can express a prior expectation *against p*, and suggest that *p* *not* be

⁶For alternative contextualist, relativist, expressivist, and dynamic approaches to capturing this, see, e.g., VELTMAN 1996, STEPHENSON 2007, SWANSON 2012, YALCIN 2012, STALNAKER 2014, SILK 2016.

added to the CG. Asking to “pursu[e] the topic ‘lack of complete certainty about p ’ or ‘possible... doubts about p ’” (ROMERO & HAN 2004: 646) needn’t convey an epistemic bias toward p .

For purposes of illustration the previous paragraph treated *perhaps*, *maybe*, etc. essentially as the semantics duals of VERUM/*really*. Yet the worry can be pressed with weaker assumptions. Accepting $\diamond p$ ensures — perhaps *inter alia*, and perhaps indirectly — that the CG is compatible with p , and that there is some credence in p , and thus lack of certainty in $\neg p$. This suffices to cast doubt on (ii) and (ii’-a): There needn’t be any violation of Quantity, or resulting infelicity, in requesting reasons against a proposition that one already doubts. And requesting reasons against a proposition needn’t suggest, defeasibly or not, that that proposition be added to the CG. The worry is that language seems to afford conventional devices which raise (roughly) the same possibilities for how the conversation might evolve as NPQs, and which do so by highlighting (roughly) the same possible continuation of the conversation, and yet have precisely opposite roles in expressing speakers’ attitudes and managing the context.

This discussion of epistemic questions also raises concerns about whether R/H’s account captures the *strength* of the speaker expectation bias with NPQs. Using an NPQ $\neg p?$ doesn’t merely convey *some* prior credence in p . It conveys a positive expectation, or bias, *toward* p ; it expresses one’s having given higher credence to p than to $\neg p$. Nothing in R/H’s account predicts this stronger implication. Consider a “contradiction scenario” where the addressee previously implied $\neg p$. Why couldn’t one request reasons against p simply because one doesn’t want the possibility that p to be hastily dismissed? Why couldn’t one ask to examine evidence against p in order to ensure that we won’t ultimately have reason to accept p ? Again, epistemic possibility questions seem to allow us to do precisely this: In asking *Maybe you don’t have hands?* ($\diamond \neg h?$), the skeptic requests reasons for doubting h , not because she positively expects $\neg h$, but because she wants to ensure that this possibility isn’t improperly ignored. The skeptic has some credence in $\neg h$ and isn’t prepared to exclude the possibility that they might ultimately have reason to accept $\neg h$. Why, then, do NPQs $\neg p?$, unlike associated EPQs $\diamond \neg p?$, invariably convey not just *some* prior credence in p but a genuine epistemic *bias toward* p ? Simply appealing to the questions’ “intents” leaves this unexplained.

3.4 Context management and attitude expression in meaning and use

The previous subsections raised problematic empirical predictions of certain context-management approaches to NPQs. In the next section we will examine how we might develop an improved theory in response. But first I would like to take a step back, and ask the reader to indulge me in some more speculative theoretical reflections on context management and attitude expression in linguistic theorizing.

It is common in the literatures on discourse-structuring devices for authors to distinguish these devices via contrasts between (e.g.) descriptive vs. expressive content, truth-conditional vs. non-truth-conditional meaning, information-sharing vs. discourse-maintenance, etc. For instance, the survey article in ZIMMERMANN 2011 begins by characterizing discourse particles as “provid[ing] the discourse participants *not with descriptions* of particular states of affairs, but rather with... [means of] *expressing the speaker’s epistemic attitude* towards the propositional content of an utterance, or... about the epistemic states of his or her interlocutors concerning a particular proposition” (2012–2013; emphasis added). Likewise, VERUM is described as linguistically distinctive, compared to other epistemic operators, in being “used not to assert that the speaker is entirely certain about the truth of *p*, but to assert that the speaker is *certain* that *p* should be added to the Common Ground CG” (ROMERO & HAN 2004: 627). Context-managing operators “indicate the *status* of a proposition relative to the CG” (REPP 2013: 231).

It is important to remember that such characterizations of the intuitive roles of these expressions invoke highly theoretical, and arguably contentious, distinctions. The neophyte might wonder: Don’t *all* speech acts express speakers’ (epistemic) attitudes — not just about the world, but about the context, one’s interlocutors, and how the discourse should evolve? Given any plausible norm of assertion (BROWN & CAPPELEN 2011) and conventional force rule (whether semantic or pragmatic), don’t all assertions “[express] the degrees of strength... for sincerely adding a proposition to the CG” (REPP 2013: 240)? Don’t all assertions “indicate whether [a] proposition is part of the CG, or whether it is new,” and “indicate how the CG should develop: whether, and with what degree of commitment on the side of the speaker, the proposition should become part of the CG, or be removed from it” (REPP 2013: 231; cf. STALNAKER 1978). After all, even an ordinary assertion that *p* expresses, among other things, the speaker’s belief (perhaps knowledge) that *p*, the speaker’s assumption that *p* is news to the addressee, the speaker’s goal of adding *p* to the CG, etc. In the case of overtly epistemic language the links between the content of the utterance, the attitudes of the discourse participants, and the CG are arguably even

more direct. If foundational expressivism in philosophy of language is correct, then the meaning of *all* language, even ordinary descriptive language, is to be explained fundamentally in terms of speakers' states of mind (see, e.g., GIBBARD 1990, 2012, BLACKBURN 1998, PRICE 2013).

These points might seem to threaten trivializing the role of NPQs, etc. in expressing speakers' attitudes and managing the context. Even Repp, who includes explicit illocutionary force operators in the syntax generally, introduces a distinct syntactic level for context-managing operators like VERUM, FALSUM, etc. But if we aren't assuming markers for attitude expression and context management in the syntax/semantics of sentences in general, why then with *really*, NPQs, etc.?

To be clear, there *are* potential empirical grounds for distinguishing the apparent expressive/context-managing role of NPQs, and for introducing context-managing operators into the grammar more selectively. It's not as if theorists move directly from intuitions about attitude expression with discourse particles, epithets, etc. to distinctive technical implementations. For instance, one might point to differences in projective behavior, embedding possibilities, or effects on local content. But there are established tests for these properties, and general categories of conventional content for interpreting their results. My point at the moment is simply that we should be cautious about hastily assigning theoretical significance to intuitions about the apparent expressive/context-managing role of NPQs. It is crucial to distinguish the general role of language in expressing speakers' states of mind, from the specific role of linguistic expressives, in the technical sense of expressions carrying a distinctive category of projective content (cf. TONHAUSER ET AL. 2013).

One *might* respond by taking up a revisionary context-management approach to the grammar generally. But such a move isn't forced upon us. We shouldn't rule out an alternative unification strategy that attempts to derive the expressive/context-managing role of (e.g.) NPQs from independently attested aspects of conventional meaning and principles of interpretation and conversation. The next section develops one way of pursuing such a strategy.

4 The account: Deriving context-management and expectation biases with NPQs

The previous section raised several empirical and theoretical worries for approaches which introduce explicit context-managing operators into the semantics of NPQs. These worries provide desiderata for a more successful account of NPQs in express-

ing speaker attitudes and managing the discourse common ground. The aim of this section is to begin developing such an account. The proposed account, I will argue, (i) elucidates the role of VERUM in coordinating speakers' epistemic attitudes, capturing both the apparent connections and relevant differences among VERUM and various categories of epistemic vocabulary; (ii) provides a more rigorous derivation of speaker expectation biases with NPQs — their existence, specific polarity, and strength — and explanation of the contrasts with epistemic modal questions; and (iii) does so utilizing only general apparatus from the semantics and pragmatics of modals, questions, and context-sensitive language.

To fix ideas I assume, following R/H, that preposing negation introduces an additional epistemic operator. (An alternative Repp-style approach, which treats preposed negation as itself having an epistemic semantics, is briefly considered in §5.2.) However, I will suggest that we treat this operator as a certain kind of ordinary epistemic necessity modal, and diagnose its context-managing role in terms of a general kind of discourse-oriented use of context-sensitive language. §4.1 provides background on the assumed semantics for epistemic modals and the relevant kind of discourse-oriented use, following SILK 2016. §4.2 shows how we can capture the context-managing role of VERUM utilizing the resources from §4.1 and general principles about the use and interpretation of context-sensitive language. §4.3 revisits the challenge from §3.3 of distinguishing NPQs and associated epistemic possibility questions (EPQs). Drawing on independently motivated apparatus from the semantics of (epistemic) modals, and an adapted general principle of discourse relevance, I show how we can capture the discourse differences between NPQs and EPQs and derive the distinctive speaker expectation biases of NPQs.

The aim of this section isn't to provide a comprehensive account of NPQs or biases in questions. It is to introduce a range of explanatory resources for capturing certain discourse properties of NPQs, and to begin examining how these resources can help us avoid the worries canvassed in §3. The developments in this section provide the basis for a more empirically adequate, independently motivated, and explanatory overall theory.

4.1 VERUM and expressive epistemic modality

As noted in §3.1, R/H observe that “though *really* or VERUM is often epistemically flavored, it is not interchangeable with pure epistemic expressions like *be sure*” (2004: 626). R/H's guiding intuition is that “*really* or VERUM is used not to assert that the speaker is entirely certain about the truth of *p*, but to assert that the speaker is *certain* that *p* should be added to the Common Ground” (2004: 627). I will argue that we

can capture this intuition, and the apparent differences between *really*/VERUM and *be sure/be certain*, while avoiding the issues with R/H's formalization described in §3. We can capture the idea that using VERUM *p* expresses one's epistemic attitudes about the proper discourse status of *p* without giving it the semantics of an epistemic modal claim about the context itself. In short, I propose that we treat VERUM as having the semantics of an ordinary epistemic necessity modal, though one conventionally associated with a certain kind of speaker-endorsing, discourse-oriented use (precisely specified below).

It is common to distinguish what we can call *endorsing* uses of modals, which present the speaker as endorsing the considerations with respect to which the modal claim would be true, from *non-endorsing* uses, which don't present the speaker in this way (LYONS 1977, 1995).⁷ (Non-endorsing uses are compatible with speaker endorsement; they simply fail to present it.) In the non-endorsing deontic use in (48), it is consistent for the speaker to dismiss the act of getting home by 10 because she isn't endorsing the norms that require it — the rules in Ernie's household; she is simply reporting what these norms require.

- (48) Ernie has to be home by 10. Aren't his parents stupid? I'd stay out if I were him.

Similarly the context in (49), adapted from KRATZER 2012, makes salient the information provided in the filing cabinet. The non-endorsing epistemic uses of *might/must* say what is possible/necessary according to this information.

- (49) [Context: We are standing in front of a locked filing cabinet. None of us has had access to the information in it, but we know that it contains the police's complete evidence about the murder of Klotho Fischer. We are betting on who might or must have killed Fischer according to the information in the filing cabinet. You, who are innocent, say:]

I might/must have done it. (cf. KRATZER 2012: 98–99)

Endorsing uses of modals, by contrast, express the speaker's endorsement of the relevant verifying information, norms, etc. The endorsing uses in (50)–(51) express the speaker's acceptance of evidence entailing that it's raining, and evidence compatible with its raining, respectively.

