

# Intonational Commitments\*

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## 1 Introduction

In this paper, I develop an account of the discourse effect of utterances of declarative sentences accompanied by rising intonation in American English (rising declaratives, or RDs) couched within the Table model (Farkas & Bruce 2010).

- (1) You slapped him?
- (2) There's a deer outside?
- (3) You got a job?

RDs like (1)-(3) instantiate a kind of biased question: they solicit information from an addressee, but they also indicate that the speaker is not neutral about the expected answer. How to model the discourse behavior of such sentences has been the subject of much recent interest (e.g. Krifka 2015, Malamud & Stephenson 2015, Farkas & Roelofsen 2017, Westera 2017, Jeong 2018), building on influential analyses by Bartels (1999), Gunlogson (2001, 2008), and Nilssonová (2006). I propose here that the discourse behavior of RDs follows from an account in which rising intonation calls off speaker commitment (q.v. Truckenbrodt 2006).

The Table model analyses discourse moves in terms of how they affect the Question Under Discussion, the individual discourse commitments of the interlocutors, and the Common Ground, including projection of possible future Common Grounds. Approaches to RDs within the Table model have taken their status as biased questions to motivate an extension

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of the model to include additional components making reference to things like projected commitments and metalinguistic issues (Malamud & Stephenson 2015, Jeong 2018), or explicit marking of commitment strength, evidence source, or epistemic bias (Northrup 2014, Farkas & Roelofsen 2017). One of the goals of this paper is to demonstrate that the discourse behavior of RDs can be derived entirely from components of the Table model independently necessary for modeling the basic speech acts of assertions and neutral questions: individual discourse commitments and projected Common Grounds. I argue that RDs behave like biased questions because they have some attributes that questions have, but also some attributes that assertions have—they project only one future Common Ground, as assertions do, but involve no speaker commitment, as neutral questions do. The discourse behavior of RDs falls out of this particular setting of the parameters of the most basic formulation of the Table model. This is not an argument that elaborations of the Table model making use of projected commitments, metalinguistic issues, variable commitment strength, or overt marking of evidence source and epistemic bias are unnecessary; it is an argument that such elaborations are not necessary to the analysis of the behavior of RDs.

Prior accounts of RDs within the Table model analyze them non-compositionally, by assigning a discourse effect to the sentence-tune pair, rather than deriving their behavior from the interaction between the meaning of rising intonation and the meaning of utterances of declarative sentences (Malamud & Stephenson 2015, Jeong 2018; Farkas & Roelofsen 2017 analyze RDs partially compositionally, but assign them additional construction-specific effects).<sup>1</sup> A second goal of this paper is to develop an account of RDs within the Table model that is fully compositional, deriving the behavior of RDs entirely from interaction between the meaning of rising intonation and the meaning of utterances of declarative sentences (following Gunlogson 2001 and Westera 2017, 2018).<sup>2</sup>

A third goal of this paper is to develop a more explicit pragmatics for the Table model than has been previously presented, to the best of my knowledge. In order to fully work through the predictions made by the proposed discourse effect of RDs, I propose a Gricean pragmatics for the act of projecting a Common Ground, as well as an account of pragmatic competition between discourse move minimal pairs. I hope that the pragmatic portion of this paper is of interest beyond the analysis of RDs, as the Table model is increasingly broadly used in the analysis of diverse phenomena—e.g. AnderBois (2018) and Kraus (2018) on mirativity, Beltrama (2018) on intensifiers, Rett (ms) on emotive markers, a.o.

In terms of empirical coverage, this paper addresses inferences to both the speaker’s and the addressee’s epistemic bias that typically accompany the use of an RD, offering an account of why RDs are always accompanied by an inference of positive epistemic bias on the part of the addressee, why RDs are compatible with inferences of both positive epistemic bias on the part of the speaker and negative epistemic bias on the part of the speaker (Farkas

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<sup>1</sup>This is true as well of many analyses not couched within the Table model, e.g. Gunlogson (2008), Krifka (2015).

<sup>2</sup>Though the account proposed is compositional on the level of the sentence-tune pair, it is not compositional within the tune—that is to say that it assigns a meaning to the entire  $l^* H-H\%$  tune, rather than deriving the meaning of that tune from interactions between the meanings of  $l^*$ ,  $H-$ , and  $H\%$ . For attempts to derive tune meanings from the meanings of their constituent tones, see Pierrehumbert & Hirschberg (1990), Bartels (1999). Thanks to Beth Sturman and Maura O’Leary for discussion of this point.

& Roelofsen 2017), and also an account of why negative speaker epistemic bias cases are in some sense non-canonical (Westera 2017, 2018).

The paper is structured like so: in §2, I place limitations on the empirical scope of the investigation. In §3, I discuss the relevant empirical generalizations about the behavior of rising declaratives. In §4, I present the model in which the account is couched, giving background on Farkas & Bruce’s (2010) Table model, Farkas & Roelofsen’s (2017) general utterance function, and developing an extension of Gricean pragmatics to the various components of the Table model. In §5, I formalize the proposal that rising intonation calls off speaker commitment, and show how that proposal explains the facts encountered in §3, given the assumption of pragmatic competition between discourse move minimal pairs. In §6, I show how the proposal handles empirical observations that Farkas & Roelofsen (2017) put forward as arguments that rising intonation contributes a semantic operator, rather than an utterance modifier. In §7, I conclude.

## 2 The Scope of the Investigation

### 2.1 Rising Declaratives: Preliminaries

Rising declaratives (RDs) are declarative sentences accompanied with rising intonation. It is commonly observed that the discourse function of such sentences is to request information, while expressing some kind of bias that is not present in the corresponding sentences with interrogative syntax. Phonologically speaking, these sentences are characterized by a low pitch accent rising to a high boundary tone. In an autosegmental-metrical system of intonational transcription (Pierrehumbert 1980, Beckman & Pierrehumbert 1986, Ladd 2008), which treats intonational tunes as discrete sequences of binary high or low tones, this can be represented as an  $L^* H-H\%$  tune, where  $*$  marks a pitch accent,  $-$  marks a phrase accent, and  $\%$  marks a boundary tone:

- (4)  $L^* \quad H-H\%$   
You slapped him?

It is important to note that the empirical focus here does not include all declarative sentences accompanied by a final rise. By focusing exclusively on steep monotonic rises (the  $L^* H-H\%$  tune), I mean to exclude from consideration ‘list intonation’ ( $L^* L-H\%$ ), in which non-final portions of a list are accompanied by shallower rises (Pierrehumbert & Hirschberg 1990), as well as more complex intonational tunes that end with a rise, such as the rise-fall-rise tune ( $L^*+H L-H\%$ ), which expresses surprise or disbelief (e.g. Constant 2012). I also mean to exclude assertive uses of RDs, which have also been argued to be intonationally distinct from inquisitive uses of RDs, a point I discuss in the following subsection.

### 2.2 Assertive vs. Inquisitive RDs

Jeong (2018) argues that there are two different constructions in English that involve declarative sentences accompanied by monotonically rising intonation. One phenomenon is the one presented above, in which a steep rise accompanying a declarative sentence leads to it being interpreted, pretheoretically speaking, as a biased question. The other phenomenon is one in which a shallower rise accompanies a declarative sentence, leading it to be interpreted as a tentative assertion:

(5) **A:** Do you like Chinese food?

$H^*$        $H$ -  $H\%$

**B:** I like orange chicken?

In this case, **B**'s utterance doesn't solicit any information from **A**, and **B** is taken to have committed to the truth of the sentence she has uttered. The rising intonation here, rather, indicates that **B** is not completely sure whether her contribution is an adequate answer to **A**'s question. Malamud & Stephenson (2015) call these 'unsure-of-move' uses of RDs. Jeong (2018) argues on the basis of experiments involving phonetic manipulation of the height of the rise that cases like these are intonationally distinct from information-soliciting uses of RDs. The two varieties of rising declaratives are actually associated with phonologically distinct intonational tunes: the biased question with a steep,  $L^*$   $H$ - $H\%$  rise, and the tentative assertion with a shallower,  $H^*$   $H$ - $H\%$  rise, as indicated above. She refers to the former as 'inquisitive' RDs and the latter as 'assertive' RDs, terminology that I adopt here.

I follow Jeong (2018) in treating inquisitive and assertive rising declaratives as two separate constructions, associated with two separate intonational tunes, and I address only the discourse behavior of inquisitive RDs, and the meaning of the  $L^*$   $H$ - $H\%$  tune, in this paper.<sup>3</sup> An investigation of what, if anything, inquisitive and assertive RDs have in common is outside the scope of this paper (see Bartels 1999, Pierrehumbert & Hirschberg 1990, and Westera 2013, 2017 for accounts that assign a meaning to  $H\%$  alone, providing a roof under which both constructions can rest). I focus here only on the meaning of a terminal contour, setting aside possible additional contributions of prenuclear pitch accents. Throughout the rest of this paper, when I use the term 'rising declarative' without qualification, I intend it to refer to inquisitive rising declaratives, and when I use the term 'rising intonation' without qualification, I intend it to refer to the  $L^*$   $H$ - $H\%$  tune. When I place a question mark at the end of an example sentence, I intend it to signify that the sentence is accompanied by an  $L^*$   $H$ - $H\%$  tune.

If, in the final calculus, the argument that inquisitive and assertive rising declaratives are phonologically distinct turns out not to hold water, this paper's analysis of the discourse effect of inquisitive RDs will be unaffected. However, its association of that discourse effect with the contribution of the  $L^*$   $H$ - $H\%$  tune will have to be sacrificed.

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<sup>3</sup>In making this assumption I diverge from e.g. Malamud & Stephenson (2015), who provide one discourse effect for both constructions.

### 3 Empirical Generalizations

I take four empirical generalizations to be crucial desiderata for the empirical adequacy of any account of inquisitive RDs:

(6) FOUR CRUCIAL GENERALIZATIONS

For any RD  $p?$  whose falling declarative counterpart denotes the proposition  $p$

a. NON-ASSERTIVENESS

A speaker who utters  $p?$  does not commit to the truth of  $p$

b. ANSWER SOLICITATION

An utterance of  $p?$  invites the addressee to weigh in on whether  $p$  is true

c. VARIABLE SPEAKER EPISTEMIC BIAS

An utterance of  $p?$  can license an inference to the speaker's suspecting that  $p$  is true or that it is false, depending on context

d. INVARIABLE ADDRESSEE EPISTEMIC BIAS

An utterance of  $p?$  is only felicitous when the speaker has reason to believe the addressee believes  $p$

The rest of this section presents empirical arguments for each of the above generalizations. Generalizations (6a) and (6b) are uncontroversial, and so the arguments presented for them will be brief. The status of generalizations (6c) and (6d) in the literature is less clear. (6c) is a synthesis of contradictory claims made in prior work: though it was uncontroversial until recently that RDs are associated with positive speaker epistemic bias (e.g. Gunlogson 2008, Krifka 2015, Malamud & Stephenson 2015, Westera 2017), Farkas & Roelofsen (2017), have recently made a forceful empirical argument that they are not always associated with such bias. Not all prior accounts of RDs have noted that (6d) is a valid generalization, but several have made it central to their empirical discussion (e.g. Gunlogson 2001, Krifka 2015 and Jeong 2018).

#### 3.1 Non-assertiveness

An inquisitive RD  $p?$  whose falling declarative counterpart denotes the proposition  $p$  does not commit the speaker to the truth of  $p$ —that is to say, the speaker does not assert  $p$  by uttering  $p?$  (Gunlogson 2001 and many others—empirical discussion here is heavily indebted to Gunlogson).

- (7) [*Context: Alvin is looking at facebook on his phone, where he sees a cryptic post by his friend Carrie, which seems to suggest that she's been fired from her job. He turns to Bertha, who is close with Carrie, and says:*]

**A:** Carrie got fired?

- a. **B:** #Thanks for the heads up.  
b. **B:** #Oh, I had no idea.

