Everything that rises must converge: Toward a unified account of inquisitive and assertive rising declaratives*

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Abstract

In English, matrix declaratives with a final rising intonation typical of polar questions are frequently used as a kind of biased question: they can only be used when there is contextual evidence in favor of the proposition denoted by the declarative. However, not all rising declaratives are used to pose a question about their content—some are used to assert the content of the declarative, while raising a second issue. In this paper, I offer a unified account of rising declaratives that seeks to explain both of these kinds of uses while positing unitary meanings for clause types and intonations. This goal cannot be achieved if we take the illocutionary force of an utterance to be completely determined by clause type and intonation, as many recent accounts have done. Instead, I propose that clause type and intonation merely constrain what a speaker could intend to do with them; pragmatic inference must play a key role in enabling an audience to uncover the speaker's illocutionary intention. In other words, there can be no hard and fast conventional discourse effects tied to particular clause type + intonation pairings. I demonstrate that the proposed account enables a derivation of assertive force, and comparisons to other recent accounts are made.

1 Introduction

Consider the following classic examples demonstrating the use of rising declaratives (RDs) to ask biased questions:[1]

*h/t Flannery O'Connor. This draft is under review for inclusion in a collected volume. Comments welcome: dgoodhue@umd.edu. 10,760 words, ~63,000 characters. Acknowledgments to be added.

[1]I use '↗' to represent the utterance final rising intonation typical of polar questions in English, usually transcribed in ToBI as L* H-H% (Pierrehumbert & Hirschberg, 1990), but see below for further discussion.

(1) S is in her office. A has just arrived holding a wet umbrella and raincoat.

a. S: Hey! It's raining↗

b. S: Hey! Is it raining↗ (based on Gunlogson 2003, 96)

Intuitively, both the RD in (1a) and the polar interrogative in (1b) are felicitous means of asking whether it is raining in the context of (1). Contrast this with (2):

(2) S is in her office. A has just arrived, and exhibits no evidence whatsoever about the weather outside.

a. S: # Hey! It's raining↗

b. S: Hey! Is it raining↗ (based on Gunlogson 2003, 95)

The context of (2) removes the evidence for rain in the form of A's wet umbrella and rain coat. Intuitively, the RD in (2a) is no longer felicitous, while the polar interrogative in (2b) is just fine. In prior work, examples like these establish (3) as a robust generalization about RDs (see e.g. Beun, 2000; Gunlogson, 2003, 2008; Truckenbrodt, 2006, 2012; Trinh & Crnič, 2011; Malamud & Stephenson, 2015; Farkas & Roelofsen, 2017; Krifka, 2017; Westera, 2017, 2018; Jeong, 2018; Rudin, 2018).

(3) (Inquisitive) rising declaratives are felicitous only if there is contextual evidence in favor of the content of the declarative clause.

What we learn from such RDs is that declaratives are not reserved for assertions; with a particular rising intonation, declaratives can be used to ask a biased question.

However, biased questions are not the only use for rising declaratives. RDs can also be used to assert. Consider the RDs in (4) and (5), which are used by S to assert their propositional content.[2]

[2]Ward & Hirschberg (1985) introduced (4) as an example of the rise-fall-rise contour (L*+H L-H%), which is distinct from the contour used in RDs. Nevertheless, L* H-H% is also felicitous in (4), though probably not preferred. On the other hand, (5) and other examples of assertive RDs below are not felicitous with rise-fall-rise.

(4) A: Do you speak Spanish?
S: I speak Ladino↗
(Jeong 2018, Farkas & Roelofsen 2017, based on Ward & Hirschberg 1985)

(5) A: What are you eating?
S: This is a persimmon↗

Besides asserting their content, (4) and (5) also seem to raise a second issue. In (4) this is something like "Is Ladino close enough to Spanish for your purposes?", while in (5) this is something like "Is that enough information?" or "Have you heard of persimmons before?". The existence of such assertive uses of RDs has been discussed in the sociolinguistics literature under the labels *uptalk* and *high rising terminals* (e.g. McLemore, 1991; Fletcher et al., 2005; Ladd, 2008; Shokeir, 2008, a.o.). The semantics/pragmatics literature cited above has either ignored assertive RDs, acknowledged them and set them aside, or tried to account for them separately from inquisitive RDs. These moves have been justified by the claim that there are two distinct rising contours, one used in inquisitive RDs, the other in assertive RDs. The idea is that each contour makes a distinct contribution to meaning resulting in the distinct inquisitive and assertive illocutionary forces observed. In section 2, I will demonstrate that the purported evidence for this intonational distinction is weak, and I will argue from other evidence that the distinction does not exist at all.

As a result of this empirical evidence, as well as for reasons of theoretical parsimony, I will argue that it is preferable to develop a unified account in which there is only one relevant rising intonation with a single meaning attached to it that can explain its use in both inquisitive and assertive RDs, as well as in most matrix uses of polar interrogatives (see Hedberg et al. 2017 for evidence from one corpus that over 90% of American English polar interrogatives rise utterance finally, *pace* Geluykens 1988). Furthermore, we should expect a stable semantics for clause types. I will adopt the standard if not universal view that declaratives denote propositions while interrogatives denote sets of propositions (answer sets). But if there is a single relevant rise meaning, and a single denotation for declaratives, then clearly the combination of these two components cannot completely explain the variation in meaning we see across inquisitive and assertive rising

declaratives. In other words, intonation plus clause type cannot determine illocutionary force, contrary to the predictions of prior work such as Farkas & Roelofsen 2017 and Rudin 2018, which both claim that rising intonation combined with a declarative clause implies a lack of commitment to the content of the declarative, and therefore that the utterance is non-assertive.

The solution I will propose is to abandon the view that clause types, or clause type-intonation pairings, are specified with conventional discourse effects, and instead allow pragmatic inference to play a greater role in enabling the audience to uncover the illocutionary force intended by the speaker of an utterance. In other words, in order to simultaneously account for inquisitive and assertive rising declaratives, the contributions to illocutionary force made by clause type and intonation need to be weaker than hypothesized in the recent literature on rising declaratives.

After establishing my view of the relevant intonation in section 2, I will lay out the ingredients of the unified account in section 3, and apply them to the basic data in section 4. I will also briefly discuss rising imperatives in section 4.1 and incredulous uses of RDs in section 4.2. In section 5, I propose a formalized version of the account in section 3, and show how it can be used to derive assertive force, even in the case of falling declaratives. Finally, I briefly compare the account to prior work in section 6.1, and raise issues for future work in section 6.2.