⁷This distinction has been noted in many areas under various labels. See also, e.g., HARE 1952, VON WRIGHT 1963, NARROG 2005, SILK 2016. My “endorsing/non-endorsing” uses correspond roughly to Lyons's “locutionary subjective/objective” uses; I adapt Lyons's terminology since the terminology of ‘subjective’ and ‘objective’ can be fraught.

- (50) It must be raining. I just saw some people walk in with wet umbrellas.
- (51) It might be raining. I just saw some people walk in with wet coats. Then again, the sprinklers have been acting up, so maybe that's why.

Endorsing uses of epistemic modals (hereafter “endorsing-epistemic modals”) propose that the relevant verifying information be accepted in the discourse context. It is contentious precisely how to capture this feature of endorsing-epistemic modals in the formal semantics and pragmatics (see n. 6). To fix ideas I assume the following sort of contextualist approach, developed in SILK 2016; theorists accepting alternative relativist, expressivist, or dynamic semantics may adapt the discussion accordingly.

It is standard to treat modals as semantically associated with a parameter or variable \mathbf{P} that ranges over sets of premises (propositions) (see esp. KRATZER 1977, 1981, 1991).⁸ This contextually supplied set of premises determines the reading of the modal (epistemic, deontic, etc.). Epistemic readings call for a premise set that encodes a body of information. *Endorsing* uses, I suggest, call for an epistemic premise set variable \mathbf{P}_e that represents a body of information endorsed in the context. In the unembedded case this typically corresponds to the discourse common ground, the information taken for granted in the conversation (though see SILK 2016: chs. 3–4 for complications). Endorsing uses don't simply say what is possible or necessary according to some body of information; they assume that the information is to be accepted in the discourse. This reflects the paradigmatic role of epistemic modals in communal inquiry.

So, on this analysis, an endorsing-epistemic utterance of *Must* (/ *Might*) p assumes a value for \mathbf{P}_e , P_c , and asserts that p follows from (/is compatible with) P_c . There are four features of this that I would like to highlight. First, common characterizations of contextualism notwithstanding,⁹ on this account there is no reference

⁸The premise semantic implementation adopted here is equivalent (LEWIS 1981) to the perhaps more familiar implementation in KRATZER 1981, 1991 which uses a set of propositions (ordering source) to preorder the set of accessible worlds (cf. LEWIS 1973). Kratzer's semantics makes use of two premise sets, calculated as a function of the world of evaluation: a premise set $F(w)$ (a “modal base”) that describes some set of relevant background facts in w and a premise set $G(w)$ (an “ordering source”) that represents the content of some ideal in w . These complications won't be relevant here. For simplicity I assume our premise sets are consistent. And I assume that premise set parameters are syntactically realized as variables (cf. VON FINTEL 1994, FRANK 1996). I use boldfaced type for parameters/variables, and italics for their values in context. My talk about context supplying values for variables can be understood as short for talk about contextually supplied assignment functions (HEIM & KRATZER 1998).

⁹E.g., SILK 2013: 212–213, MACFARLANE 2014: 146–147, a.m.o.

to the discourse context or to “the relevant information,” considered *de dicto*, in the content of an epistemic modal sentence. Epistemic modal sentences aren’t fundamentally *about* an individual, group, or discourse context. They make logical claims *given* a certain epistemic premise set. In endorsing uses this premise set represents a body of contextually endorsed information.

Second, in assuming a value for the contextual variable P_e one needn’t believe that the assumed information is already commonly accepted in the context. The relevant attitude toward the proposition that the context, and hence value for P_e , is thus-and-so isn’t belief but acceptance for the purposes of the conversation (e.g., STALNAKER 1974, THOMASON 2002). Given how skilled we are at inferring one another’s intended context,¹⁰ we can use epistemic modals as a way of testing one another’s epistemic states, inviting them to object if they think they are in a better epistemic position (SILK 2016: ch. 3).

Third, it is well-known that in discourse we keep track of information not only about the subject matter of the discourse, but also about the discourse situation itself. Hence, assuming it is presupposed that the discourse is taking place, the worlds in the context set CS will fix facts about the interlocutors, the extra-linguistic context, and the semantic values of expressions. So, one effect of accepting an endorsing-epistemic utterance of (e.g.) *Must p* is that the CS is updated to a set of worlds in which (among other things) the concrete discourse situation determines a value for P_e that entails *p*, i.e. a set of worlds in which the interlocutors endorse a body of information that entails *p*. This is no different from how accepting an utterance of (52) updates the CS to a set of worlds in which (among other things) such-and-such baby *b* is the maximally salient baby, and in which this baby is laughing.

(52) The baby is laughing.

A sincere endorsing-epistemic utterance conveys the speaker’s assumptions about what information is to be endorsed in the context, just as a sincere utterance of (52) conveys the speaker’s assumptions about what baby is to be treated as maximally salient. We can capture R/H’s and Repp’s intuition that certain uses of epistemic expressions express speakers’ assumptions about the discourse common ground and what information is to be accepted, yet without treating these uses as directly about the discourse or encoding a meta-contextual element in the semantic content.

Yet, fourth, there is a noteworthy difference in patterns of use between many paradigm context-sensitive expressions (pronouns, definite descriptions, quantifiers,

¹⁰See, a.m.o., HOBBS ET AL. 1993, CLARK & WILKES-GIBBS 1986, GARROD & DOHERTY 1994, THOMASON ET AL. 2006.

etc.) and epistemic expressions associated with P_e . Uses of context-sensitive expressions reflect speakers' assumptions about the plausibly relevant content-determining features of context. Such contextual assumptions can become at-issue in conversation. Consider the following example from SILK 2014.

- (53) [Context: It is America before the ratification of the Nineteenth Amendment. Chip is a well known sexist. Commenting to Dorothy on the glories of American democracy, Chip says:]
Chip: Ain't America great? Everyone can vote. (SILK 2014: 120)

Roughly, (53) says that every relevant individual in America can vote — slightly less roughly, that every individual in America who has a moral right to vote is legally permitted to vote. Insofar as Chip intends to say something true, it is mutually obvious that he is assuming that women aren't among the individuals to be considered in questions about voting rights. Adopting this assumption has rich inferential effects which can shape the development of the conversation. Ignoring women now can encourage further discriminatory behavior in the future. By responding with (54) Dorothy acts in a way which assumes that Chip's assumption is false; her utterance assumes that women are *not* to be excluded from the conversationally relevant domain of individuals.

- (54) *Dorothy:* No, not everyone can vote. *I* still can't.

Chip's and Dorothy's contrasting contextual assumptions can lead to (implicit/explicit) negotiation about which individuals have a moral right to vote and why.

The uses of *every* in (53)–(54) target the features of context that help determine the content of the quantificational expression — e.g., by determining the value for a quantifier domain variable (STANLEY & SZABÓ 2000). Call such uses — uses which distinguish among worlds in the CS based on the representation of context in those worlds, or adjust live values for a contextual variable — *discourse-oriented* uses.¹¹ For many paradigm context-sensitive expressions, discourse-oriented uses aren't the norm: the norm is for speakers to agree about the relevant content-determining features of context — at least after the production of the speaker's utterance (STALNAKER 2002) — in order to facilitate sharing information, e.g. about individuals in

¹¹Compare Barker's (2002) distinction between "descriptive" and "metalinguistic" uses of vague predicates. I avoid calling the latter uses 'metalinguistic' since they needn't be fundamentally about language or how to use words. More fundamentally, they concern what attitudes to take up toward the relevant content-determining contextual features (what information to accept, whom to treat as relevant/salient, etc.).

the domain. This marks a contrast with epistemic expressions. The asserted contents of epistemic modal assertions are propositions about logical relations between propositions and premise sets. Such logical matters aren't typically what is at-issue in conversation. What is typically interesting in a speaker's epistemic modal utterance is rather a certain contextual assumption of its felicitous use: that the conversationally endorsed information, and hence value for P_e , is such as to make one's utterance true. It is this value that delineates the range of live possibilities in the conversation. Endorsing uses of epistemic modals afford an efficient means of managing interlocutors' assumptions about what possibilities to ignore and not to ignore.¹²

I have said that endorsing uses are associated with a contextual variable P_e that represents a body of endorsed information. Embedded uses present the possibility of *locally* accommodating the presupposition of the epistemic premise set variable. As with other contextual variables, the value for P_e can be supplied by the context characterizing the embedding environment rather than by the global discourse context — for instance, in the scope of an attitude verb, conditional antecedent, or question operator.¹³ Relevant for our purposes, of course, is the case of questions. First, compare cases with discourse-oriented uses of paradigm context-sensitive expressions. Adapting our Chip/Dorothy example above, suppose *S* just moved to a new culture, and wants to get a feel for their attitudes toward various minority groups. *S* knows that people of such-and-such group *G* aren't legally permitted to vote, but wonders whether this is regarded as morally problematic. As a way of hopefully ascertaining *A*'s views, *S* asks:

(55) What are the voting rights like here? Can everyone vote?

Intuitively, *S*'s question is targeting the relevant domain restriction of *every*: Obviously not *everyone* can vote (e.g., infants can't), and *S* already knows that *G*s can't vote (and knows that *A* knows that *G*s can't vote). If *A* gives a *yes*-answer — roughly, that every $x \in D_c$ can vote (for domain restriction D_c) — *S* can infer that *A* isn't treating *G*s as among the individuals relevant to issues about who can vote, i.e. that *A* assumes D_c excludes *G*s. The domain restriction presupposition is getting locally accommodated under the question operator.

Or suppose *S* knows approximately how much money Rita earns (say, $\$X/\text{yr}$), and *S* thinks that *A* does too. As a way of hopefully ascertaining *A*'s views on whether

¹²See SILK 2016 for extensive further discussion of this feature of epistemic modals, and differences among context-sensitive expressions in their tendencies for (non-)discourse-oriented use.

¹³For general discussion see, e.g., STALNAKER 1974, 2014, HEIM 1990, GEURTS 1998. See SILK 2016: ch. 4 for extensive discussion for the case of epistemic modals.

such a salary counts as rich, *S* asks:

(56) Is Rita rich?

Intuitively, *S*'s question is targeting the relevant standard or threshold associated with *rich* — how rich one must be to count as rich. If *A* gives a *yes*-answer — roughly, that Rita's degree of wealth is at least as great as r_c (for richness standard r_c) — *S* can infer that *A* assumes r_c is no greater than \$*X*/yr. The degree-standard presupposition is getting locally accommodated under the question operator.

I suggest that something analogous occurs in questions such as (57) with epistemic modals (“endorsing-epistemic questions”). Suppose *S* isn't sure who the killer is, and wants to see if *A* has a better idea. *S* asks:

(57) Might the gardener have done it?

Intuitively, *S*'s question is targeting the value of the epistemic premise set variable P_e . It's not that *S* is inquiring about the logical implications of a certain mutually accepted body of evidence. Rather *S* wants to ascertain if *A* has additional evidence that would rule out the possibility *g* that the gardener is the killer. If *A* gives a *no*-answer — roughly, that P_e is incompatible with *g* — *S* can infer that *A* isn't treating *g* as a live possibility, i.e. that *A* wishes to accept for the purposes of conversation information that excludes *g*. The presupposition of a body of endorsed information, associated with P_e , is getting locally accommodated under the question operator.