Bertha cannot felicitously reply by thanking Alvin for giving her information (7a) or by indicating receipt of previously unknown information with *oh* (7b).

In this respect RDs pattern with interrogatives (8); the opposite is seen with falling declaratives (9).

- (8) *[Context: same as (7)]*  
**A:** Did Carrie get fired?  
a. **B:** #Thanks for the heads up.  
b. **B:** #Oh, I had no idea.

- (9) *[Context: same as (7)]*  
**A:** Carrie got fired.  
a. **B:** Thanks for the heads up.  
b. **B:** Oh, I had no idea.

To summarize: unlike falling declaratives, RDs don't appear to communicate information—discourse moves acknowledging receipt of information or signaling that one's interlocutor has made a commitment are not felicitous responses to them.

### 3.2 Answer solicitation

Falling declaratives also behave differently from interrogatives in that the latter solicit an answer from the addressee, and the former do not:

- (10) *[Context: Alvin is looking at facebook on his phone, where he sees a cryptic post by his friend Carrie, which seems to suggest that she has a new girlfriend. He turns to Bertha, who is close with Carrie, and says:]*  
**A:** Did Carrie get a new girlfriend?  
a. **B:** Yeah, she told me about it this morning.  
b. **B:** I don't think so, maybe she's just trying to stir up drama.  
c. **B:** #Did you know Delia is leaving her husband?
- (11) *[Context: same as (10)]*  
**A:** Carrie got a new girlfriend.  
a. **B:** Yeah, she told me about it this morning.  
b. **B:** I don't think so, maybe she's just trying to stir up drama.  
c. **B:** Did you know Delia is leaving her husband?

An interrogative can be felicitously followed by an answer, whether positive (10a) or negative (10b), but it's infelicitous to reply by raising a related issue, rather than answering the question posed by the interrogative sentence (10c). The same is not true for falling declaratives. Agreement (11a) and disagreement (11b) are felicitous, but it's also felicitous to reply by

raising a related issue (11c)—in this case, we take Bertha to have tacitly accepted the truth of Alvin’s statement. Again, RDs pattern like interrogatives (Gunlogson 2001 a.o.):

- (12) *[Context: same as (10)]*  
**A:** Carrie got a new girlfriend?  
 a. **B:** Yeah, she told me about it this morning.  
 b. **B:** I don’t think so, maybe she’s just trying to stir up drama.  
 c. **B:** #Did you know Delia is leaving her husband?

It’s felicitous to respond to  $p?$  by giving information about whether or not  $p$  is true (12a, 12b), but just as with interrogatives, it comes off as a non-sequitur to respond by bringing up a related matter (12c). RDs pattern with interrogatives in soliciting an answer.

### 3.3 Speaker epistemic bias

Rising declaratives have been argued to indicate, by some means or another, that the speaker has epistemic bias in favor of the proposition denoted by the corresponding falling declarative (see especially Gunlogson 2008 and Westera 2017)—however, Farkas & Roelofsen (2017) make empirical arguments that rather than necessarily indicating bias in favor of  $p$ , an utterance of  $p?$  indicates a preference for  $p$  over  $\neg p$  that is at best low, and at worst nonexistent. I’ll call cases in which an utterance of  $p?$  allows us to infer that the speaker suspects  $p$  to be true cases in which the speaker has POSITIVE EPISTEMIC BIAS, and cases in which an utterance of  $p?$  allows us to infer that the speaker suspects  $p$  to be false cases in which the speaker has NEGATIVE EPISTEMIC BIAS.

In this section, I review data that has led analysts to these two contradictory positions. I argue that, though any satisfactory account of RDs must explain both sets of cases, neither should be taken to be a primitive feature of RDs. The fact that these inferences are flexible and context sensitive shows that reference to bias should not be hard-coded into the discourse effect of rising declaratives (cf. Gunlogson 2008, Krifka 2015, Malamud & Stephenson 2015, Farkas & Roelofsen 2017, Jeong 2018), but instead arise via pragmatic reasoning (q.v. Nilsenová 2006, Westera 2017).

#### 3.3.1 Positive Bias

Many of the situations in which rising declaratives are felicitous are cases in which the speaker has strong epistemic bias in favor of the proposition denoted by the corresponding rising declarative. Consider the following examples, based on examples from Gunlogson (2001).

- (13) *[Context: The speaker has just seen her coworker enter the office wearing a wet raincoat. She says to him:]*  
 It’s raining?



- (14) *[Context: The speaker’s typically overgrown coworker has just entered the office with a buzzcut. She says to him:]*  
 You got a haircut?

In (13), the speaker’s visual evidence gives her strong reason to believe that it’s raining—note the similarity to contexts used to facilitate the epistemic modal *must* (e.g. by Karttunen 1972), which is uncontroversially associated with strong epistemic bias in favor of its prejacent. In (14), again the speaker’s visual evidence gives her strong reason to believe that her addressee has gotten a haircut—so strong, in fact, that one gets the sense that she is completely sure that he has gotten a haircut, and is merely being polite by avoiding using a falling declarative and thereby asserting to him facts about his own grooming.

To these cases, we can add double checking and expert consultation cases like the following:

- (15) *[Context: The speaker and her addressee made plans two days ago to get drinks tonight. They haven’t spoken about it since. She says to him:]*  
 We’re still on for tonight?
- (16) *[Context: The ship’s captain is consulting with the android who maintains the ship about the logistics of their colonization voyage. The captain says:]*  
 We have, what, eight more recharge cycles to go before we get to Origae-6?

In (15), the speaker has no reason to suspect that the plans have been cancelled—the intuitive purpose of her utterance is to double-check that they still hold, and indirectly, to remind her addressee of the plans, and perhaps initiate a logistical conversation. In (16), taken from the film *Alien: Covenant*, the captain is pretty sure about how many recharge cycles are left before they reach their destination, but knows that the android is better informed than he is, and so he requests confirmation of the exact number from him. Cases like these suggest that *p?* is compatible with very strong speaker epistemic bias toward *p*, contra Farkas & Roelofsen (2017).

### 3.3.2 Negative Bias

Given the data in the previous subsection, an account of RDs that treats them as conventionally indicating positive speaker epistemic bias might seem desirable. However, Farkas & Roelofsen (2017) put forward data that problematize that view. First, consider rising declaratives as applied to questions of taste:<sup>4</sup>

- (17) *[Context: Alvin and Bertha are watching a sunset, and Bertha has just expressed awe at its beauty. Alvin says:]*  
 This is a beautiful sunset? (based on F&R’s 14)

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<sup>4</sup>The relevance of examples involving personal taste to rising declaratives is discussed most extensively by Malamud & Stephenson (2015).



In this case, Alvin can only be interpreted as indicating that he does not agree that the sunset is beautiful, and is surprised at Bertha’s judgment.

Such skeptical or contradicting interpretations of RDs are not confined to discussions of matters of taste. Take for example the following naturally occurring example, brought to my attention by Donka Farkas (p.c.):<sup>5</sup>

(18) *[Context: George Stephanopoulos is interviewing Donald Trump.]*

**DT:** I think I’ve made a lot of sacrifices. I work very, very hard. I’ve created thousands of jobs, tens of thousands of jobs, built great structures. I’ve had tremendous success. I think I’ve done a lot.

**GS:** Those are sacrifices?

In this case, again it is difficult to interpret the RD in any way other than expressing incredulity, skepticism or disagreement. Note that it might seem particularly natural for this utterance to be accompanied by overt markers, intonational or otherwise, of incredulity or skepticism. However, the utterance is felicitous even if delivered with a pleasant, neutral tone, and the inference of skepticism still persists.

Finally, Farkas & Roelofsen (2017) cite cases in which an authority figure uses a rising declarative to contradict a statement made by one of their charges, either gently (19) or exasperatedly (20):

(19) *[Context: A student is solving a math problem in front of the class.]*<sup>6</sup>

**Student:** The answer to this problem is 5 because the square root of 9 is 2 and 2 + 3 is 5.

**Teacher:** The square root of 9 is 2? (F&R’s 55)

(20) *[Context: A mother asks her child to set the table, and he does a particularly bad job before announcing himself to be done. The mother says to the child:]*

This table is set? (based on F&R’s 69)

These cases, taken in concert with the two above, pose a great deal of difficulty for the idea that RDs intrinsically encode positive speaker epistemic bias—it is apparent that they can be used to express skepticism or contradiction in a wide variety of different circumstances.

Westera (2017) argues that cases like (19) and (20) are not necessarily problematic for a view that takes rising declaratives to intrinsically involve positive bias, as they could potentially be analyzed as involving pretense (e.g., the teacher could be pretending, for rhetorical purposes, to be biased in favor of the square root of 9 being 2). I share the intuition that these cases are pragmatically distinct from positive bias cases. Below, I give a pragmatics of rising declaratives that involves an explicit account of the role played by speaker pretense in negative bias cases, while delivering a pragmatics of rising declaratives that will result in them being associated with positive speaker epistemic bias in all cases that don’t involve speaker pretense.

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<sup>5</sup>The source of the example is an ABC news interview from July 30th 2016.

<sup>6</sup>Farkas & Roelofsen (2017) credit this example to Jeroen Groenendijk (p.c.).

### 3.4 Invariable Addressee Bias

We’ve seen above that some rising declaratives facilitate an inference to the speaker being epistemically biased in favor of the proposition denoted by the corresponding falling declarative, and others facilitate an inference to the speaker being epistemically biased against the proposition denoted by the corresponding falling declarative. What unifies the cases above is not any generalization about what epistemic bias of the speaker’s is communicated by rising declaratives, but rather is a generalization that is addressee-oriented: by uttering  $p?$ , the speaker indicates their expectation that the addressee believes  $p$  (Krifka 2015, Jeong 2018).

It should be noted that it is actually fairly difficult to disentangle the speaker’s epistemic bias toward  $p$  from the speaker’s expectation of the addressee’s epistemic bias toward  $p$  in cases in which the speaker takes the addressee to be well-informed. In such cases, the relation between the speaker’s epistemic bias toward  $p$  and the speaker’s expectation of the addressee’s epistemic bias toward  $p$  is mediated by an inference pattern called Chancy Modus Ponens, argued to be valid by Yalcin (2010) and Moss (2015).<sup>7</sup>

$$(21) \quad \begin{array}{l} \text{CHANCY MODUS PONENS} \\ \text{if } \phi \text{ then } \psi \\ \text{probably } \phi \\ \hline \text{probably } \psi \end{array} \quad (\text{Yalcin 2010 V8})$$

To see how this inference pattern relates speaker-oriented bias to addressee-oriented bias, consider again the rain case in (13). Assume that  $\phi$  is the proposition that it is raining, and  $\psi$  is the proposition that the addressee believes that it’s raining. In the context provided, it is specified that the addressee has just come in from outside. This makes it sensible for the speaker to assume that the addressee knows whether or not it’s raining—that if it’s raining, then the addressee believes it is raining. In other words, the speaker believes that *if  $\phi$  then  $\psi$*  is true. The context also provides information to the speaker the most likely explanation of which is that it’s raining—namely, the addressee’s wet raincoat. In other words, the speaker believes that *probably  $\phi$*  is true. Since the speaker believes both of these premises, then by Chancy Modus Ponens we can conclude that the speaker believes the conclusion: *probably  $\psi$* , i.e. that it’s likely that the addressee believes that it’s raining. If the speaker takes that addressee to be informed about  $p$ , then their epistemic bias toward  $p$  translates into their expectation of the addressee’s epistemic bias toward  $p$ .

Because of Chancy Modus Ponens, looking at cases in which the speaker believes the addressee to be well-informed about  $p$  doesn’t necessarily tell us whether the bias of the RD is speaker-oriented or addressee-oriented. An account that takes speaker-oriented bias to be a basic feature of RDs will lead to an inference to addressee-oriented bias in such cases, via Chancy Modus Ponens. It’s relevant to note that previous discussion in the literature focuses primarily on cases in which the addressee is taken to have more epistemic authority

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<sup>7</sup>For discussion of potential counterexamples to Chancy Modus Ponens, see Nath (2018). The counterexamples involve confounding factors that are absent from the discussion here.

over  $p$  than the speaker (for the most explicit discussion of this, see [Gunlogson 2008](#)), i.e., on exactly those cases that license Chancy Modus Ponens, obscuring whether the source of epistemic bias is speaker-oriented or addressee-oriented.

