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Rising Above Commitment

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Abstract

Deniz Rudin

Rising Above Commitment

This thesis develops a compositional account of the contribution of steeply, monotonically rising and steeply, monotonically falling intonational tunes to the utterances they accompany. I pursue an account couched within a restrictive implementation of the Table model in which falling intonation signals that the speaker is making a commitment by virtue of their utterance, and rising intonation signals that the speaker is making no commitments by virtue of their utterance. I propose a bifurcation of the Table model into a doxastic portion of the context and a teleological portion of the context, and propose that imperatives interact with the teleological portion of the context, whereas declaratives and interrogatives interact with the doxastic portion of the context.

To Catherine Rudin,

for shaping me in innumerable ways,

large and small, subtle and not,

and yet giving me the room to become who I am on my own terms.

I like who I ended up being,

and you're the best imaginable mom for that guy to have.

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This thesis is, in one sense, a product of the last month—the time in which it was written, in a wild rush. In another sense, it's a product of the last year and a half—the time in which I've been thinking about the subject matter it addresses. But every dissertation is best viewed as the irreducible product of a grad school experience. This document would not exist were it not for the last five years of education, support, and camaraderie, and so I have five years worth of thanks to give. Bear with me. As they say, it takes a village.

I came to grad school with every intention of becoming a hotshot theoretical phonologist. It was Pranav Anand's first-year semantics class that rerouted me. I had some formal background coming in, but I had absolutely no idea what semanticists cared about or worked on. Pranav's class filled in that knowledge gap with a series of freewheeling yet insanely detailed empirically-oriented conversations, and ambitious homework assignments in which that empirical spirit was supplemented with exercises in formal rigor. I was hooked, and by the end of the quarter I knew what I wanted to be. Meetings with Pranav have a tendency to zip off in unexpected directions, bringing up empirical observations and theoretical connections whose relevance to the subject at hand is not immediately obvious, but eventually is revealed to be deep and enlightening—a profound payoff that makes their infamously unbounded runtimes worth every minute. Conversations in a non-professional setting have the same wideranging kineticism: you're talking about Woody Allen, and then you're talking

about the historical recency of mimetic accuracy as a standard by which narrative art is evaluated, and then you're talking about career prospects for professional dancers in their mid-40s, and then, for some reason—the link seemed logical at the time—you're talking about savory pumpkin dishes. In his own dissertation acknowledgments, Pranav describes Barry Schein as "hallway-discussant extraordinaire." Everyone at Santa Cruz would agree that Pranav has earned that mantle himself: as an interlocutor, Pranav is legendary. His knowledge base is both broad and deep (I've yet to encounter a topic he has nothing informed and interesting to say about), he has an incredible memory, and most importantly of all he has seemingly bottomless reserves of both energy and curiosity. I'll miss the hallway-discussions (and their big brothers, party-discussions) dearly. Pranav has been my advisor since day one, and I've never completed a project that I didn't talk to him about. I don't take for granted his willingness to entertain my ideas; the open-minded, searching, never-fully-satisfied intellect he has put to work in pushing me to develop them is at least as responsible for whatever is good about the work I've done as anything I've put into it. The idea of not being able to walk down the hall and poke my head into Pranav's office, hand him a nascent idea, and have him shape it and supplement it and hand it back to me is, frankly, terrifying.

Few linguists have had as big an influence on my thinking as Donka Farkas. In both her papers and her teaching, she has incredible clarity of purpose and clarity of presentation—she outlines a problem, why it matters, and why a particular approach to it is desirable with an effortless directness that makes it all seem so natural that nobody could possibly object. My own research interests, and the angles of approach I take toward the problems that I'm interested in, have been shaped very deeply by a pair of seminars of hers that I took on opposite ends of my graduate career. There has been an embarrassingly tight connection between my choices of subject matter and the subject matter of those seminars, which speaks to how compelling I've found her motivating

concerns. Even when we disagree, my objections and my counterproposals are both built on top of a foundation that I've stolen from her. This thesis is a prime example.

Adrian Brasoveanu has made it clear to me from the very beginning that he wants me to succeed, and his propensity for giving forceful career advice (half pep talk, half hellfire and brimstone) has lead me on occasion to describe him as my "*de facto* vice-advisor." I've picked up an incredible amount by osmosis throughout my years as a member of his lab, and having an at least discursive familiarity with cognitive architectures and Bayesian analysis and Markov chain Monte Carlo and parsing algorithms and neural networks and many other high-tech topics has enriched my intellectual life and my ability to have conversations across fields. But all this technology is only part of the picture. What I'll miss most about sharing a department with Adrian is his bubbly enthusiasm and easy laugh, which make him such a joy to bump into in the hallway, and his collaborative spirit. Say hi to Megan and Toma for me—he's grown up so much over the last five years!—and thanks for everything, "teach."

I emailed Dan Lassiter out of the blue in my second year of grad school, because I had heard that, despite being a faculty member at Stanford, he lived in Santa Cruz. In my email, I said that I was skeptical of the conclusions he came to in his recent SALT paper, and that maybe we could talk about it in person. It should surprise no one who knows Dan that he replied with cheerful enthusiasm. The resulting conversation, at the Ugly Mug, displayed all of the features that would go on to characterize my relationship with Dan: he at once extended to me an extremely generous mentorship, of the sort I would expect from somebody whose actual job was to be my advisor, and at the same time treated me as a peer and as a friend. Dan's mentorship and his friendship have been immensely appreciated throughout the intervening years, as has his companionship at various conferences and workshops. His detailed comments on my drafts and thoughts about where to send them have improved both the quality of my work and its rates of

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Rounding out my perhaps unwieldily large committee is Cleo Condoravdi. She entered my life later than the rest of my committee members, as the external member of my Qualifying Exam committee, and I immediately regretted not having spoken to her sooner. She has that rare quality of not letting unclarities and ambiguities slip past her, but instead probing until she fully understands what's being said. To my mind, this is the single greatest virtue an academic can have. I lack it, and so talking to Cleo often has the effect of bringing a lot of my own implicit assumptions to light. Cleo also possesses what I think of as the second greatest virtue an academic can have: a genuine and infectious enjoyment of intellectual discussion. In our first meeting, we spent 45 entire minutes trying to suss out the source of a disagreement we were having, and even as we failed time and time again to figure out what we were even arguing about, there was a sense of joy in the air. We were smiling and laughing throughout a situation that could've easily become tense and uncomfortable with almost anybody else. The disagreement was eventually traced to a point of unclarity on my part, of course. I'm sure this thesis supplies many more.

Thanks are due as well to the many Santa Cruz faculty members whose impact on my life is not enshrined with a name on the title page of this thesis. Sandy Chung and Jim McCloskey have had perhaps as much influence on me professionally as any other Santa Cruz faculty. Working with both of them on my outside-my-comfort-zone syntax qualifying paper was a joy, each in a completely different way: Sandy for her hard-eyed, direct, and pragmatic feedback, and Jim for his generous encouragement and total faith that I had something to say that was worth saying. Despite the fact that I had no intention of studying syntax, it was a conversation with Jim that convinced me to do my PhD at Santa Cruz, and one of my most treasured memories from my early

time in the department is Sandy inviting me to lead a Lesnoto in her living room during Boris Harizanov's post-dissertation-defense party. Over the last five years, I've learned so much about how to teach, how to mentor, how to argue, how to write, and how to navigate professional life from them both, and I hope it's not presumptuous of me to say that at this point, I count them as friends.

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Chapter 1

Introduction

This thesis deals with the contribution of steeply, monotonically rising and steeply, monotonically falling intonation to the meaning of utterances of declarative, interrogative, and imperative sentences in English. Its aim is to develop an account of rising and falling declaratives, interrogatives, and imperatives in which their discourse effects are derived entirely compositionally, from the contribution of clause type and the contribution of intonational tunes, with no construction-specific stipulations. Many recent formal accounts of rising declaratives analyze them non-compositionally (Malamud & Stephenson 2015, Jeong 2018; Farkas & Roelofsen 2017 analyze them partially compositionally, but give them additional construction-specific effects). In taking a compositional mapping from sentence form to discourse function to be an important design spec of theories of intonational meaning, this thesis follows in the footsteps of its big sister, Christine Gunlogson's dissertation *True to Form* (2001).

Gunlogson's work emphasizes the importance of an interlocutor's public commitments to the meanings of utterances in discourse. Public commitments went on to comprise a major component of Farkas & Bruce's (2010) Table model, leading Paul Portner (Portner 2015) to describe commitment-based discourse models as 'The Santa

Cruz School.' Fittingly, this thesis sits squarely within the Santa Cruz School, couching its analysis within a restricted version of the Table model of the sort developed by Farkas & Roelofsen (2017). Farkas & Roelofsen assume that all utterances carry out the same basic discourse move: they make the denotation of the uttered sentence at issue, and they add the content of that denotation to the speaker's discourse commitments. Utterances of declarative and interrogative sentences behave differently from each other because they denote singleton and non-singleton sets of propositions, respectively: a declarative will make a single proposition at issue, and commit the speaker to that propositions; interrogatives will make multiple propositions (their possible answers) at issue, and commit the speaker to something much weaker: the union of those propositions.

This thesis follows Farkas & Roelofsen in assuming a unified Utterance function, and seeking to derive the different discourse effects of utterances of different sorts of sentences from the way their form interacts with that function. I differ from Farkas & Roelofsen only in that I do not treat speaker commitment as part of the basic effect of all utterances; rather, I propose that the intonational tune that accompanies a sentence modulates whether or not the speaker makes a commitment (q.v. Truckenbrodt 2006).

One of the goals of this thesis is to investigate to what extent the discourse profile of rising declaratives can be derived entirely from the representational primitives proposed by Farkas & Bruce to account for basic speech acts like assertions and (neutral) questions. Many prior proposals have taken rising declaratives (as well as other biased questions) to motivate the extension of the Table model to include representation of things like projected commitments and metalinguistic issues (Malamud & Stephenson 2015), or explicit marking of commitment strength, evidence source, or epistemic bias (Northrup 2014, Farkas & Roelofsen 2017). Though these extensions are plausible, I will attempt to show here that they are not necessary for understanding the discourse

profile of rising declaratives. I argue that decoupling speaker commitment from the basic discourse effect of uttering a declarative sentence allows us to make sense of rising declaratives entirely in terms of the basic primitives of speech acts of asserting and questioning: they put forward a singleton set of propositions, just like an assertion, but they without speaker commitment, just like a question.

In addition to this basic discourse effect, I propose that the bias profile of rising declaratives emerges from pragmatic reasoning about the speaker's choice of discourse move. I define a spec of 'discourse move minimal pairs' for each discourse move, and argue that the bias profile of rising declaratives can be made sense of in terms of inferences about the speaker's choice of a rising declarative over either of its discourse move minimal pairs: a falling declarative, and a polar interrogative.

The account of rising declaratives is given in chapter 2 of the dissertation. In chapter 3, I extend the core proposal for the contribution of intonation to the meaning of utterances to imperatives. I argue that the discourse behavior of rising and falling imperatives is amenable to an analysis in terms of those intonational tunes modulating speaker commitment, and develop an extension of the Table model to account for utterances of imperatives. In that model, a discourse context has both a doxastic portion and a teleological portion; imperatives interact with the teleological portion of the discourse context in a way directly parallel to the way declaratives interact with the doxastic portion of the context.

This introductory chapter goes on to give preliminary material that is crucial to understanding the meat of the thesis—the analysis of rising declaratives in chapter 2, and the analysis of rising imperatives in 3. In §1.1, I briefly give my assumptions about intonational phonology, which can be safely skipped by readers familiar with the topic. In §1.2, I give detailed assumptions about the representation of discourse contexts, including an introduction of my proposal for the contribution of intonational tunes to

the meaning of an utterance; even readers quite familiar with the Table model will find the rest of the thesis difficult to interpret without consulting that section first. Finally, I close the introductory chapter by briefly describing the application of the proposal to interrogatives, the least meaty of the applications in this thesis, in §1.3.

1.1 Basics of Intonational Phonology

In this thesis, I assume the most widely-adopted version of what Ladd (2008) calls the autosegmental-metrical (AM) theory of intonational phonology, developed by Pierrehumbert (1980) and Beckman & Pierrehumbert (1986). This theory of intonational phonology is used most familiarly in various incarnations of the Tones and Break Indices (ToBI) transcription framework (see e.g. Pitrelli et al. 1994).

The most basic representational assumption of the AM theory made use of in ToBI transcription is that what surfaces phonetically as continuous variation in pitch ($f0$) across an utterance is represented phonologically as a discrete string of binary (high or low) tones. These tones are of three types: pitch accents, phrase accents, and boundary tones.

Pitch accents (H* and L*)[1] represent pitch peaks (or valleys) generally associated with placement of primary stress within an intonational phrase.[2] Boundary tones (H% and L%) represent the pitch reached at one of the edges of an intonational phrase; there are both initial and final boundary tones, but initial boundary tones will play no role in this thesis. Phrase accents (H- and L-) are tones that fall between pitch accents and boundary tones.

[1]There are also complex pitch accents, like L+H*, which will not play a role in this thesis.

[2]On which word (or within which syntactic phrase) a pitch accent falls is of crucial importance to phenomena like focus (see e.g. Rooth 1992b; Büring 2016); for my purposes in this thesis, I'll ignore all issues pertaining to accent alignment.

Strings of these tones are referred to as TUNES (or CONTOURS). For instance, the tune H* L-H% would be phonetically realized as a pitch peak accompanying primary stress, followed by a downswing in pitch that swings back up toward the end of the intonational phrase. The issue of how exactly a tune is translated into the continuous variation of $f0$ across an utterance is taken to be a concern for the phonology-phonetics interface, and I provide no treatment of it here.

In this thesis, I focus exclusively on two tunes: a steep, monotonic rise (L* H-H%), and a steep, monotonic fall (H* L-L%). Throughout, I represent example sentences accompanied by L* H-H% with a sentence-final question mark, and example sentences accompanied by L* H-H% with a sentence-final period. The reader who finds herself interested in accounts of the contribution of a broader variety of tunes to the meaning of an utterance is encouraged to consult e.g. Sag & Liberman (1975); Pierrehumbert & Hirschberg (1990); Bartels (1999); Constant (2012); Jeong & Condoravdi (2017); Jeong (2018), and Kraus (2018). The reader who finds herself craving further detail on AM theories of intonational phonology is encouraged to consult the second edition of Ladd's magisterial *Intonational Phonology* (Second Edition, 2008), and if the itch persists, further scratching can be accomplished via Bolinger's *Intonation and Its Parts* (1985) and *Intonation and Its Uses* (1989).

1.2 The Table Model

In this section, I present the model of discourse contexts and discourse update that I will make use of in the rest of the thesis. I also introduce the thesis's central proposal about the affect of intonation on the meaning of utterances, and work through a preliminary application of it to interrogative sentences. The central proposal will be repeated in the following chapter. The assumptions I make about the representation of discourse con-

texts track the model proposed by Farkas & Bruce (2010) very closely; the assumptions I make about the way in which utterances update discourse contexts track the proposal of Farkas & Roelofsen (2017) very closely. However, I diverge from both proposals in small yet crucial respects. For this reason, I recommend that even readers familiar with both proposals resist the impulse to skip this section. However, I'll corral the general background in its own subsection, which can be safely skipped by such readers.

1.2.1 Background on Commitment-Based Discourse Models

The analysis of the meaning of H* L-L% and L* H-H% that I put forward in this thesis is couched within the commitment-based discourse model of Farkas & Bruce (2010), commonly referred to as the Table model. The Table model traces its lineage to discourse models proposed in the 70s, like Hamblin (1971), Lewis (1979), and especially Stalnaker's (1978) seminal model of assertions in terms of the effect they have on the Common Ground. These models have in common what we could call, following Lewis (1979), a focus on conversational 'scorekeeping': a conversational context comprises a set of components that keep track of some important aspects of that conversation, and discourse moves affect the representation of the state of the conversation as expressed by those components.[3]

Stalnaker's model has two components: a Common Ground and a Context Set. The Common Ground is a set of propositions that all interlocutors agree to behave for the purposes of the conversation as though they believe, and the Context Set is the set of all worlds compatible with every proposition in the Common Ground. The function of an assertion is to add a proposition to the Common Ground.

The Table model is in the Stalnakerian mold, but more explicitly emphasizes the

[3]See Bach & Harnish (1979) for a different conception of the role of discourse moves in conversation.

role of individual commitments (following Gunlogson 2001) in addition to shared commitments, and more explicitly emphasizes the intermediate step of proposing an update, which must be ratified before the Common Ground itself can be modified. I've chosen the Table model to formalize this thesis' analysis both because it is the locus of much contemporary work on intonational meaning (e.g. Malamud & Stephenson 2015; Farkas & Roelofsen 2017; Jeong 2018) and related topics (e.g. Beltrama 2018), and because (to preview the account) I will analyze L* H-H% and H* L-L% as modulating whether or not the speaker is making an individual commitment by virtue of their utterance—the Table model involves a particularly tight relationship between speaker commitment and the other pieces of a discourse move, allowing for a particularly formal exploration of how it affects a discourse move to change whether or not it involves speaker commitment, while leaving it otherwise untouched.[4] The basic Table model has been elaborated upon in various ways by Northrup (2014), who relativizes commitment to various evidential bases, some stronger than others; by Malamud & Stephenson (2015), who introduce sets of projected commitments and discourse moves that introduce meta-linguistic issues; and by Farkas & Roelofsen (2017), who introduce representations of evidence-based credence, interacted with by marked forms. In this thesis I make use of only the core components put forward by Farkas & Bruce (2010).[5] One of its goals is to investigate the extent to which the discourse behavior of rising declar-

[4]Other contemporary frameworks include Segmented Discourse Representation Theory (Asher & Lascarides 2005), Commitment Space Semantics (Krifka 2015), and Rational Speech Acts (Goodman & Stuhlmüller 2012). A full consideration of how the Table model analysis presented here compares to a potential implementation of comparable ideas within these other frameworks will have to be left to future work.

[5]I will argue that the roles Farkas & Bruce (2010) assign to the Table should be split into separate roles played by a Table and by a Question Under Discussion. However, I take this to be an elaboration on the intended interpretation of the Table, rather than the addition of a truly new primitive to the model.

atives can be derived entirely from the representational primitives Farkas & Bruce put forward to account for basic assertions and questions. I turn now to a presentation of my assumptions about those basic components.

1.2.2 Basic Components of the Table Model

I turn now to explaining the operation of the Table model. This model was designed to provide a unified account of the discourse effects of utterances of declarative and interrogative sentences in terms of what they make at issue, how they affect the speaker's discourse commitments, and what their potential is to lead to alterations of the Common Ground. The model includes Stalnaker's Common Ground and Context Set, and adds to them three new components: sets of Discourse Commitments for each interlocutor; a stack of sentential denotations called the Table; and a Projected Set of future Common Grounds that are possible given what is currently on the Table. I present these five core components slightly more formally here:

(1) BASIC 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 ($= \bigcap CG$)

c. DISCOURSE COMMITMENTS

For all discourse participants X, there is a set DC_X of propositions X has publicly committed to

d. THE TABLE (T)

A push-down stack of Issues (sets of propositions), the uppermost element of which (MAX(T)) is currently at issue

e. PROJECTED SET (PS)

The set of all Common Grounds that could result by adding an element of MAX(T) to the current CG (i.e., that could result from RESOLVING the current Issue—see below)

The role of each of these components will become clearer after we work through the basic examples of asserting and questioning. Before we do so, we must first discuss Issues and how they are resolved. In this model, conversations are driven by two forces: the desire to shrink the Context Set, driving interlocutors to raise Issues, and the desire to empty the Table, driving interlocutors to resolve them.[6]

(2) 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.