Given our purposes we can leave open how exactly to model the semantics and discourse dynamics of such processes of local accommodation in questions and question/answer patterns.¹⁴ What is important here is simply that *uses* of endorsing-epistemic questions in conversation can (among other things) have the effect of partitioning the CS based on whether the concrete discourse situation in those worlds determines a value for P_e that bears the relevant logical relation to the modal's prejacent. One effect of accepting, say, a *no*-answer to (57) is that the CS is updated to a set of worlds in which (among other things) the concrete discourse situation determines a value for P_e that is incompatible with *g*, i.e. in which the interlocutors endorse information that excludes *g*. This is no different from the examples in (55)–(56) with paradigm context-sensitive expressions: One effect of *S*'s utterance of, say, (55) is a partitioning of the CS into worlds based on whether the concrete discourse situation determines a value for the domain restriction variable that (roughly put) is a subset of the set of individuals legally allowed to vote; and one effect of a *yes*-

¹⁴See the references in note 6 (also BARKER 2002) for related general discussion and various approaches to modeling (what I am calling) assertive discourse-oriented uses.

answer is that the CS is updated to a set of worlds in which (among other things) Gs aren't included in the set of individuals to be considered in questions about voting rights. In these ways, we can capture intuitions about the role of epistemic questions in targeting how the CG should evolve, and can do so utilizing general, independently attested mechanisms of (local) interpretation, principles of conversation, and resulting features of the use of context-sensitive language in discourse.

4.2 VERUM as a conventionally endorsing epistemic modal: Deriving context-management

The previous section focused on epistemic modals generally. Let's return to the case of VERUM. I suggest that what distinguishes VERUM is that it *lexically specifies* being interpreted with respect to the variable P_e representing a body of contextually endorsed information. English modal verbs are lexically unspecific with respect to modal flavor; it is left to context to supply a particular reading. Even in the case of broadly epistemic readings, non-endorsing uses — interpreted with respect to other epistemic premise set variables — are possible. The non-endorsing use in (49), for instance, calls for a variable P_{fc} that refers to the information in the filing cabinet. This information may be accepted in the discourse context, but it may not be. What distinguishes VERUM, I suggest, is that it is lexically specific not only with respect to modal flavor, but also with respect to endorsing use: the lexical semantics encodes that it is interpreted with respect to P_e , as reflected in (58) (see n. 8).

$$(58) \quad \llbracket \text{VERUM/really } p \rrbracket = 1 \text{ iff } \cap \llbracket P_e \rrbracket \subseteq p \text{ iff } \cap P_c \subseteq p$$

VERUM p conventionally expresses that the verifying information is endorsed in the discourse context. This reflects the apparent essential use of VERUM (*really*, etc.) in expressing speakers' states of mind and managing the discourse common ground.

In this way, we can capture the context-managing role of VERUM simply utilizing general resources from the semantics and pragmatics of modals. Further, we can do so while avoiding R/H's worry concerning the (non-)interchangeability of *really* and *be sure* (§3.1). *Really p*, on the proposed semantics, isn't equivalent to *I know that p*, *My information entails p*, *I am certain that we should accept p*, etc. As noted in §4.1, endorsing uses aren't claims about one's epistemic state. *Really p* makes a logical claim which conventionally presupposes a body of endorsed information. The speaker expresses her state of mind in the sense of performing an act that is appropriate only if she is in that state of mind (cf. BACH & HARNISH 1979). So, concerning (24), for instance, while there may be something odd in reporting that

one is certain about one's own level of fatigue (as if this was something one might have been mistaken about), there is nothing odd in intending to ensure that one's fatigue be explicitly registered in the body of contextually endorsed information.

- (24) a. ?I am sure I am tired.
b. I really am tired.

Uses of VERUM don't report the speaker's epistemic state of mind or attitude toward the discourse context; they express them.

This revised analysis of the VERUM operator provides an improved account the role of VERUM in expressing speakers' states of mind, both about the subject matter of the discourse and about the discourse itself. Can it also provide an improved account of the existence of a speaker expectation bias associated with uses of VERUM? (We will return to the polarity and strength of the bias in §4.3.) We saw in §2.1 that R/H explain the existence of a speaker expectation bias from a proposed economy principle against unnecessary uses of "meta-conversational" discourse moves.

For if the addressee uttered p or $\neg p$, the unbiased speaker would have no reason not to execute the instruction of adding p or $\neg p$ to the CG... and hence the meta-conversational move [invoking an unbalanced partition] would be unjustified. Similarly..., if p was relevant to the conversation but the speaker was completely unbiased between p or $\neg p$, the balanced partition would be more economical and the unbalanced partition unmotivated. (ROMERO & HAN 2004: 629)

Yet as noted in §3, having *some* doubts about adding $p/\neg p$ to the CG is compatible with being "unbiased" in the sense of having equal credence in p and $\neg p$. Further, it would be preferable to derive the intuitions behind R/H's proposed economy constraint ((19)) without needing to posit an ad hoc pragmatic principle specific to "meta-conversational" moves and epistemically (un)balanced partitions. The present account can do so utilizing general, independently attested principles about the interpretation of context-sensitive expressions.

Compare the following Interpretive Economy principle from KENNEDY 2007:

- (59) *Interpretive Economy*
Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions.

(KENNEDY 2007: 36)

The rough idea is that speakers should simplify interpretation by resorting to context-dependent truth conditions only when conventionalized meanings are insufficient. Though positing this sort of principle has proven fruitful in discussions of gradable adjectives specifically, some have argued that it can be derived from basic general assumptions about goal-oriented language use (cf., e.g., POTTS 2008, QING & FRANKE 2014). One might question the details of Kennedy’s specific formulation, but suppose something like this principle is correct. Though I have suggested that VERUM lexically specifies being interpreted with respect to the variable P_e , the specific content is of course context-dependent. A value for P_e (if free) must be contextually supplied for the sentence to have a specific interpretation in context; the addressee must be able to infer how the speaker takes the discourse context to be such that it determines such-and-such content for the speaker’s utterance. Since ordinary assertions and questions are already conventional devices for managing the discourse common ground and structuring inquiry, using an additional device like *really*, whose sole conventional role is to invoke this purpose explicitly, would be unnecessary unless the speaker had special reasons to do so — e.g., because she wants to emphasize that p be added to the CG in response to possible doubts (as by asserting *Really p*, vs. p), or highlight doubts about a previous assertion that p (as by questioning *Really p?*, vs. $p?$ or even *Might $\neg p?$). Hence using VERUM will be infelicitous unless the speaker has at least *some* views about the embedded proposition and its proper discourse status, and strong enough views to call for invoking a conventional endorsing device, i.e. P_e .*

This epistemic implicature derived via Interpretive Economy is quite weak and unspecific. One might wonder how distinctive it is at all. A principle of economy — whether about meta-conversational discourse moves, like R/H’s, or uses of context-sensitive expressions, like Kennedy’s — may thus be of limited utility in explaining the distinctive character of the epistemic biases associated with VERUM. The next section develops an alternative account of the epistemic attitude conveyed in uses of VERUM — its existence and specific content, polarity, and strength — which doesn’t require giving economy a central explanatory role.

Let’s recap. R/H’s guiding intuition is that VERUM is, in some sense, an *epistemic* operator, and, specifically, an epistemic *conversational* operator, used to express speakers’ states of mind about a proposition’s relation to the CG. I have suggested that we capture these ideas by treating VERUM as a conventionally endorsing epistemic necessity modal — a modal which lexically specifies being interpreted with respect to the epistemic premise set variable P_e representing a body of contextually endorsed information. This analysis avoids problems with R/H’s formalization arising from treating VERUM p as a representational claim asserting one’s knowledge

about the proper discourse status of p , and it assimilates VERUM to more general, independently attested devices of attitude expression and context management. We can capture VERUM’s context-managing role utilizing general resources from the semantics and pragmatics of modals and context-sensitive language, while still distinguishing VERUM from ordinary epistemic expressions and modal verbs. An adequate account of speaker expectation biases requires further resources.

4.3 NPQs and epistemic possibility questions

4.3.1 A challenge revisited

Let’s return to NPQs. Analyzing NPQs in terms of our revised analysis of VERUM predicts straightaway their essential role in expressing speakers’ epistemic attitudes and managing the discourse common ground. Like other uses of VERUM, NPQs conventionally target the endorsing-epistemic premise set variable \mathbf{P}_e . The revised denotation for an NPQ, like (60), is as follows:

- (60) Isn’t Jane coming (too)?
(61) $\llbracket (60) \rrbracket$
 $= \lambda q. q = \cap \llbracket \mathbf{P}_e \rrbracket \subseteq j \vee q = \cap \llbracket \mathbf{P}_e \rrbracket \not\subseteq j$
 $= \{ \cap \llbracket \mathbf{P}_e \rrbracket \subseteq j, \cap \llbracket \mathbf{P}_e \rrbracket \not\subseteq j \}$

Paralleling our points about endorsing-epistemic questions from §4.1, using (60) will (among other things) have the effect of partitioning the CS based on whether the discourse context in those worlds determines a value for \mathbf{P}_e that entails j . And one effect of accepting, say, a *yes*-answer is that the CS will be updated to a set of worlds in which (among other things) the interlocutors endorse information entailing that Jane is coming to the party.

However, the predicted denotation in (61) makes pressing our principal challenge for context-managing approaches from §3.3: distinguishing VERUM-questions from associated epistemic modal questions. The present treatment of VERUM as a kind of epistemic necessity modal makes the challenge especially vivid. Compare the predicted “intents” — denotations and pronounced cells — of the NPQ $\neg p?$ and associated epistemic possibility question (EPQ) $\diamond_e \neg p?$, for endorsing-epistemic possibility modal \diamond_e :

- (62) $\llbracket \diamond_e p \rrbracket = 1$ iff $\cap (\llbracket \mathbf{P}_e \rrbracket \cup \{p\}) \neq \emptyset$ iff $\cap (P_c \cup \{p\}) \neq \emptyset$

- (63) NPQ $\neg p$? Intent:
 $\{\cap[\mathbf{P}_e] \subseteq p, \cap[\mathbf{P}_e] \not\subseteq p\}$
- (64) EPQ $\diamond_e \neg p$? Intent:
 $\{\cap([\mathbf{P}_e] \cup \{\neg p\}) \neq \emptyset, \cap([\mathbf{P}_e] \cup \{\neg p\}) = \emptyset\}$

The pronounced cell of the NPQ is the proposition that P_c doesn't entail p , and the pronounced cell of the EPQ is the proposition that P_c is compatible with $\neg p$. Given that P_c is just a set of propositions, these are logically equivalent. But if an NPQ $\neg p$? and an EPQ $\diamond_e \neg p$? have the same intent — roughly, to “pursu[e] the topic ‘lack of complete certainty about p ’ or ‘possible... doubts about p ’” (ROMERO & HAN 2004: 646) — whence their discourse differences? Why does the NPQ invariably convey a prior expectation that p , whereas the EPQ never conveys a prior expectation that p ? Why can the EPQ, unlike the NPQ, be used to raise the possibility that $\neg p$? Even bracketing the differences in the polarity of the epistemic implicature, why does an NPQ invariably express an antecedent *bias toward* a particular pole, while an EPQ can simply express *some* credence, if it expresses any antecedent expectation at all?