Therefore, the most valuable cases for pulling apart speaker-oriented and addressee-oriented bias are cases in which the speaker doesn't take the addressee to have epistemic authority over  $p$ . I argue that it is exactly these cases in which we see an inference of negative speaker bias toward  $p$ . In these same cases, RDs are felicitous only if the context provides the speaker with a reason to believe that the addressee has positive epistemic bias toward  $p$ , suggesting that the addressee-oriented bias associated with RDs is constant, though the speaker-oriented bias is variable.

Consider (17), whose context is repeated here as (22a):

- (22) a. *[Context: Alvin and Bertha are watching a sunset, and Bertha has just expressed awe at its beauty. Alvin says:]*  
This is a beautiful sunset?
- b. *[Context: Alvin and Bertha are watching a sunset. Bertha hasn't said anything about it, but Alvin knows that she is generally unimpressed by displays of natural beauty. Alvin says:]*  
#This is a beautiful sunset?

In the felicitous context (22a), Alvin has good reason to suspect that Bertha believes the sunset to be beautiful, namely that she just said so. In the infelicitous context (22b), Alvin has no such reason to suspect that Bertha believes the sunset to be beautiful, given her lack of response and her habitual unimpressedness at the natural world. Note that in both contexts above, Alvin and Bertha have access to the same information about the sunset (i.e. they can both see it) and neither has any claim to being a more definitive judge of whether it is beautiful, making it unlikely that Alvin takes Bertha to have epistemic authority over that proposition.

Consider also (18), repeated here as (23a):

- (23) a. **DT:** I think I've made a lot of sacrifices. I work very, very hard. I've created thousands of jobs, tens of thousands of jobs, built great structures. I've had tremendous success. I think I've done a lot.  
**GS:** Those are sacrifices?
- b. **DT:** I work very, very hard. I've created thousands of jobs, tens of thousands of jobs, built great structures. I've had tremendous success. I think I've done a lot.  
**GS:** #Those are sacrifices?

In these examples, the context for the RD is provided by the content of DT's utterance. In the felicitous context (23a), GS has good reason to suspect that DT believes that his achievements are sacrifices, because he prefaced his list of them by saying that he has made a lot of sacrifices. In the infelicitous context (23b), DT does not preface his list with that

statement, giving GS no reason to suspect that DT believes those achievements to be sacrifices, and rendering his RD a non sequitur. Just as with the previous example, there is no reason for GS to believe that DT has epistemic authority over the question of whether those achievements count as sacrifices, and there is no change in GS’s epistemic bias about whether those are sacrifices—what changes is whether DT gives GS reason to believe that he takes those achievements to be sacrifices.

### 3.5 Takeaways

Though there is general consensus in the literature that RDs share at least two of the four properties discussed above (lack of speaker commitment and answer solicitation), and there is general consensus that they involve some form of bias, accounts vary widely in which of these properties they take to be primitive features of RDs, and which they endeavor to derive from the other properties. The majority of previous accounts take bias to be a primitive feature of RDs (e.g. Gunlogson 2001, 2008, Krifka 2015, Malamud & Stephenson 2015, Farkas & Roelofsen 2017, Westera 2017, Jeong 2018), some additionally treating answer-solicitation as a primitive feature of RDs (e.g. Farkas & Roelofsen 2017, Jeong 2018, who treat RDs as denoting questions) and others additionally treating lack of speaker commitment as a primitive feature (e.g. Gunlogson 2001, 2008, Malamud & Stephenson 2015). In §5, I put forward an account that follows Truckenbrodt (2006) in taking the only primitive feature of RDs that distinguishes them from falling declaratives to be lack of speaker commitment. I take the L\* H-H% tune to indicate that the speaker is making no commitments by virtue of their utterance, and I show that the discourse model of Farkas & Bruce (2010), assuming Farkas & Roelofsen’s (2017) general utterance function and an account of pragmatic competition between falling declaratives, rising declaratives, and polar interrogatives, allows us to derive the other three properties of RDs from the act of putting forward a declarative sentence’s denotation without committing to it. In the following section, I give my theoretical assumptions.

## 4 Theoretical Assumptions: The Table Model

In this section, I describe the model in which this paper’s proposal is couched. Part of this section gives background assumptions, and can be safely skipped by readers familiar with Farkas & Bruce (2010) (§4.1) and Farkas & Roelofsen (2017) (§4.2). §4.3 introduces novel assumptions about the Gricean pragmatics that govern the Table model.

### 4.1 Background: Farkas & Bruce (2010)

Farkas & Bruce (2010) break up the meaning of utterances into three interrelated but distinct parts: the denotation of the uttered sentence; how the utterance affects the speaker’s

discourse commitments, and what content the utterance makes at issue.<sup>8</sup>

These parts are interrelated because what a speaker commits to by virtue of their utterance, and what a speaker makes at issue by virtue of their utterance, are both defined in terms of the denotation of the uttered sentence, as is brought out particularly formally by [Farkas & Roelofsen](#)’s utterance function (see §4.2 for details). In addition to a set  $A$  of discourse participants, the model has the following five components

(24) COMPONENTS OF THE [Farkas & Bruce \(2010\)](#) MODEL:

- a. COMMON GROUND ( $CG$ )  
The set of all propositions that all discourse participants are publicly committed to
- b. CONTEXT SET ( $CS$ )  
The set of all worlds that are compatible with all propositions in the Common Ground ( $= \cap CG$ )
- c. DISCOURSE COMMITMENTS  
For all discourse participants  $a \in A$ , there is a set  $DC_a$  of propositions  $a$  has publicly committed to
- d. THE TABLE  
A push-down stack of Issues (sets of propositions), the uppermost element of which  $\text{MAX}(T)$  represents the current local Question Under Discussion (QUD—[Roberts 1996](#), [Ginzburg 1996](#))
- e. PROJECTED SET ( $PS$ )  
The set of all Common Grounds that could result by adding an element of  $\text{MAX}(T)$  to  $CG$  (i.e. that could result from RESOLVING the current QUD—see below)

In this model, conversations are driven the desire to shrink the Context Set, driving interlocutors to raise and resolve Issues.<sup>9</sup>

(25) ISSUES

An Issue is a set of sets of worlds (= a set of propositions). To add an Issue to the Table is called RAISING an Issue.

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<sup>8</sup>This model builds on the work of [Hamblin \(1971\)](#), [Stalnaker \(1978\)](#), [Lewis \(1979\)](#), [Roberts \(1996\)](#), and [Gunlogson \(2001\)](#). For alternative approaches see e.g. [Bach & Harnish \(1979\)](#), [Truckenbrodt \(2006\)](#), and [Ginzburg \(2012\)](#).

<sup>9</sup>If an Issue proves unresolvable, it can be removed from the Table if the participants agree to disagree, which I give a formal definition of here:

(1) AGREEING TO DISAGREE

An issue  $I$  can be removed from the Table if for any discourse participants  $X$  and  $Y$ ,  $\exists p \in DC_X, \exists q \in DC_Y. p \cap q = \emptyset \wedge (\exists r \in I. (\cap DC_X \cap CS) \subseteq r \wedge \neg(\cap DC_Y \cap CS) \subseteq r)$

This is a dispreferred strategy for emptying the Table, as it does not lead to shrinking the Context Set.

(26) RESOLVING an Issue

If an Issue  $I$  is the topmost element of the Table, it is removed from the Table if  $\exists p \in I.CS \subseteq p$

In other words, if the Context Set entails an answer to the current local QUD, it is removed from the Table.

Farkas & Bruce take agreement with assertions to be a default, leading a proposition  $p$  to become Common Ground if one participant asserts it and no other participants object. I will assume that default agreement is available whenever at least one discourse participant has made a commitment that could potentially provide an answer to the current QUD. This can be expressed formally like so:

(27) DEFAULT AGREEMENT

For some issue  $I$  and discourse participant  $a$ , if  $I$  is the top element of the Table and  $\exists p \in DC_a, \exists q \in I.(CS \cap p) \subseteq q$  and no discourse participants have made discourse commitments that are incompatible with  $p$ ,  $p$  will be added to  $CG$  unless somebody objects

Note, crucially, that some participant must make an Issue-resolving commitment in order for the Issue to be resolved via silent assent on the part of the other discourse participants.

Farkas & Bruce treat speech acts as functions from contexts to contexts, where a context is a six-tuple containing the five basic components above, plus a set of discourse participants.

(28) DISCOURSE CONTEXTS

A context  $c_n$  is a tuple  $\langle A_n, DC_n, T_n, CG_n, CS_n, PS_n \rangle$

Where  $A_n$  is a set of individuals,

$DC_n$  is a set of sets of discourse commitments, one for each  $a \in A_n$

$T_n$  is a Table,

and  $CG_n$ ,  $CS_n$ , and  $PS_n$  are a Common Ground, a Context Set, and a Projected Set, such that  $CS_n = \cap CG_n$  and  $PS_n = \{CG_n + p : p \in \text{MAX}(T)\}$

Farkas & Bruce (2010) define the assertion of a sentence  $s$  denoting a proposition  $p$  as an act that raises the Issue  $\{p\}$ , and adds  $p$  to the speaker's discourse commitments. Formally speaking, for an speaker  $sp$  to assert a sentence  $s$  that denotes a proposition  $p$  in context  $c_n$  does the following:

(29) ASSERT( $s, sp, c_n$ )  $\rightarrow c_{n+1}$ , such that

(cf. Farkas & Bruce's ex. 9)

i.  $DC_{sp,n+1} = DC_{sp,n} + p$

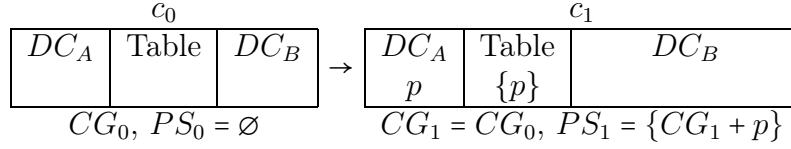
ii.  $T_{n+1} = T_n + \{p\}$

iii.  $PS_{n+1} = \{CG_{n+1} + p\}$

iv. in all other respects,  $c_{n+1} = c_n$

This is depicted visually in (30):

- (30) a. **A**: I got a haircut.  
 b. UPDATE WITH *I got a haircut*.



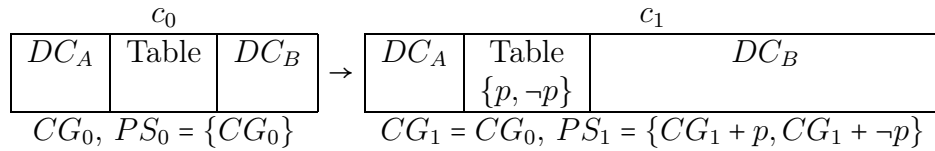
Note that this assertion does two things: first, it adds  $p$  to  $DC_A$ , representing the fact that  $A$  has publicly committed to  $p$ . Second, it raises the Issue  $\{p\}$ , giving rise to a Projected Set that contains only one future Common Ground: one that includes  $p$ . It makes sense that we would want  $A$ 's assertion of  $p$  to project only a future Common Ground which includes  $p$ , because given  $A$ 's commitment to  $p$ , it is no longer possible for  $\neg p$  (or any of its subsets) to become Common Ground. So an assertion's pairing of a commitment to  $p$  with a singleton  $PS$  is very natural. However, commitment to  $p$  and projection of a singleton  $PS$  are separable in principle within this model, and the account of RDs below will pull them apart.