(3) RESOLVING an Issue

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

[6]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, $\exists p \in DC_X, \exists q \in DC_Y . p \cap q = \varnothing \wedge (\exists r \in I.(\bigcap DC_X \cap CS) \subseteq r \wedge \neg(\bigcap DC_Y \cap CS) \subseteq r)$

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

In other words, if the Context Set entails an answer to the current Issue, 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 would resolve the current Issue if it were made mutual. This can be expressed formally like so:

(4) DEFAULT AGREEMENT

For some issue I and discourse participant X, if $I = \text{MAX}(T)$ and $\exists p \in DC_X, \exists q \in I.(CS \cap p) \subseteq q$ and no discourse participants have made discourse commitments that are incompatible with p, p will be automatically added to CG unless somebody objects

Note, crucially, that some participant must make a potentially 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. I will argue for one additional component of a discourse context after working through the basic cases of assertions and questions.

(5) DISCOURSE CONTEXTS (preliminary version)

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 $DC_{a,n}$, 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 $CS_n = \bigcap CG_n$ and $PS_n = \{CG_n + p : p \in \text{MAX}(T)\}$

1.2.3 Asserting and Questioning in Farkas & Bruce (2010)

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 a speaker sp to assert a sentence s that denotes a proposition p in context c_n does the following:

(6) 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. $T_{n+1} = T_n + \{p\}$

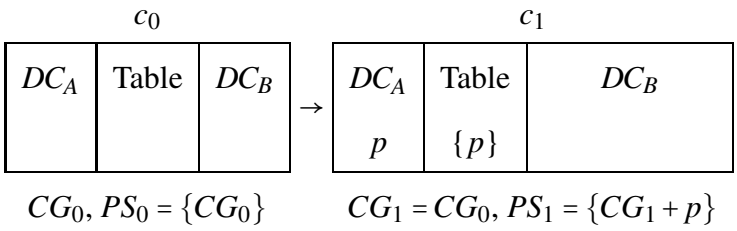
iii. $PS_{n+1} = \{CG_{n+1} + p\}$

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

This is depicted visually in (7):

(7) 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 has raised 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, a fact that will be made use of in the analysis of rising declaratives in the following chapter.

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:[7]

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

i. $T_{n+1} = T_n + P$

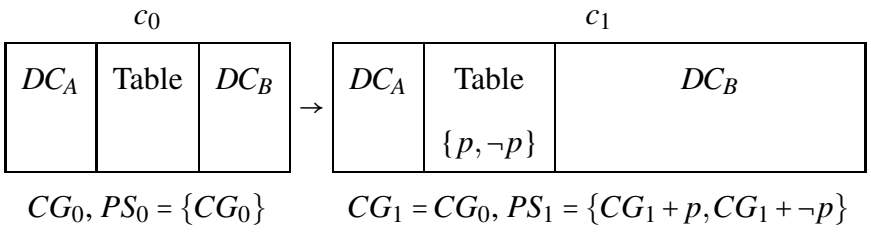
ii. $PS_{n+1} = \{CG_{n+1} + p : p \in P\}$

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

This is depicted visually in in (9):

(9) a. **A**: Did you get a haircut?

b. UPDATE WITH *Did you get a haircut?*



Note that the assertion in (7) 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

[7] 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.

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

1.2.4 Separating the QUD from the Table

In a moment I'll go on to introduce a general utterance function that derives the effects proposed above for assertions and questions from the semantics of declarative and interrogative clauses, following Farkas & Roelofsen (2017). Before I do, I'd like to take a moment to discuss the status of the Table as it relates to the notion of a Question Under Discussion (QUD—Roberts 1996; Ginzburg 1996). Farkas & Bruce describe the Table stack as their model's implementation of QUDs. One major role played by QUDs is to determine whether or not a conversational contribution is relevant—a discourse move is relevant only if it helps us progress toward an answer to our current QUD. For instance, Roberts has this to say:

> A move m is **Relevant** to the question under discussion q ... iff m either introduces a partial answer to q (m is an assertion) or is part of a strategy to answer q (m is a question). (Roberts 1996 ex. 15)

However, in Farkas & Bruce's model, the Table is not just used to structure the flow of a discourse and define a notion of relevance for discourse moves; the Table is also used to keep track of what is currently at issue, and to provide antecedents for anaphora—particularly the anaphoric targets of polarity particle responses—and ellipsis. In fact, in Farkas & Bruce's formulation of the Table, it is a stack of pairs of sentential denotations with syntactic structures. (I've suppressed the syntactic structures

in my own presentation of the Table model, as they are not relevant to the phenomena I discuss here.)

> Having syntactic objects on the Table is needed because a grammar of cross-turn conversation and ellipsis has to have access to the grammatical form (and not just the content) of immediately previous utterances. (Farkas & Bruce 2010 p. 86)

I believe that the notion of a QUD as the basis by which we evaluate the relevance of discourse moves, and the notion of the maximal element of a Table, which shows what is currently at issue and licenses anaphora and ellipsis, should be kept separate. To illustrate this, consider the following example:

(10) **A:** Who murdered the duke?
B: The duchess has a motive.
C: But the butler does too, and his alibi is weaker.

Consider **C**'s discourse move. It is relevant with respect to the QUD corresponding to **A**'s utterance: it makes progress towards an answer to the question of who murdered the duke. Note that it is not relevant in terms of potentially resolving the Issue raised by **B**'s utterance: it has no bearing on whether or not it's true that the duchess has a motive. Rather, it puts pressure on whether or not that fact should lead us to suspect that the duchess is the murderer, and puts forward the butler as a stronger candidate. All of this is easy to understand in terms of **C**'s move being chosen in terms of its relevance to the QUD *Who murdered the duke?*—**C**'s assertion is an attempt to make progress toward an answer to that question. However, **C**'s utterance also involves elliptical and anaphoric dependencies to **B**'s utterance. Most notably, **C**'s utterance involves Verb Phrase Ellipsis, which requires a linguistic antecedent (Hankamer & Sag 1976 a.o.)

and is likely subject to syntactic parallelism constraints (Rooth 1992a a.o., but cf. Hardt 1999 a.o.). So it seems that it would be best to keep the notion of the Table separate from the notion of a QUD: the Table deals with the move-by-move details of what is currently at issue, and what elliptical and anaphoric potentials are made available by the most recent discourse move; the relevance of discourse moves to the current line of inquiry is defined in relation to a QUD, which may remain stable for several discourse moves, and is not necessarily determined by the most recent move. For this reason, I'll add to the components of Farkas & Bruce's model a QUD, in order to be able to maintain Robert's notion of relevance given above.

(11) DISCOURSE CONTEXTS (final version)

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

Where A_n is a set of individuals,

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

T_n is a Table,

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

and QUD_n is a contextually salient question

Before I move on, let me make one final observation about the elements of a discourse context: though we have many components, they are *modally unified*: all the components of our discourse context are to be interpreted DOXASTICALLY, i.e. relative to beliefs. A speaker's discourse commitments are propositions that they are presenting themselves as though they believe. In other words, when a speaker makes a discourse commitment to a proposition, they are pledging to behave as though their doxastic state entails that proposition. The Common Ground (and Context Set) is likewise doxastic: the Common Ground is a set of propositions that *all* interlocutors are doxastically

committed to for the purposes of the conversation. The Table and the Projected Set are likewise given a doxastic interpretation: the propositions in the maximal element of the Table are those propositions currently under consideration for addition to the Common Ground, i.e. under consideration as potential mutual doxastic commitments, and the Projected Set shows what it would look like if those potential mutual doxastic commitments were made. Finally, the QUD structures doxastically-oriented inquiry: which of these propositions should we believe is true?[8]

Let me also note that though we have many components in our discourse model, they do not operate fully independently of one another—they are deeply interwoven. A Common Ground is a set of mutual discourse commitments, and so its members must also be members of all interlocutors' individual discourse commitments; the Context Set is defined entirely in terms of the Common Ground; the Projected Set is defined entirely in terms of the Table and the Common Ground; the QUD dictates the felicity of discourse moves that alter the Table.

1.2.5 Farkas & Roelofsen's (2017) Utterance Function

With the elements of a discourse context established, I turn now to the assumptions I make about what all utterances have in common. I'll adopt Farkas & Roelofsen's (2017) proposal for a general utterance function, with one small change made to it.

Farkas & Roelofsen (2017) go a step further than Farkas & Bruce (2010), and provide a fully general utterance function that can derive asserting and questioning from the denotations of declarative and interrogative sentences, respectively. This is an im-

[8]Note that I gloss over, here and throughout, the difference between doxastic and epistemic modality. The difference is not of crucial importance to the phenomena that I discuss; if you have a stake in whether asserting and questioning involve knowledge or just belief (e.g. Williamson 2000), feel free to replace *doxastic* with *epistemic* as you make your way through the main text.

portant 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).[9] 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*.

I'll present Farkas & Roelofsen's general utterance function, then introduce the crucial change I propose to make to it.

(12) UTTERANCES AS FUNCTIONS: (preliminary)

$\textsc{Utt}(\langle sp, s, c_n \rangle) = c_{n+1}$

Where sp is a speaker and s is a sentence

(13) THE BASIC DISCOURSE EFFECT OF UTTERANCE: (preliminary)

For any utterance $u : \langle sp, s, c_n \rangle \rightarrow c_{n+1}$,

a. $T_{n+1} = T_n + [\![s]\!]$

[9] In their system, intonation also plays a role in determining whether a sentence denotes a singleton or non-singleton set of propositions. I set this aside for the moment, discussing it in §2.7.

b. $DC_{sp,n+1} = DC_{sp,n} + \bigcup [\![s]\!]$

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

For Farkas & Roelofsen, any utterance has two effects. 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 sentences, 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 (15), 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 (15),

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.

1.2.6 Adding intonation to the utterance function

In this thesis, I will adopt almost Farkas & Roelofsen's general utterance function, with one small change: I will not assume that speaker commitment is a feature of the basic discourse effect of all utterances. Rather, I will extent the general utterance function to take an intonational tune as an argument, and argue that the intonational tune that accompanies an utterance determines whether or not the speaker makes a commitment to the denotation of the uttered sentence. The utterance function that I will assume throughout the thesis is as follows:

(14) UTTERANCES AS FUNCTIONS: (with intonation)

$\textsc{Utt}(\langle sp, s, t, c_n \rangle) = c_{n+1}$

Where sp is a speaker, s is a sentence, and t is a tune.

(15) THE BASIC DISCOURSE EFFECT OF UTTERANCE: (with intonation)

For any utterance $u : \langle sp, s, t, c_n \rangle \rightarrow c_{n+1}$,

a. $T_{n+1} = T_n + [\![s]\!]$

b. modulo the effect of t, in all other respects $c_{n+1} = c_n$

I will discuss only two intonational tunes in this thesis: a steep, monotonic rise (L* H-H%) and a steep, monotonic fall (H* L-L%). However, it's worth noting that Kraus (2018) gives a treatment of the Surprise-Redundancy Contour ((H-)L* H*-L% — Sag & Liberman 1975 a.o.), the Rise-Fall-Rise contour (L*+H L-H% — Ward & Hirschberg 1985 a.o.), and what she calls the Excited contour (H* L%, with an exceptionally high peak), in terms of their effect of discourse commitments, suggesting that treating intonational tunes as commitment modulators is a productive approach beyond the basic cases of monotonic rises and monotonic falls discussed here.

I will assume that the contributions of L* H-H% and H* L-L% are as follows:

(16) CONTRIBUTION OF L* H-H%:

For any utterance $u : \langle a, s, t, c_n \rangle \rightarrow c_{n+1}$,

if t = L* H-H%, $DC_{a,n+1} = DC_{a,n}$

Utterances accompanied by steeply, monotonically rising intonation make no changes to the speaker's discourse commitments.

(17) CONTRIBUTION OF H* L-L%:

For any utterance $u : \langle a, s, t, c_n \rangle \rightarrow c_{n+1}$,

if t = H* L-L%, $DC_{a,n+1} = DC_{a,n} + \bigcup [\![s]\!]$

Utterances accompanied by steeply, monotonically falling intonation add the informative content of the uttered sentence to the speaker's discourse commitments, just as in the basic effect of utterance proposed by Farkas & Roelofsen.[10]

The bulk of this thesis will be devoted to working out the application of this proposal to the discourse behavior of rising declaratives and imperatives. Rising and falling interrogatives provide less to chew on, as the choice of rising vs. falling intonation

[10] In taking rising vs. falling intonation to dictate whether or not the speaker makes a commitment, I follow Truckenbrodt (2006).

doesn't seem to alter the basic discourse effect of the utterance of an interrogative sentence. As this is so, I close this introductory chapter with a discussion of rising and falling interrogatives, as a warmup to ease us into an understanding of the proposal at hand about the role played by intonation in the discourse effect of an utterance.

1.3 Application to interrogative sentences

Though the core contribution of this thesis is its account of the contribution of L* H-H% to the meaning of utterances of declarative and imperative sentences, it would. of course, be undesirable in the extreme for the account of rising and falling intonation to make bad predictions about the meanings of interrogative sentences they accompany.

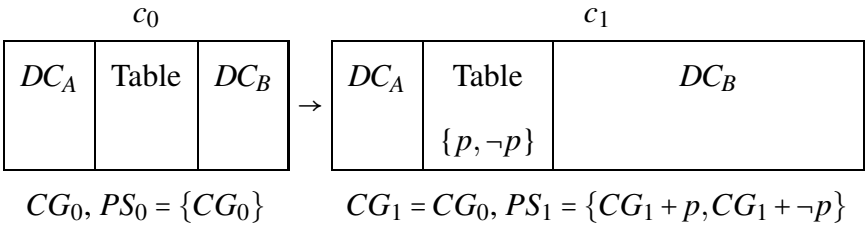
In this section, I (briefly) discuss pairings of L* H-H% and H* L-L% with polar interrogatives, wh-interrogatives, and alternative questions, and show that this thesis's proposal for the contribution of those tunes is congruent with empirical investigations in prior literature.

Of course, interrogative sentences host a broad variety of intonational tunes beyond than the two I discuss here. See Bolinger (1985, 1989) and especially Bartels (1999) for surveys. Throughout this chapter I rely on empirical discussions in Bartels' chapters 5 and 6, and citations therein.

1.3.1 Rising and Falling Polar Interrogatives

The L* H-H% tune is widely observed to be the most normal or most canonical intonational tune to accompany polar interrogatives (see Bartels 1999 §5.1.1.1). The account of L* H-H% developed in the previous chapter makes good predictions about this. In fact, it derives for rising polar interrogatives exactly the update effect proposed for them by Farkas & Bruce (2010).

(18) UPDATE WITH *Did you get a haircut?*



Because a polar interrogative denotes $\{p, \neg p\}$, the utterance of a polar interrogative accompanied by L* H-H% places a set $\{p, \neg p\}$ on the Table; by virtue of the effect of L* H-H%, the speaker acquires no commitments by virtue of their utterance. This simply decomposes the questioning act defined by Farkas & Bruce (2010) into the portion of it provided by the denotation of the question, and the portion of it provided by the contribution of the intonational tune. Because utterances of polar interrogatives are generally treated as not involving speaker commitment (though cf. Farkas & Roelofsen 2017), treating L* H-H% as signaling or enforcing lack of speaker commitment correctly captures why it would be canonically associated with those utterances.

However, H* L-L% is also possible on polar interrogatives. Bartels (1999) notes that the tune "is possible on any question that is syntactically marked as such (by inversion), without interfering with its questionhood." She also notes that the "intuitive connotation of falling [polar interrogatives] is curtness" (p.127). I share this intuition. Consider the following cases:

(19) **A:** My client was not always scrupulous about the truth.

B: Yes, but did he knowingly lie.

(20) **A:** Did Paul come to the party?

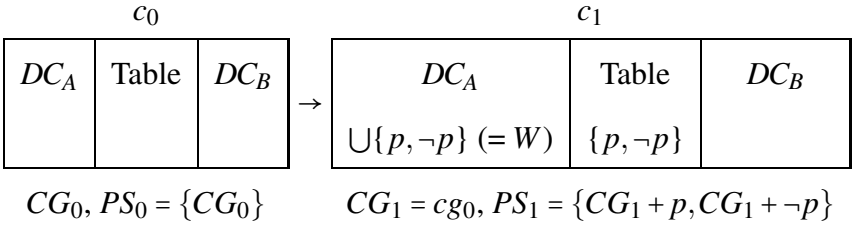
B: Well, so let me think who was there... Susie came for sure, and Margie. I think Dan was there... The snacks were great...

A: Was Paul there.

As these examples show, utterances of polar interrogatives accompanied by H* L-L% are naturally used to prod someone who is dancing around the point the speaker is interested in, and can convey impatience or brusqueness. However, I'll note that these clearly do not perform a fundamentally different speech act that rising polar interrogatives do. These utterances still make whether or not p is true at issue, and still elicit addressee response. We don't see what we see with declaratives, where the choice between H* L-L% and L* H-H% fundamentally changes the nature of the speech act.

The account predicts this as well: if the speaker utters a falling polar interrogative, they incur a commitment to the informative content of its denotation, $\{p, \neg p\}$. For any p, $\bigcup\{p, \neg p\} = W$; in other words, the commitment incurred will be necessarily trivial.

(21) UPDATE WITH *Was Paul there.*



In terms of the dynamics of the discourse, this move will have the same effect as the update with a rising polar interrogative: the speaker has raised an Issue that projects both p-incorporating and $\neg p$ incorporating conversational futures, and though they've made a discourse commitment, it's not a discourse commitment that could potentially resolve that Issue, so addressee response is still elicited. In fact, the update in (21) is exactly the discourse update the Farkas & Roelofsen (2017) propose is associated with canonical polar interrogatives.

It's less clear why falling polar interrogatives are associated with curtness, and I won't attempt to provide an explanation for that fact here, suffice it to say that it doesn't seem to interact with the core conventional discourse move associated with the utterance of the interrogative, which is our primary concern here. I will say that at the

very least, the idea that falling and rising polar interrogatives differ conventionally only in terms of the speaker's choice to make a trivial commitment could potentially open an avenue towards an explanation for the sense of curtness. On this view, falling polar interrogatives are marked with respect to rising polar interrogatives: the speaker has chosen to use a form that incurs a trivial commitment, when they could've avoided doing so. Comparing (18) with (21), we can see that updates with falling polar interrogatives are quite literally marked with respect to updates with rising polar interrogatives: the former add a completely superfluous commitment to the speaker's *DC*; the latter leaves the speaker's *DC* untouched. This difference could provide the scaffolding for a 'marked form, marked meaning' inference (Horn, 1984). However, I'll have nothing to say about why a sense of curtness would be the inference derived from the speaker's choice to use a more marked form to achieve a discourse effect that is for all practical purposes identical to the effect achieved by a less marked one.