These questions are pressing for any analysis of NPQs in terms of an added broadly epistemic operator. The challenge raises difficult issues about the import of pronunciation choice in questions, differences between positive and negative questions, and relations among positive and negative epistemic modal notions. I won't pretend to fully resolve these issues here. The remainder of this section develops one possible line of reply. I leave further developments for future research.

4.3.2 A revised semantics for epistemic modals

Our aim is to distinguish the negated necessity answer, $\neg \square_e p$, in an NPQ from the positive possibility answer, $\diamond_e \neg p$, in an EPQ. What we need, then, is a semantics which rejects the duality of epistemic necessity and possibility in the following sense: we need a semantics which distinguishes a state of *excluding* the epistemic necessity of p from a state of *committing* to the epistemic possibility of $\neg p$. Such a distinction may receive independent motivation from discussions of attention and question-sensitivity with epistemic modals (cf. FRANKE & DE JAGER 2011, YALCIN 2011, 2012). It isn't implausible that in order to accept the possibility/necessity of a proposition p , the question of whether p needs to be “on one's radar.” I might fail to accept that it must be raining in Abuja because I think it might be sunny there. But, intuitively, I might fail to accept this simply because I've never considered the ques-

tion. Moreover, even if you asked me, I might have no idea what to say. Consider:¹⁵

- (65) S: Might it be raining in Abuja? Do you think it's possible?
 A: Abuja? Where's that? I have no idea. I don't know whether it might be raining there.
- (66) S: Might God exist? Do you think it's possible?
 A: No clue. I don't know whether God might exist (/whether it's possible that God exists).

It may seem misleading to characterize *A*'s epistemic state as accepting the possibility that it's raining in Abuja, or the possibility that God exists. Positively leaving open a possibility *p*, on this line, is stronger than not accepting the necessity of *p*.¹⁶

One way of capturing this is to enrich the structure of information states. Suppose we lift the type, and treat what context supplies for the interpretation of a modal as a *set* of premise sets (a set of sets of propositions).¹⁷ Consider the following revised semantics for endorsing-epistemic possibility/necessity modals, \diamond_e/\square_e , letting $\llbracket \mathcal{P}_e \rrbracket = \mathcal{P}_c$ be a set of epistemic premise sets representing a body of endorsed information:

- (67) $\llbracket \diamond_e p \rrbracket = 1$ iff $\forall P \in \mathcal{P}_c: \cap(P \cup \{p\}) \neq \emptyset$
 (68) $\llbracket \square_e p \rrbracket = 1$ iff $\forall P \in \mathcal{P}_c: \cap P \subseteq p$

This says that *p* is epistemically necessary (/possible) iff *p* follows from (/is compatible with) every epistemic premise set in \mathcal{P} . Hence an information state can fail to accept the necessity of *p* without thereby accepting the possibility of *p*: $\neg \square_e p$ is true iff *some* epistemic premise set in \mathcal{P} is compatible with $\neg p$, but the truth of $\diamond_e \neg p$ requires that *every* epistemic premise set in \mathcal{P} is compatible with $\neg p$. Bodies of information, in this sense, needn't be complete. Suppose we represent the discourse common ground — and states of presupposition, belief, knowledge, etc. — similarly as a set of sets of propositions. This captures how interlocutors might fail to presuppose a proposition *p* without thereby committing to the possibility that $\neg p$.

¹⁵For related cases and discussion, see also, e.g., DEROSE 1991, STALNAKER 2014, MOSS 2015.

¹⁶There is a potential for confusion in our “possibility”-talk. I treat possibilities as propositions. I use the following locutions interchangeably: in saying that one “leaves open a possibility *p*,” or “leaves open the possibility that *p*,” or “accepts the possibility of *p*,” I mean (roughly) that one accepts *Might p*, and that one's information state verifies $\diamond_e p$. In saying that one “fails to accept the possibility that *p*,” I mean (roughly) that one fails to accept *Might p*, and that one's information state verifies $\neg \diamond_e p$ and fails to verify $\diamond_e p$.

¹⁷For additional motivations, discussion, and implementations, see WILLER 2010, ROTHSCCHILD 2012, YALCIN 2012, MOSS 2015, SILK 2016: §3.3.6; cf. SILK 2015: §4.2 on deontic modals.

4.3.3 Deriving expectation biases with NPQs and EPQs

The semantics for (epistemic) possibility and necessity operators in (67)–(68) distinguishes the denotations and pronounced cells of an NPQ $\neg p?$ and EPQ $\diamond_e \neg p?$:

$$(69) \quad \text{NPQ } \neg p? \text{ Intent: } \{ \forall P \in \llbracket \mathcal{P}_e \rrbracket : \cap P \subseteq p, \neg \forall P \in \llbracket \mathcal{P}_e \rrbracket : \cap P \subseteq p \}$$

$$(70) \quad \text{EPQ } \diamond_e \neg p? \text{ Intent: } \{ \forall P \in \llbracket \mathcal{P}_e \rrbracket : \cap (P \cup \{p\}) \neq \emptyset, \neg \forall P \in \llbracket \mathcal{P}_e \rrbracket : \cap (P \cup \{p\}) \neq \emptyset \}$$

The pronounced cell in the EPQ asymmetrically entails the pronounced cell in the NPQ. How might these contrasting “intents” help explain the discourse differences between NPQs and associated EPQs?

To help address this issue I adopt the following relevance requirement on the felicity of discourse moves, adapted from ROBERTS 1996 and SIMONS ET AL. 2010, where the Question Under Discussion (QUD) is a set of alternative propositions corresponding to the current discourse topic.

- (71) An utterance is felicitous only if it is *relevant* to the Question Under Discussion (QUD), where
- a. An *assertion* is relevant to a QUD iff accepting it would increase the likelihood of accepting a partial or complete answer to the QUD.
 - b. A *question* is relevant to a QUD iff it has an answer such that accepting it which would increase the likelihood of accepting a partial or complete answer to the QUD.

This definition of relevance is more complicated than Roberts’s and Simons et al.’s in two respects: First, I characterize relevance in terms of *acceptance* rather than truth-conditional entailment. This is to capture the relevance of discourse moves aimed at adjusting the value of a contextual variable via accommodation (“discourse-oriented uses” in the sense of §4.1). For instance, suppose the current QUD is who is coming to the party later, and S utters *Jane really is coming*. The asserted, truth-conditional content is (roughly) that a certain body of information \mathcal{P} entails the proposition j that Jane is coming. This logical proposition needn’t entail the partial answer that Jane is coming. Yet S’s assertion is relevant insofar as *accepting* it would require accommodating a value for \mathcal{P}_e that entails j , and adjusting the discourse common ground CG accordingly, given what the variable \mathcal{P}_e represents. What is important for relevance is that updating with *Jane really is coming* would land one in a context that accepts an answer to the QUD.

Second, I characterize relevance in terms of *likelihood* rather than (truth-conditional or informational) entailment. The intuitive idea behind the account of relevance is that discourse moves are relevant by being “part of a *strategy* to answer” a QUD (ROBERTS 1996: 16; emphasis added). But a discourse move can be part of a strategy to answer a question not just by introducing (or having an answer which introduces) a partial/complete answer itself, but by directing the development of the conversation toward such an answer. Suppose the current QUD is who is coming to the party later, as above, and S utters *Maybe Jane is coming*. Accepting S’s utterance needn’t entail accepting a partial answer to the QUD. Yet S’s assertion is relevant insofar as accepting it would raise the likelihood of accepting an answer to the QUD — intuitively, by directing the inquiry toward examining possible evidence for *j*. S’s assertion delineates the possible answer *j*, and makes this answer “visible” (YALCIN 2011) to the CG — formally, by requiring that a verdict be given about the possibility of *j* for every premise set *P* in the set of sets of propositions \mathcal{P} representing the CG. In this sense S’s assertion is part of a strategy to answer the QUD, hence relevant.

Further, I assume that assertions constitute *proposals* to update the CG, and that such proposals must be *grounded* for the update to go through (STALNAKER 1978, CLARK & SCHAEFER 1989, TRAUM 1994, FARKAS & BRUCE 2010, GINZBURG 2012). So the current QUD remains active until this grounding process occurs and acceptance is signaled. I assume that if one is in a position to ground an interlocutor’s assertion, one should.

With these notions at hand, let’s examine the expectation biases and felicity patterns of using NPQs and EPQs in the following four types of discourse scenarios: in response to an implication that $p/\neg p$ (R/H’s “contradiction scenarios”), and to suggest $p/\neg p$ as an answer to a relevant question (R/H’s “suggestion scenarios”).

Let’s start with EPQs. An EPQ $\diamond_e \neg p?$ raises the *positive* question whether it might be that $\neg p$. Accepting the pronounced cell requires committing to treating $\neg p$ as a live possibility. So, to parallel R/H’s own remarks, the intent of the question isn’t just to pursue possible doubts about *p*; it is to pursue positive reasons for leaving open the possibility of $\neg p$. This correctly predicts, first, that that an EPQ $\diamond_e \neg p?$ cannot be used to contradict a previous discourse move implying $\neg p$ by conveying credence in *p*, as reflected in (46), reproduced below.

- (72) A: The butler is surely the killer.
 S: #Are you sure? Maybe it wasn’t the gardener?

S raises the question $\diamond_e \neg g?$ whether to leave open the possibility $\neg g$ that the gardener isn’t the killer. Updating with the backgrounded cell wouldn’t be relevant,

since the interlocutors already fail to mutually accept the possibility that $\neg g$. So, S 's question is relevant only insofar as updating with the pronounced cell would be relevant. Updating with the pronounced cell would require committing to treating $\neg g$ as a live possibility. Such a commitment would be entailed by accepting A 's assertion. So, S 's question is relevant — assuming the possibility that $\neg g$ wasn't already accepted as a live possibility — only insofar as S isn't implicitly grounding A 's assertion and resolving the current QUD. Given that S didn't ground A 's assertion, S must not be in a position to do so. So, S 's utterance is potentially felicitous only insofar as S wishes to raise doubts about A 's implication that $\neg g$. But asking to pursue positive evidence for the possibility that $\neg g$ would be ineffective as a means of resolving the QUD in response to an implication that $\neg g$: If S has credence in g and wants to investigate this possibility, S should use a discourse move that directs the inquiry accordingly, as in (73). And if S wants A to confirm A 's implication that $\neg g$, S should use a stronger question that does so directly, as in (74); insofar as one can pursue reasons for accepting $\neg g$ without first pursuing reasons for accepting the possibility that $\neg g$,¹⁸ raising the stronger question would be a more efficient way of resolving the QUD.