Farkas & Bruce (2010) define the act of questioning as raising the Issue denoted by the question, and making no change to the speaker's discourse commitments. Formally speaking, for a speaker  $sp$  to question using a sentence  $s$  that denotes a set  $P$  in context  $c_n$  does the following:<sup>10</sup>

- (31) QUESTION( $s, sp, c_n$ )  $\rightarrow c_{n+1}$ , such that  
 i.  $T_{n+1} = T_n + P$   
 ii.  $PS_{n+1} = \{CG_{n+1} + p : p \in P\}$   
 iii. in all other respects,  $c_{n+1} = c_n$

This is depicted visually in in (32):

- (32) a. **A**: Did you get a haircut?  
 b. UPDATE WITH *Did you get a haircut?*



Note that the assertion in (30) allowed for the Issue raised to be resolved via default agreement, as  $A$  makes a potentially Issue-resolving commitment by virtue of her utterance. In this case, however, addressee response is necessitated: the speaker has made no commitments which could resolve the Issue on the Table, and so the addressee must make an Issue-resolving commitment if it is to be resolved. This explains why questions solicit addressee response:

<sup>10</sup>In Farkas & Bruce's original formulation, they define a polar question operator that applies to a proposition-denoting sentence radical. The reason for their focus on polar interrogatives is because they are concerned with explaining why both declaratives and polar interrogatives license *yes* and *no* responses. I've generalized their questioning act to non-polar interrogatives here.



the speaker’s discourse move has done nothing that will allow the Issue on the Table is going to be resolved, meaning the addressee is going to have to weigh in if the QUD is to serve its purpose of shrinking the *CS*.

In the following section I present Farkas & Roelofsen’s (2017) proposal for deriving the association of declarative sentences with assertions, and of interrogative sentences with questions, from a general utterance function.

## 4.2 Farkas & Roelofsen’s (2017) Utterance Function

I turn now to the assumptions that I make about what all utterances have in common. I adopt Farkas & Roelofsen’s (2017) proposal for a general utterance function in its entirety. My proposal will pull apart from theirs below in taking the L\* H-H% tune to alter the discourse move carried out by an utterance, rather than altering the semantic content of the uttered sentence.

Farkas & Roelofsen (2017) go a step further than Farkas & Bruce (2010), and provide a fully general utterance function that can derive Farkas & Bruce’s asserting and questioning moves from the denotations of declarative and interrogative sentences, respectively. This is an important step forward, because it explains why asserting is the default function of declarative sentences, and why questioning is the default function of interrogative sentences: the interaction between the denotations of declarative and interrogative sentences and the general utterance function derives the conventional illocutionary force of each.

The utterance function defined by Farkas & Roelofsen has the effect of placing the denotation of a sentence on the Table, and adding its informative content to the speaker’s discourse commitments; the role played by the form of the sentence is in determining whether that denotation is a singleton set of propositions (declarative) or a non-singleton set (interrogative).<sup>11</sup> Farkas & Roelofsen assume the framework of Inquisitive Semantics (Ciardelli et al. 2013), in which declarative sentences denote singleton sets of propositions, interrogative sentences denote non-singleton sets of propositions, and all sentential denotations are downward closed (= closed under the subset relation). That closure property will not be relevant to the phenomena we discuss here, and so I will make the simpler assumption of a Hamblin semantics (Hamblin 1973) in which declarative sentences denote singleton sets of propositions *simpliciter*, and interrogative sentences denote non-singleton sets of propositions *simpliciter*.<sup>12</sup>

An utterance is a function from contexts to contexts, or more accurately, a function from sentence-speaker-context triples to contexts.

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<sup>11</sup>In their system, intonation also plays a role in determining whether a sentence denotes a singleton or non-singleton set of propositions. As this is not a feature of the system I develop here, I set it aside, as it is not crucial to understanding the utterance function.

<sup>12</sup>Nothing crucial about this account rests on the assumption of a Hamblin semantics or of Inquisitive Semantics—one could just as soon say that declarative sentences denote propositions *simpliciter*, and that they are type-lifted to singleton sets of propositions in the act of adding the to the Table. I’ve made the assumptions I’ve made entirely for the sake of presentational simplicity.

- (33) UTTERANCES AS FUNCTIONS:  
 $\text{UTT}(\langle s, sp, c_n \rangle) = c_{n+1}$

All utterances share a discourse effect:

- (34) THE DISCOURSE EFFECT OF AN UTTERANCE:  
 For any utterance  $u : \langle s, sp, c_n \rangle \rightarrow c_{n+1}$ ,
- a.  $T_{n+1} = T_n + \llbracket s \rrbracket^{c_n}$
  - b.  $DC_{sp,n+1} = DC_{sp,n} + \cup \llbracket s \rrbracket^{c_n}$
  - c. in all other respects,  $c_{n+1} = c_n$

Any utterance does two things. First, the denotation of the uttered sentence is pushed onto the Table. Second, the ‘informative content’ of the uttered sentence, or the grand union of its denotation, is added to the speaker’s discourse commitments. In the case of a declarative sentence, which denotes a singleton set of propositions, its informative content will just be that proposition. In the case of an interrogative sentence, which denotes a non-singleton set of propositions, its informative content will be the union of those propositions—the set of all worlds compatible with some answer to that question (i.e., the presupposition of the question).

It should be clear that this general utterance function derives nearly identical results to Farkas & Bruce’s assertion operator as applied to declarative sentence, and questioning operator as applied to interrogative sentences. In the case that the uttered sentence denotes a singleton set of propositions (as we will assume declarative sentences do), this utterance function will add that set’s only member to the speaker’s discourse commitments, and place that set onto the Table—exactly what Farkas & Bruce’s assertions do. In the case that the uttered sentence denotes a non-singleton set (as we will assume interrogative sentences do), this utterance function will place that set on the Table, and will also add its grand union to the speaker’s discourse commitments. This differs minimally from Farkas & Bruce’s questioning acts. What is placed on the Table is the same, but Farkas & Bruce’s questioning acts add nothing to the speaker’s discourse commitments. However, this difference seems trivial. In the case of a polar interrogative, with a denotation of the form  $\{p, \neg p\}$ , the grand union of that denotation is  $W$ , and so given the utterance function in (34), the speaker is making a trivial commitment. In the case of a wh-interrogative, the grand union of the denotation represents the presupposition of the question, and so given the utterance function in (34), the speaker is making a commitment to the presupposition of the question—something that we might assume they are already committed to, as the question they’ve asked presupposes it! So the addition of a very weak commitment to the discourse effect of an utterance of an interrogative sentence doesn’t seem to pull the proposal apart from the proposal of Farkas & Bruce in any substantial way. This is good—Farkas & Roelofsen’s utterance function explains why asserting and questioning are associated with declarative and interrogative sentences while maintaining the basic mechanical operation of Farkas & Bruce’s asserting and questioning operators.

### 4.3 Table Model Pragmatics

I turn now to a presentation of how Grice's (1975) familiar Cooperative Principle is to be applied to the various elements of the Table model—a topic that has not been given a fully explicit treatment in prior work to the best of my knowledge. Grice's maxims are generally applied at the level of propositional content: they drive the inferences we make about what proposition a speaker intended to communicate given their choice of sentence. But in reasoning about the pragmatics of a speaker's choice of discourse move in the Table model, we need to think not only about what proposition the speaker intended to convey, but also about what they intended to convey by their choice to incur a discourse commitment, and by their choice to add a hypothetical *CG* to the projected set. Hence the need to be explicit about under what circumstances it is cooperative to make commitments, and under what circumstances it is cooperative to make projections.

I assume that the reader has some basic degree of familiarity with the maxims that comprise Grice's Cooperative Principle—namely QUANTITY, QUALITY, RELATION, and MANNER—and I will restrict my comments to discussing the applicability of these maxims to the components of the Table model. Throughout, I'll ignore the maxim of MANNER, as it will play no role in what follows. I'll propose applications of the maxims of QUALITY and QUANTITY to the cooperativity of moves that add content to a set of discourse commitments, and of moves that add content to the projected set. In terms of the maxim of RELATION, I'll assume a version of what Roberts (1996) assumes: that a discourse move is relevant only if it brings us closer to answering the current QUD. I state this in terms of the Table model here:

- (35) A discourse move is RELEVANT in a context  $c_n$  iff a resolution to the Issue it raises would also resolve  $\text{MAX}(T_n)$ , or comprises part of a strategy to resolve  $\text{MAX}(T_n)$  (cf. Roberts 1996 ex. 15)

That's all I'll have to say about the maxim of RELATION as it applies to discourse moves: that raising an Issue is only cooperative if resolving it helps us on our way to answering the QUD. Moving on to the maxims of QUANTITY and QUALITY, I'll now state my assumptions about how they apply to the act of adding a propositions to one's discourse commitments, and to the act of adding content to the Projected Set.

#### 4.3.1 QUALITY and QUANTITY for commitments

With respect to the act of adding a proposition to one's discourse commitments, the maxims of QUALITY and QUANTITY apply very straightforwardly:

- (36) QUALITY (commitment version):
- 1) Do not add a proposition to your discourse commitments if you know it to be false.
  - 2) Do not add a proposition to your discourse commitments if you don't know it to be true.

(37) **QUANTITY** (commitment version):

The more commitments you can make, the better, as long as doing so violates no other maxims.

It should be clear that these versions of **QUALITY** 1 and 2 are straightforward restatements of Grice's maxim, revised to refer specifically to discourse commitments. That making a discourse commitment is subject to some version of Grice's maxim of **QUALITY** is a completely standard assumption, q.v. e.g. [Farkas & Bruce \(2010\)](#) p.86. The commitment-oriented statement of **QUANTITY**, which I've seen no reason to split into two submaxims here, simply states that it's better to make commitments than withhold them, provided that those commitments are relevant and honest. This should be intuitive as well: making discourse commitments supplies information about one's beliefs; the more commitments you make, the more information you've given your interlocutors.

### 4.3.2 **QUALITY and QUANTITY for projection**

I assume that the act of adding content to the Projected Set, which is accomplished in the Table model via adding content to the Table, is subject to the maxims of **QUALITY** and **QUANTITY** as well. The Projected Set is defined in terms of the maximal element of the Table, and the Common Ground. Raising an Issue (= placing a set of propositions  $P$  on the Table) in a context with a Common Ground  $CG$  always has the effect of creating a Projected Set  $PS = \{CG + p : p \in P\}$ . In other words, for each proposition  $p$  that is a member of the raised Issue, the Projected Set contains a hypothetical Common Ground that is identical to the current one except that it also contains  $p$ . I assume that the act of projecting a hypothetical Common Ground is subject to the maxims of **QUALITY** and **QUANTITY** as follows:

(38) **QUALITY** (projection version):

- 1) Do not add a hypothetical Common Ground to the projected set if an interlocutor has made a public commitment that is incompatible with that Common Ground (i.e.: don't project  $CG + p$  if there is some interlocutor  $A$  such that  $\cap DC_A \cap p = \emptyset$ )
- 2) Do not add a hypothetical Common Ground to the projected set if you have reason to believe there is an interlocutor whose private beliefs are incompatible with that Common Ground (i.e.: don't project  $CG + p$  if you have reason to believe there is an interlocutor whose private beliefs entail  $\neg p$ )

(39) **QUANTITY** (projection version):

Add as many hypothetical Common Grounds to the projected set as you can, as long as doing so violates no other maxims.

The elements of the projected set represent the future Common Grounds that could result from resolving the Issue currently on the Table. I take the act of projecting a future Common Ground to be subject to the maxim of **QUALITY** in a way that I hope is intuitive: the simplest way to put it is that projecting a future Common Ground is cooperative only if you believe there's a chance that that future Common Ground could actually come about.

If some interlocutor (including the speaker) has made public commitments incompatible with that Common Ground, then it is impossible for that Common Ground to come about (making the projection violate QUALITY 1); it might also be that, though no interlocutor has made such a public commitment, the speaker has reason to suspect that some interlocutor’s private beliefs (maybe their own!) make that interlocutor unlikely to allow such a Common Ground to come about (making the projection violate QUALITY 2). I also make the obvious assumption about QUANTITY: that it’s better to point out as many possible conversational futures as possible, provided that you do actually believe them to be possible.