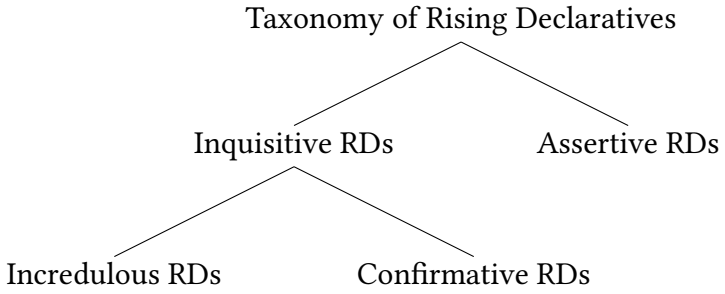
2 There is no formal distinction between inquisitive and assertive RDs

Hirschberg & Ward (1995) claim that assertive rising declaratives are distinguished intonationally by having a high rising contour, represented by H* H-H%, while the standard polar question contour is low rising, L* H-H%. It's clear from their discussion that the relevant intonational distinction is meant to be in the height of the nuclear pitch accent, with L* at the bottom of the speaker's range, while H* is in the middle (see further confirmation that the L*/H* distinction is intended to map onto a phonetic distinction in the height of F0 at the pitch accent in fig. 14.13 of Pierrehumbert & Hirschberg 1990, p. 281). Truckenbrodt (2012) builds on this distinction, provid-

ing an elegant account of the interpretational distinction that depends crucially on the phonological reality of the L*/H* distinction between these two contours. More recently, researchers have built on the claim that there is an intonational distinction while changing its characterization, claiming that the key distinction is one of steepness, with the low rising contour L* H-H% rising more steeply to a higher final boundary tone than the high rising contour H* H-H% (Jeong, 2018; Rudin, 2018; Westera, 2018). I believe that the latter is more empirically accurate: when there is an interpretationally relevant intonational distinction among rising declaratives, it is one of steepness due to differences in the height of the final boundary tone, not differences in the height of the pitch accent.[3]

Ultimately, though, the most important problem for the above views is that the intonational distinction, whatever its phonetic form and phonological representation, does not correlate with the split between inquisitive and assertive rising declaratives. In particular, shallower rises are perfectly felicitous with both inquisitive and assertive RDs. To see this, consider the following taxonomy of RDs (cf. the similar taxonomy in Jeong 2018).

(6)



Inquisitive RDs can be divided into two kinds: incredulous RDs and confirmative RDs. The example in (1a) could have been either incredulous or confirmative, depending on the speaker's amount of surprise at the evidence of rain. The key point is that the intonational steepness distinction tracks the split between incredulous and non-incredulous RDs, not the inquisitive/assertive split. In the following, I give a minimal triple that demonstrates this fact (taken from Goodhue 2021;

[3]It is possible in principle that the phonetic distinction in the height of the final boundary tone is due to a phonological distinction in the height of the nuclear pitch accent. However this interpretation of the mapping between phonology and phonetics is not only counterintuitive, it was clearly not the intention of the intonational phonologists who originally proposed these representations.

see this reference for further discussion). In (7), S utters the RD incredulously because they are shocked by A's claim that the girl is only nine.

(7) Incredulous (IRD)
S and A are watching a girl give a very professional performance in a school debate. S thinks that she must be at least 13 years old.
A: I can't believe she's only 9.
S: She's nine↗

In (8), S utters the RD confirmatively; they are not shocked that the girl is nine, they just want to double check that fact.

(8) Confirmative (IRD)
S and A are buying a birthday card for the daughter of A's friend. While searching for a card for the correct age, S thinks A told him previously that she just turned nine, but he wants to confirm it.
S: She's nine↗

In (9), S asserts that their daughter is nine, but doesn't know whether there is still room for kids in her age group.

(9) Assertive (ARD)
S wants to enroll his daughter in music lessons with A.
S: My daughter wants to study tuba.
A: Okay, but there are limited places for each age group, and some age groups have already filled up. How old is she?
S: She's nine↗

Intonationally, the incredulous RD in (7) stands apart in that it rises more steeply than (8) and (9). This can be seen in the three pitch tracks of my performances of these examples in figure 1. Table 1 provides the pitch minima and maxima for each example in each minimal triple.

The intonations in this minimal triple fail to follow the purported intonational distinction between inquisitive and assertive RDs. One kind of inquisitive RD, confirmatives, patterns with assertive RDs in having shallower rises, while another kind of inquisitive RD, incredulous ones,

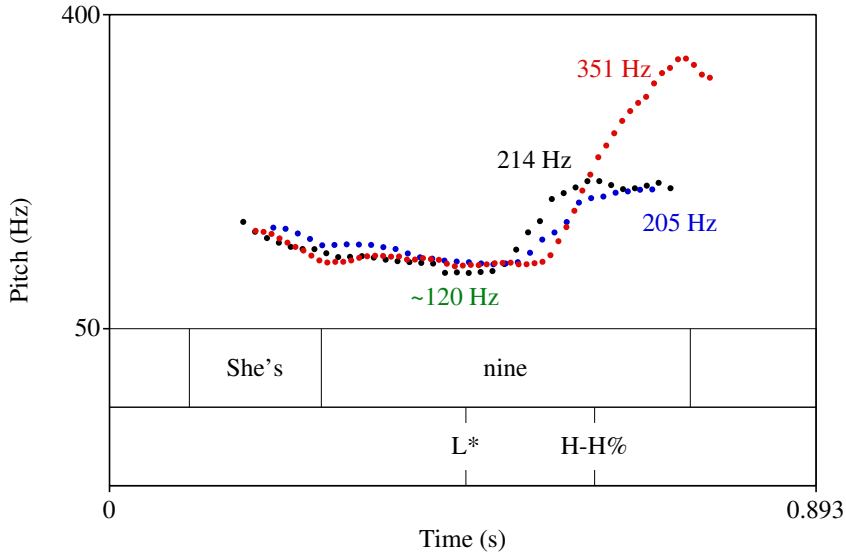


Figure 1: Pitch tracks for the incredulous (7) in red, the confirmative (8) in blue, and the assertive (9) in black, with the max Hz of final boundary tones listed, and the average Hz for the L* pitch accent in green. (Boersma & Weenink, 2020)

	Nuclear pitch accent	*Final boundary tone*
Incredulous RD in (7)	122 Hz	351 Hz
Confirmative RD in (8)	125 Hz	205 Hz
Assertive RD in (9)	115 Hz	214 Hz