- (73) A: The butler is surely the killer.
 S': Are you sure? Maybe it was the gardener?
 i'. *Pronounced cell*: $\forall P \in [\mathcal{P}_e]: \cap(P \cup \{g\}) \neq \emptyset$
- (74) A: The butler is surely the killer.
 S': Are you sure? It wasn't the gardener?
 i'. *Pronounced cell*: $\neg g$
 S'': Are you sure? Was it really not the gardener?
 i''. *Pronounced cell*: $\forall P \in [\mathcal{P}_e]: \cap P \subseteq \neg g$

So, even if S 's question is relevant, it is inappropriate as a means of advancing the discourse. An EPQ $\diamond_e \neg p?$ is generally infelicitous in response to a discourse move by the addressee implying $\neg p$.¹⁹

¹⁸The reason for this qualification is to allow for the felicity of questions such as in (i):

- (i) A: Everyone came to the party.
 S: Are you sure? Did Jane come?

¹⁹Note, however, that although an EPQ $\diamond_e \neg p?$ is infelicitous in response to a *discourse move* implying $\neg p$, it can be felicitous in response to other *evidence* implying $\neg p$. Such evidence could even include a third-party's utterance, as in (i).

- (i) [Context: A and S are PIs investigating the possible suspects. They overhear the police chief say it was the butler. S says:]

Likewise, an EPQ $\diamond_e \neg p$? cannot be felicitously used to suggest p as an answer to a relevant question, as reflected in (47), reproduced below.

- (75) [Context: Dialog between two editors of a journal in 1900:]
A: I'd like to send this paper out to a senior reviewer, but I'd prefer somebody who has experience with our regulations.
S: #Maybe Frege hasn't reviewed for us? He'd be a good one.

The current implicit QUD is, roughly, which senior reviewers have already reviewed for the journal. A 's goal is to find such a reviewer. Updating with the backgrounded cell wouldn't be relevant, since the interlocutors already fail to mutually accept the possibility $\neg f$ that Frege hasn't reviewed for the journal. Updating with the pronounced cell wouldn't be relevant either — at least as a way of suggesting f . Pursuing reasons for leaving open that Frege might be relevant, but only insofar as it might narrow the list of potential reviewers, or perhaps suggest some *other* potential reviewer. (Suppose Frege and Twin-Frege review complement sets of journals, and we don't have direct access to Twin-Frege's reviewing history.) So, if S 's question is felicitous, it is felicitous only insofar as it *excludes* Frege.

Conversely, we correctly predict that an EPQ $\diamond_e \neg p$? can be felicitously used in response to an addressee's implication that p . Recall (44):

- (44) *Moore*: My hands hurt.
Skeptic: How do we know you have hands? Maybe/Perhaps you don't have hands and you're just a brain in a vat?

Moore's assertion implies h that he has hands. Instead of grounding Moore's assertion, Skeptic raises the question whether to accept the possibility that $\neg h$. This question is directly relevant to the (now current) QUD of whether Moore has hands which hurt: updating with the pronounced cell, and pursuing reasons for leaving open the possibility that $\neg h$, would increase the likelihood of accepting an answer to this question. Likewise, uttering the EPQ $\diamond_e \neg f$? can be a felicitous way of suggesting $\neg f$, as in (76).

- (76) [Context: Dialog between two editors of a journal in 1900:]
A: I'd like to send this paper out to a senior reviewer, but I'd prefer somebody new.

Maybe it wasn't the gardener?

Evidence that p isn't generally discourse-equivalent to an assertion that p . In any case, S 's utterance in (i) still cannot be interpreted as contradicting the police chief by conveying credence in g .

S: Maybe Frege hasn't reviewed for us? He'd be a good one.

S's question is directly relevant to the QUD of which senior reviewers haven't reviewed for the journal: updating with the pronounced cell, and pursuing reasons for leaving open the possibility that $\neg f$, would increase the likelihood of accepting an answer to this question and satisfying *A*'s goal of finding a suitable reviewer.

This treatment of EPQs correctly predicts that EPQs $\diamond_e \neg p?$ don't express a bias toward *p*. First, insofar as any epistemic attitude is conveyed, it is a credence in the *negated* proposition $\neg p$. Second, this expectation needn't be a full-blown *bias* toward $\neg p$. Given our semantics, the bias toward the positive answer is simply a bias toward the *possibility* that $\neg p$ — hence why Skeptic's question *Maybe you don't have hands and you're just a brain in a vat?* in (44) need only express some credence in the skeptical scenario where you don't have hands.

In these ways, there is nothing special about the epistemic attitudes conveyed with EPQs. An EPQ is a *positive* polar question about the possibility of a certain proposition. The embedded proposition might be negative, but the polarity of the question is positive: accepting the possibility that $\neg p$ isn't equivalent, on the proposed semantics, to not accepting the necessity of *p*. So, whatever explains the bias (if there is one) toward the positive answer in positive polar questions generally would carry over to the case of positive polar epistemic questions. EPQs behave like any other positive polar question — though in the case of an EPQ $\diamond_e \neg p?$, a positive polar question about the possibility of negated proposition. An EPQ $\diamond_e p?$ raises the possibility that *p*, and can express the speaker's bias toward the positive answer: that *p* be treated as a live possibility in the discourse.

Let's turn now to the felicity conditions and expectation biases with NPQs in our four candidate types of discourse scenarios. First, recall the "contradiction scenario" in (7), reproduced below, where the speaker utters $\neg j?$ in response to a discourse move by the addressee implying $\neg j$.

- (77) A: John just got here, so it looks like we're all ready to go to the party.
S: Isn't Jane coming too?

We can derive the speaker's expectation bias toward the positive answer *j* as follows. *A*'s assertion implies $\neg j$. In response *S* poses the question with the "intent" (denotation and pronounced cell) in (69): roughly put, *S* raises the question of whether to accept *j*, and pronounces the answer corresponding to not accepting *j*. Updating with the pronounced cell wouldn't be relevant: if *S* is implicitly grounding *A*'s assertion, then the interlocutors are in the stronger state of accepting $\neg j$, and the pronounced cell is already verified; and if *S* isn't implicitly grounding *A*'s assertion

(as is the case), then the interlocutors fail to mutually accept j (indeed, a state they were in prior to A 's assertion), and the pronounced cell is already verified. Either way, updating with the pronounced cell would fail to advance the discourse. Updating with the backgrounded cell, by contrast, *would* be relevant, as it would involve endorsing information that entails a complete answer to the current QUD. So, for S 's question to be relevant, S must intend A to consider the possibility of accepting j . This would be infelicitous if S was antecedently biased toward $\neg j$, in which case S could have directly grounded A 's assertion and accepted $\neg j$. And it would be infelicitous if S merely had some credence in j and wanted to investigate this possibility or confirm A 's implication that $\neg j$, in which case S could have used questions that highlight these options directly, as in (78)–(79), respectively:

- (78) S' : Might Jane be coming too?
i'. *Pronounced cell*: $\forall P \in \llbracket \mathcal{P}_e \rrbracket : \cap(P \cup \{j\}) \neq \emptyset$
- (79) S' : Is Jane not coming?
i'. *Pronounced cell*: $\neg j$

However, S 's intending A to consider the possibility of accepting j *would* be felicitous if S was antecedently biased toward j . Since A just implied $\neg j$, raising the possibility of accepting j invites A to provide reasons for not doing so that would support A 's previous assertion. It is in this way that S 's using the NPQ “suggest[s] that [j] be added to the Common Ground unless the addressee has reasons to doubt [j]” (ROMERO & HAN 2004: 649). So, assuming S is being cooperative, S must have had an antecedent expectation that j .

This account also captures the intuition that replying with an NPQ provides a relatively polite way of expressing disagreement and of failing to ground the addressee's assertion straightaway. Uttering $\neg j?$ raises the option of retracting to a state of the discourse which failed to accept j , via the pronounced cell, and considers an alternative continuation of the discourse in which j is accepted, via the unpronounced cell. So, in using the NPQ S chooses to *background* the answer — the only answer which would be relevant to the discourse, given A 's assertion — that is contrary to A 's assertion, and which S would have antecedently favored. Using the NPQ provides a way of inviting A to consider the alternative option of accepting j , but without directly contradicting A or highlighting the contrary alternative possibility, as in (80).

- (80) A : John just got here, so it looks like we're all ready to go to the party.
 S' : No, we still have to wait for Jane. She's coming too.
 S'' : Is Jane not coming?

S''' : Might Jane be coming too?

Accepting the pronounced cell of the NPQ provides A a weak initial way of registering A 's disagreement with S 's antecedent expectation; this may then be clarified with reasons supporting A 's stronger previous implication that $\neg j$.

Next, recall the "suggestion scenario" in (47), reproduced below, where the speaker utters an NPQ $\neg p?$ in order to suggest p as an answer to a relevant question.

(81) [Context: Dialog between two editors of a journal in 1900:]

A: I'd like to send this paper out to a senior reviewer, but I'd prefer somebody who has experience with our regulations.

S: Hasn't Frege already reviewed for us? He'd be a good one.

Again, the current implicit QUD is, roughly, whether there is an experienced senior reviewer who has reviewed for the journal, and, if so, whom. A 's goal is to find such a reviewer. Updating with the pronounced cell of S 's NPQ $\neg f?$ would fail to advance the discourse, and hence wouldn't be relevant, since the interlocutors already fail to mutually accept f . Updating with the backgrounded cell, by contrast, would be relevant, as it would involve endorsing information that entails a (partial) answer to the current QUD. So, for S 's question to be relevant, S must intend A to consider the possibility of accepting f . This would be infelicitous if S was antecedently biased toward $\neg f$, in which case S would regard accepting f as decreasing the likelihood of accepting a correct answer to the QUD and satisfying A 's goal. And it would be infelicitous if S merely had some credence in f and wanted confirmation for accepting f , since there is no indication that A has such confirming evidence; if S simply wanted to raise the possibility that f , S could have used a question that highlights this option directly, as in done so more directly by asking questions such as those in (82):

(82) S' : Has Frege already reviewed for us?

i' . *Pronounced cell*: f

S'' : Maybe Frege has already reviewed for us?

i'' . *Pronounced cell*: $\forall P \in [\mathcal{P}_e]: \cap(P \cup \{f\}) \neq \emptyset$

However, S 's intending A to consider the possibility of accepting f *would* be felicitous if S was antecedently biased toward f , in which case S could provide strong evidence for f if A doesn't have such evidence herself. So, assuming S is being cooperative, S must have had an antecedent expectation that f , and be suggesting f as an answer to the current QUD.

As in the case of (77), this account captures the intuition that S 's using the NPQ

provides a relatively circumspect way of suggesting f . In choosing to background the answer of accepting f , the only answer which would be relevant to the discourse, S is able to express her prior bias toward f and suggest accepting f , but without explicitly asserting f or directly requesting A to provide confirming evidence for f herself.

So, the crucial feature of NPQs $\neg p?$, on this account, is that they *background* the answer in virtue of which they are relevant to the discourse, the answer (roughly) of accepting p . This account carves out, and *derives*, a crucial discourse role of NPQs: they provide a means of raising the possibility of accepting p and indicating one's antecedent bias toward p , but in a relatively modest way. Using an NPQ thus affords a polite way (i) of expressing disagreement and inviting the addressee to defend a prior assertion, but without directly challenging the addressee; and (ii) of suggesting a relevant possibility toward which one is biased, but without directly asserting this possibility or introducing one's bias explicitly.