### 4.3.3 Adversarial contexts and speaker pretense

The application of the maxim of QUALITY to the Projected Set deserves further comment. It’s easy to think of normal dialogues in which utterances are made that project Common Grounds that contravene the discourse commitments of some interlocutor (i.e., that violate QUALITY 1), or that are not compatible with the speaker’s beliefs or their suspicions about others’ beliefs (i.e., that violate QUALITY 2). I will discuss three such cases, and argue that they are indeed, as the maxims I’ve defined predict, contexts in which the Cooperative Principle is not being obeyed.

An obvious case of violation of QUALITY 1 as it applies to the Projected Set is assertions that directly contradict the previous statement. Consider the following dialogue.

- (40) **A:** Tupac is alive.  
**B:** No, he’s dead.  
**A:** No, he’s alive!  
**B:** No, he’s dead!

**A**’s initial utterance commits her to a proposition  $p$ ; **B**’s reply commits him to  $\neg p$ . His reply also places  $\neg p$  on the Table, projecting a Common Ground containing  $\neg p$ . This is despite the fact that **A**’s commitment to  $p$  renders that Common Ground impossible. We might suppose that **B** does indeed think that such a Common Ground is possible—that is to say, that **A** can be convinced to give up her commitment—and that he is therefore being cooperative in spirit, despite disobeying the letter of the maxims. However, the final two moves of the dialogue give up this facade entirely—though each move has the effect of projecting a Common Ground, it becomes clear that each party is only interested in reiterating their own commitment, and the use of assertions as a tool for building Common Ground falls by the wayside. In this case, the interlocutors are not obeying the Cooperative Principle—they are not behaving in a way that optimizes the efficient exchange of (relevant) information. I will call contexts in which the speaker chooses to project a future Common Ground that they do not actually believe can come about given the current state of the discourse an ADVERSARIAL context. A speaker who initiates an adversarial context is an uncooperative speaker. A speaker may initiate an adversarial context because their goal is to convince their interlocutor to rescind the commitment that currently prevents the projected Common Ground from coming about—following the spirit, not the letter, of the Cooperative

Principle. However, one may also initiate, or maintain, an adversarial context just for the pleasure of fighting.

Some subtler cases of adversarial contexts are the cases of ‘quiz’ questions (41) and ‘gotcha’ questions (42):

- (41) *[Context: A is a teacher administering a pop quiz to his student B]*  
**A:** Was Freud born in the 20th century?  
**B:** ... Yes.  
**A:** Wrong!
- (42) *[Context: A is B’s mother, and knows that B snuck out of her room to go to a party last night]*  
**A:** Did you go to bed early last night?  
**B:** Yep, I finished my homework and turned in.  
**A:** You liar!

In (41), **A**’s utterance projects both a  $p$ -incorporating and a  $\neg p$ -incorporating Common Ground. However, his private beliefs are compatible with only one of those Common Grounds, and he will correct his students if they give him the wrong answer—he has no intention of allowing one of those Common Grounds to come about. Again, this is a context in which he is not obeying the Cooperative Principle—he’s not trying to efficiently exchange information; he’s trying to get his students to prove whether or not they’ve learned the material, and in order to do so he needs to maintain the pretense of neutrality about a question he’s in reality quite opinionated about. I’ll refer to adversarial contexts in which it’s the speaker’s own discourse commitments or private beliefs that keep them from believing that a Common Ground that their utterance projects could actually come about as contexts involving **SPEAKER PRETENSE**. In the context of a quiz question, that we are in a context involving speaker pretense is mutually understood (speaker pretense is overt). However, a gotcha question, like (42), is only effective if the addressee is not aware that they’re in a context involving speaker pretense (speaker pretense is covert).

## 5 The Proposal

### 5.1 $L^*$ H-H% as an Utterance Modifier

I adopt here Farkas & Bruce’s (2010) Table model with no further modifications (cf. Northrup 2014, Malamud & Stephenson 2015, Farkas & Roelofsen 2017, a.o.), that is to say, with no components additional to those presented in (28). I adopt Farkas & Roelofsen’s (2017) utterance function as given in (34). I differ from Farkas & Roelofsen (2017) in taking the  $L^*$  H-H% tune to modify the utterance function, instead of the semantic content of the uttered sentence (in §6 I address their arguments in favor of a semantic operator account of rising intonation). I turn now to the implementation of my proposal.

I restate Farkas & Roelofsen’s (2017) utterance function here, presented in  $\lambda$ -calculus.

(43) Let  $k$  be the type of a context.

$$\llbracket \text{UTT} \rrbracket = \lambda P_{(st)t} . \lambda sp_e . \lambda c_k . \left[ \begin{array}{lcl} DC_{sp} & = & DC_{sp,c} + \cup P \\ T & = & T_c + P \\ PS & = & \{CG + p : p \in P\} \\ c' = c & \text{in all other respects} & \end{array} \right]^{c'}$$

As the ordering of  $\lambda$ -expressions indicates, I assume that an utterance is a function that combines first with the compositional semantic value of a sentence.<sup>13</sup> It returns a function that will take a speaker and an input context as arguments, and return an output context. That output context is one in which the speaker has committed to the informative content of that sentential denotation (i.e. its grand union), that sentential denotation is raised as an Issue (i.e. it has been pushed onto the Table), and the projected set illustrates all hypothetical Common Grounds that could result from resolving that Issue.<sup>14</sup> The output context is not allowed to differ from the input context in any other way.

I assume, taking inspiration from Truckenbrodt (2006), that  $L^* H\text{-}H\%$  indicates that the speaker is making no discourse commitments by virtue of their utterance. I implement this by taking  $L^* H\text{-}H\%$  to denote a function from functions from contexts to contexts to functions from contexts to contexts.

(44) Let  $K$  be an abbreviation for type  $ekk$  (a function from contexts to contexts).

$$\llbracket L^* H\text{-}H\% \rrbracket = \lambda K_K . \lambda sp_e . \lambda c_k . \left[ \begin{array}{lcl} DC_{sp} & = & DC_{sp,c} \\ c' = K(sp, c) & \text{in all other respects} & \end{array} \right]^{c'}$$

Utterances accompanied by  $L^* H\text{-}H\%$  do the same thing that standard utterances do given Farkas & Roelofsen’s (2017) utterance function, except that the speaker’s discourse commitments are held steady— $L^* H\text{-}H\%$  overwrites any alterations that the utterance would ordinarily make to the speaker’s discourse commitments.

I assume that the  $H^* L\text{-}L\%$  tune denotes an identity function over functions from contexts to contexts, not interfering with the default utterance function at all, i.e., retaining speaker commitment.<sup>15</sup>

(45)  $\llbracket H^* L\text{-}L\% \rrbracket = \lambda K_K . K$

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<sup>13</sup>Recall that I am assuming a Hamblin semantics in which all sentences denote sets of propositions—declarative sentences singleton sets, and interrogative sentences non-singleton sets.

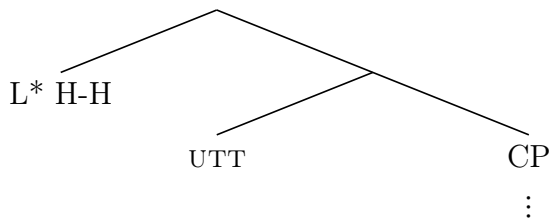
<sup>14</sup>Note here that I overload the interpretation of  $+$  by using it to represent both adding an element to a set, and pushing an element onto a stack. I trust that no confusion will result.

<sup>15</sup>Note that it would be possible to do things the other way around. That is to say, one could say that the default discourse effect of utterance involves no speaker commitment, that the  $H^* L\text{-}L\%$  tune adds in speaker commitment, and that the  $L^* H\text{-}H\%$  tune is an identity function. This would be a notational variant on the current account for the range of data examined in this paper, but might make some difference in terms of parsimony if a wider variety of intonational tunes were considered. The question of whether commitment or lack of commitment deserves status as the default is far outside the scope of this paper. Thanks to Jessica Rett for discussion of this point.



I assume that the denotation of the sentence, the utterance function, and the tune interact compositionally like so:<sup>16</sup>

(46)



Composition of an utterance accompanied by  $L^* H-H\%$  proceeds like so: first, the familiar processes of compositional semantics deliver a compositional semantic value for the uttered sentence, providing a Hamblin set as the denotation of the CP node. The utterance function is applied to that Hamblin set, returning a function of type *ekk*, in search of a speaker and an input context. That function becomes the argument to  $L^* H-H\%$ , which returns a new function of type *ekk*. When supplied with a speaker and an input context, that function will deliver the same output context that would've been delivered by the unmodified utterance function, except that the speaker's commitments will remain as they were in the input context.

Note that this proposal derives Farkas & Bruce's (2010) assertion operation as the discourse effect of declaratives that accompanied by  $H^* L-L\%$ : the basic discourse effect of an utterance of a declarative sentence accompanied by  $H^* L-L\%$  will be exactly the same as in Farkas & Roelofsen (2017), as I've adopted their account of the utterance function, and  $H^* L-L\%$  denotes an identity function that applies to it. It also derives Farkas & Bruce's (2010) questioning operation as the discourse effect of interrogatives that are accompanied by  $L^* H-H\%$ : such utterances raise non-singleton Issues because interrogative sentences denote non-singleton Hamblin sets, and they make no commitments of the speaker by virtue of the modification to the utterance function made by  $L^* H-H\%$ .<sup>17</sup>

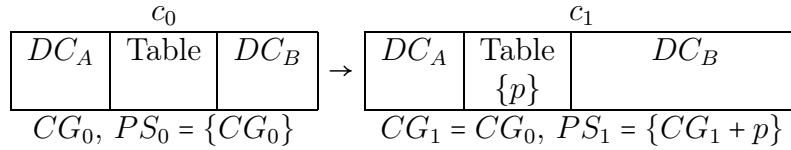
<sup>16</sup>*Nota bene*: this tree does not represent a commitment to the notion that UTT and  $L^* H-H\%$  are a part of the syntactic representation of a sentence; this tree is intended simply as a visual representation of the crucial compositional interactions I'm proposing. I remain agnostic about whether or not it's a good idea to treat things like UTT as syntactic objects in the narrow sense, though my gut tells me that it isn't. The proposal at hand does not depend crucially on resolving that question in either direction.

<sup>17</sup>Note that the proposal at hand differs from Farkas & Roelofsen's (2017) treatment of the discourse effect of interrogatives in one small way: on their proposal, utterances of interrogative sentences (irrespective of intonation) involve the speaker's commitment to the informative content of the question ( $\cup P$ , for some question denotation  $P$ ). This difference is not of crucial importance, as that commitment is not a potentially Issue-resolving one: in the case of a polar interrogative, the speaker makes a trivial commitment to  $W$ ; in the case of a *wh*-interrogative, the speaker makes a commitment to the presupposition of the question. That said, I take it to be a pleasant feature of the present proposal that it allows us to see why rising intonation is typically associated with utterances of interrogative sentences: the commitment that the speaker would incur by uttering an interrogative with falling intonation would be strictly redundant. However, we also predict that interrogatives accompanied by falling intonation will not be particularly defective, nor will they have a different discourse effect from rising interrogatives, for exactly the reasons that render Farkas & Roelofsen's (2017) functional. And indeed that is so. See Bartels (1999) ch. 5 & 6 for empirical discussion of rising and falling intonation on polar and *wh*-questions, and Rudin (2018a) §1.3 for further theoretical discussion.