Table 1: Pitch minima and maxima for each of the productions in fig. 1.

patterns alone in rising more steeply. This calls into question the idea that assertive RDs can be set aside on intonational grounds.[4]

I believe that the intonational distinction here is likely to be a paralinguistic one. On this view, all three sub-kinds of rising declaratives above have the same phonological intonation, best transcribed in ToBI as L* H-H%, and the higher boundary tone of incredulous rising declaratives is a paralinguistic effect, caused by increased emotional activation, as has been discussed

[4]Furthermore, the fact that the key distinction is in the height of the final boundary tones, not the nuclear pitch accents, poses a serious challenge for Hirschberg & Ward's (1995) and Truckenbrodt's (2012) interpretational accounts, which depend on the purported L*/H* distinction. For example, Truckenbrodt analyzes H* as signaling addition of a salient proposition to the common ground, while H- signals the questioning of a salient propositions (L* and L- are meaningless defaults). Thus L* H-H% questions the proposition uttered while H* H-H% asserts the proposition uttered while questioning a related salient proposition. This is a nice compositional account of inquisitive and assertive RDs that is nevertheless implausible because it depends on a dubious distinction in pitch accents.

by Gussenhoven (2004), Bänziger & Scherer (2005), and Westera (2017).[5] That said, I leave a final determination of whether incredulous polar question rises are a linguistic or paralinguistic phenomenon to future work, as the answer is not immediately relevant (see Ladd 2008, p. 124ff., for relevant discussion and pointers to the literature). What matters is that the intonational distinction, whatever causes it, does not track the inquisitive/assertive interpretational distinction, and this is what poses a challenge for prior work on RDs since it undermines the intonational motivation for setting assertive RDs aside as a distinct phenomenon.

As for H* H-H%, I tentatively assume that it does not contribute a different meaning from L* H-H%. Corpus evidence in Hedberg et al. 2017 shows that both contours are used in matrix polar interrogatives, and the experimental evidence based on corpus data in Nilsenovà 2006 demonstrates that both contours as well as L* L-H% significantly increase question interpretations of declarative clauses. My working assumption is that all three contours are part of a family contributing a single meaning that I will seek to characterize below. The '↗' symbol could be realized by any of these contours.[6]

The strongest empirical evidence to date in favor of the claim that inquisitive and assertive RDs feature different intonational contours is given by Jeong (2018, p. 320ff.), who runs experiments demonstrating that the steeper the rise is (determined by the height of the final boundary tone, *not* the nuclear pitch accent), the more likely participants are to arrive at an inquisitive interpretation. While these are interesting results, they only provide weak evidence for the claim that the two interpretations are distinguished categorically by two phonological tunes. The reason is that the unified view that I have just articulated can explain these results equally well: On the paralinguistic view, steepness implies emotional activation, and emotional activation correlates with incredulity (on an alternative linguistic view of the incredulity distinction, steepness

[5]One prediction of this view is that if the speaker is emotionally activated for reasons other than incredulity, then any kind of rising declarative should bear an intonation that rises to a higher boundary tone. Intuitively, this prediction may be borne out. For example, imagine that the speaker of (9) is very excited and hopeful that there is still room in the 9-year-olds' tuba class. However, experimental verification may be needed.

[6]If it turns out that these three contours do have different meanings, then my account below is for whichever is the standard polar question rise, likely L* H-H%. The only crucial intonational claim here is that there is no intonational distinction, including the L*/H* H-H% distinction, that tracks the inquisitive/assertive split.

would directly imply incredulity). Incredulity implies inquisitivity. Thus, when participants hear a steeper rise, they are more likely to infer an inquisitive interpretation. Shallower rises on the other hand are less emotionally activated, and thus non-incredulous, which is consistent with either an inquisitive (confirmative) interpretation or an assertive interpretation, which is borne out in Jeong's (2018) experimental results. This explanation has the added benefit of explaining why intonation has a gradient effect on interpretation across three steepnesses in these experiments: the steeper the rise, the more emotionally activated, and the more emotionally activated, the more likely to be incredulous, thus the more likely to be inquisitive. On the view that steepness signals a categorical distinction between two tunes correlating with inquisitive or assertive interpretations, we might expect to observe a categorical effect: above a certain threshold of steepness there is an inquisitive interpretation, below it an assertive interpretation.

Given the foregoing, I will assume on the grounds of both empirical evidence and theoretical parsimony that a unified account that posits only one relevant linguistic rise '↗' with one conventionally associated meaning is preferable to accounts that posit formal and semantic distinctions between assertive and inquisitive RDs.

3 The account (informal)

I will briefly consider and reject two ideas about the meaning contribution of the polar question rise (↗) before presenting my proposal. One straightforward idea is that ↗ means that the illocutionary force of the present act is a question. This hypothesis can be rejected right away, since ↗ is neither a necessary nor a sufficient condition on asking questions. Canonical constituent questions and non-canonical polar questions are successfully posed in the absence of ↗, and as we have see with assertive rising declaratives, assertions can be made with ↗.

Another idea that has been suggested is that ↗ conveys uncertainty. Nilsenovà (2006) pursues this idea, ultimately analyzing RDs as logically equivalent to an epistemic possibility statement, $\Diamond p$. As Trinh & Crnič (2011) point out, one challenge for this view is that it fails to predict em-

pirical asymmetries between RDs and *might p* statements. Another problem for the uncertainty view, regardless of the particular formalization, is that ↗ is felicitously used in polar questions even when the speaker is not uncertain of the answer, namely in exam questions.

Here is my proposal (a more formal implementation will be discussed in section 5, but first I will demonstrate the headway made by the core idea independently of its implementation):

(10) *Meaning contribution of the polar question rise '↗'*
↗ conveys that the speaker does not publicly commit to a proposition q that would help to settle an open question.

As a default, q is the content of the clause uttered itself (the content of the declarative, or the prejacent of a polar interrogative) because it is the easiest relevant proposition to identify. But q doesn't have to be identified with this overt content. In contexts in which the content of the clause uttered is an unlikely target for the speaker to convey lack of commitment about, the rise targets some other proposition.[7] But not just any proposition—one that is relevant to some open question. q must be relevant for the same reason that the propositional content p of the declarative or interrogative uttered must be relevant, namely a general pragmatic relevance requirement (Grice 1989, Roberts 1996/2012, among many others).