To summarize: the account of intonational meaning presented in the previous section predicts that L* H-H% will be a fully natural companion to utterances of polar interrogatives, and that such utterances accompanied by H* L-L% will not be fundamentally different in terms of discourse dynamics, though it may be marked in some other way. Both predictions are borne out.

1.3.2 Rising and Falling Wh-Interrogatives

For wh-interrogatives, the canonical intonation appears to be the reverse of polar interrogatives: "The tonal pattern usually considered basic for [wh-interrogatives] is the typical falling declarative pattern, H* L-L%, preceded by H* prenuclear accents, if any" (Bartels 1999 §6.1.1). However, a wide variety of intonational tunes can accompany wh-questions without seeming to alter their basic discourse function (see Bartels 1999 §6.1.2). What is important for our purposes is that L* H-H% can also accompany

wh-interrogatives, and unlike polar interrogatives, utterances of wh-interrogatives with L* H-H% and H* L-L% are not obviously discriminable from each other in affect. Consider the following examples, adapted from Bartels (1999) p.176.

(22) **A:** I was on vacation last month.

B: Where did you go(./?)

A: Ireland.

B: How did you like it(./?)

(23) **A:** I can't seem to get rid of this back pain. I've made the rounds at the health center with it, and last week I even went to see an orthopedic specialist at my own expense.

B: And what did he have to say(./?)

(24) *To someone who goes abroad often:*

When are you going abroad again(./?)

(25) How much did it cost you(./?)

It appears that the choice of rising or falling intonation for wh-interrogatives matters extremely little—in both cases, the speaker is requesting information from the addressee about the same topic, and doing so without any overt bias. Unlike with polar interrogatives, the falling wh-interrogatives don't seem to convey curtness or impatience. So what's the difference?

Unlike polar interrogatives, wh-interrogatives have non-trivial informative content. Consider the Hamblin sets denoted by the interrogatives in the sentences above:

(26) a. $[\![$Where did you go$]\!]$ = {$[\![$You went to Antigua$]\!]$, $[\![$You went to Barbados$]\!]$, $[\![$You went to Bermuda$]\!]$, . . . }

b. $[\![$How did you like Ireland$]\!]$ = {$[\![$You liked it a little$]\!]$, $[\![$You liked it a lot$]\!]$, . . . }

c. ⟦What did he have to say⟧ = {⟦He said I'm dying⟧, ⟦He said it's psychosomatic⟧, ...}

d. ⟦When are you going abroad⟧ = {⟦You're going abroad tomorrow⟧, ⟦You're going abroad next week⟧, ⟦You're going abroad this summer⟧, ...}

e. ⟦How much did it cost⟧ = {⟦It cost five dollars⟧, ⟦It cost a hundred dollars⟧, ...}

What happens if a speaker commits to the informative content of one of these denotations? The grand union of (26a), for instance, is not W—it's the set of all worlds in which the addressee went *somewhere*. Likewise the grand union of (26b) is not W—it's the set of all worlds in which the addressee has *some opinion* about their experience of Ireland. In other words, the informative content of the denotation of a wh-interrogative is exactly the same as what the utterance of a wh-interrogative presupposes. So if a speaker utters a wh-interrogative accompanied by H* L-L%, they're making a discourse commitment to the presupposition of the question!

If a speaker utters the same sentence with L* H-H%, the question still presupposes what it presupposes. Either the context is congruent with that presupposition—that is to say, the speaker is *already* committed to it—or the presupposition is accommodated—that is to say, we take the speaker to be committed to that content by virtue of having uttered a sentence that presupposes it.

The context that results from the utterance is identical for rising and falling wh-interrogatives: the speaker has placed the denotation of the wh-interrogative on the Table, and is committed to its presupposition. Whether that commitment already existed prior to the utterance, was introduced via presupposition accommodation, or was signaled by falling intonation has no effect on what the end result looks like.

To summarize: the account predicts that there should be very little discernible dif-

ference between wh-interrogatives uttered with L* H-H% and with H* L-L%. And that's indeed what we see.

1.3.3 Rising and falling alternative questions

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

(27) a. Does she speak English, or French.

b. Does she speak English, or French?

If the disjunctive interrogative has a final fall, as in (27a), 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 (27b)—in this case, one does not get the sense that the speaker believes that she must speak at least one of the two languages.

I'll assume, following Roelofsen & Farkas (2015), that the denotation of a disjunctive interrogative whose disjuncts denote p and q is $\{p, q\}$. If accompanied by falling 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. Therefore, the account at hand predicts the observed asymmetry.

Chapter 2

Rising Declaratives

In this section, I present an analysis of rising declaratives. The structure of this chapter is as follows: in §2.1, I define the scope of the empirical investigation. In §2.2, I walk through the empirical behavior of rising declaratives in detail, arguing for four empirical generalizations that synthesize empirical arguments made in prior work, including generalizations that seem *prima facie* to be mutually contradictory. In §2.3, I present a brief survey of previous accounts, both of rising declaratives as a construction and of the meaning of rising intonation in general, highlighting problems that they encounter and signposting ways in which my account makes use of their insights. In §2.4, I reiterate the basic proposal from the previous chapter, and show how it applies to rising declaratives. In §2.5, I outline a set of Gricean assumptions about pragmatic competition between discourse moves, and in §2.6 I show how those assumptions allow us to understand the bias profile of rising declaratives. In §2.7 I show how my account of rising and falling intonation as modulating speaker commitment can handle data used by Farkas & Roelofsen (2017) to argue for intonational tunes as semantic operators affecting the denotations of the sentences they accompany.

2.1 What is a Rising Declarative?

What I will refer to as rising declaratives (RDs) are declarative sentences accompanied by the L* H-H% tune. 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.

(28) a. You slapped him?

b. There's a deer outside?

c. You got the job?

As mentioned in §1.1, throughout this thesis, when I punctuate an example sentence with a final question mark, unless there is some indication to the contrary I intend that to represent that the sentence is accompanied by the L* H-H% tune.

(29) *You slapped him?*
L* H- H%

Likewise, when I punctuate an example sentence with a final period, I intend that to represent that the sentence is accompanied by the H* L-L% tune.

Though there is some consensus on the properties of RDs—for instance that they solicit addressee response, as questions do, but that they are felicitous in only a proper subset of the contexts in which standard polar interrogatives are appropriate—recent literature has proposed a broad variety of seemingly mutually contradictory empirical characterizations of the constraints on the distribution of RDs (i.e. the kind of bias they communicate) and a highly diverse set of theoretical techniques for capturing their behavior. My goal in this chapter is to synthesize the insights, both empirical and analytical, of prior work into an account of RDs that improves on prior accounts on both fronts—empirically, by explaining the full range of seemingly contradictory empirical observations from prior work, and analytically, by giving a more explanatory

account of RDs that derives their behavior entirely from the contribution of declarative form and the contribution of the L* H-H% tune, avoiding the stipulation of any *ad hoc* construction-specific conventional effects.

To reiterate the proposal from the previous chapter, I will assume, following a suggestion by Truckenbrodt (2006), that intonational tunes in English are compositional on the level of the discourse move, affecting in a consistent way the discourse update that is enacted by the utterance they accompany. Specifically, I analyze the L* H-H% tune as an indicator that no changes to the speaker's commitments are being made by virtue of the utterance, and the H* L-L% tune as an indicator that the speaker is making a commitment to the informative content of the denotation of the sentence they've uttered. I argue that formalizing this notion within the framework of Farkas & Bruce (2010), and supplementing it with a pragmatic account of competition between discourse moves, allows us to capture formally the full range of empirical facts about the behavior of RDs.

However, before either the empirical generalizations or the analysis can be discussed, it is important to be as clear as possible that the empirical focus here does not include all declarative sentences accompanied by a final rise. By focusing exclusively on steep monotonic rises and falls (the L* H-H% tune and the H* L-L% tune), I mean to exclude from consideration 'list intonation,' in which non-final portions of a list are accompanied by very shallow rises, as well as so-called 'uptalk', and more complex intonational tunes that end with a rise, such as the rise-fall-rise tune (Constant, 2012). I also mean to exclude 'assertive' uses of RDs, which have been argued to be intonationally distinct from inquisitive uses of RDs, a point I discuss in the following subsection.

2.1.1 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 an assertion that is somehow hedged or tentative:

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

***B**: I like orange chicken?*
H* H- H%

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. Jeong argues that 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 inquisitive RDs in this chapter. As I will derive the behavior of inquisitive RDs from the contribution of the L* H-H% tune, it is only natural that they will have a different discourse effect than assertive RDs, provided that Jeong is correct in assigning to them a distinct intonational tune. Throughout the rest of this thesis, if I use the term

'rising declarative' or 'RD' without qualification, I intend it to refer to inquisitive rising declaratives.

2.2 Empirical Generalizations

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

(31) 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 assert that *p* is true

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. ANTICIPATION OF ADDRESSEE COMMITMENT

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 (31a) and (31b) are uncontroversial, and so the arguments presented for them will be brief. Generalizations (31c) and (31d) are the subject of active debate. Various versions of (31d) have been proposed in prior work (e.g. Gunlogson 2001; Krifka 2015 and Jeong 2018—see §2.3.3 for details). (31c) is a synthesis of arguments made in prior work that RDs indicate negative speaker epistemic bias

(Farkas & Roelofsen 2017) and that they indicate positive speaker epistemic bias (e.g. Gunlogson 2008; Westera 2017).

2.2.1 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 that *p* is true by uttering *p*?.

(32) *[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 (32a) or by indicating receipt of previously unknown information with *oh* (32b).[1]

In this respect RDs pattern with interrogatives (33); the opposite is seen with falling declaratives (34).[2]

(33) *[Context: same as (32)]*

A: Did Carrie get fired?

a. **B:** #Thanks for the heads up.

b. **B:** #Oh, I had no idea.

[1]This argument for the non-assertiveness of RDs dates back to Gunlogson (2001).

[2]These generalizations, of course, apply only to inquisitive RDs; assertive RDs pattern with falling declaratives with respect to these diagnostics.

(34) *[Context: same as (32)]*

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.

2.2.2 Answer solicitation

Another way in which falling declaratives behave differently from interrogatives is that the latter solicit an answer from the addressee, and the former do not:

(35) *[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:** #I haven't been having much luck in my love life lately.

(36) *[Context: same as (35)]*

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:** I haven't been having much luck in my love life lately.

An interrogative can be felicitously followed by an answer, whether positive (35a) or negative (35b), but it's infelicitous to reply by commenting on a related issue, rather than answering the question posed by the interrogative sentence (35c). The same is not true for falling declaratives. Agreement (36a) and (36b) are felicitous, but it's also felicitous to reply by commenting on a related issue (36c)—in this case, we take Bertha to have silently accepted the truth of Alvin's statement. Again, RDs pattern like interrogatives:

(37) *[Context: same as (35)]*

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:** #I haven't been having much luck in my love life lately.

It's felicitous to respond to p? by giving information about whether or not p is true (37a, 37b), but just as with interrogatives, it comes off as a non-sequitur to respond by commenting on a related matter (37c). RDs pattern with interrogatives in soliciting an answer.

2.2.3 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, other authors, most notably Farkas & Roelofsen (2017), have argued that rather than indicating strong bias in favor of p, an utterance of p? indicates that the speaker's evidence-based epistemic preference for p over $\neg p$ 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 the availability of both kinds of bias, neither should be taken to be a primitive feature of RDs. In §2.2.4, I argue that the form of bias that RDs reliably, conventionally communicate is the speaker's expectation that the addressee believes *p*, rather than an expression of the speaker's own bias (cf. Gunlogson 2001; Krifka 2015; Jeong 2018).

2.2.3.1 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).

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

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

In (38), 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 (39), 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:

(40) *[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?

(41) *[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 (40), 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 (41), 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 at the very least compatible with strong speaker epistemic bias toward p.

2.2.3.2 Negative Bias

Given the data in the previous subsection, an account of RDs that treats them as 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:[3]

(42) *[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)

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.[4]

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.):[5]

(43) *[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?

[3]The relevance of examples involving personal taste to rising declaratives is discussed most extensively by Malamud & Stephenson (2015).

[4]Note that it might seem especially natural to read this sentence with focus on *this*:

(1) THIS is a beautiful sunset?

In this case, the sentence is not actually accompanied by the L* H-H% tune: the focus on *this* is cashed out intonationally as a high pitch accent, and there is a pitch decline between that pitch accent and the high boundary tone. However, (42) is still felicitous without focus on *this*, though it might sound a little disingenuous. That negative bias uses of rising declaratives could be taken to involve some kind of pretense is discussed by Westera (2017), and will recieve further discussion below.

[5]This example comes from an interview on ABC news, July 30th 2016.

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 and otherwise, of incredulity or skepticism. However, the utterance is felicitous even if delivered with in a pleasant, neutral tone, and the inference of skepticism 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 (44) or exasperatedly (45):

(44) *[Context: A student is solving a math problem in front of the class.]*[6]

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)

(45) *[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.

2.2.4 Anticipation of Addressee Commitment

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

[6]Farkas & Roelofsen (2017) credit this example to Jeroen Groenendijk (p.c.).

falling declaratives, 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*.

In order to argue for this generalization, I will revisit the examples discussed in the previous two subsections and show that manipulating the context such that the speaker has no reason to suspect that the addressee believes *p* renders *p*? infelicitous, even though the speaker's epistemic bias toward *p* remains constant.

Take for example (38), whose context is repeated here as (46a):

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

b. *[Context: The speaker has just seen her coworker enter the office wearing a wet raincoat. She goes into her boss's office, from which the coworker's entrance was not visible, and says to her boss:]*
#It's raining?

In the context that licenses the RD (46a), the speaker has good reason to suspect that her addressee believes that it is raining—because she suspects that the explanation for his wet raincoat is that he just came in from the rain. In context (46b), though the speaker has the exact same reason to suspect that it's raining (i.e., the exact same degree of epistemic bias), again on the basis of her coworker's wet raincoat, she has no reason to suspect that her addressee believes that it is raining, as he did not see the raincoat, and so the RD is infelicitous.

We see something similar with double-checking cases. Consider (41), whose context is repeated here as (47a):

(47) a. *[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?

b. *[Context: The ship's captain is talking to one of his passengers, who is unaware of the details of the logistics of the voyage. The captain says:]* #We have, what, eight more recharge cycles to go before we get to Origae-6?

In the felicitous context (47a), the captain is pretty sure that there are eight recharge cycles left, due to his familiarity with the logistics of the voyage. He also knows that the android knows the exact number of recharge cycles left, as its memory is infallible and knowing the number of recharge cycles is part of its duty. So he has reason to suspect that the android believes there are eight recharge cycles left—if he's correct that that is the number, the android will know that that is the number. However, in (47b) the captain's addressee cannot be assumed to know the number of recharge cycles left, and so the captain has no reason to suspect that they believe that number to be eight. Again, the speaker's utterance of *p*? is made felicitous or infelicitous by manipulating whether they have reason to suspect that their addressee believes *p*, with their epistemic bias toward *p* remaining constant.

These two examples, in which the speaker has positive epistemic bias, might seem reducible to a more general pragmatics of questions. If the goal of uttering *p*? is to get your addressee to tell you whether *p* is true, then of course it would be unproductive to say it to someone who you know knows less about *p* than you do—in the same way, using a polar interrogative to ask whether *p* is true is infelicitous in contexts where you

know your addressee is uninformed about *p*. However, if we move on to examine cases in which the speaker has negative epistemic bias toward *p*, we'll see that the felicity of *p*? is still dependent on the speaker having reason to suspect that the addressee believes *p*, in a way that is not reducible to the addressee being more qualified to resolve whether *p* is true than the speaker is.[7]

Consider (42), whose context is repeated here as (48a):

(48) 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 (48a), Alvin has good reason to suspect that Bertha believes the sunset to be beautiful, namely that she just said so. In the infelicitous context (48b), 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, unlike the positive epistemic bias cases above, it does not make sense to talk about this contrast in the felicity of *p*? in terms of the relative informedness of the conversational participants with respect *p*. 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. I take this to support my claim that the relevant generalization about RDs really is that they are only felicitous if

[7] See Gunlogson (2008) for extensive discussion of the role of asymmetric expertise in RDs, though she does not discuss cases where the speaker has negative epistemic bias.

the speaker has reason to believe that the addressee believes *p*—that is to say, that they anticipate positive addressee response.

Finally, consider (43), repeated repeated here as (49a):

(49) 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 the examples above, the context for the RD is provided by the content of DTs utterance. In the felicitous context (49a), 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 (49b), 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 change in either party's informedness about whether those achievements count as sacrifices, and 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.

These cases seem less amenable to the objection that the infelicity of the (b) RDs follows from a general pragmatics of information-requesting. For instance, in (49b), GS might very well want to know whether DT judges those actions to have comprised sacrifices, and indeed a request for information via a polar interrogative is perfectly

felicitous:

(50) **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: Are those sacrifices?

DT: Of course not.

GS: Okay. Just wondering whether you thought so.

2.2.5 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 as well 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 (Gunlogson 2001, 2008; Krifka 2015; Malamud & Stephenson 2015; Farkas & Roelofsen 2017), some additionally treating answer-solicitation as a primitive feature of RDs (e.g. Farkas & Roelofsen 2017, who treat RDs as denoting questions) and others additionally treating lack of speaker commitment as a primitive feature (Gunlogson 2001, 2008; Malamud & Stephenson 2015). In §2.4, 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 Table model predicts that the other two properties of RDs will follow from a speaker putting forward a declarative sentence meaning but making no commitment to its content.

Before I present my proposal, §2.3 discusses prior approaches to the meaning of intonational tunes and to the discourse effect of rising declaratives. I hope to highlight the broad variety of insights, both empirical and theoretical, that are on display in prior work—the proposal in §2.4 comprises an attempt to derive the full range of empirical observations that are made in prior work, and to synthesize many of the theoretical innovations that have been put forward in response to them, even when those observations and those innovations might seem at first blush to be mutually incompatible.

2.3 Previous Accounts

In this section, I briefly summarize prior accounts of the meaning of intonational tunes and of the discourse effect of rising declaratives, indicating empirical problems where they crop up, and signposting the ways in which my account makes use of and synthesizes the insights and innovations of prior accounts.

2.3.1 Decompositional accounts of intonational tunes

Several prior accounts decompose the meanings of intonational tunes into the contributions of each tone in the tune. In this thesis, I focus on rougher-grained units, focusing on complete tunes, and defining their contributions holistically, rather than attempting to decompose the contribution of the L* H-H% tune into the contributions of the L* pitch accent and the H% boundary tone, for instance. The account I give of the L* H-H% tune is broadly congruent with prior decompositional analyses—formalizing the contribution of the components of that tune to its meaning is far beyond the scope of this thesis.