## 5.2 The Basic Discourse Effect of Rising Declaratives

Farkas & Bruce’s (2010) and Farkas & Roelofsen’s (2017) assertions involve the speaker raising a singleton Issue while at the same time making a potentially Issue-resolving commitment; their (neutral) questioning acts involve the speaker raising a non-singleton Issue while making no potentially Issue-raising commitments. Given the proposal above, a declarative sentence uttered with the L\* H-H% tune will behave in a unique way: the speaker raises a singleton Issue, projecting only one future Common Ground, as in a standard assertion; however, they make no potentially Issue-resolving commitment in the act of raising it, as in a standard question. This is illustrated in (47):

- (47) a. **A:** You got a haircut?  
 b. UPDATE WITH *You got a haircut?*



This update differs minimally from the updates with falling declaratives and with polar interrogatives described above. It differs from the utterance of a falling declarative only in not adding  $p$  to the speaker’s discourse commitments (cf. (30)), and it differs from the utterance of a polar interrogative only in not projecting a Common Ground including  $\neg p$  (cf. (32)). In other words, an utterance of an RD shares properties with both assertions and questions, explaining why RDs have so often been described as a type of ‘biased question’.

We can now start to see how this proposal captures the four crucial generalizations discussed in §3.

On this view, that RDs don’t involve speaker commitment is simply the conventional effect of the L\* H-H% tune. In the following subsection, I explain how this account of RDs predicts that they solicit an answer from the addressee. I will argue that the final two generalizations follow from the pragmatics of the choice of a rising declarative over the corresponding falling declarative and polar interrogative, which, as stated above, differ minimally in their discourse effect from rising declaratives. I develop the relevant pragmatics of discourse move choice, and show how it accounts for the facts, in §5.4.

## 5.3 Accounting for answer solicitation

The shared conversational goal that drives Issue-raising in the Table model is the desire to shrink the Context Set—therefore, in order for raising an Issue to prove conversationally useful, that Issue must be resolved. In order for an Issue to be resolved, it is necessary that some discourse participant make a commitment—recalling discussion in §4, an Issue is only resolved once an element of it is entailed by the Context Set; the Context Set only shrinks if propositions are added to the Common Ground; and propositions are added to the Common Ground only if they become shared commitments. If, by virtue of her utterance,

the speaker makes a commitment that could potentially resolve the Issue she has raised (as the speaker does when uttering a falling declarative), the other participants can simply choose not to object, and the Issue gets resolved via default agreement. However, if the speaker makes no potentially Issue-resolving commitment by virtue of her utterance (as in the utterance of an interrogative), somebody else will have to weigh in in order for the Issue to be resolved—only once an interlocutor provides a potentially Issue-resolving commitment can the Common Ground be modified such that the context set entails a resolution to the Issue at hand. The rising declarative in (47) solicits addressee response for the same reason that interrogatives solicit addressee response: the speaker has raised an Issue without making a commitment that could resolve it, meaning that a further commitment is necessary if the Issue is to be resolved.

To put it very simply: in the Table model, all discourse moves that do not result in a situation that facilitates default agreement solicit addressee response—i.e. all discourse moves that do not involve (a potentially Issue-resolving) speaker commitment solicit addressee response.

The final two generalizations, regarding the bias profile of RDs, will require more work to explain. I turn now to the development of a pragmatics of competition between discourse moves.

## 5.4 The Pragmatics of Rising Declaratives

The explanation of the final two generalizations, regarding the biasedness of RDs, will not follow directly from the mechanics of the discourse model, as the explanation of response-elicitation did. Rather, I argue that they follow from pragmatic competition between discourse moves. I assume that the bias profile of rising declaratives arises from pragmatic inferences driven by consideration of the speaker’s choice to utter a rising declarative instead of a salient alternative utterance (see e.g. [Horn 1972](#) and [Gazdar 1979](#) for classic applications of reasoning about alternative utterances to the derivation of pragmatic inferences). I propose that the salient alternatives are the utterances of the corresponding falling declaratives and rising polar interrogatives. On the proposal given above, those utterances differ from utterances of rising declaratives only with respect to whether or not the speaker commits to  $p$  (in the case of rising declaratives vs. falling declaratives) or with respect to whether or not the speaker raises an Issue containing  $\neg p$ , and adds  $CG + \neg p$  to the Projected Set thereby (in the case of rising declaratives vs. rising polar interrogatives). I will assume the pragmatics of commitment and projection in the Table model given in §4.3; §5.4.1 fleshes out my assumptions about the nature of pragmatic competition between these three discourse moves; §5.4.2 describes the basic pragmatics of utterances of rising declaratives; §5.4.3 explains how the pragmatics of rising declaratives captures invariable addressee bias; §5.4.4 explains how the pragmatics of rising declaratives captures speaker epistemic bias.

### 5.4.1 Discourse move minimal pairs

First, I'll make a constrained assumption about which discourse moves are in pragmatic competition with each other: I'll assume that any move  $m$  is in competition with its DISCOURSE MOVE MINIMAL PAIRS.

(48) DISCOURSE MOVE MINIMAL PAIRS:

For any utterance  $m$  comprising an utterance by a speaker  $sp$  of a sentence with a  $p$ -denoting sentence radical, a move  $m'$  by a speaker  $sp$  comprises a discourse move minimal pair with  $m$  iff

- a.  $m'$  and  $m$  are utterances of a sentence with the same radical
- b. for any input context, the output context of  $m'$  differs from the output context of  $m$  in exactly one of the following ways:
  - i) whether or not the speaker has committed to  $p$
  - ii) whether or not  $\neg p$  is an element of the Issue raised by the utterance

When I say that two sentences share the same radical, I mean that they are lexico-syntactically identical at least up to the matrix TP, resulting in TPs that share a denotation. I assume that a declarative sentence denoting  $\{p\}$  and an interrogative sentence denoting  $\{p, \neg p\}$  are derived from an identical sentence radical denoting  $p$ ; a declarative clause type operator applies to that radical to return the denotation  $\{p\}$ ; an interrogative clause type operator triggers T-to-C movement and returns the denotation  $\{p, \neg p\}$ .

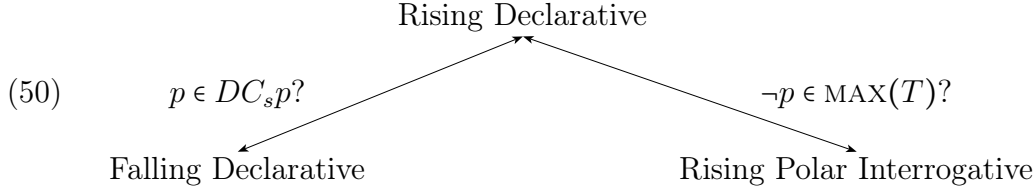
We can now consider a 2x2 grid of utterances of sentences whose radical denotes  $p$ :

(49)

	L* H-H%	H* L-L%
DEC	Rising Declarative	Falling Declarative
INT	Rising Polar Interrogative	Falling Polar Interrogative

Given the definition in (48), any  $p$ -denoting sentence radical will give rise to two discourse move minimal pairs. A rising declarative and a falling declarative over that radical comprise a discourse move minimal pair, as they differ only in whether or not the speaker commits to  $p$  by virtue of the utterance; a rising declarative and a rising polar interrogative over that radical comprise a discourse move minimal pair, as they differ only in whether or not the Issue they raise contains  $\neg p$ . That radical will give rise to no other discourse move minimal pairs: rising declaratives and falling polar interrogatives differ not only in the Issue they raise but also in the alterations they make to the speaker's commitments, as do rising polar interrogatives and falling declaratives, and falling polar interrogatives and falling declaratives; the difference between rising polar interrogatives and falling polar interrogatives is not in terms of whether or not they commit the speaker to  $p$ , but in whether or not they commit the speaker to  $W$ .

The two discourse move minimal pairs associated with any  $p$ -denoting sentence radical, and the dimensions along which the pairmates vary, are diagrammed below:



I assume that members of discourse move minimal pairs are in pragmatic competition with each other, cashed out as follows:

- (51) DISCOURSE MOVE MINIMAL PAIRS IN COMPETITION:  
 For any move  $m$  comprising an utterance by speaker  $sp$  in context  $c$ , if  $m$  is a member of a discourse move minimal pair  $\langle m, m' \rangle$ ,  $m$  is cooperative iff it would have been uncooperative for  $sp$  to make move  $m'$  in  $c$ .<sup>18</sup>

In §5.4.3 and §5.4.4, I argue that the bias profile of rising declaratives is derived from pragmatic competition with their two discourse move minimal pairs. First, a quick note on the basic pragmatics of rising declaratives, independent of the effects of competition with their discourse move minimal pairs.

#### 5.4.2 The basic pragmatics of RDs

Uttering a rising declarative adds nothing to the speaker's commitments, and places  $\{p\}$  on the Table, resulting in the Projected Set  $\{CG + p\}$ . Given the Gricean assumptions put forward in §4.3, we get the following two pieces of the pragmatics of uttering a rising declarative, without needing us to consider competition with any alternative utterances. First, the proposition  $p$  must be relevant to the current conversation in the sense given in (35), otherwise it would not be cooperative to add  $\{p\}$  to the Table. Second,  $p$  must not be incompatible with any interlocutor's discourse commitments, and the speaker must not have reason to believe it's incompatible with any interlocutor's private beliefs, as per the application of QUALITY 1 and 2 to the Projected Set (38). If either of these conditions are not met, then the utterance is not cooperative.

With this basic pragmatics in place, we can now turn to accounting for the bias associated with rising declaratives. I argue that the biasedness of rising declaratives has two sources,

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<sup>18</sup>Note that §3.1 and §3.2 contain examples in which rising declaratives, falling declaratives, and polar interrogatives are all used in the same context. This might *prima facie* suggest that it's incorrect to say that these three moves are never cooperative in the same context as each other. I believe that to conclude this is a mistake. The information given at the beginning of these examples does not fully determine a context; rather, it sets some constraints on a space of possible contexts. Take (7), for instance. The context does not specify how strong an inference to the truth of  $p$  Alvin has made on the basis of his evidence, or how sure he is that Bertha knows the latest news about Carrie. On the view I suggest here, the falling declarative is felicitous if Alvin's reaction to the evidence is to conclude that  $p$  is true; the rising declarative is felicitous if Alvin has concluded that  $p$  is likely, and suspects that Bertha will know if it's true; and the polar interrogative is felicitous if Alvin has not made either conclusion. All three contexts are compatible with the prompt given; Alvin's choice of utterance in a context meeting the indicated specification gives us information about what inferences he has derived from the evidence available to him.

one associated with each discourse move minimal pair that rising declaratives are a member of. Recall that rising declaratives comprise a discourse move minimal pair with falling declaratives, from which they differ only with respect to whether or not the speaker commits to  $p$ —in order for the choice of a rising declarative over a falling declarative to be justified, that commitment must be uncooperative; rising declaratives also comprise a discourse move minimal pair with rising polar interrogatives, from which they differ only with respect to whether or not the Issue they raise contains  $\neg p$ , and thereby with respect to whether or not they project a Common Ground containing  $\neg p$ —in order for the choice of a rising declarative over a rising polar interrogative to be justified, projecting that Common Ground must be uncooperative. In the rest of this section, I work through how this reasoning derives the bias of rising declaratives.

### 5.4.3 Accounting for addressee bias

Rising declaratives comprise a discourse move minimal pair with both falling declaratives and rising polar interrogatives. In this section, I discuss the latter discourse move minimal pair, and argue that it accounts for the addressee-oriented bias associated with utterances of rising declaratives denoting  $p$ : that such utterances are only felicitous when the speaker has reason to suspect that the addressee believes  $p$ .

Recall that making a discourse move that is a member of a discourse move minimal pair is only cooperative if making the other move in the pair would’ve been uncooperative. Because, by definition, discourse move minimal pairs differ in exactly one respect from one another, the source of the uncooperativity of the observed discourse move’s pairmate is easy to pin down.