In contrast, I will treat the falling intonation typical of assertions of declaratives (H* L-L%, '↘') as a meaningless default. Alternatively, it could be taken to convey that the speaker commits to some proposition, however, I will argue that this is unnecessary by showing how assertive commitment can be derived rather than stipulated in section 5. An added advantage to this approach is that it helps to explain why the same falling contour is felicitous with three very different speech acts—assertions, constituent questions, and imperative commands/requests—since the falling contour makes no meaning contribution at all. Another benefit is that we are not forced into an empirically inadequate dichotomy. For example, suppose we were to analyze falling vs. rising intonation as manipulating whether the present utterance commits the speaker to its

[7] Cf. Bartels (1999), Truckenbrodt (2012), and Westera (2017) who make similar moves that differ in their details.

propositional content or not respectively.[8] The problem is that there are many other contour shapes besides these two. How do they fit into the landscape of pragmatics with respect to commitment? To take just one example, the rise-fall-rise contour (L*+H L-H%) is a well-studied rising contour that is used in assertions that commit the speaker to the declarative content. Do we need to make a list of contours that speakers use to make commitments? The result would be that commitment would be the elsewhere case, suggesting that commitment should not be baked into lexical meanings for contours at all. Treating ↘ as a meaningless default and deriving assertive commitment pragmatically resolves this issue.

Following Stalnaker (1978), Lewis (1979), Roberts (1996/2012), Farkas & Bruce (2010), and others, I assume conversation is a cooperative effort to increase knowledge of the way the world is. This is pursued by asking questions and asserting answers. Both questions and assertions put their content onto a stack of issues to be addressed, the discourse table. When the interlocutors agree to mutually commit to the truth of a proposition in an issue on the table, that proposition is added to a common ground of publicly mutually believed propositions. The more propositions in the common ground, the fewer ways the world might be and the more the interlocutors know about the world. Thus, adding and removing issues from the table is the means by which the purpose of conversation is achieved.

Given this view of the goal of conversation and how it functions, I assume that there is an ever present pressure in conversations:

(11) *Support requirement*
Whenever there is an open issue on the table, there is pressure for some interlocutor or other to commit to a proposition in that issue.

Once someone fulfills this support requirement, other interlocutors can agree with the commitment made, thus resolving that issue and adding the proposition to the common ground. (11) will help to explain both why questions usually signal the desire for a response, and why assertions

[8] Cf. Rudin 2018 for an example along these lines. Rudin (2022) revises the analysis so that commitment is built into all utterances (within a certain domain), and ↗ cancels that commitment.

commit the speaker to their propositional content.

4 Application to basic data

Recall (8) and (9):

(8) Confirmative RD
S and A are buying a birthday card for the daughter of A's friend. While searching for a card for the correct age, S thinks A told him previously that she just turned nine, but he wants to confirm it.
S: She's nine↗

(9) Assertive RD
S wants to enroll his daughter in music lessons with A.
S: My daughter wants to study tuba.
A: Okay, but there are limited places for each age group, and some age groups have already filled up. How old is she?
S: She's nine↗

(8) is used by S to ask A whether the proposition *that she is nine* is true, while (9) is used by S to commit to that proposition. Beyond that, there are some additional effects: (8) conveys some bias toward the proposition, while (9) raises a second issue. The goal is to have unitary meanings for clause types and for ↗. Given the distinct global meaning effects of (8) and (9), clearly these examples cannot be explained by the combination of the semantics of these component parts alone. The solution, I argue, is to allow pragmatic inference to play a key role in enabling the audience to uncover the speaker's intended speech act in uttering a rising declarative.

Starting with (8): I proposed in section 3 that ↗ conveys that S is not committing to a relevant proposition q, and that by default q is the content of S's declarative clause, here *that she is nine*. Thus S raises a proposition q that would settle a relevant question in the context (*How old is the birthday girl?*) without committing to q. Given the view of the aims of conversation above, and in particular the support requirement in (11), since S is not committing to q and S is talking only to A, S must intend A to address the issue S raised by giving an answer. I take raising an issue and expecting an answer to be constitutive of the speech act 'question'.[9]

[9]Possible counterexamples to (12) may include rhetorical questions and reflective questions. However it could be argued that rhetorical questions are in fact indirect assertions whose derivation transits through the usual understanding of questions in (12), while reflective questions are questions in which one talks to oneself, which fits with (12) when viewed in that light.

(12) Definition of *question/inquisitive*:
If S's intention in uttering U is to raise an issue without settling that issue themselves, and with the expectation that A will settle that issue in reply by committing to a proposition in that issue, then U is a question.

So far then, we have explained how an audience is able to infer that a rising declarative like that in (8) is intended with inquisitive illocutionary force. The second meaning effect to explain about inquisitive RDs like (8) is that they convey a bias in favor of the proposition denoted by the declarative. In choosing to use a RD that denotes only *that she is nine*, S raises an issue that contains only that one proposition (instead of the two propositions {*that she is nine*, *that she is not nine*} that would have been raised via a polar interrogative, "Is she nine?"). Given the support requirement in (11), S could not have done this if S did not have some reason to think that A was in a position to commit to this particular proposition. Thus we understand why inquisitive rising declaratives necessarily convey a contextual bias as formulated in (3): the contextual evidence provides the justification for S to restrict A to the single proposition denoted by the declarative.[10]

Note that the speaker does not themselves need to be biased for the content of the RD. The above logic is met even if S is skeptical of that proposition, so long as S thinks A can and will commit to the proposition, as is the case for incredulous RDs (on which, more below). Note also that private speaker bias for the content of the declarative is not enough to meet the bias condition in (3). E.g., if S had private reasons to believe that it is raining in (2), and S knew that A was arriving from outside, but there was no publicly available contextual evidence of rain, then the RD in (2a) would still be infelicitous. It seems that, if S is going to raise an issue that contains only one proposition and ask A to settle it, then there must be contextual evidence available to explain why S would do so. Otherwise, S is required to provide A with more than one alternative.

Now for (9): Again, $\nearrow$ conveys that S is not committing to a relevant proposition q, and that by default q is the content of S's declarative clause, here *that she is nine*. However, this default assumption can be violated if identifying q with the content of S's declarative clause is implausible in the context. The default assumption will be most implausible when S is the clear epistemic

[10]Cf. similar views of RD bias in Rudin 2018 and Westera 2018.

authority with respect to the declarative content in that context. (9) demonstrates this: Since the girl is S's daughter and A has never met the girl, and since the proposition *that she is nine* settles the open question "How old is your daughter?" that A put to S, the audience can safely assume that S's use of ↗ is not meant to convey lack of commitment to the declarative content; the default assumption that q is the content of S's declarative clause is broken. Furthermore, since S has not conveyed a lack of commitment to this content, and given S's position of authority, then given the support requirement in (11) and the prior conversational context, the audience can further infer that S intends to commit to the proposition *that she is nine*, settling A's question (this derivation of assertive commitment is revisited in greater detail in section 5). I take raising an issue and settling it by committing to a relevant proposition to be constitutive of the speech act 'assertion'.