2.3.1.1 Pierrehumbert & Hirschberg (1990)

Pierrehumbert & Hirschberg (1990) argue that the L* pitch accent signals 'non-predication': for example, in interrogative sentences, which are associated with the L* H-H% tune, the speaker isn't predicating something of the accented phrase, but rather asking a question about it. They analyze the H% boundary tone as signaling dependence on a future utterance. In the case of a question, that dependence has to do with response elicitation; in lists, that dependence has to do with signaling that the list is not yet complete.

2.3.1.2 Bartels (1999)

Bartels (1999) adopts a meaning for H% that is comparable to that proposed by Pierrehumbert & Hirschberg (1990), in which it signals 'continuation dependence'. Rather than associating L* with non-predication, she analyses the L- phrasal tone as contributing an ASSERT morpheme, which sentences uttered with the H- phrasal tone lack, accounting for the non-assertivity of utterances accompanies by tunes including H-.

2.3.1.3 Westera (2017)

Westera (2017) (elaborating on ideas that first saw print in Westera 2013) analyzes the H% boundary tone as signaling that the speaker doesn't believe themselves to be obeying all of the Gricean maxims. In the case of RDs, he shows that in some contexts it can be strongly inferred that the maxim the speaker does not believe themselves to be obeying must be Quality, and argues that it is this inference that explains the behavior of inquisitive RDs (assertive RDs, on this view, are RDs uttered in contexts in which it is inferred that the relevant maxim is Relation). This inference generates the lack of assertiveness of RDs: if the speaker does not believe themselves to be obeying Quality, then they cannot be taken to be endorsing the truth of what they've said. His system also derives that the speaker has positive epistemic bias, as there is a cost to violating Quality

which is proportional to the probability that the uttered sentence is false, making RDs less costly the more confident the speaker is that the uttered sentence is true.

Because his system derives positive epistemic bias for inquisitive RDs, it is difficult to see how it could explain the cases of negative epistemic bias discussed in §2.2.3.2. Westera discusses the possibility that such cases are pragmatically marked, involving some sort of pretense, or being in some sense metalinguistic, though he does not provide a formal account of how exactly such cases function. I share the intuition that such cases involve speaker pretense, and I provide an account of the role of pretense in such cases below.

2.3.2 Meta speech acts (Krifka, 2015)

Krifka (2015) defines an update effect for RDs in a 'commitment space' semantics for context-updating in dialogue. In a commitment space semantics, the current context is supplemented with the set of all future contexts that could possibly develop from it via licit updates to the current context—corresponding roughly to the role played by the projected set in the Table model. Krifka's update for RDs acts on that set of licit future contexts rather than on the current context itself, performing a 'meta speech act' by removing contexts from that set of licit future contexts. For Krifka, the utterance of p? removes from the commitment space all future contexts that do not support p, though it has no effect on the current context itself. In essence, though p? does not assert p, it structures the space of possible future contexts in a way that requires its answer to be p. In this respect, it is clear how Krifka accounts for anticipation of addressee commitment: the utterance of p? leaves only p-futures available, giving the addressee only one licit way to reply. However, it is less clear on this account why the speaker is not interpreted to be committing to p: they've made a discourse move such that all future contexts are p-supporting contexts.

2.3.3 Commitment-based discourse models

Perhaps the most productive line of work on RDs has been within the framework of commitment-based discourse models, in a line of thinking that can be traced back to Gunlogson's seminal dissertation. It is within this framework that my proposal is situated.

2.3.3.1 Gunlogson (2001)

Gunlogson (2001) proposes that while falling declaratives commit the speaker to some proposition p, rising declaratives commit the addressee to that proposition. This captures the addressee-orientedness of the empirical generalization argued for in §2.2, which is heavily indebted to Gunlogson's own empirical investigation. However, it's not clear what it means to commit one's addressee to something—surely, one has control over what one commits to! This problem is addressed by Jeong's (2018) refinement of Gunlogson's proposal, making use of projected commitments as introduced by Malamud & Stephenson (2015).

2.3.3.2 Truckenbrodt (2006)

Truckenbrodt (2006) takes up Gunlogson's (2001) analysis and proposes a reframing of it. He proposes that rather than intonation signaling who is being committed to a proposition (with falling intonation indicating the speaker and rising intonation indicating the addressee), we could instead take falling intonation to signal that the speaker is making a commitment, and rising intonation to signal that the speaker is *not* making a commitment. In other words, Truckenbrodt proposes that we could take the non-assertiveness of RDs to be primary, rather than their bias. This proposal was not formalized by Truckenbrodt within a discourse model that would make concrete predictions—below

I formalize this idea within the framework of Farkas & Bruce (2010) and work through its consequences in formal detail.

2.3.3.3 Gunlogson (2008)

In later work, Gunlogson (2008) proposed that RDs are ways for speakers to make 'contingent commitments'—i.e., by uttering *p*?, the speaker indicates their willingness to commit to *p* provided that their addressee commits first. This is developed in a framework in which sourcehood is important—speakers can commit to a proposition as its conversational source, or commit to it dependent upon an interlocutor having committed to it as source. An RD, on this view, indicates the speaker's desire to make a dependent commitment: the addressee must commit as source to license the speaker's dependent commitment.

This proposal elegantly accounts for cases of positive epistemic bias, but it's difficult to see how it could be extended to account for negative epistemic bias cases, in which the speaker does not seem to indicate willingness to commit to *p*.

2.3.3.4 Malamud & Stephenson (2015)

Malamud & Stephenson (2015) do not make a distinction between assertive and inquisitive RDs, and their account seems better designed to account for assertive ones than inquisitive ones. On their account, the utterance *p*? differs from an assertion of *p* in two ways. First, it raises a 'meta-linguistic issue' about the appropriateness of the discourse move, which must be addressed before *p* can be added to the Common Ground. They also extend the commitment-based discourse model of Farkas & Bruce (2010) to include sets of projected commitments for all discourse participants. When a speaker utters *p*?, *p* is added not to the speaker's discourse commitments, but to their *projected* discourse commitments. To put it informally: when a speaker utters *p*?, they weakly

assert it—they express a lack of confidence that it is a relevant contribution, but they nonetheless put the conversation into a state such that *p* will be a candidate for becoming Common Ground once that meta-linguistic issue is resolved, and project their own commitment to it. This seems to be a good account of assertive RDs, but it's difficult to see how it could capture the relevant facts about inquisitive RDs, namely the possibility of negative speaker epistemic bias (which clashes with the speaker projecting their own commitment to *p*) and the anticipation of addressee commitment to *p*, which falls out of neither the meta-linguistic issue nor the projected speaker commitment.

2.3.3.5 Farkas & Roelofsen (2017)

Farkas & Roelofsen's (2017) proposal is couched in the framework of inquisitive semantics (Ciardelli et al., 2013), and the formal details of their proposal presuppose some basic background in the notions of that framework. What is important for our purposes is that they treat rising intonation as contributing a semantic operator that when applied to a declarative sentence returns the denotation that a corresponding polar interrogative sentence would have—that is to say, in their system the rising declarative *It's raining?* has the same denotation as the polar interrogative *Is it raining?*.[8] They capture the difference in behavior between polar interrogatives and rising declaratives, despite their denotational equivalence, by proposing additional discourse effects that accompany marked ways of asking questions, like rising declaratives and tag interrogatives.

Farkas & Roelofsen (2017) extend standard models of discourse context to include representations of evidence-based credence (building on work by Northrup 2014), and propose that the additional discourse effect of *p*? is that in addition to asking whether

[8]Their proposal for rising intonation is fully general, and captures the behavior of interrogatives as well—I've focused on how it applies to declarative sentences here for reasons of rhetorical expediency.

or not p is true, it indicates that the speaker has evidence on the basis of which their epistemic preference for p over $\neg p$ is 'at most low'. This additional discourse effect is not derived from the interaction of declarative form and rising intonation, though Farkas & Roelofsen suggest that it is connected to rising intonation being generally correlated with low credence.

It is clear how this account captures the negative epistemic bias data, in which the speaker is at best skeptical of p (low epistemic preference for p over $\neg p$) and at worst confident that p is false (zero epistemic preference for p over $\neg p$), but it's not clear how it can account for the positive epistemic bias data. In double-checking cases like (40) and expert consultation cases like (41), the speaker seems to be indicating the opposite—that their epistemic preference for p over $\neg p$ is high.

2.3.3.6 Jeong (2018)

Jeong (2018) combines aspects of Malamud & Stephenson (2015) and Farkas & Roelofsen (2017)—she follows Farkas & Roelofsen in taking inquisitive RDs to have the semantics of polar interrogatives (i.e. she takes p? to denote $\{p, \neg p\}$), and she follows Malamud & Stephenson in assuming a model of discourse including sets of projected commitments. Jeong takes p? to add p to the addressee's projected commitments, straightforwardly accounting for anticipation of addressee commitment to p, and getting around the conceptual objection to Gunlogson (2001) that the speaker shouldn't have the authority to commit their addressee to anything—on this account, the speaker merely *projects* addressee commitment, which the addressee can then either sanction or deny.

2.3.4 Summary and Preview of the Account

My proposal synthesizes the insights of these prior proposals, while providing a simple and formally explicit account of RDs that derives their behavior entirely from the contribution of declarative form and the contribution of the L* H-H% tune, supplemented by a pragmatics of competition between discourse moves.

Empirically, my proposal captures many of the observations made by the prior accounts outlined above. My proposal for the L* H-H% tune results in sentences accompanied by it being continuation-dependent and unassertive, in congruence with the generalizations Pierrehumbert & Hirschberg (1990) make about tunes ending in H% and Bartels (1999) makes about tunes lacking the L- phrasal accent. The analysis of rising declaratives captures the role anticipation of addressee commitment plays in their felicity (Gunlogson, 2001; Krifka, 2015; Jeong, 2018); in terms of epistemic bias, it explains why *p*? can be uttered when the speaker suspects that *p* is true but needs confirmation from the addressee (Gunlogson, 2008; Westera, 2017) and also captures why it can be uttered when the speaker suspects (or knows) that *p* is false (Farkas & Roelofsen, 2017).

Theoretically, my proposal follows Truckenbrodt (2006) and Westera (2017) in taking rising intonation to be a marker that the speaker is unwilling to commit to the truth of their utterance, though my implementation follows Truckenbrodt more closely. My proposal follows Krifka (2015) in cashing out predicted addressee commitments via the effect an utterance has on projected conversational futures, though I stop short of adopting his framework, and instead show that the same effect can be derived from more standard commitment-based discourse models.

Like the main line of prior work on rising declaratives (Gunlogson, 2001, 2008; Malamud & Stephenson, 2015; Farkas & Roelofsen, 2017; Jeong, 2018), my proposal is couched in a commitment-based discourse model. I implement my analysis in the

model proposed by Farkas & Bruce (2010), and show how the independently-motivated primitives of that model can generate the observed behavior of RDs without any additional components.

2.4 The Basic Proposal

In this section, I reiterate the proposal from the previous chapter for the contribution of L* H-H% and H* L-L% to the meanings of utterances, and discuss how it accounts for the basic behavior of rising declaratives. In §2.5, I present my assumptions about the pragmatics of competition between discourse moves, and in §2.6 I show how that pragmatics derives the more complicated generalizations about the bias associated with utterances of rising declaratives.

2.4.1 Intonational Tunes as Commitment Modulators

I assume the representation of discourse contexts, the conception of utterances as functions from contexts to contexts, the basic effect of all utterances, and the contribution of rising and falling intonation that was proposed in the previous chapter. For the reader's convenience, all are repeated here:

(51) DISCOURSE CONTEXTS (final version)

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

Where A_n is a set of individuals,

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

T_n is a Table,

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

and QUD_n is a contextually salient question

(52) UTTERANCES AS FUNCTIONS: (with intonation)

$\text{UTT}(\langle sp, s, t, c_n \rangle) = c_{n+1}$

Where sp is a speaker, s is a sentence, and t is a tune.

(53) THE BASIC DISCOURSE EFFECT OF UTTERANCE: (with intonation)

For any utterance $u : \langle sp, s, t, c_n \rangle \rightarrow c_{n+1}$,

a. $T_{n+1} = T_n + [\![s]\!]$

b. modulo the effect of t, in all other respects $c_{n+1} = c_n$

(54) CONTRIBUTION OF L* H-H%:

For any utterance $u : \langle a, s, t, c_n \rangle \rightarrow c_{n+1}$,

if t = L* H-H%, $DC_{a,n+1} = DC_{a,n}$

(55) CONTRIBUTION OF H* L-L%:

For any utterance $u : \langle a, s, t, c_n \rangle \rightarrow c_{n+1}$,

if t = H* L-L%, $DC_{a,n+1} = DC_{a,n} + \bigcup [\![s]\!]$

I've already shown in §1.3.1 that this account derives Farkas & Bruce's questioning act as the conventional discourse effect of a rising polar interrogative. It's worth briefly noting here as a further sanity check that this decomposition of conventional discourse effects into the effect of sentence type and the effect of intonational tune derives Farkas & Bruce's assertion as the conventional discourse effect of a falling declarative. A declarative sentence denoting $\{p\}$, if uttered with falling intonation, will place $\{p\}$ on the Table, and commit the speaker to $\bigcup \{p\}$, i.e. to p. What about rising declaratives?

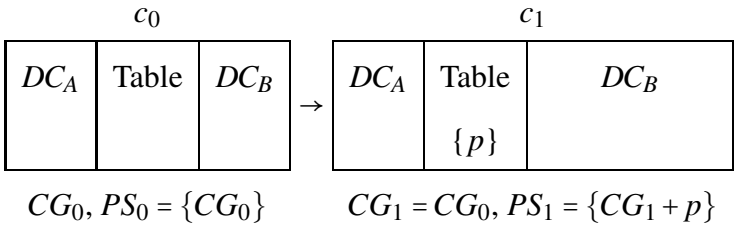
2.4.2 The basic behavior of rising declaratives

Given the discourse effects defined above, a declarative sentence uttered with the L* H-H% tune will behave in a unique way: the speaker will make no discourse com-

mitments, but they will raise a singleton Issue, projecting only one future Common Ground. This is illustrated in (56):

(56) 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, and it differs from the utterance of a polar interrogative only in not projecting a Common Ground including $\neg p$. It is these two differences that predict the characteristic behavior of inquisitive rising declaratives.

It is immediately obvious how this account of inquisitive rising declaratives captures the fact that RDs don't involve commitment: on this view, that aspect of the meaning of RDs is simply the conventional effect of the L* H-H% tune. In the following subsection, I explain how this account of inquisitive rising declaratives predicts that the solicit an answer from the addressee. Accounting for the rest of the empirical facts encountered in §2.2 will require the development of a pragmatics of discourse move choice, which I turn to in §2.5.

2.4.3 Accounting for answer solicitation

The shared conversational goal that Farkas & Bruce (2010) assume drives Issue-raising is the desire to shrink the Common Ground—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 §1.2.2, 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 (56) 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 Farkas & Bruce (2010) model, all speech acts that do not result in a situation that facilitates default agreement solicit addressee response—i.e. all speech acts that do not involve (a potentially Issue-resolving) speaker commitment solicit addressee response.

The last 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.

2.5 Pragmatic competition between discourse move minimal pairs

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, it will follow from pragmatic competition between discourse moves. I assume, following the main line of work in formal pragmatics, that pragmatic inferences are derived from consideration of the speaker's choice of utterance, and how it compares to salient alternative utterances (see e.g. Horn 1972 and Gazdar 1979). The basic idea underlying this approach, irrespective of its formal implementation, is that the speaker must have a good reason to have chosen their utterance instead of any salient alternative. Formal approaches differ with respect to how salient alternatives are taken to be generated, and how they specify what the good reasons for choosing one over another are. I'll note here that the development of theories of formal pragmatics has generally focused on assertions: pragmatic inferences are used to figure out what information the speaker is trying to communicate given the observation that they've made an assertion of a sentence associated with a particular truth-conditional meaning. Consider for instance the Rational Speech Acts framework (Goodman & Stuhlmüller, 2012). In this framework, pragmatic competition begins with an observed utterance. A listener observes that the speaker has made an utterance with propositional content p; if they were fully literal-minded, then they would conclude that the speaker's intent was to communicate that p is true, nothing more and nothing less. However, recursive Bayesian reasoning leads to a probability distribution over intended meaning given observed utterance. My point in discussing this is that this process of pragmatic reasoning starts from the observation that the speaker has asserted a sentence denoting p, and ends with an inference about the proposition p' that the speaker in fact intended

to communicate by virtue of that assertion. What I develop in this section is somewhat different—I'm interested in the inferences we derive about the speaker's choice to make p at issue by virtue of a rising declarative, rather than by virtue of a falling declarative, or a polar interrogative. In other words, I'm interested in the inferences we make about the speaker's choice of discourse move, rather than the inferences we make about the propositional content of their discourse move. For this reason, I will not be able to use an out-of-the-box theory of formal pragmatics. Instead, I'll sketch a set of basic Gricean assumptions about pragmatic competition between discourse moves. I'll make assumptions that are as conservative as possible, and show that the reasoning I employ is comparable to the reasoning employed in more familiar cases of pragmatic inferences.

2.5.1 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.

(57) 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

I assume here 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:

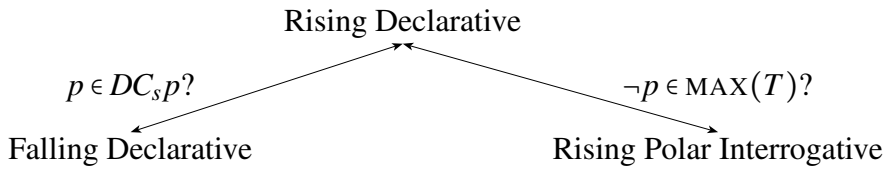
(58)

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

Given the definition in (57), 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:

(59)



I assume that members of discourse move minimal pairs are in pragmatic competition with each other. I'll cash this out by treating utterances of a member of a discourse move minimal pair as associated with the following conventional effect:

(60) CONVENTIONAL EFFECT OF DISCOURSE MOVE MINIMAL PAIRS:
For any move m comprising an utterance by speaker sp in context c, if m is the member of a discourse move minimal pair $\langle m, m' \rangle$, m triggers the conventional inference that it would have been uncooperative for sp to make move m' in c.

I turn now to discussion of the relevant notion of cooperativity.

2.5.2 Gricean maxims for discourse moves

I intend the notion of cooperativity here to be interpreted in its Gricean sense. Grice (1975) famously proposed a Cooperative Principle characterized by four conversational maxims; I present the definitions Grice gives for them here:

(61) a. QUANTITY: 1) Make your contribution as informative as is required (for the current purposes of the exchange). 2) Do not make your contribution more informative than is required.

b. QUALITY: 1) Do not say what you believe to be false. 2) Do not say that for which you lack adequate evidence.

c. RELATION: Be relevant.

d. MANNER: 1) Avoid obscurity of expression. 2) Avoid ambiguity. 3) Be brief (avoid unnecessary prolixity). 4) Be orderly.