In the case of rising declaratives vs. rising polar interrogatives, that one minimal difference is in whether or not the Issue raised by the move contains  $\neg p$ . Both moves raise an Issue containing  $p$ ; the rising declarative raises the singleton Issue  $\{p\}$ , whereas the rising polar interrogative raises the Issue  $\{p, \neg p\}$ . So if the rising declarative is cooperative, but the rising polar interrogative isn’t, the only potential source for that contrast is the presence of  $\neg p$  in the Issue raised by the rising polar interrogative: it must be that it would have been uncooperative for the speaker to add an Issue containing  $\neg p$  to the Table, and thereby add  $CG + \neg p$  to the projected set. In other words, that projected Common Ground must violate either QUANTITY or QUALITY, in the sense given in (38) and (39).<sup>19</sup>

The explanation for the uncooperativity of the rising polar interrogative cannot possibly be that it violates the maxim of QUANTITY: it does *better* than the rising declarative, as it projects two Common Grounds, instead of one. So it must be that to project that additional

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<sup>19</sup>I assume that there is no distinction in terms of how the two moves fare with respect to the maxim of *RELATION*—presumably, if resolving the Issue  $\{p\}$  is relevant to the current conversation, then so is resolving the Issue  $\{p, \neg p\}$ . I also assume that rising declaratives and rising polar interrogatives are equally mannerly. Neither is particularly more ambiguous or obscure than the other, and certainly the distinction between a rising declarative and a polar interrogative does not resemble Grice’s (1975) distinction between “Miss X sang *Home sweet home*.” and “Miss X produced a series of sounds that corresponded closely with the score of *Home sweet home*.” (p.55, ex.3).



$\neg p$ -incorporating Common Ground would violate the maxim of QUALITY. That means that either some interlocutor has already made a commitment entailing  $p$  (projecting  $CG + \neg p$  would violate QUALITY 1), or the speaker has reason to believe that some interlocutor's private beliefs entail  $p$ , such that they won't allow  $\neg p$  to become Common Ground (projecting  $CG + \neg p$  would violate QUALITY 2). Note as well that the speaker has chosen an utterance that does not commit themselves to  $p$ , so it cannot be their own belief that is preventing  $\neg p$  from becoming Common Ground; if they believed  $p$ , it would be uncooperative of them to have avoided making a commitment to it, as will be discussed in more detail in the following section. Therefore, it must be that an addressee has made a public commitment entailing  $p$ , or that the speaker has reason to believe that the addressee's private beliefs will prevent them from allowing  $p$  to become Common Ground.

What we see here has the profile of a standard quantity implicature (e.g. [Geurts 2010](#)): the rising polar interrogative fares better on the maxim of QUANTITY (it projects twice as many hypothetical Common Grounds), and yet it was not chosen. We therefore derive the inference that to have chosen it would have violated the maxim of QUALITY. Though the application of this reasoning is made to the content of the Projected Set, which is not how we're used to thinking about it, the reasoning is the same as it is in deriving, for instance, the exclusivity implicature of *or* ([Gazdar 1979](#)).

Putting together the pieces we've discussed so far, when a speaker utters a rising declarative, they solicit addressee response about whether  $p$  is true, and indicate that they suspect the addressee will say that it is. It is not yet apparent why rising declaratives are associated with inferences about the speaker's epistemic bias—or why those inferences are sometimes positive and sometimes negative. In the next section, I argue that these inferences come from competition between rising declaratives and falling declaratives: the other discourse move minimal pair that rising declaratives are a member of.

#### 5.4.4 Accounting for speaker bias

Rising declaratives are members of a discourse move minimal pair with falling declaratives. Therefore, the use of a rising declarative is only cooperative if the corresponding falling declarative would've been uncooperative. The two moves differ only with respect to whether they commit the speaker to  $p$ . So if a rising declarative is cooperative, but a falling declarative would have been uncooperative, it must be that it would've been uncooperative for the speaker to commit to  $p$ . The Issue raised by both utterances is the same, and so the maxim of RELATION cannot be the explanation for that uncooperativity; I assume that the two utterances are equivalently mannerly. That leaves us, again, with QUANTITY and QUALITY. And again, QUANTITY will not be our explanation: the falling declarative makes more commitments of the speaker than the rising declarative does, so by the maxim of QUANTITY we should prefer it, all else being equal. Since the speaker has chosen a less informative form, and signaled that its more informative pairmate would have been uncooperative, it must be that the more informative pairmate would've violated QUALITY.

As defined in (36) and (37), there are two ways that a speaker commitment can violate



QUALITY: it could be that the commitment is to a proposition that the speaker knows to be false; it could also be that the commitment is to a proposition that the speaker doesn't have sufficient evidence for, whether they suspect it's true or not. If we conclude that QUALITY 1 has been violated, only a negative bias interpretation is available. But a positive bias interpretation is compatible with violation of QUALITY 2. In other words, the utterance of an RD does not intrinsically signal speaker bias—any inference to the speaker's degree of credence in  $p$  short of full commitment is compatible with such an utterance.

In all cases, a rising declarative solicits addressee response about whether  $p$  is true, and signals an expectation that they'll say it is, as outlined at the end of the previous section. Our inferences about whether QUALITY 1 or QUALITY 2 is the relevant maxim that would've been violated by the utterance of a falling declarative will be guided by our inferences about the speaker's reasons for soliciting that commitment.

There are multiple reasons why the speaker might solicit addressee commitment to  $p$ . It might be that the speaker suspects that  $p$  is true, and is willing to commit to  $p$  as long as the addressee does so first, perhaps because the addressee is better informed than the speaker about whether  $p$  is true. In a context that suggests that the speaker has this motive, we would generate the inference that though the falling declarative would've violated QUALITY 2 (the speaker does not have sufficient evidence for  $p$  to commit to it), they do have positive epistemic bias toward  $p$ .

Consider for example this case in which positive epistemic bias is inferred, originally discussed in §3.3.1:

- (52) *[Context: The ship's captain is consulting with the android who maintains the ship about the logistics of their colonization voyage. The captain says:]*  
We have, what, eight more recharge cycles to go before we get to Origae-6?

In (52), the addressee is extremely knowledgeable about how many recharge cycles remain before the ship reaches its destination, and so it is sensible to assume that the speaker will go along with the addressee's answer. The speaker uses a form that predicts that the addressee will commit to  $p$ , and the context suggests that she is willing to take the addressee's word for it, so we can infer that the speaker has positive epistemic bias toward  $p$ . In other words, she is not sure enough that  $p$  is true to be confident in asserting it (to assert  $p$  would violate QUALITY 2), but she is more than willing to believe that  $p$  is true (to assert  $p$  would not violate QUALITY 1).

Now consider this case in which negative epistemic bias is inferred, originally discussed in §3.3.2:

- (53) *[Context: A student is solving a math problem in front of the class.]*  
**Student:** The answer to this problem is 5 because the square root of 9 is 2 and 2 + 3 is 5.  
**Teacher:** The square root of 9 is 2?

In (53), the speaker is extremely knowledgeable about basic arithmetic, and so it is not

plausible that they do not know for sure whether or not  $p$  is true, making a QUALITY 2 interpretation of the uncooperativity of committing to  $p$  unavailable. Rather, the reason why it would've been uncooperative for them to commit to  $p$  must be QUALITY 1: that they know  $p$  to be false. This explains the inference of negative speaker epistemic bias in this case.

In positive epistemic bias cases, we infer that the speaker's motivation for soliciting addressee commitment to  $p$  is so that they can double-check that  $p$  is true with their better-informed addressee before they are willing to make a commitment themselves (Gunlogson 2008). This is clearly not what is going on in (53). In contexts like this, the speaker is choosing to solicit addressee commitment to  $p$  because they want to provoke a disagreement over whether  $p$  is true. They infer that their addressee believes  $p$ , though they themselves do not, and so they solicit addressee commitment to  $p$  so that they can respond to it with disagreement, or at least make clear, by virtue of their lack of commitment, that they do not agree.

In these contexts, we conclude that the speaker has chosen to project a *CG* that is incompatible with their own beliefs. In other words, the contexts in which we see negative bias inferences associated with rising declaratives are adversarial ones. Specifically, they are adversarial contexts characterized by speaker pretense, as defined in §4.3.3. That speaker pretense (a form of uncooperativity) is required to generate a negative bias interpretation explains why such cases are felt by some observers to be marked (Westera 2017).

Because the account here does not hard-code any speaker epistemic bias into the conventional discourse effect of rising declaratives, it is flexible enough to accommodate for the full spectrum of previously discussed epistemic biases, unifying what are *prima facie* mutually contradictory generalizations. What underlies all inferences to the speaker's epistemic bias is that they must have some reason to avoid committing to  $p$ . What the context allows us to infer that reason is will make the difference between positive bias and negative bias. Negative bias cases are in some sense less canonical than positive bias cases because they require us to assume speaker pretense.

## 6 Utterance Modifier vs. Semantic Operator

The analysis of rising declaratives that I've given here is predicated upon the idea that the contribution of L\* H-H% to the meaning of an utterance it accompanies is on the level of the discourse move, by modulating whether or not the speaker makes a commitment, rather than on the level of the compositional semantic value of the sentence itself.

This approach is suggested (as one of several theoretically plausible approaches to how to model the contribution of intonation compositionally) by Paul Portner like so: "... sentence mood and intonation specify two separate dimensions of discourse function, with the ultimate force of the utterance being a combination of the two." (Portner 2018, p.22)

Previous approaches to RDs have been heterogenous in what assumptions they make about the role intonation plays in making RDs behave like RDs. Gunlogson (2001), Truckenbrodt

(2006), and Westera (2017) have made assumptions comparable to mine; others have been agnostic about what intonation is contributing, defining the discourse update carried out by a rising declarative as a *sui generis* construction-specific effect, not in terms of the contribution of declarative form and the contribution of rising intonation (Krifka 2015, Malamud & Stephenson 2015, Jeong 2018). Farkas & Roelofsen (2017) stand as a notable exception within the landscape of recent work on the topic, proposing that intonational contours affect the semantic content of a sentence, (potentially) changing what it denotes.

On their account of rising intonation, it contributes an operator that takes a denotation and adds to it the complement of its informative content, which when applied to the denotation of a declarative sentence returns the corresponding polar interrogative denotation. To explain the special properties of rising declaratives that distinguish them from polar interrogatives, Farkas & Roelofsen appeal to the idea that marked forms acquire extra discourse effects, and assign to RDs an additional discourse effect that they communicate information about the speaker’s evidence-based epistemic preference for  $p$  over  $\neg p$ .

Farkas & Roelofsen offer two main empirical arguments in favor of the view that RDs have the same denotation as polar interrogatives, rather than having the same denotation as falling declaratives. As I’ve taken the latter view, I answer those two arguments in this section. The first argument has to do with the effect of intonation on disjunctive questions; in §6.1 I show that my proposal delivers the same result as theirs. The second argument has to do with the use of RDs as quotative complements of rogative verbs; in §6.2, I show that my proposal can handle those facts, and may even fare better with respect to them than Farkas & Roelofsen’s.

## 6.1 Rising and falling disjunctive questions

Roelofsen & Farkas (2015) observe that there is an intuitive difference in the behavior of disjunctive questions with rising and falling intonation.

- (54) a. Does she speak English, or French.  
b. Does she speak English, or French?

If the disjunctive interrogative has a final fall, as in (54a), the question is interpreted as communicating that she must speak at least one of the two languages. No such inference accompanies disjunctive interrogatives with a final rise, as in (54b)—in this case, one does not get the sense that the speaker believes that she must speak at least one of the two languages.

Farkas & Roelofsen (2017) give an account of this fact along the following lines, simplifying for rhetorical expediency: the denotation of a disjunctive interrogative whose disjuncts denote  $p$  and  $q$  is the set  $\{p, q\}$ . Rising intonation provides a function that takes as its argument the denotation of the sentence it accompanies, and returns a new set of propositions that includes the complement of the informative content of the original denotation:

- (55)  $\lambda P_{(st)t}. P + \overline{UP}$

Because it is not accompanied by rising intonation, (54a) will simply denote  $\{p, q\}$ —that is to say, the utterance projects only a *CG* incorporating the proposition *She speaks English* and a *CG* incorporating the proposition *She speaks French*. However, because it is accompanied by rising intonation, (54b) will denote  $\{p, q, \neg(p \vee q)\}$ —that is to say, in addition to the two *CG*s projected by its falling counterpart, it also projects a *CG* incorporating the proposition *She speaks neither English nor French*, explaining the relevant contrast between the two sentences.