(13) Definition of *assertion*/*assertive*:
If S's intention in uttering U is to raise an issue and settle that issue themselves by committing to a proposition in that issue, then U is an assertion.

Thus, we have explained how an audience is able to infer that a rising declarative like that in (9) is intended with assertive illocutionary force. The second meaning effect to explain about assertive RDs like (8) is that they raise a second issue. This is caused by ↗, which still conveys that S is not committing to some proposition q that is relevant to an open question. In (9), the goal is to enroll S's daughter in music lessons with A. A has said that whether this can be achieved depends on whether there is room in her age group. S's answer settles what her age group is, but leaves open whether there is still room in that age group. Thus, the proposition q that S expresses lack of commitment about is *that there is still room in the nine-year-old group*, since if this proposition were combined with the content of the declarative *that she is nine*, they would together resolve the global issue, *Can my daughter study tuba with you?*. By working backward from the proposition asserted and the remaining issues to resolve in the context to achieve some goal, the audience can infer the proposition targeted for lack of commitment by the ↗ in assertive

RDs.

4.1 A similar illocutionary ambiguity in rising imperatives

Rudin (2018) observes that ↗ can appear with imperatives, and that it has a roughly similar effect as with declaratives and interrogatives, conveying a lack of commitment that manifests as suggested actions that the addressee could take but is not required to. For example, compare the falling imperatives used by the boss in (14a) to the rising imperatives used by the coworker in (14b):

(14) New employee: What should I do now?
  a. Boss: Take the trash out↘ Wash the sink↘ (then) Take your break↘
  b. Coworker: Take the trash out↗ Wash the sink↗ Take your break↗

The boss is issuing a set of commands to be carried out in a particular order, while the coworker is merely offering a menu of suggested options. Now consider the boss's use of a rising imperative in (15):

(15) The boss has just told the new employee to replace the trash bags in all of the trash cans, tie up the used ones, and put them by the back door. After doing this, the employee asks:
New employee: What should I do now?
Boss: Put them in the dumpster↗

The boss's rising imperative in (15) could be interpreted as a weak suggestion if we assume that the boss is either inappropriately negligent or inappropriately unauthoritative. However, another possible interpretation is that the boss is issuing a normal command, and that ↗ raises another issue, roughly *How do you not know this?*. An explanation parallel to that given for the inquisitive/assertive RD split above can be given here, namely the boss has the social authority to issue commands while the coworker does not. This explains why the most natural interpretation of the rising imperatives in (14b) is a weakening of the commands themselves, while one natural interpretation of the rising imperative in (15) is that it retains its usual commanding force, and

↗ raises another issue that the audience is left to infer pragmatically.

The unifying fact across declaratives and imperatives is that the rise's meaning usually targets the content of the clause it appears with, but it doesn't *have* to. Whether the audience is cued to search for some other relevant content for ↗ to interact with depends on whether the context renders its application to the clausal content improbable.

4.2 Incredulous uses of RDs

A particular subkind of incredulous rising declaratives poses a *prima facie* challenge for the account given so far. First, consider the following incredulous RD:

(16) S thinks they did nothing wrong:
A: You should apologize.
S: I should apologize↗ (based on Pierrehumbert & Hirschberg, 1990, 292)

In (16), S believes that she should not apologize; in other words, there is a *not-p* speaker bias. This *not-p* bias clearly fits with the lack of commitment to *p* conveyed by ↗, that I posited in (10).

But incredulous RDs do not require such a complete form of *not-p* speaker bias. Recall the context in (7). There the speaker might have previously thought that the child was older than nine, and thus have had a previous *not-p* bias. But suppose A and S both take A to be in a better position to know the child's age, perhaps because A works at the school and S is merely visiting. In that case S should be inclined to accept A's claim that the child is nine; in other words after A's utterance, S should be biased for *p*. At the same time, the contextual evidence gives S a *not-p* bias, so while S may be inclined to accept *p* on the basis of A's epistemic authority, there is of course still some chance that A could be wrong. Thus, this state of affairs is still compatible with the lack of commitment to *p* conveyed by ↗.

Now consider a case in which the contextual evidence immediately settles the issue for *p*:[11]

[11] Thanks to an anonymous reviewer for *Sinn und Bedeutung* for this example.

(17) S believes that her friend A is abroad on vacation and not due back for some time. Then, S bumps into A at the local café.
S: You're back↗

Like in both (7) and (16), S in (17) had a prior *not-p* speaker bias. However, in (17), the truth of p is so obvious to S that she can't help but be publicly committed to it (her use of the pronoun *you* even shows that she has updated her discourse model with A's presence).

So how can the lack of commitment to p required by the proposed meaning for ↗ be met? One possibility might be to say that like in the case of assertive RDs such as (9), it can't and so lack of commitment is interpreted to be about some other relevant proposition q. However, this would be counterintuitive, since it would force us to conclude that some incredulous RDs are in fact a kind of assertion, and that the proposition q that S is not committed to is one that, when combined with p, resolves an open question. This treats incredulous RDs like (17) as quite distinct from ones like (7) and (16). Intuitively, this seems to be on the wrong track: All incredulous RDs share in common that their effect can be paraphrased as "S is incredulous that p". I believe this paraphrase should be captured by assimilating incredulous RDs to other kinds of inquisitive RDs, applying the lack of commitment conveyed by ↗ to the propositional content of the declarative, p. Treating (17) as unique would undermine that project.

Another feature (7), (16), and (17) share is that in each case S had a prior *not-p* bias, regardless of how that bias was then impacted by contextual evidence just prior to the incredulous RD utterance. However this feature is not common across inquisitive RDs generally. In (1) for example, S could have had no prior bias either way before being confronted with the evidence of A's wet umbrella. And in (8), S appears to have a weak prior p bias. So prior *not-p* speaker bias cannot form the basis of a unified analysis of inquisitive RDs, let alone RDs more generally.

The analysis from section 3 can be maintained if we take examples like (17) to involve some pretense: S clearly knows that p is true, but she is nevertheless shocked at p, because just prior to new evidence supporting p, S would have happily committed publicly to *not-p*. Thus S conveys her surprise via the lack of commitment expressed by ↗. S then immediately accepts that p is

true.