As I noted above, the way these maxims help us understand pragmatic inferences has generally been worked out on the level of asserted content. Inferences are derived from making the assumption that the proposition the speaker put forward is the most cooperative piece of information they could've shared, and the result of that inference is often a strengthening of that asserted content. Take the most often discussed example of a pragmatic inference: scalar implicatures. Since Horn (1972), the standard story about scalar implicatures is this. The speaker has said asserted that *some x are y*. It would be more informative (asymmetrically entailing) for them to have said *all x are y*. If the assumption of cooperativity is to be maintained, then, the stronger alternative must be uncooperative for some other reason, since if no other maxim ruled it out, the speaker should've chosen the stronger alternative in observance of the maximum of QUANTITY. A sentence like *all x are y* is not obviously less mannerly than a sentence like *some x are y*; if we assume we are in a context in which both claims are relevant, then we're forced to conclude that the speaker's reason for not uttering *all x are y* is that it would've violated QUALITY. If we take the speaker to be well-informed, then we conclude that the speaker's reason for not uttering it is that it would've violated the first clause of the maxim of quality (QUALITY 1). In other words, we conclude that the speaker thinks it is false, and we take them to be communicating a strong presupposition than the literal truth conditions of their utterance, namely that *some but not all x are y*.

I've stepped through this example for two reasons. The first is to reiterate that the standard applications of Gricean reasoning deliver pragmatically enriched propositions: the pragmatic inference is that the speaker intends to communicate something stronger than the literal meaning of their sentence. But in the Table model, utterance meaning involves more than just the truth-conditional content of the proposition the speaker puts forward; utterance meaning also involves speaker commitment, the Table, and the Projected Set. It's in these other components that discourse move minimal pairs differ,

not in terms of the content of the proposition they put forward. This leads me to the second reason why I've stepped through this example: because I believe that, once we've formulated Grice's maxims to apply to the other elements of utterance meaning, we'll see that the biases associated with rising declaratives can be derived from the same, familiar reasoning associated with scalar implicatures: rising declaratives are, in some sense or another, less informative than the moves that they are members of a minimal pair with: falling declaratives and rising polar interrogatives. And they therefore license the inference that to have uttered those pairmates would've violated QUALITY.

I'll thus propose extensions of the maxims of QUALITY and QUANTITY to the moves of adding content to a speaker's discourse commitment, and of placing content on the Table (and, thereby, adding elements to the Projected Set). I'll have nothing to say about the maxim of MANNER moving forward, as I'll only consider utterances that are mannerly. In terms of the maxim of RELATION, I'll assume a version of what Roberts (1996) assumes, as I discussed in §1.2.4: 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:

(62) A discourse move is RELEVANT in a context iff a resolution to the Issue it raises would answer the current QUD.

This is 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 could answer 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 proposition to one's discourse commitments, and to the act of adding content to the Projected Set.

2.5.2.1 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:

(63) QUALITY (commitment version):

1) Do not add a proposition to your discourse commitments if you believe it to be false.

2) Do not add a proposition to your discourse commitments if you don't have good reason to believe it to be true.

(64) 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. 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.

2.5.2.2 QUALITY and QUANTITY for projection

I assume that the act of adding content to the Projected Set, which is legislated in the Table model via adding content to the Table, is subject to the maxims of QUALITY and QUANTITY as well. Just as a reminder, 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 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:

(65) 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 $\bigcap DC_A \cap p = \varnothing$)

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 $\neg p$)

(66) 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: it's more informative to point out more possible future Common Grounds, provided that they actually are possible, and that they're relevant.

2.5.2.3 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 other interlocutors (i.e., that violate QUALITY 1), or that are not compatible with the speaker's private 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.

(67) **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. 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 maximizes the 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 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; however, one may also initiate, or maintain, an adversarial context just for the pleasure of fighting.

Some subtler cases of an adversarial context are the cases of 'quiz' questions (68) and 'gotcha' questions (69):

(68) *[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!

(69) *[Context: **A** is **B**'s mother, and knows that **B** snuck out of her room to go to 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 (68), **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 a Common Ground they project 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. However, a gotcha question, like (69), is only effective if the addressee is not aware that they're in a context involving speaker pretense.

With these pragmatic assumptions in hand, I turn now to the pragmatics of rising declaratives.

2.6 The pragmatics of rising declaratives

In this section, I show how the pragmatic assumptions made in the previous section allow us to understand the discourse behavior of RDs, as explored in §2.2. In §2.6.1, I discuss the basic pragmatics of RDs, independent of competition with discourse move minimal pairs. In §2.6.2, I discuss pragmatic competition between rising declaratives and rising polar interrogatives, arguing that it accounts for the addressee-oriented bias associated with rising declaratives. In §2.6.3, I discuss pragmatic competition between rising declaratives and falling declaratives, arguing that it accounts for the speaker-

oriented bias associated with rising declaratives.

2.6.1 The basic pragmatics of RDs

With our pragmatic assumptions now in hand, let's take a basic first look at the pragmatics of uttering a rising declarative. Uttering a rising declarative adds nothing to the speaker's commitments, and places $\{p\}$ on the Table, resulting in the Projected Set $\{CG + p\}$. What I've assumed about the application of Gricean cooperativity to discourse moves gives us 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 QUD, 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.

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, 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.

2.6.2 Accounting for anticipation of addressee commitment

As discussed above, the proposal for the discourse effect of L* H-H% accounts quite directly for the first two empirical generalizations about rising declaratives: that they don't involve speaker commitment, and that they elicit addressee response. I turn now to the more complicated cases, which I argue involve pragmatic competition between discourse move minimal pairs.

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 some reason to suspect that the addressee believes p.

Recall that making a discourse move that is a member of a discourse move minimal pair triggers the inference that the other member of 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 have been uncooperative to add $\neg p$ 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.[9]

The explanation for the uncooperativity of the rising polar interrogative cannot possibly be that is violates the maxim of QUANTITY: it's *more* informative than the rising declarative, as it projects two Common Grounds, instead of one. So it must be that to project that additional $\neg p$-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 themself to p, so it cannot be their own public commitment or private 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: 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 derive the inference that it violates 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.

[9] 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 QUD, then so is resolving the Issue $\{p, \neg p\}$. I also assume that rising declaratives and rising polar interrogatives are equally mannerly.

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. In other words, a rising declarative is a tool for soliciting addressee commitment to p. However, 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.

2.6.3 Accounting for epistemic bias

Rising declaratives are members of a discourse move minimal pair with falling declaratives. Therefore, the use of a rising declarative triggers the inference that 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 described above, 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. I propose that inferences of negative bias associated with rising declaratives and inferences of positive bias associated with rising declaratives can be traced to whether the context supports the inference that the corresponding falling declarative would've violated QUALITY 1 or QUALITY 2, respectively.

In any case, a rising declarative solicits addressee commitment to p, 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.[10]

Consider for example this case in which positive epistemic bias is inferred, originally discussed in §2.2.3.1:

(70) *[Context: The ship's captain is consulting with the android who maintains the ship about the logistics of their colonization voyage. The captain says:]*

[10]This explanation of RDs in terms of soliciting addressee commitment to p which will be followed up by speaker commitment to p, and the role relative epistemic authority plays in such an explanation, is strongly indebted to Gunlogson (2008).

We have, what, eight more recharge cycles to go before we get to Origae-6?

In (70), the addressee is extremely knowledgable 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.

Now consider this case in which negative epistemic bias is inferred, originally discussed in §2.2.3.2:

(71) *[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 (71), the speaker is extremely knowledgable 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 (71). 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.

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 preference, as defined in §2.5.2.3. Note that this proposal cashes out Westera's (2017) suggestion that negative bias uses of rising declaratives involve some form of speaker pretense. I hope that the account that I've presented here can help clarify exactly what notion of speaker pretense is relevant, and how the pragmatics of rising declaratives allows them to be deployed with this kind of pretense, to the observed effect.

Because the account here does not hard-code any speaker epistemic bias into the conventional discourse effect of rising declaratives, it is able to account for the full spectrum of previously discussed epistemic biases, unifying what are *prima facie* mutually contradictory generalizations. What is core to the pragmatics of rising declaratives is that they trigger the inference that for the speaker to have committed to p would've been uncooperative, by virtue of violating QUALITY. But there are multiple possible explanations for why a commitment might violate QUALITY, and so we predict that different contexts will give rise to different inferences about the nature of the speaker's bias with respect to p. A positive bias context is just a context in which we have reason to infer that the speaker's commitment to p would've violated QUALITY 2, though they suspect p to be true; a negative bias context is just a context in which we have reason to infer that the speaker's commitment to p would've violated QUALITY 1, i.e., that they believe p to be false. Because rising declaratives project a p-incorporating Common Ground, negative bias cases inherently involve an element of speaker pretense.

2.7 Commitment Modulation vs. Q-forming operator

The analysis of rising declaratives that I've given here is predicated upon the idea that the contribution of an intonational tune to the meaning of an utterance 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 .

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 2015, 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) and Truckenbrodt (2006) have made comparable assumptions to mine; Westera (2017) has also made comparable assumptions, taking rising intonation to communicate that the speaker doesn't take themselves to be obeying all the Gricean maxims; others have been 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 they denote.

Of particular note is their account of rising intonation, which they analyze as contributing 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 and Roelofsen offer two main empirical arguments in favor of the view that RDs have the same denotation as polar interrogatives. One of them has to do with the effect of intonation on alternative questions; in §1.3.3, I showed how my proposal for the meaning of rising and falling intonation can handle the facts they discuss. In this section, I'll address their other empirical argument—that RDs can be quotative complements of rogative verbs—and show that my proposal can handle those facts as well. I'll also discuss the fact that RDs don't license NPIs, which seems to provide an argument in favor of a disjoint treatment of the denotations of RDs and polar interrogatives.

2.7.1 RDs as quotative complements

One 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:[11]

(72) a. 'Amalia left?', she {wondered,asked}.

b. She {wondered,asked}, 'Amalia left?'

[11] 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.

Because the verbs *wonder* and *ask* are ROGATIVE, that is, they only select clausal complements that denote questions (Lahiri 2002 and many others), Farkas & Roelofsen (2017) take the facts in (72) 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 bear the hallmarks of direct quotation, as can be seen by considering the interpretation of indexicals that appear within them:

(73) *[Context: **A**lvin is talking to Bertha about a conversation he had with **C**ynthia.]*

a. **A**: Then Cynthia asked me, 'You're married?'

   You = **A**: ✓ You = **B**: #

b. **A**: Then Cynthia asked me, 'Are you coming?'

   You = **A**: ✓ You = **B**: #

c. **A**: Then Cynthia asked me if you're married.

   You = **A**: # You = **B**: ✓

Consider the case in (73a) 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 (73b), 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 (73c),

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 (72) 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 (73) 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.[12] 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 an interrogative complement (type Q). I propose the following denotations for these two flavors of *ask*, modeled on Lahiri's ex. 96, p. 282:[13]

(74) $[\![ask_1]\!] = \lambda q.\lambda x.[\exists u : sp(u) = x \wedge s(u) = q]QU(u)$

(75) $[\![ask_2]\!] = \lambda Q.\lambda x.[\exists u : sp(u) = x \wedge [\![s(u)]\!] = Q]QU(u)$

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

[12] 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.

[13] 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 the first chapter of this thesis. I've also suppressed reference to the addressee argument, for readability.

In each flavor, 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_1) or denotational (ask_2).

The observation we're trying to capture is that rising declaratives can be arguments of ask_1, but they cannot be arguments of ask_2. I'll proposed 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_1 could also be an argument to ask_2, 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 thesis. 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:[14]

(76) For any u whose speaker is sp 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

[14]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.

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_1. However, rising declaratives do not denote questions, explaining why they cannot be arguments of ask_2.

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 view in which rising declaratives share a denotation with polar interrogatives.

It's worth noting that utterances of rising declaratives can be described with the word *question*. Recall the following example, familiar by now from §2.2:

(77) *[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:

(78) **Android**: Is that a question sir?
Captain: Yes, that's a question.

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

(79) $[\![question]\!] = \lambda u.QU(u)$

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.

2.7.2 RDs and NPIs

As discussed by Gunlogson (2001), RDs do not license NPIs like *any* and *ever*:

(80) a. You didn't eat any cake.

b. Did you eat any cake?

c. # You ate any cake?

(81) a. You haven't ever been to Paris.

b. Have you ever been to Paris?

c. # You've been to Paris?

This is a problem for the idea that RDs have the same denotation as polar questions, given the standard analysis of NPIs as licensed in some way or another by the semantic properties of their environment (see e.g. Ladusaw 1979; Kadmon & Landman 1993; von Fintel 1999; Barker to appear).

Farkas & Roelofsen (2017), following Horn (2016), adopt an alternative analysis in which such NPIs are instead licensed only in contexts 'compatible with the assumption that the speaker has no particular reason to prefer p over $\neg p$.' Since RDs, on Farkas & Roelofsen's account, conventionally encode some form of speaker epistemic bias, they are predicted to block NPIs. However, the idea that bias blocks NPIs is *prima facie* incompatible with the observation that High Negation Polar Interrogatives, which are strongly associated with speaker bias (Ladd 1981; Romero & Han 2004; AnderBois 2011; Northrup 2014), license NPIs:

(82) a. Don't you ever get sick of hamburgers?

b. * You ever get sick of hamburgers.

(83) a. Aren't there any vegetarian restaurants around here?

b. * There are any vegetarian restaurants around here.

It may be that the details of this bias-based approach to NPI licensing can be worked out in a way that explains these facts. However, regardless of the viability of this alternative approach to NPI licensing, if we adopt an analysis in which RDs do not denote questions, but instead achieve their 'inquisitive' effects by other means, we are able to retain the traditional idea that NPIs are licensed by the semantic properties of their environment. RDs don't license NPIs for the exact same reason that their falling declarative counterparts don't: because they have the same syntax and the same semantics.

2.8 Conclusion

Many previous analysts have called inquisitive RDs 'biased questions', e.g. Krifka (2015) and Farkas & Roelofsen (2017). Though my account does not treat them as questions in the semantic sense, the intuition behind that term is cashed out in a principled way: their intuitive questioniness comes from the contribution of the L* H-H% tune, which makes no discourse commitments of the speaker and solicits addressee response thereby; their intuitive biasedness comes from their declarative form, which projects only one future Common Ground, in effect anticipating that addressee response will be positive.

My account has relied on decompositional accounts of speech acts, like Farkas & Bruce (2010), which break discourse effects down into a few moving parts, so as to allow a formal explanation of how different speech acts differ, and what they have in common. In doing so, they allow for the description of a broader variety of speech acts than the few they were designed to model, as those moving parts can be combined in a broad variety of ways. I hope to have demonstrated here that it is viable to treat RDs in terms of the primitives of the Table model, giving a compositional account of RDs

in terms of the effect of the sentence's form and the effect of its intonation, and that it is useful to explore the possibilities made available by such models beyond the speech acts specifically defined by their creators.

In the case of inquisitive rising declaratives in particular, I hope to have shown that exploring the dynamics of the Farkas & Bruce (2010) model allows us to derive a very broad range of prior empirical observations from the basic idea that rising intonation communicates that the speaker is making no commitments (Truckenbrodt, 2006), in conjunction with the idea that any utterance places the denotation of the uttered sentence on the Table (Farkas & Roelofsen, 2017). It allows us to capture the full range of empirical phenomena addressed in prior empirical work on the subject, and to do so in a more satisfyingly explanatory fashion, by capturing the behavior of RDs entirely in terms of the interaction between rising intonation and declarative form, and by deriving that behavior entirely from mechanisms independently proposed to model the speech acts of asserting and questioning, with no appeal to additional *ad hoc* modifications to the basic model.

Chapter 3

Rising Imperatives

In this part of the thesis, I extend the account of the meanings of L* H-H% and H* L-L% defended in this thesis to imperatives. In order to do so, I'll need to make some assumptions about the meanings of utterances of imperatives. The theoretical terrain here is at present complicated and fractious—the theories of imperatives currently being debated in the literature often seem to not resemble each other at all, and there is very little consensus about even the most basic aspects of the meanings of utterances of imperatives. In the following chapter, I'll argue that rising imperatives can provide an empirical desideratum for the adequacy of theories of imperatives. In order to account for them, I'll propose a division of labor in the theory of imperatives between denotation, commitment, and update, following Farkas & Bruce's (2010) treatment of declaratives and interrogatives, which I hope can provide an avenue toward eventually reconciling the intuitions behind the various seemingly incompatible theories currently on the market. I'll begin this chapter, then, by discussing current theories of imperatives is §3.1. I'll then move on to discuss the crucial empirical facts about rising imperatives in §3.2 and §3.3. In §3.4 I argue that the empirical facts prose non-trivial problems for prior theories of imperatives; in §3.5, I propose an extension of the Table model to imperatives, as a preliminary to the account of rising imperatives. That account sits in §3.6. Finally, in §3.7, I look at how rising declaratives and imperatives behave in Hindi,

which is, I argue, instructively different from their behavior in English.

3.1 Theories of Imperatives

Because my proposal for decomposing the meaning of imperative utterances into denotation, commitment, and Table-mediated projection of Common Ground builds directly on prior proposals for the meaning of imperatives, sometimes by borrowing technology, and sometimes by attempting to derive the same intuitions, in this section I offer a brief survey of some of the major theories on the market.

3.1.1 Kaufmann (2012a, 2016)

Kaufmann develops a theory of imperatives as modals. The basic idea is that imperatives contain a covert modal operator (OP_{Imp}) that has the same meaning as a strong priority modal[1], plus some additional presuppositions that guarantee that it is interpreted performatively (cf. Ninan 2005). These presuppositions are important due to the directive force of imperatives: though priority modals can be used to describe an obligation that exists independently of the utterance (84a), imperatives always bring about an obligation by virtue of their utterance (84b).

(84) a. (According to the organizational spreadsheet,) Peter has to pick up the speaker from the airport.

b. Peter, pick up the speaker from the airport.

[1]The term 'priority modal' is a cover term for the various flavors of modality that represent which possibilities are 'preferred,' in some sense or another, e.g. deontic, bouletic, and teleological (Portner, 2007). This is in contrast to flavors of modality that are simply about what the facts are, in some sense or another, e.g. epistemic, doxastic, and circumstantial.

Unlike (84a), the only possible interpretation of (84b) is that the speaker is assigning an obligation by virtue of her utterance. In case this judgment feels a little too wispy, consider the following:

(85) a. (According to the organizational spreadsheet,) Peter has to pick up the speaker from the airport. But I think we should shuffle things around and have Martha pick her up instead.

b. Peter, pick up the speaker from the airport. #But I think we should shuffle things around and have Martha pick her up instead.

As (85a) shows, because an ordinary strong priority modal can be interpreted relative to a body of obligations other than what the speaker herself commands, it's possible for the speaker to follow up by expressing an opinion that contradicts that body of obligations. However, the infelicity of the follow-up in (85b) is congruent with the idea that an imperative intrinsically creates an obligation endorsed by the speaker: she can't go on to express a contradictory opinion. This is true even when we attempt to overtly relativize the imperative to some speaker-external body of information, as in (85a):

(86) (According to the organizational spreadsheet,) Peter, pick up the speaker from the airport. #But I think we should shuffle things around and have Martha pick her up instead.

However, it is possible to force a performative interpretation of overt strong priority modals; Kaufmann's presuppositions are designed to ensure this interpretation. In other words, the theory aims to draw out the following parallel:

(87) Go to the store! ≈ I hereby decree that you must go to the store.