Finally, let's apply this account of speaker expectation biases with NPQs to scenarios in which using an NPQ is *infelicitous*. An NPQ $\neg p?$ is infelicitous in response to a discourse move by the addressee implying p . The NPQ $\neg j?$ in (83) cannot be used to contradict A 's implication that j by conveying a bias toward $\neg j$.

- (83) A: John isn't going to the party, but everyone else from our class is.
S: #Isn't Jane coming too?

A 's assertion implies j that Jane is going to the party. Instead of grounding A 's assertion, S raises the question (roughly) of whether not to accept j . Updating with the backgrounded cell corresponding to accepting j would be relevant insofar as A 's assertion hasn't yet been grounded and the current QUD is still unresolved. But S cannot intend to pursue this possibility, since if she did, she would have grounded A 's assertion directly. But updating with the pronounced cell wouldn't be relevant: the discourse is already in a state of not accepting j . If S has doubts about A 's implication that j and wishes to challenge A 's assertion, request further evidence supporting A 's assertion, or raise the possibility that $\neg j$, S could have done so directly, as in the respective questions in (84).

- (84) A: John isn't going to the party, but everyone else from our class is.
S': No, Jane isn't coming either.
i'. $\Rightarrow \neg j$
S'': Is Jane (really) coming too?
i''. *Pronounced cell:* j
S''': Might Jane not be coming either?
i'''. *Pronounced cell:* $\forall P \in [\mathcal{P}_e]: \cap(P \cup \{\neg j\}) \neq \emptyset$

So, *S*'s NPQ in (83) is anomalous regardless of *S*'s antecedent views about whether *j*: updating with the pronounced cell wouldn't be relevant, and using the NPQ would be an inappropriate way of pursuing the backgrounded cell, given *A*'s preceding implication that *j*. If *S* is biased toward *j*, she should ground *A*'s assertion straightaway. And if *S* has doubts about *j* (whether or not those doubts rise to a level of a bias toward $\neg j$), she should use a relevant discourse move that directs the inquiry toward investigating those doubts.

Likewise, an NPQ $\neg p?$ cannot be felicitously used to suggest $\neg p$ as an answer to a relevant question, as in (85).

- (85) [Context: Dialog between two editors of a journal in 1900:]
 A: I'd like to send this paper out to a senior reviewer, but I'd prefer somebody new.
 S: #Hasn't Frege reviewed for us? He'd be a good one.
 (cf. ROMERO & HAN 2004: ex. 106)

The current implicit QUD is, roughly, which senior reviewers haven't reviewed for the journal. *A*'s goal is to find such a reviewer. Updating with the pronounced cell of *S*'s NPQ $\neg f?$ wouldn't be relevant, since the discourse is already in a state of not accepting *f*. Updating with the backgrounded cell would be relevant insofar as it would narrow the list of potential reviewers. But this would involve accepting *f*, not $\neg f$. So, *S*'s question is felicitous only insofar as it excludes Frege. If *S* wishes to suggest $\neg f$, an additional negative element must be added, the possibility that $\neg f$ must be highlighted, or an ordinary polar question must be used, as in the respective questions in (86):

- (86) a. Hasn't Frege not reviewed for us?
 b. Maybe Frege hasn't reviewed for us?
 c. Has Frege (not) reviewed for us?

Let's recap. I have argued that NPQs $\neg p?$ and EPQs $\diamond_e \neg p?$ have the following contrasting biases and patterns of felicitous use: The NPQ $\neg p?$ is felicitous as a way of expressing disagreement in response to an implication that $\neg p$, but not in response to an implication that *p*. And it is felicitous as a way of suggesting *p*, but not of suggesting $\neg p$, as an answer to a relevant question. Further, the expectation conveyed by the speaker about *p* constitutes a *bias toward p*. By contrast, an EPQ $\diamond_e \neg p?$ behaves like any ordinary positive polar question — albeit a polar question about the possibility that $\neg p$. Insofar as reasons for leaving open the possibility of $\neg p$ are reasons against *p*, this correctly predicts that the polarity of the expectation should be against

p — hence why the EPQ cannot be used to disagree with a previous implication that $\neg p$, or be used to suggest p as an answer to a relevant question. However, like with any other positive polar question, the bias of the EPQ (if there is any bias at all) is a bias toward the pronounced cell, namely the *possibility* that $\neg p$. This needn't rise to the level of a bias toward the embedded proposition $\neg p$ itself. By distinguishing failing to accept p from leaving open the possibility that $\neg p$, and thereby distinguishing the pronounced cells of NPQs $\neg p?$ and EPQs $\diamond_e \neg p?$, we can capture the distinctive epistemic biases of NPQs.

5 Conclusion and further issues

This paper has examined various distinctive discourse properties of preposed negative *yes/no* questions (NPQs) in English, focusing in particular on data concerning *speaker expectation biases*. Unlike with ordinary polar questions, utterances of NPQs (i) invariably convey an epistemic attitude of the speaker about the correct answer, where (ii) the polarity of the speaker's expectation is opposite of the polarity of the question: using the negative question $\neg p?$ necessarily expresses the speaker's prior expectation that the positive answer is correct. The aim of the paper has been to develop an improved account of speaker expectation biases within one broad family of approaches — what I have called *context-management approaches*. The strategy of context-management approaches is to explain NPQs' distinctive speaker expectation biases by treating NPQs as *epistemic* questions, in particular as epistemic questions *about the context*, i.e. questions about the proper discourse status of a given proposition. NPQs, on these views, are conventional devices for directly managing the discourse common ground. The principal general challenges for these views, I argued, are (i) to provide an empirically adequate formalization of the proposed context-managing operators, (ii) to motivate treating the expressive and context-managing roles of NPQs as interestingly different from those of uses of language generally, and, perhaps most pressingly, (iii) to explain the discourse differences between NPQs and associated epistemic modal questions.

I have argued that we can capture the intuitions motivating existing context-managing approaches — in particular, concerning the roles of NPQs in expressing speakers' states of mind and managing the discourse context — without positing special epistemic context-managing operators or treating NPQs as fundamentally about the discourse itself. For concreteness I followed ROMERO & HAN 2004 (R/H) in treating preposing of negation as introducing an additional epistemic operator. However, I suggested that we treat this operator as a certain kind of ordinary

epistemic necessity modal, and showed how we can capture the expressive/context-managing roles of NPQs in terms of a more general kind of discourse-oriented use of context-sensitive language. NPQs afford conventional devices for expressing speakers' epistemic attitudes and managing the discourse common ground by being interpreted with respect to an item, VERUM, conventionally associated with a body of information endorsed for purposes of conversation.

Finally, drawing on independently motivated apparatus from the semantics of (epistemic) modals, I showed how we can distinguish the interpretations of NPQs $\neg p?$ and epistemic possibility questions $\diamond_e \neg p?$ (EPQs). The negative state (roughly) of failing to presuppose p targeted by the NPQ, on the proposed semantics, isn't equivalent to the positive state (roughly) of leaving open the possibility that $\neg p$ targeted by the associated EPQ. This analysis, along with an adapted general principle of discourse relevance, predicts the contrasting discourse properties and epistemic implicatures of NPQs and EPQs. The distinctive speaker expectation biases seen with NPQs can be derived from independently motivated features of their semantics and general principles of interpretation and conversation.

The account of NPQs developed in this paper is far from complete. In closing I would like to briefly consider several limitations of the present discussion and possible directions for future research.

5.1 NPQs and “denegations of assertions”

This paper has examined one broad family of approaches to NPQs — what I have called *context-management* approaches, as developed in work by Romero, Han, and Repp. This is of course not the only kind of analysis on offer. First, I would like to briefly compare the account of NPQs developed in this paper with the account of NPQs developed in recent work by Krifka (2012, 2015). This will help clarify certain important features of the present account.

Like R/H and Repp, Krifka treats NPQs as broadly meta-illocutionary devices. However, the distinctive discourse properties of NPQs are captured, fundamentally, not in terms of a distinctive context-oriented operator, but in terms of a distinctive type of speech act: an NPQ $\neg p?$ is treated as expressing *speech act denegation*, in the sense of asking the addressee to refrain from asserting p . This view is superficially similar to the revised account developed in §4.3 which treats the NPQ as asking the addressee (roughly) whether not to mutually accept p . Yet, as with R/H and Repp, there are important differences in how we technically implement these ideas about the intuitive contents of NPQs.

Krifka treats NPQs in terms of a distinctive question operator REQUEST —

which presents only one possible answer, in contrast to the ordinary question operator which presents each possible answer equally — and a distinctive meta-speech act of *denegation*, or failing to perform a certain speech act (cf. *I don't promise to come*, expressing refraining from promising to come). These speech-act and meta-speech-act elements are explicitly represented in the syntax, which includes distinct categories for various commitment and speech-act phrases. There may be independent reasons for introducing such elements into the syntax, semantics, and inventory of speech acts. The account developed in this paper, by contrast, avoids requiring these additional commitments. I have argued that we can capture the distinctive discourse properties of NPQs utilizing general, independently motivated apparatus from the semantics for modals and interpretation of questions. Distinct question operators, speech acts, and syntactic categories are not required.²⁰

Krifka's account also fails to adequately explain the epistemic biases and felicity conditions of NPQs. Krifka claims that, for an NPQ $\neg p$?, "the overall intention of the speaker is to ask for confirmation for the proposition [p]" (2012: 31). However, no derivation of this intention is provided. Why would asking the addressee to exclude asserting p express a "sole interest" (2012: 33) in or expectation that p ? Perhaps Krifka's account could be developed to address this, but additional resources will be required. It would also be interesting to examine how epistemic modal questions might be analyzed, and distinguished from NPQs, in a speech-act-based framework.

5.2 Preposed negation and epistemic operators

For concreteness I have followed R/H in treating the preposing of negation as introducing an additional (epistemic) operator. One might wonder why the non-canonical order would have this effect. R/H observe that the discourse-oriented properties, or "conversational emphasis" (655), of NPQs seem present in declaratives with preposed negative elements, as in the (a)-examples in (87)–(88).

- (87) a. Never has John lied.
 b. John never lied.
- (88) a. Never would Mary reveal the secret.

²⁰Similar points hold for the related speech-act theories developed in work by Asher and Reese (ASHER & REESE 2007, REESE 2007). These theories treat NPQs as complex speech acts — specifically, as combinations of assertions and questions. An NPQ is treated as asserting p , and then questioning this assertion, requesting confirmation or reasons for disagreement. While I agree that NPQs have something like this effect, the account developed in this paper avoids positing a distinct conventionalized complex speech act type ASSERTION • QUESTION.

- b. Mary would never reveal the secret.

(ROMERO & HAN 2004: EXS. 121–122)

Even if a VERUM-type operator is also present in such examples, the question remains why preposing negation would trigger *adding* an unpronounced operator.

One response would be to point out the parallels with polarity focus. Suppose one follows R/H in treating focal stress on polarity elements as introducing VERUM:

- (89) a. Did he STUDY for that class?
 b. LF: [Q VERUM [he studied for that class]]

(ROMERO & HAN 2004: EX. 60)

Just as the polarity focus in (89a) introduces a covert VERUM operator in addition to the verb *study*, so too, the thought goes, with the non-canonical preposing of negation and the overt negative element. Such a reply might make treating preposed negation in terms of a covert operator less theoretically surprising. But the question remains why exactly this particular syntax should be associated with this particular operator, given the robust cross-linguistic association between preposing negative elements and discourse-oriented effects.