5 Formal account

I will now introduce a formalized version of the account in section 3 that builds on that in Goodhue 2021. I assume that declarative clauses denote propositions, functions from worlds to truth values of type $\langle s, t\rangle$ as in (18a). Following Hamblin 1973, I treat polar interrogative clauses as denoting sets of their two possible answers as in (18b), which are characterized by functions from propositions to truth values of type $\langle\langle s, t\rangle, t\rangle$. I assume polar interrogatives include a Q morpheme in the C-domain that take a propositional prejacent as input to produce the polar question interpretation in (18b).

(18) a. Declarative: $[\![\phi]\!] = p$
b. Polar interrogative: $[\![?\phi]\!] = \{p, \neg p\}$

I assume a model of context à la Farkas & Bruce 2010, which incorporates notions from Hamblin 1971, Stalnaker 1978, and Roberts 1996/2012, and therefore is akin to other approaches to rising declaratives working in this framework (e.g. Gunlogson, 2003, 2008; Malamud & Stephenson, 2015; Farkas & Roelofsen, 2017; Jeong, 2018; Rudin, 2018, 2022).

(19) *A context c is a tuple* ⟨*DC, CG, T, QUD*⟩
a. *DC* is a set of sets of discourse commitments DC_a for each interlocutor a
b. *CG* is $\bigcap DC$, the common ground, a set of propositions interlocutors are mutually committed to
c. *T*, the table, is a push-down stack of issues (where issues are sets of propositions)
d. *QUD* is a salient question in *T*

Since the questions uttered go onto the table, we might wonder what the role of a separate *QUD* is. This is seen most clearly in (9) (which will be reviewed below), in which S's RD answers a local question at the top of *T*, but in which the relevance of the proposition q targeted by $\nearrow$ is determined based on its role in a strategy to resolve some larger question. The larger question in

(9) is a prior question, deeper in the push-down stack of T. Thus the only requirement on *QUD* is relatively weak, that it be an issue in T.

Since rising declaratives can either be questions or assertions empirically speaking, their conventional or mechanistic effect on the context c needs to be relatively weak. I propose the following, minimal dynamic pragmatics for utterances:

(20) *Utterance function*
$\textsc{utterance}(\psi, c_n) \longrightarrow c_{n+1}$ such that
a. $T_{n+1} = T_n + [\![\psi]\!]^{c_n}$, if $[\![\psi]\!]^{c_n} \in D_{\langle\langle s,t\rangle,t\rangle}$
b. $T_{n+1} = T_n + \{[\![\psi]\!]^{c_n}\}$, if $[\![\psi]\!]^{c_n} \in D_{\langle s,t\rangle}$

(20) has two slightly different effects depending on whether the utterance ψ denotes a proposition (is a declarative) or denotes a set of propositions (is an interrogative). (20a) says that if ψ is an interrogative, its content is added directly to the table. (20b) says that if ψ is a declarative, a singleton set of its content is added to the table. These are subcases of a single utterance function, rather than two distinct utterance functions depending on clause type, since they have the same basic effect of adding utterance content to the table and nothing more (cf. Farkas & Bruce 2010, Jeong 2018, Rudin 2018, in which different sentence types/intonations are subject to utterance functions differing in whether content is added to the speaker's discourse commitments). The distinction between (20a) and (20b) is merely for technical reasons, to make sure that everything added to the table is of the same type, a set of propositions, and therefore an issue.[12]

With the above in place, we are ready to introduce a formalized semantics for ↗ based on the informal proposal in (10):[13]

(21) $[\![\nearrow]\!]^{c_n} = \lambda p_{\langle s,t\rangle} . p$

[12] An alternative would be to adopt a semantics that gives interrogatives and declaratives the same type (cf. Farkas & Roelofsen, 2017; Rudin, 2018, 2022). However I prefer to impose this minor complexity on the utterance function so as to maintain uniformity with the view that the intensions of declarative clauses are functions of type $\langle s, t\rangle$, rather than to complicate our semantics of declarative clauses in order to smooth the interface with pragmatics.

[13] ↗ is defined to compose with propositions, which is necessary in order to have a unified semantics for ↗ that can coherently state the lack of commitment conveyed in both RDs and polar questions. As a result, ↗ must compose below the Q morpheme in polar interrogatives.

a. *Lack of commitment*: $\exists q[q \notin DC_{S_{c_{n+1}}}]$
b. *Relevance*: $\exists q \exists P[q \in P \ \ \& \ \ p \in P \ \ \& \ \ \bigcap P \in QUD_{c_{n+1}} \ \ \& \ \ \bigcap(P - \{q\}) \notin QUD_{c_{n+1}}]$
c. *Default assumption in (21a) and (21b) that can be violated*: $q = p$

(21a) says that there is a proposition q such that the speaker S is not committed to q. What (21b) says is that there is a set of propositions P such that q is in P and p is in P and that the propositions in P taken together would answer the *QUD*. On the other hand though, if q were to be removed from P, the resulting set of propositions taken together would *not* answer the *QUD*. (21b) ensures that the proposition q targeted by $\nearrow$ is a necessary component of a strategy P to address the *QUD*. Without (21b), $\nearrow$ would be predicted to be felicitous on any assertion, since presumably there is always some non-relevant proposition q that S lacks commitment to. Ultimately, this relevance component may be handled entirely via a more general pragmatic condition on relevance, however I have chosen to spell out how it applies specifically here so we can see its role in regulating the inferences drawn for assertive RDs. Finally, (21c) imposes a default condition that the proposition q is identified with the content p of the clause uttered. This is the most straightforward content to identify in the context, and the only reason not to assume that $q = p$ is if the assumption is highly implausible in the context, as we saw for (9).

As discussed in section 3, the view of pragmatics adopted here leads to the pragmatic support requirement in (11), revised as follows:

(22) *Requirement of support for a proposition p in I*
When an issue I is added to the table T, there is pressure for some interlocutor a to support a proposition $p \in I$ by adding p to their discourse commitments DC_a.

Reviewing the explanations of (8) and (9) in section 3, we see that the formal account is successful. In (8), the *QUD* is "How old is the birthday girl?". The proposition added to the table, *that she is nine*, would resolve that issue, if only someone would commit to it. However, $\nearrow$ conveys that S is not committed to it. This plus (22) causes S's RD to be treated as a question, adding a singleton set to the table with the expectation of an answer from A. The choice to add a single-

ton set to the table produces the bias inference, that S expects A to give that answer and not its negation.