The proposal at hand derives the same contrast, but in terms of speaker commitment, not in terms of projection.

I'll assume, with Roelofsen & Farkas (2015), that the denotation of a disjunctive interrogative whose disjuncts denote  $p$  and  $q$  is  $\{p, q\}$ . When not accompanied by rising intonation, the speaker places that denotation on the Table, and also commits herself to its informative content—that is, to  $p \cup q$ . In other words, with falling intonation, the speaker commits herself to the actual world being a member of one or the other (or perhaps both) of those propositions. However, if accompanied by rising intonation, the speaker makes no commitment by virtue of her utterance. She raises the Issue  $\{p, q\}$  and elicits addressee response, but does not make any commitment that rules out the possibility of the actual world being a member of neither proposition. The two utterances (54a) and (54b) differ only with respect to whether or not they commit the speaker to  $p \cup q$ , and so one can infer by the line of pragmatic reasoning described in the previous section that when a speaker utters (54b), it would not be cooperative for them to make that commitment—that they aren't sure that  $p \cup q$  is true. Therefore, the account at hand predicts the observed asymmetry.

## 6.2 RDs as quotative complements

The other empirical argument that Farkas & Roelofsen (2017) offer in favor of treating English intonational contours as contributing semantic operators that potentially alter the denotation of a sentence comes from the possibility for RDs to appear as complements of verbs that select for interrogatives.

Consider the following, modeled on Farkas & Roelofsen's example 44c and surrounding discussion:<sup>20</sup>

- (56) a. 'Amalia left?', she {wondered,asked}.
- b. She {wondered,asked}, 'Amalia left?'

Because the verbs *wonder* and *ask* are ROGATIVE, that is, they only select clausal complements that denote questions (Lahiri 2002 a.o.), Farkas & Roelofsen (2017) take the facts in (56) to show that RDs must denote questions, in order for them to be acceptable arguments to rogative verbs. I do not believe that this conclusion follows. To see why not, first note that such sentences are only possible if the rising declarative is a direct quote. These complements

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<sup>20</sup>Farkas & Roelofsen (2017) only discuss cases in which the RD is preposed, but the facts shake out the same when the RD follows the verb.

bear the hallmarks of direct quotation, as can be seen by considering the interpretation of indexicals that appear within them:

- (57) [*Context: Alvin is talking to Bertha about a conversation he had with Cynthia.*]
- a. **A**: Then Cynthia asked me, ‘You’re married?’  
     You = **A**: ✓                      You = **B**: #
  - b. **A**: Then Cynthia asked me, ‘Are you married?’  
     You = **A**: ✓                      You = **B**: #
  - c. **A**: Then Cynthia asked me if you’re married.  
     You = **A**: #                      You = **B**: ✓

Consider the case in (57a). In this case, **A** is the speaker, and **B** is the addressee, but **A** is reporting an utterance in which he himself was the addressee. We see that the referent of a second-person pronoun in the rising declarative complement of *ask* can only be interpreted as referring to **A**, and cannot be interpreted as referring to **B**, despite the fact that **B** is the addressee. Indexicals within the rising declarative are mandatorily interpreted relative to the context of the reported utterance, in which **A** was the addressee, and cannot be interpreted relative to the current speech context, in which **B** is the addressee. This is the hallmark of the behavior of indexicals in direct quotes (Sharvit 2008 a.o.). And indeed we see the same pattern in (57b), which we know must be a direct quote because of the lack of a complementizer and the presence of syntactic inversion. When we look at the case of an interrogative clausal complement in (57c), which we can tell is not a direct quote because of the presence of a complementizer and the lack of syntactic inversion, we see the opposite pattern: the second-person pronoun can only refer to the addressee in the current speech context, not to the addressee in the reported speech context.

In other words, it’s not quite accurate to say that the observation in (56) shows that rising declaratives can be clausal complements of verbs like *ask* and *wonder* in the same way that interrogatives can. Rather, the facts in (57) suggest that whereas true interrogatives can be either clausal complements or quotative complements of such verbs, rising declaratives are only able to be their quotative complements.

In order to make sense of this asymmetry, I propose a modification of Lahiri’s (2002) account of *ask*, on which view it comes in a quotative flavor and a question-embedding flavor.

Lahiri proposes that quotations are elements of a distinct semantic type; I’ll call that type *quotation*, and assign it the semantic type  $q$ .<sup>21</sup> Rogative speech-act verbs like *act* come in a version that selects for a complement of type  $q$  in addition to a more familiar version that selects for the denotation of an interrogative clause (here abstracted over with the variable  $Q$ ). I propose the following denotations for these two flavors of *ask*, modeled on Lahiri’s ex. 96, p. 282:<sup>22</sup>

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<sup>21</sup>Lahiri calls this semantic type *utterance*; I’ve changed the terminology because I’m using the term *utterance* to refer to a function from contexts to contexts.

<sup>22</sup>I’ve followed Lahiri’s denotations closely, but updated them to reflect in more detail the assumptions about utterances as functions from contexts to contexts developed in this paper. I’ve also suppressed reference to the addressee argument, for readability.

$$(58) \quad \llbracket ask_1 \rrbracket = \lambda q. \lambda x. [\exists u : sp(u) = x \wedge s(u) = q] QU(u)$$

$$(59) \quad \llbracket ask_2 \rrbracket = \lambda Q. \lambda x. [\exists u : sp(u) = x \wedge \llbracket s(u) \rrbracket^{c(u)} = Q] QU(u)$$

Recall that an utterance is a function  $u : \langle s, sp, c_n \rangle \rightarrow c_{n+1}$ .  $s(u)$  is the sentence argument to  $u$ ,  $sp(u)$  is the speaker argument to  $u$ , and  $c(u)$  is the context argument to  $u$ .

In each flavor, a sentence with the verb *ask* is true iff there exists an utterance whose speaker is *ask*'s subject, and that utterance is a member of the predicate *QU* (which I'll define momentarily). The quotative flavor additionally specifies that that utterance was an utterance of the quoted sentence; the rogative clause-embedding version additionally specifies that that clause denotes the same thing as the uttered sentence. In other words, both flavors say that their subject made an utterance that had the property *QU*, and that their clausal complement bears a relation of identity to the uttered sentence; they differ only in whether the relevant sort of identity is lexico-syntactic (*ask<sub>1</sub>*) or denotational (*ask<sub>2</sub>*).

The observation we're trying to capture is that rising declaratives can be arguments of *ask<sub>1</sub>*, but they cannot be arguments of *ask<sub>2</sub>*. I'll propose a meaning for *QU* that captures this distinction. Lahiri assigns to *QU* the meaning that an utterance was of a sentence that denotes a question. However, this predicts that any sentence that could be an argument to *ask<sub>1</sub>* could also be an argument to *ask<sub>2</sub>*, leaving us unable to account for the asymmetry at hand. I'll propose something different, making use of the formal machinery of utterances as mappings from contexts to contexts made use of in this paper. Recall that in the Table model, we can define a class of utterances that elicit addressee response in a specific way: by raising an Issue without making a commitment that could resolve it. I propose that *QU* denotes exactly this property of an utterance:<sup>23</sup>

$$(60) \quad \text{For any } u \text{ whose speaker is } sp \text{ and whose output is a context } c_o, \\ QU(u) = 1 \text{ iff } [\neg \exists p : p \in DC_{sp,o}]([\exists q : q \in \text{MAX}(T_o)]p \cap CS_o \subseteq q)$$

Informally: an utterance is a member of the predicate *QU* if the context it outputs is one in which the speaker has raised an issue without making a commitment that could resolve it. This predicate is true both of utterances of rising declaratives, and of utterances of polar interrogatives, explaining why both kinds of sentences can be arguments to *ask<sub>1</sub>*. However, rising declaratives do not denote questions, explaining why they cannot be arguments of *ask<sub>2</sub>*.

My argument in this section is this: [Farkas & Roelofsen](#)'s original observation that rising declaratives can be arguments of rogative speech act verbs does not actually provide an argument in favor of their denoting questions. Rather, the proposal that they do not denote questions allows us to make sense of the fact that they are only allowed to be arguments of such verbs if they are being directly quoted. That rising declaratives can only be interpreted quotatively when they are the complement of rogative speech act verbs is not predicted on a

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<sup>23</sup>Note that there are of course many other ways one can elicit addressee response: with an imperative like *Tell me what's on your mind*, or even by shooting someone a look. These elicit addressee response by means other than raising an Issue without making a commitment that could resolve it, and so they do not fall under the generalization at hand.



view in which rising declaratives share a denotation with polar interrogatives—such a view does not predict a distinction between embeddability under  $ask_1$  vs. embeddability under  $ask_2$ .

It’s worth noting that utterances of rising declaratives can be described with the word *question*. Recall the following example, familiar by now from §3:

- (61) *[Context: The ship’s captain is consulting with the android who maintains the ship about the logistics of their colonization voyage. The captain says:]*  
We have, what, eight more recharge cycles to go before we get to Origae-6?

In the film *Alien: Covenant*, this dialogue continues like so:

- (62) **Android:** Is that a question sir?  
**Captain:** Yes, that’s a question.

The proposal above gives us a ready explanation for this fact:

- (63)  $\llbracket question \rrbracket = \lambda u. QU(u)$

The word *question* simply predicates of an utterance that it elicited addressee response by way of raising an Issue without making a commitment to resolve it.

## 7 Conclusion

In this paper, I’ve proposed an account of the discourse effect of the L\* H-H% tune, namely that it calls off speaker commitments, and argued that, given some Gricean assumptions about the pragmatics of the Table model, the proposal derives the observed discourse behavior of rising declaratives. I’ve proposed that the inferences about speaker- and addressee-oriented bias that are associated with such utterances are not a part of their conventional effect, but rather stem from pragmatic reasoning.

The proposal that I’ve made is English-specific. There is no reason to suspect that rising intonation has the same discourse effect cross-linguistically, any more so than there is to assume that the string of phonemes /kæt/ has the same meaning cross-linguistically. That said, some languages may well use intonation in a comparable way. And there is no reason to suppose that a language that provides a way for speakers to call off commitment must do so via intonation. The meaning that I’ve associated with L\* H-H% in English is comparable to meanings proposed for discourse particles in other languages (see e.g. [Rojas-Esponda 2014](#), [Kraus 2018](#) a.o.). It’s an interesting question for future research to what extent there is cross-linguistic uniformity in the effect of rising intonation, and to what extent meanings associated with intonational tunes in some languages are associated with particles in others.

I’ve taken a compositional approach to the account of rising declaratives, in which the discourse effect of a sentence accompanied by rising intonation is determined by the standard



discourse effect of an utterance of a sentence of that type, modified by the discourse effect of rising intonation. One strength of this approach is that it makes predictions regarding a range of constructions broader than just rising declaratives. In this paper I’ve shown that the proposal derives Farkas & Bruce’s (2010) questioning act as the discourse effect of utterances of interrogative sentences accompanied by L\* H-H%, and shown that this account predicts the observed asymmetry between disjunctive questions uttered with rising intonation and with falling intonation. But the predictions this account makes are broader than the discourse behavior of rising and falling declaratives and interrogatives. As observed by Portner (2018), English imperatives can also be accompanied by rising intonation:

(64) Have a seat?

Extending this paper’s proposal to utterances of imperatives requires a model of utterances of imperative sentences that decomposes them into commitment, Issue-raising, and projection along the same lines of Farkas & Bruce’s decomposition of assertions and questions. Developing such an extension is outside of the scope of this paper, but see Portner (2018) and Rudin (2018a, 2018b) for recent proposals.

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