The use of the phrase *I hereby decree* is not Kaufmann's, but I believe it accurately captures the idea that imperatives are NECESSARILY PERFORMATIVE strong priority

modals. Kaufmann (2012a) is an exceptionally rich book that discusses many aspects of the semantics (and syntax) of imperatives that I will not dig into here; here I present only the core of her account of the denotation of imperatives.

In the most recent presentation of her account, Kaufmann (2016) defines the presuppositions that ensure the performativity of imperatives like so (her 47):

(88) An imperative of the form '$OP_{Imp}p$' triggers the following presuppositions on its context of use c:

a. EPISTEMICAUTHORITY(c)

b. NONDESCRIPTIVITY(c) :$\Leftrightarrow$

(A-PRACTICAL(c) $\wedge$ ANSWER(p,Π_c)) $\vee$

(EXPRESSIVE(c) $\wedge$ (SOLILOQUY(c) $\vee$ SETTLED(c, p))

A context c is characterized by speaker epistemic authority iff the speaker in c has perfect knowledge of the modality salient in c (Kaufmann's 46). This accounts for various restrictions on the modal flavor of imperatives: "speakers will typically be assumed to know what they are desiring or commanding, and speakers that are taken to be in a position to give advice on factual matters will also be taken to have perfect knowledge of the relevant circumstances and goals of the person they are advising" (pp.17-18). In other words, the epistemic authority condition is connected to the ability of imperatives to be used to express desires and commands, but also to their ability to be used to give advice. It is the epistemic authority condition that ensures the performativity of imperatives: the speaker cannot be simply describing some independent body of law or obligation, they must be expressing what is preferable relative to a modality more intimate to them.

I'll take the nondescriptivity condition one disjunct at a time. A context c is addressee-practical iff the addressee has a salient decision problem Π in c and the modality salient

in c is relevant to resolving that decision problem (Kaufmann's 41). An utterance of an imperative therefore satisfies the first disjunct of the nondescriptivity condition iff it serves as an answer to that salient decision problem, given that it is interpreted relative to that salient modality.

The second disjunct says the following. A context c is expressive iff it is not α-practical for any agent α, and its salient modality is speaker bouletic (Kaufmann's 44). A context is a soliloquy if the speaker "has in mind a particular addressee A other than herself but believes that A cannot hear her utterance" (p.15). A proposition is metaphysically settled if it must be either true or false by the time of utterance, even if the interlocutors aren't sure which it is yet (Kaufmann's 48). An utterance of an imperative therefore satisfies the second disjunct of the nondescriptivity condition iff it does not bear on a salient decision problem, 'addresses' an absent addressee, and expresses the speaker's desires about a proposition whose truth is already settled.

Why this second disjunct? It's meant to account for what Condoravdi & Lauer (2012) call 'absent wish' uses of imperatives:

(89) [on the way to a blind date] Be blond! (C&L's 7di)

In such uses of imperatives, there is not a salient decision problem for the addressee that the imperative provides a solution to, as required by the first disjunct of the nondescriptivity condition; however, the conditions of the second disjunct are met.

Though this disjunctive presupposition gets the job done, one wonders whether there's a way to capture the behavior of absent wishes while unifying them with the fact that imperatives are also used to order people around. Giving a unified account of the entire illocutionary typology of imperatives is the primary motivating concern of the account I turn to next.

3.1.2 Condoravdi & Lauer (2012, 2017)

Condoravdi and Lauer propose that imperatives are speaker preferential attitudes. Like Kaufmann, they propose that imperatives contain a covert operator that is a function from propositions to propositions; they propose that the denotation of an imperative of the form IMP(p) is the proposition that the speaker has a public effective preference for p.

Effective preferences are preferences relevant to rational action choice. Effective preferences are subject to two major conditions: that they be consistent, and that they be realistic.

(90) EFFECTIVE PREFERENCES (cf. Condoravdi & Lauer (2016) ex. 65-67):
An agent A's EFFECTIVE PREFERENCE STRUCTURE (EP_A)[2] is a pair $\langle \mathbf{P}, \prec \rangle$ that is consistent and realistic with respect to A's epistemic state,
where $\mathbf{P} \subseteq \wp(W)$ and $\prec$ is a strict partial order on $\mathbf{P}$

a. CONSISTENCY:
EP_A is CONSISTENT WITH A's epistemic state E_A iff for any $X \subseteq \mathbf{P}$, if $E_A \cap \bigcap X = \varnothing$, there are $p, q \in X$ such that $p \prec q$

b. REALISM:
EP_A is REALISTIC relative to A's epistemic state E_A iff for all $p \in \mathbf{P}$, $p \cap E_A \neq 0$

The consistency requirement ensures that any two propositions that are disjoint (relative to the agent's information state) cannot both be maximal with respect to the preference ordering; the realism requirement ensures that an agent cannot have an effective preference for a proposition they know to be false. Of course, neither of these

[2] I've suppressed relativization to worlds here and throughout, as I don't believe that doing so will cause confusion.

conditions holds for non-effective preferences: it's perfectly coherent to want to stick to one's diet and to also want to eat ice cream, for instance, and it's perfectly coherent to want to have gotten an A on a test you got a B on. The additional conditions placed on effective preferences are what make them useful for rational action choice. For further empirical discussion about the behavior of different kinds of preferences, including arguments that *want* is ambiguous between both effective and non-effective preferences, see Condoravdi & Lauer (2016) §5 and references therein.

Just as a speaker's beliefs can pull apart from their discourse commitments (they can lie, or just bullshit), what a speaker presents their effective preferences as being can pull apart from what their effective preferences actually are. Condoravdi & Lauer introduce sets of Public Effective Preferences (PEPs), to correspond to the more familiar (doxastic) discourse commitments from Gunlogson (2001) and Farkas & Bruce (2010).

(91) For every interlocutor A, PEP_A is a set of propositions that A has publicly committed to act as though are maximal with respect to EP_A (cf. Condoravdi & Lauer (2012) §3.2.).

Condoravdi & Lauer bifurcate commitment states into a set of PEPs[3] and the familiar set of doxastic commitments, which Condoravdi & Lauer (2017) call Public Beliefs (PBs):

(92) A commitment state is a pair $C = \langle C_{PB}, C_{PEP} \rangle$ (cf. C&L 2017 ex.16)

With this architecture in place, we can return to the basic proposal: that an imperative of the form IMP(p) denotes the proposition that the speaker has a public effective

[3]Condoravdi & Lauer (2017) treat PEPs as themselves being effective preference structures, not as sets of propositions that are supposed to correspond to the maximal elements of a private effective preference structure. Nothing will go wrong if we take the simpler road.

preference for p.

A major motivating factor behind Condoravdi & Lauer's proposal is the illocutionary typology of imperatives—what they describe as their "functional heterogeneity" (cf. Schmerling 1982). Of particular relevance are the cases discussed at the end of the previous section, in which imperatives are used to communicate wishes. Perhaps the most compelling cases for treating imperatives as speaker preferential attitudes are what Condoravdi & Lauer describe as "addressee-less wishes:"

(93) Please, don't rain! (C&L 2012 ex. 7ci)

However, removing directive force from the semantics of imperatives means some additional work needs to be done in order to explain that imperatives are so often used to carry out speech acts that we would describe as orders and commands. Condoravdi & Lauer (2012) propose the following principle as an additional aspect of the conventional meaning of imperatives:

(94) The speaker takes it to be possible and desirable that, after his utterance, there is no action on his part that is necessary for the realization of the content. (C&L 2012 ex. 36)

The idea is that when a speaker signals their effective preferences with an imperative, they also signal that they don't want to take further action to realize those preferences, leaving it up to the addressee to bring about the indicated state of affairs.

Taking imperatives to express the speaker's preferences also renders many advice uses of imperatives problematic.

(95) [Strangers on a subway platform.]
X: How can I go to Harlem? / I want to go to Harlem.
Y: Take the A train. (C&L 2017 ex. 4b)

In this case, it seems odd to assume that the speaker is saying that their own effective preference is for the addressee to take the A train—they're directing the addressee to do so because of the addressee's goals, not because of their own. The solution that Condoravdi & Lauer (2017) propose to this problem is that agents are "cooperative-by-default."

(96) *Cooperation by default* An agent a is cooperative-by-default if she adds any topical goal g of another agents she learns about to her effective preference structure EP_a, in such a way that for no self-motivated preference $p \in EP_a : p < g$ (C&L 2017 ex. 26)

In other words, agents assume other people's goals as their own effective preferences, at least locally, for the purpose of advice-giving.

Though wish-type uses of imperatives make a treatment of imperatives as speaker preferential attitudes seem plausible, it's troubling that directive uses of imperatives, which are generally taken to be their canonical use, require the stipulation of additional ad hoc principles on this view. In the following section, I'll develop a particular implementation of Condoravdi & Lauer's preferential attitude semantics that attempts to derive the directivity of imperatives from the interaction between that semantics and the structure of the Farkas & Bruce (2010) model. However, it will still be necessary for me to assume some form of cooperation by default.

3.1.3 Portner (2004)

Portner develops a theory of imperatives as performing updates to 'to-do lists.' He takes discourse contexts to include, in addition to Common Grounds and a set of Questions (≈ a Table), a to-do list (TDL) associated with each interlocutor. A to-do list is a set of properties representing "actions which the addressee should take" (Portner 2004 p.237).

He takes imperatives to denote (addressee-restricted) properties, and takes utterances of imperatives to add the denoted property to the addressee's to-do list.

The core of Portner's view is that, while declaratives and interrogatives are fundamentally about coordinating on what we think is true (declaratives by updating the Common Ground, and interrogatives by updating the QUD), imperatives are fundamentally about coordinating on what each interlocutor should do. As such, imperatives interact with a novel component of the conversational context, which represents such behavioral commitments.

Portner provides a mechanistic account of why different clause types interact with the different components of a conversational context in the way they do: because interrogatives denote questions, they interact with the Question Set, as it is a set of questions; because declaratives denote propositions, they interact with the Common Ground, as it is a set of propositions; because imperatives denote properties, they interact with to-do lists, as they are sets of properties. To utter a sentence is to propose that its denotation to be added to that element of the context which comprises a set of elements of the same semantic type as that denotation.

Kaufmann (2012a, §3.2) and references therein provide compelling arguments that imperatives should be taken to be fully articulated CPs that denote propositions—Portner (2007) backs off of the claim that imperatives denote properties. Portner (2017) analyzes imperatives as denoting partitions. Irrespective of the mechanics of the implementation, what persists throughout these various proposals is that imperatives are taken to propose to-do list updates: the meaning of an imperative utterance is defined in terms of its (intent to have an) effect on the addressee's to-do list.

3.1.4 Charlow (2014)

Though there are many differences between his proposal and Portner's, Charlow (2014) also gives an account of imperatives in which their update potential is related directly to addressee task-assignment. For Charlow, "[t]he meaning of an imperative of the form $!\phi$ is identified with *a property of a plan*: the property it has just if it requires or is settled on seeing to it that ϕ" (p.618). To give another summary (p.644):

- Imperatives tell an agent *what to plan*
- An imperative of the form $!\phi$ does this by encoding, as a matter of its semantics, the property a plan has if it is decided on ϕ. The semantic function of an imperative is to partition plans along such lines.

In order to get from the idea that imperatives denote properties of plans to the idea that imperatives are used to tell other agents what to plan, Charlow develops what he calls Model- and Cognitive-Conditional-Theoretic Semantics (MCCTS). The proposal is richly formal, but I'll gloss over the details here. What is important for our purposes is that, like Portner, Charlow's proposal derives the core result for imperatives that they are used to (attempt to) alter the addressee's plans.

3.1.5 Starr (2017)

Starr develops an account couched within dynamic semantics in which imperatives have an update potential that is related to, but distinct from, the update potential of declarative sentences. Whereas declarative sentences, following Veltman (1996), update the context by restricting the context via intersection with some proposition p, Starr analyzes imperative sentences as updating a preference relation over the worlds in the context such that the contextually available p-worlds are preferred over the contextually available $\neg p$ worlds. A successful update with an imperative results in a context

in which we've all agreed that we prefer the p worlds to the $\neg p$ worlds. To put it schematically, declarative sentences are about building common ground, and imperative sentences are about establishing common preferences. The slogan is, as Starr puts it in his conclusion (§5.3), that "imperatives promote alternatives."

3.1.6 Summary and a path forward

In the next section, I'll present some empirical generalizations about rising imperatives, and argue that no prior proposal allows us a ready account of their behavior. I'll make a proposal for how to incorporate imperatives in the framework of Farkas & Bruce (2010), drawing inspiration from all these prior accounts, though drawing directly only on the technology developed by Condoravdi & Lauer (2012, 2016, 2017). The proposal I develop comprises an attempt to unify, at least to a certain extent, the disparate intuitions about the discourse function of imperatives that we find in the accounts surveyed above. I attempt to capture the performativity of imperatives, the role of speaker commitment in utterances of imperatives, and the update potential of imperatives, packaging together a conception of imperative updates as altering the addressee's behavioral commitments and a conception of imperative updates as leading to the adoption of common preferences.

3.2 Rising Imperatives: the essential data

This section surveys the essential data about the behavior of rising imperatives, much of which is novel. It also argues that the behavior of rising imperatives poses problems for all of the theories surveyed above, and as such, that whether or not a theory can account for rising imperatives, in a compositional manner that draws out the parallel between rising imperatives and rising declaratives, is an important desideratum for the

ultimate empirical adequacy of that theory. With this goal in mind, let's turn to the data

Imperatives accompanied by the L* H-H% tune have not been widely discussed discussed in prior literature (though see Bolinger 1989; Portner 2015; Keough et al. 2016). However, (what look like) rising imperatives are quite common in casual speech:

(97) Buy me a drink?

(98) Let's go?

(99) Give me a ride home?

I'll return in a moment to the question of whether or not these are genuine imperatives (I'll argue that they are), but first I'd like to establish a couple of empirical facts about these apparent rising imperatives.

One intuition (following Portner 2015) is that rising imperatives sound much more tentative/suggestiony than falling imperatives.

(100) **A:** I really like this present grandma gave me.

a. **B:** Write her a thank-you note.

b. **B:** Write her a thank-you note?

As signaled by my use of the highly technical term 'suggestiony,' I intend this to be taken as an informal, impressionistic judgment. With that in mind, impressionistically speaking, in (100a) **B** seems to be *instructing* **A** to write her grandmother a thank-you note, whereas in (100b) **B** seems to be only pointing out a relevant course of action. **B**'s utterance here seems fairly similar to an utterance of *You could write her a thank-you note*. To put it in a slightly more theory-laden way, in (100a) **B** seems to have committed to the idea that that's what **A** should do, but in (100b) **B** seems to be leaving it up to **A** to decide whether that's what she should do.

I'd like to put some empirical teeth on the intuition that rising imperatives are in some sense weaker than falling imperatives. I'll do this in two ways. First, I'll discuss

the possibility for the rejection of an imperative to be followed up on by *I insist*. Then I'll move on to discuss sequences of contradictory imperatives.

3.2.1 *I insist*

That some imperatives feel weaker than others is an old observation—in addition to imperatives that seem to give commands or instructions, there are also imperatives that are felt to be more like offers, like *Have a cookie*. In this section I'll argue that rising imperatives are not the same thing as weak uses of falling imperatives. Observe the following.

(101) **A:** Have a cookie.

B: No, thanks.

A: I insist.

Even for a use of a falling imperative that is typically taken to be illocutionarily 'weak,' like an offer, the speaker can respond to the addressee's rejection of the imperative with *I insist*, doubling down, pretheoretically speaking, on their proposal that the addressee have a cookie. However, if the original imperative is uttered with rising intonation, following up with *I insist* becomes significantly degraded.

(102) **A:** Have a cookie?

B: No, thanks.

A: ??I insist.

To put a finer point on it, consider sequences in which *I insist* directly follows the imperative:

(103) Have a cookie. I insist.

(104) #Have a cookie? I insist.

It appears that while 'weak' uses of falling imperatives can still be insisted upon, rising imperatives cannot. This suggests that not all 'weak' imperative are created equal—whatever leads to the weakness of rising imperatives is not the same thing that leads to the weakness of 'offering' uses of falling imperatives. I will argue that 'weak' uses of falling imperatives, like offers, are *pragmatically* weak, whereas rising imperatives are *conventionally* weak.

3.2.2 Contradictory sequences

Perhaps most strikingly, intonation affects whether a sequence of imperatives is contradictory or not:

(105) **A:** I'm having trouble managing my time lately. I don't know what my plans should be for this evening, do you have any advice?

a. **B:** Work on your paper? Blow it off and go to the beach?

b. **B:** Work on your paper. #Blow it off and go to the beach.

Example (105) displays a crucial asymmetry. In (105b), the speaker contradicts herself, instructing the addressee to pursue mutually incompatible courses of action.[4] However, as (105a) shows, a contradictory sequence of imperatives, putting forward mutually incompatible courses of action, can become felicitous if each imperative is accompanied by the L* H-H% tune.

In other words: rising intonation can obviate contradiction for sequences of imperatives. This observation is compatible with the intuition that rising imperatives merely

[4]Note here that, as is the case throughout this thesis, the sentence-final period in these examples should be taken as signifying that the utterance is accompanied by a steep, monotonic fall (the H* L-L% tune). There are non-monotonically falling tunes that nonetheless end in a final fall with which examples like this can be made felicitous.

present a course of action, without actually asking the addressee to pursue it (or, to put the intuition another way, that a speaker does not commit to a preference that the addressee actually carry out the indicated course of action when she utters a rising imperative). It can be cooperative to highlight a variety of different courses of action, even mutually incompatible ones, as possible courses of action relevant to the addressee. However, one cannot cooperatively ask that someone actually *pursue* mutually incompatible courses of action.

3.3 Are these really imperatives?

In English, imperatives are morphologically indistinguishable from infinitive VPs.[5] Because English has no special imperative verbforms, it can be difficult to prove that a given sentence is indeed a (morphosyntactic) imperative. It might be, then, that these apparent rising imperatives in English are actually not imperatives at all. In this subsection, I provide two arguments that the phenomena at issue are indeed best analyzed as rising imperatives. My first, and most definitive, argument is that the same phenomena are seen in languages that do have morphologically marked imperatives. My second argument is that the English cases are not easily reduced to non-imperative uses of fragmentary infinitive VPs, making it reasonable to use English data to investigate the phenomenon of rising imperatives.

[5]In some cases, English imperatives have more going on than infinitive VPs, for instance negated imperatives, in which *do*-support occurs (1), and imperatives with overt subjects (2):

(1) Don't stay out too late.

(2) Everyone be quiet.

However, even in these cases, the verb shows up in its infinitive form.