As for (9), there is a local question, the topmost issue I on T, "How old is your daughter?", and there is a larger *QUD* further down in T, "Can my daughter study tuba with you?". Unlike for (8), here the default assumption in (21c) that S's use of $\nearrow$ conveys lack of commitment about the propositional content of the declarative p is implausible: S knows his own daughter's age. Given this and (22), S's intention is clearly to assert p, that is, to raise the issue $\{p\}$ and settle it himself by committing to p. Thus $\nearrow$ must convey S's lack of commitment about some other relevant proposition q. According to (21b), q is relevant just in case, together with p, it forms a necessary part of a strategy P to resolve the *QUD*. Given this, the *QUD*, and p, q must be the proposition *that there is still room in the nine-year-old group*. Thus $\nearrow$ conveys a lack of commitment meaning, while at the same time allowing the utterance it appears in to be interpreted as an assertion.

5.1 Resolving a technical issue, and deriving assertion

For assertive RDs like (9), the lack of commitment conveyed by $\nearrow$ cannot be about p, that is $q \neq p$, because S intends to commit to p. However, there is a loophole in the formal implementation that incorrectly allows $q = p$ in (9): Suppose we assume $q = p$. All (21a) requires is that S not be committed to p at c_{n+1}. But all the utterance function in (20) does is add the content $\{p\}$ to the table at c_{n+1}. Thus, when we assume $q = p$, the lack of commitment requirement in (21a) is met at c_{n+1}, and so (9) is incorrectly predicted to be felicitous.

There are two separate issues here, a technical one, and a more substantive issue. First, the technical issue: Does $\nearrow$ really only convey a lack of commitment at c_{n+1} and not later contexts? The answer is clearly no. When S signals their lack of commitment to q via $\nearrow$, they convey that they lack the grounds to commit to q, and so will continue to do so until something changes that. Like (21b), this may have nothing to do with the meaning of $\nearrow$ in particular, but may instead be a general fact about commitments over time: If an interlocutor a makes a commitment to p, we expect a to continue to be committed to p until something happens to change that. Likewise,

if a conveys a lack of commitment to p, we expect a to continue to not be committed to p until something changes that. Still, like with (21b), we can make this explicit in our formal model of $\nearrow$. Suppose $n' > n + 1$ and $c_{n'+1}$ is a hypothetical context in which some new evidence causes S to reconsider their lack of commitment to q. Then we can revise (21a) as follows to show that $\nearrow$ requires S not to be committed to q in the context immediately following the utterance context, c_n, up through the context just prior to the one in which new evidence about q comes to light, $c_{n'+1}$:

(21a)′ *Revised lack of commitment*: $\exists q[q \notin DC_{S_{c_{n+1}}}, \ldots, DC_{S_{c_{n'}}}]$

On this updated denotation, (9) is correctly predicted to be infelicitous if $q = p$, since S clearly intends to commit to p on the basis of his own authority.

The second, more substantive issue: When and how, on this model, do assertions commit S to the propositional content of the declarative? This could be asked equally well about assertive RDs and assertions of falling declaratives. The idea behind utterance functions like (20) is common in dynamic pragmatics: utterances are thought of as functions from contexts to contexts. Thus if an utterance is assertive, then assertive update including commitment should be reflected in the output context c_{n+1}, contrary to how I have defined (20). In asserting p, whether via a falling or rising declarative, S intends to commit to p, and so from their perspective, commitment is achieved from the moment the utterance is complete. Likewise, from the perspective of addressees, as soon as they have understood an utterance as an assertion, they will take S to be/have been committed to p starting with whatever context immediately follows the utterance. The purpose of the minimal utterance function in (20) is to avoid building commitment into a conventional discourse effect for particular clause types or intonations, *pace* Farkas & Roelofsen (2017), Jeong (2018), and Rudin (2018, 2022), and instead separate out linguistic meaning from context update, creating space for pragmatics to operate on linguistic meaning and context to produce assertive force. (20), then, might be thought of as part of locutionary force: When S utters ϕ, the context is updated with the fact of S having said it. This includes the syntactic structure and the compositional inter-

pretation computed on it, including the contribution of the prosodic contour, though not yet the full pragmatic consequences of any of these. I also intend it to include—and here I enrich the Austinian notion of locutionary act—that the content of ϕ is added to the table T, changing that component of our formal model of context. It's from here that the audience can, if need be, draw inferences to recover S's intended illocutionary force. With this alternative view of the utterance function, I can now demonstrate how utterances come to be regarded as assertions that commit S to propositional content. Consider the assertion of a falling declarative in (23):

(23) A: How old is your daughter?
S: She's nine↘

By (20), S adds the singleton set of the proposition *that she is nine*, call it p, to the table. Recall that I am assuming that falling intonation is a meaningless default. There is nothing else in the meaning of the declarative clause itself or in the utterance function that implies S's commitment to p. Given the broadly Stalnakerian view of conversation adopted here, and the support requirement in (22) in particular, I assume that by adding $\{p\}$ to T, S either intends to commit to p or not (i.e., S intends a lack of commitment to p). I also assume a requirement to maximize non-at-issue content, comparable to Gricean Quantity and Maximize Presupposition. Maximize NAI leads to the following: There is a linguistic form, ↗, that explicitly conveys lack of commitment. So if S intends to convey lack of commitment to p while uttering declarative ϕ, S should explicitly do so via ↗. In the case of the falling declarative in (23), S has not chosen to use ↗, and so we can infer that S *doesn't* intend lack of commitment to p. But since, in uttering ϕ, S either intends commitment to p or lack of commitment to p, it follows that S intends to commit to p. Here is the same train of reasoning, in schematic form:

1. S utters "She's nine↘" (23)
   - $\neg$ S explicitly conveys $p \notin DC_S$ (Consequence of 1)
2. $T + \{p\}$ (1, utterance function in (20))
3. S intends $p \in DC_S \vee$ S intends $p \notin DC_S$ (2, Stalnakerian pragmatics/(22))

4. S′ utters "She's nine↗" (NAI-stronger alternative to 1)
   - S′ explicitly conveys $p \notin DC_{S'}$ (Consequence of 4)
5. S intends $p \notin DC_S \rightarrow$ S explicitly conveys $p \notin DC_S$ (1, 4, Maximize NAI)
6. $\neg$ S intends $p \notin DC_S$ (modus ponens on 1 & contrapositive of 5)
7. S intends $p \in DC_S$ (disjunctive syllogism on 3 & 6)

This is how assertive commitment can be derived for falling declaratives based on the proposed meaning of ↗ in (21), combined with a broadly Stalnakerian view of conversation, including the support requirement in (22), as well as Gricean pragmatics.