An alternative response would be to adopt a Repp-style implementation, and treat preposed negation as *itself* a conversational operator (§2.2). One way of implementing such an account in the present framework would be to treat the preposed negation as a kind of *modal* negation (cf. KRATZER 1989, STONE & HARDT 1999, BITTNER 2011), as in (90).

- (90) $\llbracket \text{NOT}_{\text{mod}} p \rrbracket = 1$ iff $\forall P \in \llbracket \mathcal{P}_e \rrbracket : \cap P \subseteq \neg p$

That is, just as VERUM *p* says (roughly) that the relevant endorsed information \mathcal{P}_c entails *p*, NOT_{mod} *p* would say (roughly) that the relevant endorsed information \mathcal{P}_c entails $\neg p$. NOT_{mod}, like VERUM, would be treated as a conventionally endorsing epistemic necessity modal, lexically specifying being interpreted with respect to \mathcal{P}_e . Preposed negative polar questions, on this line, would be treated analogously to non-preposed negative questions with epistemic *really* (cf. ROMERO & HAN 2004: 639n.17):

- (91) a. Isn't Jane coming?
 b. [Q NOT_{mod} [Jane is coming]]
- (92) a. Is Jane really not coming?
 b. [Q VERUM [not [Jane is coming]]]

(93) $\llbracket(91)\rrbracket = \llbracket(92)\rrbracket \approx \{\mathcal{P}_c \text{ entails } \neg j, \neg \mathcal{P}_c \text{ entails } \neg j\}$

An account developed along these lines would have the potential theoretical advantage of avoiding positing a covert operator in NPQs. And it would unify the cases of preposed negation and (e.g.) *really*, treating the relevant conversational operators as contributed by specific lexical items. However, the question for the VERUM-based account arises in a new form — namely, why preposed negation should be systematically associated with a distinct (modal) lexical entry cross-linguistically. It also remains to be seen how exactly the proposed derivation of speaker expectation biases with NPQs would carry over, and how the differences among outer-/inner-negation readings of NPQs and *really not* polar questions would be explained. Detailed comparison of these sorts of approaches to preposed negation, and general cross-linguistic investigation of associations between non-canonical syntactic structures and discourse effects, are called for.

5.3 Answer patterns with NPQs

There is one final puzzling feature of NPQs that I would like to mention: their *answer patterns*. The most natural interpretation of a *yes*-answer to an NPQ $\neg p?$ is as an assertion of p , and the most natural interpretation of a *no*-answer is as an assertion of $\neg p$:

- (94) Isn't Jane coming too?
 a. Yes (she is).
 b. No (she isn't).

Even if the *yes*-answer could be construed as meaning VERUM j (roughly, that the endorsed information \mathcal{P}_c entails j), two questions arise: first, why the *yes*-answer targets the backgrounded cell; and, second, why the *no*-answer seems to positively imply $\neg j$, rather than the much weaker proposition corresponding to the pronounced cell (roughly, that the endorsed information fails to entail j).

Though I won't be able to fully address these issues here, the approach to NPQs in this paper may provide the basis for a more adequate account of answer patterns with NPQs. First, note that qualified answers are possible — both qualified *yes*-answers, as in (95a), and qualified *no*-answers, as in (95b):

- (95) Isn't Jane coming too?
 a. Yeah, I'm not sure / I don't know. Maybe (not).
 b. No, I'm not sure / I don't know. Maybe (not).

Such examples pose challenges for existing accounts. The qualified *yes*-answer in (95a) is surprising on R/H's (2004) account, which treats *yes*-answers as affirming, not simply p , but the stronger $\text{VERUM } p$. Though R/H don't consider the possibility of qualified *no*-answers, such examples might seem favorable to their analysis, insofar as it treats them as targeting the pronounced cell. Both (95a)–(95b) are surprising on Romero's (2006) account, which treats both *yes*- and *no*-answers as necessarily targeting the embedded proposition p . REPP 2013 takes qualified *yes*-answers as evidence for giving the semantics of NPQs in terms of a distinct FALSUM operator, and treating the targeted cell as (roughly) the weak proposition that there is some evidence for p . Qualified *no*-answers, however, remain unexplained. KRIFKA 2012 treats unqualified answers as assertions of $p/\neg p$ by default. Though he mentions the possibility of treating qualified *yes*-answers, no specific account is provided (p. 31). It is unclear how qualified *no*-answers would be captured.

The possibility of qualified *yes*-/*no*-answers might seem to support the present account. One might say something like this: Suppose we follow KRIFKA (2012) in treating answer particles as referring to a salient propositional discourse referent (*dr*) and asserting its proposition or negation. The present contextualist semantics treats an NPQ $\neg p$? as introducing three potential propositional *dr*'s, given the structure in (16), reproduced below.²¹

- (96) LF: [Q not [VERUM [p]]]
- a. $\text{dr } \phi = p$
 - b. $\text{dr } \psi = \text{VERUM } p$
 - c. $\text{dr } \chi = \neg \text{VERUM } p$

This predicts roughly the following possible distinct answers (for simplicity, let's bracket potential differences between the assertions of ϕ and of ψ):

- (97)
- a. *No*-answer asserting $\neg\phi$
 - b. *Yes*-answer asserting ϕ ($\approx \psi = \neg\chi$);
 - c. *No*-answer asserting $\neg\psi$
 - d. =*Yes*-answer asserting χ ($=\neg\psi$)

This is essentially the answer pattern observed in (94)–(95) above.

So, the account of NPQs from §4 may seem to be looking pretty good in capturing the answer patterns with NPQs: It captures how an unqualified *yes*-answer as-

²¹This is in contrast to Krifka, which treats the negation as a non-propositional speech act negation, and thus treats NPQs as introducing only a *dr* for p .

serts p and cannot be interpreted as asserting $\neg p$, and how an unqualified *no*-answer asserts $\neg p$ and cannot be interpreted as asserting p . It makes sense of why simple *yes*-answers seem to be targeting the backgrounded cell, as they are in fact targeting the related simple propositional ϕ . And it predicts the possibility of qualified *yes-/no*-answers, like those in (95), and their approximate equivalence.

Further, it is perhaps not surprising that simple *yes-/no*-answers typically target the embedded proposition, and that qualified answers are relatively less common. As noted above, the QUD in uses of VERUM typically concerns the subject matter of the discourse — whether p — rather than the logical implications of a mutually endorsed body of evidence. Insofar as the addressee has settled views on p — e.g., in “contradiction scenarios” where the addressee previously implied $\neg p$ — she can answer an NPQ by addressing the QUD itself. If the addressee is unsure about p — e.g., in a “suggestion scenario,” or a contradiction scenario where the speaker’s question leads the addressee to rethink her previous implication that $\neg p$ — she can resort to a qualified answer that targets one of the cells in the question’s denotation. This diagnosis may also make the following predictions about the relative frequencies of different answers in different scenarios: it may predict (i) more qualified *no*-answers than qualified *yes*-answers in contradiction scenarios, insofar as *no* has the same (negative) polarity as her previous implication that $\neg p$; (ii) more qualified *yes*-answers than qualified *no*-answers in suggestion scenarios, insofar as *yes* has the same (positive) polarity as the speaker’s expectation bias; and (iii) more unqualified answers (specifically, unqualified *no*-answers) in contradiction scenarios than in suggestion scenarios, insofar as the addressee previously implied a commitment about the embedded proposition. I leave it to future research to investigate these predictions.

All this said, we should be careful not to hastily assigning theoretical significance to the sorts of qualified answers in (95). Qualified answers are possible with ordinary polar questions as well — both with positive polar questions, as in (98), and non-preposed negative questions, as in (99).

- (98) Is Jane coming?
- a. Yeah, I think she is, but I’m not sure.
 - b. No, I think she isn’t, but I’m not sure.
 - c. Yeah, I don’t know. Maybe (not).
 - d. ??No, I don’t know. Maybe.
- (99) Is Jane not coming?
- a. Yeah, I think she is (/isn’t), but I’m not sure.
 - b. No, I think she is (/isn’t), but I’m not sure.

- c. Yeah, I don't know. Maybe.
- d. No, I don't know. Maybe.

The matter calls for further investigation.

References

- ASHER, NICHOLAS & BRIAN REESE. 2007. Intonation and discourse: Biased questions. *Interdisciplinary Studies on Information Structure* 8, 1–38.
- BACH, KENT & ROBERT HARNISH. 1979. *Linguistic communication and speech acts*. Cambridge: MIT Press.
- BARKER, CHRIS. 2002. The dynamics of vagueness. *Linguistics and Philosophy* 25, 1–36.
- BITTNER, MARIA. 2011. Time and modality without tenses or modals. In MONIKA RATHERT & RENATE MUSAN (Eds.), *Tense across languages*, pp. 147–188. Tübingen: Niemeyer.
- BLACKBURN, SIMON. 1998. *Ruling passions*. Oxford: Clarendon Press.
- BOLINGER, DWIGHT. 1978. Yes-no questions are not alternative questions. In HENRY HIŻ (Ed.), *Questions*, pp. 87–105. Dordrecht: Reidel.
- BROWN, JESSICA & HERMAN CAPPELEN (Eds.). 2011. *Assertion: New philosophical essays*. Oxford: Oxford University Press.
- BÜRING, DANIEL & CHRISTINE GUNLOGSON. 2000. Aren't positive and negative polar questions the same? MS, UCLA & UCSC.
- CLARK, HERBERT H. & EDWARD F. SCHAEFER. 1989. Contributing to discourse. *Cognitive Science* 13, 259–294.
- CLARK, HERBERT H. & DEANNA WILKES-GIBBS. 1986. Referring as a collaborative process. *Cognition* 22, 1–39.
- DEROSE, KEITH. 1991. Epistemic possibilities. *Philosophical Review* 100, 581–605.
- EGAN, ANDY & BRIAN WEATHERSON (Eds.). 2011. *Epistemic modality*. Oxford: Oxford University Press.

- FARKAS, DONKA F. & KIM B. BRUCE. 2010. On reacting to assertions and polar questions. *Journal of Semantics* 27, 81–118.
- VON FINTEL, KAI. 1994. *Restrictions on quantifier domains*. Ph.D. thesis, University of Massachusetts, Amherst.
- VON FINTEL, KAI & ANTHONY S. GILLIES. 2011. ‘Might’ made right. In EGAN & WEATHERSON (2011), pp. 108–130.
- FRANK, ANETTE. 1996. *Context dependence in modal constructions*. Ph.D. thesis, University of Stuttgart.
- FRANKE, MICHAEL & TIKITU DE JAGER. 2011. Now that you mention it: Awareness dynamics in discourse and decisions. In ANTON BENZ, CHRISTIAN EBERT, GERHARD JÄGER, & ROBERT VAN ROOIJ (Eds.), *Language, games, and evolution*, pp. 60–91. Berlin: Springer-Verlag.
- GARROD, SIMON & GWYNETH DOHERTY. 1994. Conversation, co-ordination and convention: An empirical investigation of how groups establish linguistic conventions. *Cognition* 53, 181–215.
- GEURTS, BART. 1998. Presuppositions and anaphors in attitude contexts. *Linguistics and Philosophy* 21, 545–601.
- GIBBARD, ALLAN. 1990. *Wise choices, apt feelings: A theory of normative judgment*. Cambridge: Harvard University Press.
- GIBBARD, ALLAN. 2012. *Meaning and normativity*. New York: Oxford University Press.
- GINZBURG, JONATHAN. 2012. *The interactive stance: Meaning for conversation*. Oxford: Oxford University Press.
- GUNLOGSON, CHRISTINE. 2001. *True to form: Rising and falling declaratives as questions in English*. Ph.D. thesis, UC Santa Cruz.
- GUTZMANN, DANIEL & HANS-MARTIN GÄRTNER (Eds.). 2013. *Beyond expressives: Explorations in use-conditional meaning*. Leiden: Brill.
- HAN, CHUNG-HYE. 1999. *The structure and interpretation of imperatives: Mood and force in universal grammar*. Ph.D. thesis, University of Pennsylvania.