3.3.1 Rising imperatives in other languages

In this section, I present data from Hebrew, Dutch, French, and German languages with morphologically unambiguous imperatives in which rising imperatives pattern like the English cases. The crosslinguistic investigation presented here is very preliminary—there is much work left to be done, and many interesting factors that affect the acceptability of rising imperatives for reasons that will remain mysterious—but I believe that at the very least it can be shown that at least some speakers of languages with morphologically unambiguous imperatives find rising imperatives acceptable in at least some contexts.[67]

3.3.1.1 Hebrew

First, consider this Hebrew case:

(106) ***A:*** *ani ayef, ma laasot?* ***B:*** *lech lishon kzat?*
A: 1SG tired what to.do **B:** go.IMP to.sleep little
A: 'I'm tired, what should I do?' **B:** Take a nap?

In this case, just as in the English cases, an imperative uttered with the L* H-H% tune conveys a weaker, more suggestiony meaning than an imperative uttered with the H* L-L% tune would.

3.3.1.2 French

The following examples show that rising imperatives have the same effect in French (Québécois/European, respectively):

[6]Thanks to Itamar Francez, Jérémie Beauchamp, Dominique Sportiche, Erlinde Meertens, Magda Kaufmann, Sven Lauer, Manfred Krifka, Andreas Walker, and Carina Kauf for empirical discussion and copious judgments.

[7]Of course, rising intonation doesn't work the same in all languages; in the final section of this chapter, I discuss the case of Hindi as one example of a language in which the patterns work out differently.

(107) *[Context: a 12-year-old is talking to her mother:]*

Achète-moi une (crème glacée / glace)?
buy.IMP-me a (cream iced / ice)

'Buy me an ice cream?'

Again, the rising imperative is weaker than its falling counterpart would be. There appears to be some contextual variation in the acceptability of rising imperatives that seems to be indexed to relative social authority. For some speakers I've spoken to, (100b) sounds degraded—it sounds like an over-polite way for a mother to talk to her daughter. It would be more normal to use a falling imperative. The context jn (107) facilitates the use of a rising over a falling imperative, however, as it would not be appropriate (in some families) for a 12-year-old daughter to order her mother around.

The French facts regarding contradictory sequences of imperatives pattern with the English facts:

(108) *[Context: The addressee is a little too sleep to get work done in his office, and is complaining about it to the speaker.]*

Fais une sieste sur le campus? Va à la maison?
Make.IMP a nap on the campus Go.IMP to the house?

'Take a nap on campus? Go home?'

This sequence is acceptable even though the context makes it clear that those are mutually exclusive options; a corresponding sequence with falling intonation is contradictory.

These facts appear to go through for only some speakers, however. Others offers contradictory judgments on the facts encountered in this section, judging (107) to be infelicitous, and (108) to be felicitous only with list intonation, not with the sorts of rises that accompany interrogatives. Further work is necessary to discern what conditions this variation in judgment of acceptability. I have not consulted enough speakers

to have a sense of whether the acceptability of rising imperatives indexes factors like European vs. Québécois or younger generation vs. older generation. It might be that there is fine-grained cross-speaker variation in judgment patterns independent of those factors.

3.3.1.3 Dutch

Rising imperatives in Dutch appear to behave like they do in English.

(109) *[Context: The addressee is a little too sleep to get work done in his office, and is complaining about it to the speaker.]*

Doe een dutje? Ga naar huis?
Do.IMP a nap Go.IMP to home

'Take a nap? Go home?'

The above example is perfectly felicitous in a context in which it's understood that taking a nap and going home are mutually exclusive options; the corresponding sequence of imperatives accompanied by steep, monotonic falls is infelicitous.

3.3.1.4 German

German rising imperatives are judged acceptable by many consultants, but the facts aren't uncontroversial. The acceptability of German rising imperatives seems to vary a great deal with context. Again, the relative social authority of the interlocutors seems to have a great deal of impact, though, surprisingly, the facts seem to cut in the opposite direction of the French facts presented above.[8]

[8]Thanks to Kelsey Kraus for helping facilitate this fieldwork.

The following example is judged to be fully acceptable in the given context:[9]

(110) *[Context: a teacher is talking to a student, who is sitting near the window.]*

Hier ist es ein bißchen muffig. Mach das Fenster auf?
here is it a little stuffy make.IMP the window open

'It's a little stuffy in here. Open the window?'

However, acceptability is degraded significantly if the utterance is directed to a teacher by a student, and the sentence is felt to be iffy at best if it's directed by a student to another student. This might suggest that in German, rising imperatives are best when the speaker has authority over the addressee. However, some consultants find the following example significantly degraded, even though the authority differential runs in the same direction:

(111) *[Context: a child is walking with her mother. They pass an ice cream cart. The child says:]*

Kauf mir ein Eis?
buy.IMP me an ice

'Buy me an ice cream?'

Examples of utterances from mothers to children are also felt to be degraded:

(112) *[Context: a child comments that she really likes her present from Grandma. Her mother says:]*

Schreib mal eine Dankeskarte?
write.IMP once.PRT a thank-you note

'Write her a thank-you note?'

[9]Consultants have also noted that including the modal particle *doch* in a rising imperative nearly always renders it fully felicitous. See Kraus (2018) and citations therein for perspective on the meaning of *doch*; I will not analyze its interaction with rising imperatives here.

The role of social authority (and familial relationships) in the acceptability of rising imperatives is interesting, and certainly worthy of further scrutiny. It's not necessarily surprising that the facts might change from language to language, as we've seen in French and German (or indeed from subject to subject), as the ways in which it's appropriate for people to address each other vary from culture to culture (or indeed from family to family, or from rhetorical style to rhetorical style). One important upshot of this variation is that when investigating the felicity of rising imperatives, one must control contexts carefully, and try a broad variety of them out. In any case, we might assume, informally, a hierarchy of politeness between falling imperatives, rising imperatives, and polar interrogatives: rising imperatives are more polite than falling imperatives, as they don't actually issue a command; however, they still suggest a course of action more forcefully than a polar interrogative, like *Do you want to write her a thank-you note?* does. I suspect that the status of rising imperatives as more polite than falling imperatives, but not the most polite possible way to suggest a course of action, is what makes creating contexts that license them so tricky.

Regardless, what is important for our purposes here is that, given the correct imperative, and the correct context, rising imperatives are felicitous in German.

Consultants find sequences of mutually contradictory rising imperatives to be uncomplicatedly felicitous, and the corresponding sequences of falling imperatives to be infelicitous.

(113) *[Context: there's a talk in two hours that the addressee is interested in seeing, but they're so drowsy they're afraid they won't get anything out of it. Their friend says:]*

Mach ein Schläfchen (in deinem Büro)? Geh nach Hause?
make.IMP a nap in your office go.IMP to house
'Take a nap (in your office)? Go home?'

(114) *[Context: the addressee asks for advice about how to spend her afternoon. Her friend says:]*

Schreib weiter? (Lass sie stehen und) geh an den See?
write.IMP further let.IMP it sit and go.IMP to the ocean
'Keep writing? (Set it aside and) go to the ocean?'

To conclude: the fact that the phenomena at issue hold of rising imperatives for at least some speakers, in at least some contexts, in languages where there can be no question of whether we're looking at an imperative or not is enough to show that rising imperatives should be taken seriously as an empirical phenomenon. I turn now to arguing that even the English cases are not easy to reduce to non-imperative uses of infinitive VPs in English.

3.3.2 English rising imperatives are (probably) imperatives

In this section, I argue that apparent rising imperatives in English cannot be reduced to either of the non-imperative sentence types they most obviously resemble: fragment answers, or questions that have undergone left-edge ellipsis. This, of course, falls short of a proof that apparent rising imperatives in English are actually imperatives, and not some fourth thing, but I take myself to have shifted the burden of proof to those who would want to argue that these aren't real imperatives. Such an argument would only be credible if apparent rising imperatives in English can be shown concretely to behave like some other independently-motivated occurrence of what look like floating infinitive VPs.

3.3.2.1 Rising Imperatives vs Fragment Answers

One potential analysis of some apparent rising imperatives in English is that they are fragment answers (Merchant, 2004; Stainton, 2005). Though it's hard to see how all

apparent rising imperatives in English could be reduced to fragment answers, this objection can be applied to data in which an apparent rising imperative is used to reply to a question:

(115) **A:** What should I read tonight?

B: A novel?

(116) **A:** What should I do tonight?

B: Read a novel?

In (115), **A**'s question seeks an answer that can be provided by a DP, and a DP fragment is an appropriate response. Likewise, in (116), **A**'s question seeks an answer that can be provided by a VP, and a VP fragment is an appropriate response. Why should we think that **B**'s response in (116) is anything other than **B**'s response in (115): a fragment answer? If apparent rising imperatives in English are actually just fragment VPs, then accounting for them should be reduced to accounting for rising intonation on fragment answers, not accounting for how rising intonation interacts with imperatives.

There are empirical ways that we can tell fragment answers apart from imperatives: negation in imperatives behaves in a particular way:

(117) a. Don't text him back anymore.

b. * Not text him back anymore.

Negated imperatives always involve contraction with *do*; bare negation is never allowed in imperatives. However, both kinds of negation are grammatical in fragment answers, showing that fragment answers of the same size as imperatives are not actually (necessarily) imperatives at all:

(118) **A:** I keep telling the guy who I broke up with that I'm not interested in talking to him, but he won't stop texting me. What should I do?

a. **B:** Don't text him back anymore?

b. **B:** Not text him back anymore?

In this case, **A**'s question licenses fragment answers of the appropriate size; we can tell for sure that that (118b) is a fragment answer, because it's not a possible imperative. So we might as well assume that (118a) is a fragment answer as well, since (118b) demonstrates that the question licenses fragment answers of the appropriate size.

We can, therefore, use the grammaticality of (118b) as a test for whether we're in a context that licenses fragments of the relevant kind. If imperative-sized fragment answers are possible, (118b) should be appropriate.

Not all questions license imperative-sized fragment answers, and if we alter the context so that it no longer licenses fragment answers, rising imperatives are still possible:

(119) **A:** I keep telling the guy who I broke up with that I'm not interested in talking to him, but he won't stop texting me. Do you have any advice?

a. **B:** Don't text him back anymore?

b. **B:** *Not text him back anymore?

Even speakers who find (118b) completely acceptable agree that (119b) is ungrammatical. This shows that rising imperatives are still possible in contexts that don't license imperative-sized fragment answers. Therefore, apparent rising imperatives in English can't be reduced to fragment answers. The upshot of this investigation is that when an apparent rising imperative is given in response to a question, we must control the question to make sure that it doesn't license imperative-looking fragment answers. I've done so throughout this thesis.

3.3.2.2 Rising Imperatives vs Left-Edge Ellipsis

Another thing that apparent rising imperatives in English resemble are questions that have undergone ellipsis at their left edge (Zwicky & Pullum 1983; Fitzpatrick 2006; Weir 2016). Consider the following examples, due to Fitzpatrick (2006):

(120) <~~Does~~> anybody want a hot dog?

(121) <~~Has~~> anyone seen John today?

(122) <~~Is~~> anybody going to the game?

(123) <~~Do~~> you want chicken or beef?

I'll call these instances of 'left-edge ellipsis,' following Weir (2016).

Many apparent rising imperatives in English admit of intuitively plausible paraphrases with questions:

(124) Buy me a drink? ≈ Do you want to buy me a drink?

So it doesn't seem completely crazy to propose that (at least some) apparent rising imperatives are derived from questions via left-edge ellipsis, like so:

(125) <~~Do you want to~~> buy me a drink?

Such an account would need to explain why so much more is elided here than in normal cases of left-edge ellipsis, which as seen above generally elide only something very small. However, irrespective of that wrinkle, I'll argue that a left-edge ellipsis account of apparent rising imperatives in English is not tenable. I'll give two arguments that apparent rising imperatives cannot be reduced to questions with left-edge ellipsis.

First, left-edge ellipsis has been shown to be prosodically licensed, and to only be possible at the left edge of an intonational phrase. The following examples come from Weir (2016), and many more such examples can be found therein.

(126) a. (Have you) seen the new Star Wars?

b. I'm asking you whether *(you have) seen the new Star Wars.

(127) a. (I) won't bother seeing it, I think.

b. I think *(I) won't bother seeing it.

Rising imperatives, however, do not display this sensitivity to whether or not they fall at the left edge of an intonational phrase. In fact, rising imperatives are perfectly natural when material intervenes between the 'missing' subject and the left edge of an intonational phrase:

(128) **A:** I'm having trouble managing my time lately. I don't know what my plans should be for this evening, do you have any advice?

B: Maybe work on your paper?

My second argument that apparent rising imperatives cannot be reduced to cases of left-edge ellipsis is that it's difficult to see how an ellipsis account could deal with negated rising imperatives:

(129) Don't text him back anymore?

It is difficult indeed to see how this could be derived via left-edge ellipsis from a question. *Don't* should be sitting in C, to the *left* of the putatively elided subject. As left-edge ellipsis is a process that gets rid of material on the left edge of the sentence, there is no way to left-edge elide the subject without also eliding *don't*.

3.4 Why are rising imperatives a problem?

In this section, I discuss the ramifications of the empirical observations above for various prior proposals for the semantics of imperatives. I show that accounting for rising imperatives is a non-trivial problem for prior accounts.

3.4.1 Portner (2015)

Portner (2015) provides the only formal account of rising imperatives of which I am aware. Portner builds an extension of the system in Portner (2004), which is elaborated along lines similar to Farkas & Bruce (2010). Farkas & Bruce (building on Gunlogson's 2001 arguments regarding the importance of individual discourse commitments) add to Stalnaker's (1978) Common Ground sets of individual discourse commitments—instead of adding a proposition directly to the Common Ground, an assertion instead adds that proposition to the speaker's individual discourse commitments, and *proposes* that the rest of the interlocutors agree to let it become a shared commitment. Portner (2015) makes a similar maneuver for Portner's (2004) 'to-do lists.' He proposes that each interlocutor has their own individual copy of each other's to-do lists. When an imperative is uttered, the speaker adds the property it denotes to their own version of the addressee's to-do list thereby, and *proposes* that the addressee add it to their own version of their to-do list as well, giving rise to a shared understanding among the interlocutors that the addressee is to take action to make the indicated property true of themself.

Following Gunlogson (2001), Portner (2015) takes falling and rising intonation to indicate whose individual commitments are being altered. For Gunlogson, a falling declarative adds a proposition to the speaker's discourse commitments, but a rising declarative adds a proposition to the addressee's discourse commitments. Likewise, Portner proposes that a falling imperative adds a property to the speaker's version of the addressee's to-do list, and a rising imperative adds a property to the addressee's version of the addressee's to-do list.

Portner describes the effects his theory predicts for falling and rising imperatives like so: In uttering a falling imperative, the speaker communicates that she "rates futures in which the addressee [obeys the imperative] higher than those in which he does

not, and creates an expectation that this judgment will become mutual" (1b, p.15). In uttering a rising imperative, the speaker communicates that she "thinks the addressee rates futures in which the addressee [obeys the imperative] higher than those in which he does not, and creates an expectation that this judgment will become mutual" (2b, p.16). To paraphrase extremely simply: on Portner's view, a falling imperative indicates that the speaker wants the addressee to act in a certain way, and a rising imperative indicates that the speaker thinks the addressee wants to act in a certain way. In both cases, the speaker intends to create a common understanding that for the addressee to act in that way would be preferable.

It's an open question whether it's empirically accurate to characterize rising imperatives as signaling that the speaker expects that the addressee wants to carry out the indicated action. Take, for instance, the following case, repeated from above:

(130) *[Context: a 12-year-old is talking to her mother.]*

Buy me an ice cream?

In this case, my intuition is not that the speaker expects that the addressee's preference is to buy them an ice cream, but rather that the speaker is probing whether the addressee would be willing to. Likewise, it's not clear that the utterance creates an expectation that the addressee buying an ice cream will become a common preference—part of the intuitive weakness of rising imperatives is that they're much more easily and uncontroversially dismissed than falling imperatives. It certainly doesn't fit my intuitions to paraphrase what the speaker is doing in this example as "I think that you want to buy me an ice cream, and I'm willing to adopt that preference as well." Similar concerns apply to many of the examples discussed above.

However, I believe Portner's proposal to be unable to capture the empirical facts discussed above irrespective of whether or not one shares the intuition that rising im-

peratives signal the speaker's expectations of what the addressee wants to do. Portner's account is incapable of capturing the crucial asymmetry in (105): that sequences of imperatives that are contradictory with steep, monotonic falls become felicitous with steep, monotonic rises.

On Portner's view, a sequence of falling imperatives and a sequence of rising imperatives do the same thing, formally speaking: they perform a sequence of updates to a to-do list, adding multiple properties to it one after another. The only difference, for Portner, is whether the to-do list being updated is the speaker's version or the addressee's version. As the contradictoriness of the sequence of falling imperatives in (105) shows us, some sequences of updates to a to-do list are incoherent: a coherent to-do list cannot contain two properties that cannot both be made true of the holder of the to-do list. It shouldn't matter whether the to-do list is the speaker's version or the addressee's version: in the falling imperative sequence, on Portner's view, the speaker has added two incompatible properties to their version of the addressee's to-do list, expressing contradictory preferences about what course of action the addressee should take, and creating the expectation that those contradictory preferences will become shared preferences. In the rising imperative sequence, something nearly identical has happened: the speaker has added two incompatible properties to the addressee's version of the addressee's to-do list, expressing contradictory expectations about what the addressee's preferences are, and again creating the expectation that those contradictory preferences will become shared preferences. On any view in which rising imperatives comprise to-do list updates, sequences of mutually incompatible rising imperatives should be just as infelicitous as sequences of mutually incompatible falling imperatives; the facts show just the opposite.

3.4.2 Kaufmann (2012a, 2016)

Kaufmann's theory reduces imperative semantics to declarative semantics: an imperative denotes the same sort of thing a declarative does (contra Portner 2004; Charlow 2014; Starr 2017), there are no special components of the context that imperatives interact with (contra Portner 2004), and no special commitments that imperatives incur (contra Condoravdi & Lauer 2017). For Kaufmann, what gives imperatives their directive force, and renders them nondescriptive, is their presuppositions, which guarantee that they are interpreted performatively. An imperative, for Kaufmann, differs from a declarative sentence with an overt strong priority modal only with respect to those presuppositions; they are the same as *must*-claims uttered in contexts that lead to them being interpreted performatively. In other words:

(131) ⟦Go to the store⟧ ≈ ⟦I hereby decree that you must go to the store⟧

However, rising imperatives clearly are not the same as performatively-interpreted *must*-claims: rising imperatives, as we've seen above, are conventionally weak—they do not create obligations in the same way as falling imperatives. So at the very least, if Kaufmann's theory is to be able to deal with rising imperatives, it must be that rising intonation somehow calls off the relevant presuppositions. Let's assume for a moment that this is so. Even if there were a mechanism that called off Kaufmann's presuppositions, we'd still be left with the core semantics of her proposal: a covert strong priority modal. But declarative sentences with overt strong priority modals, which should have the same semantics as a presupposition-cancelled imperative on Kaufmann's account, simply do not interact with rising intonation in the same way that imperatives do:

(132) a. Work on your paper? Blow it off and go to the beach?

b. #You {must, have to, need to} work on your paper? You {must, have to, need to} blow it off and go to the beach?