Given that assertive commitment is essentially an implicature on this view, it's reasonable to wonder if it can be canceled. The answer may be yes, and the evidence comes from falling declarative questions:

(24) A: We have a problem: We need someone to go pick Ali up from the airport, but Kate is on the other side of town.
   a. S: And James isn't available↘
   b. S: And James isn't available↗

From A's claim that they have a problem, S is able to infer that the people who would usually be asked to pick Ali up from the airport are unavailable. But A only mentioned Kate, so S asks about the other usual person James. The felicity of the falling version in (24a) shows that falling declaratives do not *necessarily* lead to full-fledged assertion (cf. Bartels 1999 (p. 243) and Gunlogson 2008 for more discussion of falling declarative questions). However, the rising version in (24b) is also felicitous, so why doesn't maximize NAI force ↗ to be used? Note that there is an intuitive difference between (24a) and (24b) in that S seems to genuinely ask about p in (24b), whereas in (24a), S seems to have drawn a conclusion that S wants A to confirm. As Gunlogson (2008) puts it, S may be making a dependent commitment. So falling declarative questions fall short of full assertive force, while at the same time not being equivalent to RDs, which suggests that it is correct to derive assertion pragmatically.

Note that the key factor in identifying falling declarative questions is the inverse of the key factor in identifying assertive rising declaratives: the latter are identified in cases where S clearly knows more about p than A, while the former are identified in cases where A clearly knows more about p than S. This suggests then that relative knowledgeability of interlocutors with respect to the content of declarative clauses plays a crucial role in the force interpretation of utterances, especially if the form of the utterance would otherwise usually be used to convey the opposite force.

6 Conclusion

The advantage of the account I have proposed is its ability to explain how we arrive at distinct illocutionary forces when interpreting one and the same linguistic form. I have posited unitary meanings for linguistic forms (declaratives denote p, polar interrogatives denote $\{p, \neg p\}$, $\nearrow$ conveys lack of commitment to a relevant proposition q), as well as a single utterance function that adds utterance content to the table. Speakers can employ the combination of declarative and $\nearrow$ to assert or to question, thanks primarily to the ability of $\nearrow$ to apply directly to the declarative content or not. I further observed that pragmatic pressure to grow the common ground in turn leads to pragmatic pressure to raise and resolve issues via interlocutor support for a proposition in the issue. This combined with the meanings of the linguistic forms enables speakers to implicate, and addressees to derive, the distinct discourse effects of inquisitive and assertive RDs such as *She's nine*$\nearrow$ in (8) and (9), as well as falling declaratives as in (23). Illocutionary force on this view resides purely in the pragmatics, with the audience's ability to recover the speaker's intended force depending only in part on input from the linguistic system.

6.1 Comparison to prior accounts

Farkas & Roelofsen (2017), Jeong (2018), and Rudin (2018, 2022) produce distinct accounts that nevertheless arrive at the same conclusion that clause type + intonation determines illocutionary

force as a matter of convention. Farkas & Roelofsen (2017) argue that ↗ is a semantic operator that turns declaratives into polar interrogatives. Rudin (2018, 2022) argues that intonation manipulates the utterance function, with ↗ calling off commitment to declarative content. The result is that each of these accounts are in their own way too rigid to handle assertive RDs like (9), and are forced to set them aside. Jeong (2018) meanwhile proposes that RDs that rise more steeply can only be inquisitive while those that rise more shallowly can only be assertive. I argued against these intonational claims in section 2. Furthermore, Jeong's account has the added theoretical drawback of stipulating four distinct sentence types with four overlapping but distinct conventional discourse effects: falling declaratives, polar interrogatives, steep RDs, and shallow RDs. The theoretical advantage of my account is that these overlapping but distinct discourse update effects emerge from unitary semantics for clause types and ↗, combined with pragmatics.

Westera also offers a unified account of inquisitive and assertive RDs (Westera, 2013, 2017, 2018): On this view, ↗ is claimed to convey that S is violating a Gricean maxim. A general challenge for this view is that it incorrectly predicts ↗ to be felicitous for run-of-the-mill quantity implicatures (e.g. *some* implicates *not all*), since quantity implicatures involve a violation of the maxim of quantity. But this analysis also faces a specific challenge from one of the key phenomena it is meant to explain, rising declaratives: In an example like (9), S is respecting all maxims, and so ↗ should be infelicitous contrary to fact. First, S's utterance is relevant and informative enough relative to the local question *How old is your daughter?*. Second, an anonymous reviewer for *Sinn und Bedeutung* suggests that Westera would say that S's RD violates relevance relative to the larger *QUD*, *Can my daughter study tuba with you?*. While an account of relevance could be stated so that it predicts S's utterance to be irrelevant to the larger QUD, such an account would be undesirable. After all, S's utterance is clearly a relevant step in a strategy to resolve the larger *QUD*, so it would be odd to claim that ↗ is felicitous in (9) because S's utterance is *not* relevant to the larger *QUD*. For a useful comparison, consider a genuine relevance violation example like (4) (discussed in Westera 2013):

(4) A: Do you speak Spanish?
S: I speak Ladino↗
(Jeong 2018, Farkas & Roelofsen 2017, based on Ward & Hirschberg 1985)

In (4), S doubly violates relevance, first for A's local question, and again for the larger *QUD* because S is unaware of it and so is uncertain about the relevance of the present utterance to it. This obviously contrasts with (9), in which the relevance of S's utterance to both the local question and the larger *QUD* is quite clear. The account I have proposed has no issue here, since ↗ conveys that S lacks commitment to a relevant proposition.

6.2 Looking ahead/other issues for future work

In future work, it may be worthwhile to further explore and defend the view that assertive force is pragmatically derivable. This view of assertion may have consequences for the acquisition of the illocutionary force, since it suggests that children might be able to build the pragmatic category of assertion from more basic components of pragmatics and grammar.

Another avenue for future work is to explore more closely, and to consider modeling, relative authority between speaker and addressee on both the epistemic and the social dimension, which played crucial roles in explaining assertive RDs and falling declarative questions (epistemic), as well as rising imperative commands (social). Perhaps contextual models should include authority parameters along more than one dimension, which could be appealed to when applying ↗ to p, so as to determine whether or not $q = p$.

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