- HARE, R.M. 1952. *The language of morals*. Oxford: Oxford University Press.
- HEIM, IRENE. 1990. On the projection problem for presuppositions. In STEVEN DAVIES (Ed.), *Pragmatics: A reader*, pp. 397–405. Oxford: Oxford University Press.
- HEIM, IRENE & ANGELIKA KRATZER. 1998. *Semantics in Generative Grammar*. Oxford: Wiley-Blackwell.
- HOBBS, JERRY R., MARK STICKEL, & PAUL MARTIN. 1993. Interpretation as abduction. *Artificial Intelligence* 63, 69–142.
- HÖHLE, TILMAN N. 1992. Über verum-fokus im Deutschen. In JOACHIM JACOBS (Ed.), *Informationsstruktur und Grammatik*, pp. 112–141. Opladen: Westdeutscher Verlag.
- KENNEDY, CHRISTOPHER. 2007. Vagueness and grammar: The semantics of relative and absolute gradable adjectives. *Linguistics and Philosophy* 30, 1–45.
- KRATZER, ANGELIKA. 1977. What ‘must’ and ‘can’ must and can mean. *Linguistics and Philosophy* 1, 337–355.
- KRATZER, ANGELIKA. 1981. The notional category of modality. In HANS-JÜRGEN EIKMEYER & HANNES RIESER (Eds.), *Words, worlds, and contexts: New approaches in word semantics*, pp. 38–74. Berlin: de Gruyter.
- KRATZER, ANGELIKA. 1989. An investigation of the lumps of thought. *Linguistics and Philosophy* 12, 607–653.
- KRATZER, ANGELIKA. 1991. Modality/Conditionals. In ARNIM VON STECHOW & DIETER WUNDERLICH (Eds.), *Semantics: An international handbook of contemporary research*, pp. 639–656. New York: de Gruyter.
- KRATZER, ANGELIKA. 2012. *Modals and conditionals: New and revised perspectives*. New York: Oxford University Press.
- KRIFKA, MANFRED. 2012. Negated polarity questions as denegations of assertions. In FERENC KIEFER & CHUNGMIN LEE (Eds.), *Contrastiveness and scalar implicatures*. Berlin: Springer.

- KRIFKA, MANFRED. 2015. Bias in commitment space semantics: Declarative questions, negated questions, and question tags. In SARAH D'ANTONIO, MARY MORONEY, & CAROL ROSE LITTLE (Eds.), *Proceedings of Semantics and Linguistic Theory (SALT) 25*, pp. 328–345. Ithaca: CLC Publications.
- LADD, ROBERT D. 1981. A first look at the semantics and pragmatics of negative questions and tag questions. In *Proceedings of the Chicago Linguistics Society (CLS) 17*, pp. 164–171. Chicago: University of Chicago Press.
- LEWIS, DAVID. 1973. *Counterfactuals*. Cambridge: Harvard University Press.
- LEWIS, DAVID. 1981. Ordering semantics and premise semantics for counterfactuals. *Journal of Philosophical Logic* 10, 217–234.
- LYONS, JOHN. 1977. *Semantics*, vol. 2. Cambridge: Cambridge University Press.
- LYONS, JOHN. 1995. *Linguistic semantics: An introduction*. Cambridge: Cambridge University Press.
- MACFARLANE, JOHN. 2014. *Assessment sensitivity: Relative truth and its applications*. Oxford: Clarendon Press.
- MOSS, SARAH. 2015. On the semantics and pragmatics of epistemic vocabulary. *Semantics and Pragmatics* 8, 1–81.
- NARROG, HEIKO. 2005. Modality, mood, and change of modal meanings: A new perspective. *Cognitive Linguistics* 16, 677–731.
- POTTS, CHRISTOPHER. 2008. Interpretive economy, Schelling points, and evolutionary stability. MS, University of Massachusetts, Amherst.
- PRICE, HUW. 2013. *Expressivism, pragmatism, and representationalism*. Cambridge: Cambridge University Press.
- QING, CIYANG & MICHAEL FRANKE. 2014. Gradable adjectives, vagueness, and optimal language use: A speaker-oriented model. In TODD SNIDER, SARAH D'ANTONIO, & MIA WEIGAND (Eds.), *Proceedings of SALT 24*, pp. 23–41. Ithaca: CLC Publications.
- REESE, BRIAN JON. 2007. *Bias in questions*. Ph.D. thesis, University of Texas at Austin.

- REPP, SOPHIE. 2006. \neg (A&B). Gapping, negation and speech act operators. *Research on Language and Computation* 4, 397–423.
- REPP, SOPHIE. 2009. *Negation in gapping*. Oxford: Oxford University Press.
- REPP, SOPHIE. 2013. Common ground management: Modal particles, illocutionary negation and VERUM. In GUTZMANN & GÄRTNER (2013), pp. 231–274.
- ROBERTS, CRAIGE. 1996. Information structure: Towards an integrated theory of formal pragmatics. In JAE-HAK YOON & ANDREAS KATHOL (Eds.), *OSU Working Papers in Linguistics, Volume 49: Papers in Semantics*.
- ROMERO, MARIBEL. 2006. Biased *yes/no* questions: The role of VERUM. *Sprache und Datenverarbeitung* 30, 9–24.
- ROMERO, MARIBEL & CHUNG-HYE HAN. 2004. On negative *yes/no* questions. *Linguistics and Philosophy* 27, 609–658.
- VAN ROOY, ROBERT & MARIE ŠAFÁŘOVÁ. 2003. On polar questions. In ROBERT B. YOUNG & YUPING ZHOU (Eds.), *Proceedings of Semantics and Linguistic Theory (SALT)* 13, pp. 292–309. Ithaca: CLC Publications.
- ROTHSCHILD, DANIEL. 2012. Expressing credences. *Proceedings of the Aristotelian Society* 112, 99–114.
- SADOCK, JERROLD. 1971. Queclaratives. In *Papers from the seventh regional meeting of the Chicago Linguistics Society (CLS)*, pp. 223–232. Chicago: CLS.
- SILK, ALEX. 2013. Truth-conditions and the meanings of ethical terms. In RUSS SHAFER-LANDAU (Ed.), *Oxford studies in metaethics*, vol. 8, pp. 195–222. New York: Oxford University Press.
- SILK, ALEX. 2014. Accommodation and negotiation with context-sensitive expressions. *Thought* 3, 115–123.
- SILK, ALEX. 2015. How to be an ethical expressivist. *Philosophy and Phenomenological Research* 91, 47–81.
- SILK, ALEX. 2016. *Discourse Contextualism: A framework for contextualist semantics and pragmatics*. Oxford: Oxford University Press. URL <http://goo.gl/aIDDmb>.

- SIMONS, MANDY, JUDITH TONHAUSER, DAVID BEAVER, & CRAIGE ROBERTS. 2010. What projects and why. In NAN LI & DAVID LUTZ (Eds.), *Proceedings of SALT 20*, pp. 309–327. Ithaca: CLC Publications.
- STALNAKER, ROBERT. 1974. Pragmatic presuppositions. In STALNAKER (1999), pp. 47–62.
- STALNAKER, ROBERT. 1978. Assertion. In STALNAKER (1999), pp. 78–95.
- STALNAKER, ROBERT. 1999. *Context and content: Essays on intentionality in speech and thought*. Oxford: Oxford University Press.
- STALNAKER, ROBERT. 2002. Common ground. *Linguistics and Philosophy* 25, 701–721.
- STALNAKER, ROBERT. 2014. *Context*. New York: Oxford University Press.
- STANLEY, JASON & ZOLTÁN GENDLER SZABÓ. 2000. On quantifier domain restriction. *Mind and Language* 15, 219–261.
- STEPHENSON, TAMINA. 2007. Judge dependence, epistemic modals, and predicates of personal taste. *Linguistics and Philosophy* 30, 487–525.
- STONE, MATTHEW & DANIEL HARDT. 1999. Dynamic discourse referents for tense and modals. In HARRY BUNT & REINHARD MUSKENS (Eds.), *Computing meaning*, vol. 2, pp. 302–321. Dordrecht: Kluwer.
- SUDO, YASUTADA. 2013. Biased polar questions in English and Japanese. In GUTZMANN & GÄRTNER (2013), pp. 277–297.
- SWANSON, ERIC. 2010. On scope relations between quantifiers and epistemic modals. *Journal of Semantics* 27, 529–540.
- SWANSON, ERIC. 2012. The application of constraint semantics to the language of subjective uncertainty. *Journal of Philosophical Logic* pp. 1–28.
- THOMASON, RICHMOND H. 2002. The beliefs of other agents. MS, University of Michigan.
- THOMASON, RICHMOND H., MATTHEW STONE, & DAVID DEVAULT. 2006. Enlightened update: A computational architecture for presupposition and other pragmatic phenomena. In DONNA BYRON, CRAIGE ROBERTS, & SCOTT SCHWENTER (Eds.), *Presupposition accommodation*. OSU Pragmatics Initiative.

- TONHAUSER, JUDITH, DAVID BEAVER, CRAIGE ROBERTS, & MANDY SIMONS. 2013. Towards a taxonomy of projective content. *Language* 89, 66–109.
- TRAUM, DAVID. 1994. *A computational theory of grounding in natural language conversation*. Ph.D. thesis, University of Rochester.
- VELTMAN, FRANK. 1996. Defaults in update semantics. *Journal of Philosophical Logic* 25, 221–261.
- WILLER, MALTE. 2010. *Modality in flux*. Ph.D. thesis, University of Texas, Austin.
- VON WRIGHT, GEORG HENRIK. 1963. *Norm and action: A logical inquiry*. London: Routledge and Kegan Paul.
- YALCIN, SETH. 2011. Nonfactualism about epistemic modality. In EGAN & WEATHERSON (2011), pp. 295–332.
- YALCIN, SETH. 2012. Bayesian expressivism. *Proceedings of the Aristotelian Society* 112, 123–160.
- ZIMMERMANN, MALTE. 2011. Discourse particles. In CLAUDIA MAIENBORN, KLAUS VON HEUSINGER, & PAUL PORTNER (Eds.), *Semantics: An international handbook of natural language meaning*, vol. 2, pp. 2011–2038. Berlin: de Gruyter.