One might retreat slightly, and say that imperatives contain covert weak necessity modals, like *should*, not strong necessity modals, like *must* (see Kaufmann 2012b for arguments both for and against treating imperative modality as weak necessity). However, the paraphrase is still not right:

(133) a. Work on your paper? Blow it off and go to the beach?

b. ??You should work on your paper? You should blow it off and go to the beach?

To my ear, rising sequences of sentences with weak necessity modals over disjoint propositions are iffy at best. Regardless of the strength of that judgment, however, it's clear that (133a) does not mean the same thing as (133b). The former asks the addressee to entertain the possibility that what they should do is work on their paper and the possibility that what they should do is blow it off and go to the beach. The latter asks the addressee to consider that they *could* work on their paper, and that they *could* blow it off and go to the beach.

That Kaufmann's proposal reduces the meaning of imperatives to the meaning of a particular use of modalized declaratives is a design feature of her account—she takes it to be desirable for imperatives to be of the same semantic type as declaratives, and to interact with the same contextual components in the same ways. However, the declarative paraphrases that seem sensible for canonical uses of imperatives do not interact with rising intonation in the same way that the actual imperatives do, suggesting that Kaufmann's story is not the full story.

3.4.3 Condoravdi & Lauer (2012, 2017)

Condoravdi & Lauer's account also has the property that imperative sentences are of the same semantic type as declarative sentences, and interact with the context in the same

way. Condoravdi & Lauer (2017) take imperatives to denote the proposition p that the speaker has a public effective preference for some proposition q; following Gunlogson (2001) and Farkas & Bruce (2010) they take speakers to incur a doxastic commitment to the proposition denoted by their utterance, and they define a relationship between public beliefs and public effective preferences such that making such a proposition p a public belief entails that the speaker has also made q a public effective preference. Imperatives work just like declaratives; the reason why they affect a speaker's public effective preferences instead of only their public beliefs is that the speaker has committed to a public belief about their own public effective preferences.

Because Condoravdi & Lauer, just like Kaufmann, give an account of imperatives in which they interact with the context in the same way as declaratives, we might expect imperatives to interact with intonation in the same way as their declarative paraphrases. On Condoravdi & Lauer's account, imperatives are speaker preferential attitudes of a particular kind:

(134) $[\![\text{Leave}]\!] \approx [\![\text{I want you to leave}]\!]$

Where *want* is interpreted in terms of effective preferences

But again, what we see empirically is that overt speaker preferential attitudes don't interact with intonation in the same way that imperatives do:

(135) a. Work on your paper? Blow it off and go to the beach?

b. #I want you to work on your paper? I want you to blow it off and go to the beach?

That overt speaker preferential attitudes do not interact with intonation in a way that is congruent with imperatives is problematic for the idea that imperatives simply denote speaker preferential attitudes, and otherwise interact with the context in the same way that speaker preferential attitudes do.

3.4.4 Charlow (2014) and Starr (2017)

Whereas Portner (2015) develops an explicit account of the role of rising intonation in imperatives, and Condoravdi & Lauer and Kaufmann give accounts in which imperatives interact with the context in the same way as declaratives, allowing us to assess whether the proposal for the effect of L* H-H% on utterances of declaratives ports over to their accounts of imperatives, Charlow's (2014) and Starr's (2017) formal proposals do not contain an explicit mechanism for rising intonation, nor do they reduce imperatives to declaratives, making it difficult to assess whether their proposals are amenable to a uniform treatment of the effect of L* H-H% across utterances of both declarative and imperative sentences. Neither account involves an explicit notion of speaker commitment that would allow us to see the ramifications of calling off that portion of the imperative utterance while holding everything else constant. As such, neither proposal provides a ready account of the contribution of L* H-H% to the meaning of an imperative utterance. I do not rule out the possibility that a sensible account of rising imperatives can be given within the frameworks developed by each of these accounts; I leave a fuller exploration of the manipulations that would need to be made to make this feasible to future work.

3.5 Slicing up the meaning of imperative utterances

My overall goal in this section will be to show that extending the account of the contribution of the L* H-H% tune developed in Part I of this thesis to imperatives can give us an explanation of the empirical facts encountered above. However, that account relied crucially on the architecture of the Farkas & Bruce (2010) model. In that model, the meaning of utterances is split up into three parts: the denotation of the uttered sentence, what that utterance commits the speaker to, and what hypothetical Common Grounds

that utterance projects, by way of placing content on the Table. Following Farkas & Roelofsen (2017), I assume that those three components are tightly linked to each other: in the case of a standard assertion, the speaker makes a commitment to the denotation of the uttered sentence, and that denotation is placed on the Table, projecting the Common Ground that would result from that commitment being made mutual. I've proposed that the L* H-H% tune signals that the speaker's commitments are not changing by virtue of their utterance, deriving the discourse effect of rising declaratives from the other, non-commitment-related properties of utterances of declarative sentences, in addition to pragmatic inferences triggered by the speaker's choice to use a rising declarative instead of one of its discourse move minimal pairs.

In order to extend this proposal to imperatives, and see whether it makes sensible predictions about the discourse behavior of rising imperatives, we first need a tripartite division of the meaning of imperative utterances into what they denote, what they commit the speaker to, and what potential future Common Grounds they project. No such tripartite division has been proposed in prior literature. However, the relevance of one to the investigation of illocutionary variation in imperatives, including variation cued by intonation, was pointed out recently by von Fintel & Iatridou (2017). I quote them at length here:

> The idea, then, is that any of these core speech moves—assertion, question, imperative—by default carries full speaker endorsement: an assertion commits the speaker to the proposition asserted, a question means that the speaker wants the conversation to address this question now, and an imperative means that the speaker wants the addressee to add the prejacent to their TDL. But in the right circumstances and perhaps depending on linguistic clues, any of these speech moves can have weaker speaker endorsement levels: an assertion may just float a proposition, without much

> or any indication that the speaker believes it, and expect the hearer to decide whether it should be added to the common ground; a question may just be put in the room without any urge to put it on the top of the question-under-discussion stack; and an imperative may just be put out there without speaker endorsement, leaving it fully to the addressee to decide whether to add it to their TDL. We submit that the latter corresponds to acquiescence and indifference uses.
>
> Beyond this suggestion, what would be needed to turn this into a full account of weak uses of imperatives (and ideally, the other speech moves)? The first order of business will be to specify a model of conversational dynamics that makes endorsement levels explicit. Then, we'd have to talk about compositionally interpreted expressions that manipulate endorsement levels. Finally, we'd have to put in place a mechanism to ensure that the default level of endorsement is at the strong end of the scale.

von Fintel & Iatridou go on to note that work by Malamud & Stephenson (2015) makes progress on that first order of business (though they do not make note of it, so do Northrup 2014 and Farkas & Roelofsen 2017). They go on to say that "The second task, a compositional semantics for speech-act-weakening expressions, is something that has not yet been worked out. ... We will not attempt here to embark on such a project."

This thesis comprises just such a project, and as such, I turn now to developing an extension of the Farkas & Bruce (2010) model that allows a compositional account of L* H-H% and H* L-L% as commitment-modulating operators for imperatives, as well as declaratives and interrogatives. I follow Portner (2015) in bifurcating Farkas & Bruce's contexts into a portion that declaratives and interrogatives interact with (corresponding to Farkas & Bruce's original system) and a portion that imperatives interact

with, which otherwise operates in a parallel fashion. However, there are significant differences in the details of the implementation.

What I will propose here is a programmatic extension of the Table model. As I noted in §1.2.4, the components of the Table modal are modally unified: all receive a doxastic interpretation. I propose that the Table model is actually split in two: into a doxastic half, which corresponds exactly to the Table model we've been dealing with throughout this thesis, and into a teleological half, which is identical to the doxastic half in all respects other than the modal interpretation given to its components. I will propose that imperatives do *exactly the same thing* that declaratives do, except that they interact with the half of the context whose interpretation is teleological, rather than doxastic. I will assume, following Condoravdi & Lauer (2012), that the modality relevant to the teleological half of the context is effective preferences. However, one could imagine an alternative implementation in which the relevant modality is priority modality of the kind made use of by Portner (2007) and Kaufmann (2012a). Unfortunately, I will not be able to flesh out that implementation here.

3.5.1 Bifurcating the model

In this section, I will step through the components of the Table model, and propose that they are bifurcated into a doxastic half and a teleological half, with the doxastic half being the familiar component from Farkas & Bruce (2010), and the teleological half serving the same purpose relative to effective preferences.

I follow Condoravdi & Lauer (2012, 2017) in assuming that an individual's discourse commitments are bifurcated into doxastic and preferential commitments.

(136) DISCOURSE COMMITMENTS (bifurcated version):
For all discourse participants X, $DC_X = \langle DC_{dox,X}, DC_{tel,X} \rangle$

Where $DC_{dox,X}$ is a set of propositions that X is publicly committed to acting as though she believes,

and $DC_{tel,X}$ is a set of propositions that X is publicly committed to acting as though are maximal with respect to X's effective preference structure EP_X

An agent's Doxastic Discourse Commitments (DC_{dox}) correspond directly to discourse commitments in the Farkas & Bruce (2010) model: they represent what the speaker has publicly committed to act as though she believes. An agent's Teleological Discourse Commitments (DC_{tel}) correspond to Condoravdi & Lauer's (2012, 2017) Public Effective Preferences: they represent what the speaker has publicly committed to act as though they have an effective preference for. See §3.1.2 for the full details about effective preferences; informally, they're preferences that guide action choice, which are required to be consistent and realistic. The consistency requirement, simply stated, would be that the grand intersection of any agent's DC_{tel} must not be the empty set. We could state the condition on realism like so:

(137) REALISM CONDITION ON DC_{tel}:

For any agent X, $[\forall p : p \in DC_{tel,X}]p \cap \bigcap DC_{dox,X} \neq \varnothing$

In other words, an agent's doxastic commitments constrain their possible teleological commitments.

I will continue to programmatically bifurcate the other elements of the Table model along the same lines, splitting the Table, the Projected Set, the QUD, the Common Ground, and the Context Set into a doxastic and a teleological half:

(138) COMMON GROUND (bifurcated version):

$CG = \langle CG_{dox}, CG_{tel} \rangle$

Where $CG_{dox} = \{p : \forall X, p \in DC_{dox,X}\}$,

and $CG_{tel} = \{p : \forall X, p \in DC_{tel,X}\}$

The Doxastic Common Ground (CG_{dox}) is the Common Ground familiar from Stalnaker (1978): the set of all propositions that all interlocutors are (publicly, doxastically) committed to. The Teleological Common Ground is the set of all propositions that all interlocutors are publicly committed to having an effective preference for.

(139) CONTEXT SET (bifurcated version):

$CS = \langle CS_{dox}, CS_{tel} \rangle$

Where $CS_{dox} = \bigcap CG_{dox}$,

and $CS_{tel} = \bigcap CG_{tel} \cap CS_{dox}$

The Doxastic Context Set (CS_{dox}) is the set of all worlds compatible with all the propositions in the Doxastic Common Ground; the Teleological Context Set (CS_{tel}) is the set of all worlds compatible with all the propositions in *both* Common Grounds. In other words, the Teleological Context Set represents not just the worlds in which all of the interlocutors' mutual teleological commitments obtain (call them 'goal-worlds'), but rather only those such worlds that are also compatible with the interlocutors' doxastic commitments—only the goal-worlds that are achievable given what the interlocutors have agreed the facts are (for the purposes of the conversation). The assumption of a Teleological Context Set in the first place ensures that mutual teleological commitments must be consistent: if two disjoint propositions enter CG_{tel}, CS_{tel} will be the empty set, resulting in anomaly. The stronger assumption that CS_{tel} also reflects the information in CS_{dox} ensures that mutual teleological commitments must be realistic: if the interlocutors make teleological commitments that are unachievable given their doxastic commitments, CS_{tel} will again be the empty set, resulting in anomaly. I take this to be a desirable result, as consistency and realism are assumed to be properties of the effective preference structures that teleological commitments are interpreted as giving information about. Just as with speakers' teleological discourse commitments,

the assumption that effective preferences are subject to a consistency requirement provides glue that holds the doxastic and teleological portions of the context together: the doxastic commitments that speakers make, and the propositions that enter the doxastic Common Ground, constrain the possible teleological commitments that they can make, and constrain which propositions can enter the teleological Common Ground.

I turn now to the Table.

(140) THE TABLE (bifurcated version):

$T = \langle T_{dox}, T_{tel} \rangle$

Where the maximal element of T_{dox} represents the propositions that are currently candidates for becoming members of CG_{dox},

and the maximal element of T_{tel} represents the propositions that are currently candidates for becoming members of CG_{tel}

Again, the Doxastic Table (T_{dox}) is the Table familiar from Farkas & Bruce (2010): it hosts content under consideration for incorporation into the Doxastic Common Ground. The Teleological Table (T_{tel}) hosts content under consideration for incorporation into the Teleological Common Ground. As alert readers may have already anticipated, each Table is associated with its own Projected Set, which contains possible future Common Grounds incorporating the material on it.

(141) THE PROJECTED SET (bifurcated version):

$PS = \langle PS_{dox}, PS_{tel} \rangle$

Where $PS_{dox} = \{CG_{dox} + p : p \in \text{MAX}(T_{dox})\}$,

and $PS_{tel} = \{CG_{tel} + p : p \in \text{MAX}(T_{tel})\}$[10]

[10] I assume here a function MAX from stacks to sets of propositions—when MAX is applied to a stack, it returns the maximal element of that stack.

The Doxastic Projected Set (PS_{dox}) is the Projected Set familiar from Farkas & Bruce (2010): it contains a set of possible future Doxastic Common Grounds, one incorporating each element of the set of propositions that is the maximal element of the Doxastic Table. The Teleological Projected Set (PS_{tel}), does the same for the teleological side of the context, *mutatis mutandis*.

Finally, I assume that the QUD is bifurcated into a doxastic QUD and a teleological QUD as well:

(142) THE QUD (bifurcated version):

$QUD = \langle QUD_{dox}, QUD_{tel} \rangle$

Where QUD_{dox} and QUD_{tel} are sets of propositions.

QUD_{dox} is the familiar QUD: it specifies a question about what the world is like; adding an Issue to T_{dox} is only relevant if resolving that Issue provides a strategy for resolving QUD_{dox}. QUD_{tel} is also a set of propositions, but it does not receive the doxastic interpretation the more familiar QUD receives. Rather, QUD_{tel} is a question about what our effective preferences should be, and adding an Issue to T_{tel} is only relevant if resolving that Issue would resolve QUD_{tel}. I state this relevance condition on Issue-raising in its full generality:

(143) RELEVANCE CONDITION ON ISSUE-RAISING:

For any modality α, a discourse move m that raises an Issue I by placing it on T_α is relevant iff resolving I would (partially) answer QUD_α

I assume that QUD_{tel} plays the role Kaufmann (2016) assigns to a contextually salient decision problem: imperatives implicitly address a contextually salient decision problem, just like declaratives implicitly address a contextually salient question about what the world is like. For this reason, I will often refer to QUD_{tel} as a decision problem. Kaufmann specifies that a decision problem is a set of non-overlapping

propositions each of which represents a course of events that is *choosable*. She acknowledges that she does not have a full formal definition for choosability; I'll make the following simple assumption:

(144) CHOOSABILITY CONDITION ON QUD_{tel}:

$[\forall p : p \in QUD_{tel}]p \cap CS_{dox} \neq \varnothing$

Again, the realism condition on effective preferences rears its head, and allows the doxastic portion of the context to impose constraints on the teleological portion: I'll assume that an effective preference is a choosable solution to a decision problem if it is compatible with the doxastic Context Set. That is to say, a decision problem can only be solved by adopting an effective preference for something that we don't already know to be impossible.

What we've done so far is systematically generate a teleological portion of our representation of discourse contexts. All I've done is assume that every component of the Table model, with its familiar doxastic interpretation, is paired with a component identical except that it receives an interpretation in terms of effective preferences. I've imposed only those the constraints on the teleological portion of the discourse context that follow from the realism condition on effective preferences. I'll move on to my assumptions about the denotation of imperatives.

3.5.2 Imperative denotations and clause typing

I'll assume that imperatives denote a simple proposition that expresses their fulfillment conditions, a 'minimal' semantics for imperatives (q.v. von Fintel & Iatridou 2017, cf. Condoravdi & Lauer 2017 §3):

(145) $[\![$Go to the store!$]\!] \approx [\![$*Addressee* goes to the store$]\!]$ (cf. C&L 2017 ex. 14)

I've stipulated here that the subject of an imperative is always the addressee. For copious evidence that subjects of imperatives, even overt subjects, must be restricted to addressees, see Kaufmann (2012a §3.2.4). It's unsatisfying to have to simply stipulate this requirement, but it's not obvious to me at present how I could derive it.

Let me note as well that this minimal proposal for the semantics of imperatives, though it appears superficially very different, is inspired heavily by the proposals of Kaufmann (2012a, 2016) and Condoravdi & Lauer (2012, 2017). Both authors propose that exactly such a proposition is involved in the denotation of imperatives; they propose it is an argument to a covert modal operator in the left periphery of the imperative clause. What I propose here is that the relevant modality involved comes from how the imperative interacts with the context. In the model of the meaning of utterances of declarative sentences we've been working with throughout the thesis, declaratives are not doxastically modalized on the level of the denotation. However, an utterance of a declarative sentence places its content under consideration as a potential (doxastic) Common Ground update, and might also, depending on intonation, incur a (doxastic) commitment. It's the way that a declarative sentence interacts with the discourse context that gives its utterance a doxastic flavor. Likewise, I propose that, though there is no covert modal that contributes modal flavor to the denotation of an imperative, its utterance places its content under consideration as a potential (teleological) Common Ground update, and might also, depending on intonation, incur a (teleological) commitment. Just like with declaratives, the modal flavor comes not from covert modality in the imperative clause, but rather from the way in which the proposition denoted by the sentence is put into play in the discourse context. I turn now to how this works.

I'll assume that clause typing enters the picture not via an imperative operator that alters the semantics of imperatives (Kaufmann 2012a, 2016, Condoravdi & Lauer 2012, 2017), but rather that clause typing serves the purpose of determining which half of the

context an utterance interacts with: declarative and interrogative sentences interact with the doxastic half of the context; imperative sentences interact with the teleological half of the context.

I'll cash this out by modifying the utterance function to be sensitive to the clause type of the uttered sentence.[11]

(146) UTTERANCES AS FUNCTIONS (clause-typed version):

UTT$(sp, s, t, ct, c_n) \rightarrow c_{n+1}$

Where sp is the speaker,

s is a sentence

t is an intonational tune

ct is a clause type

and c_n and c_{n+1} are contexts

I assume the following basic discourse effect for utterances:

(147) THE BASIC DISCOURSE EFFECT OF UTTERANCE (clause-typed version):

For any utterance

a. if ct is DEC or INT, $T_{dox,n+1} = T_{dox,n} + [\![s]\!]$

b. if ct is IMP, $T_{tel,n+1} = T_{tel,n} + [\![s]\!]$

c. in all other respects, $c_{n+1} = c_n$ (modulo the effect of t)

The definition of the discourse effect of H* L-L% will need to be modified to ensure that utterances that add content to the Doxastic Table result in doxastic commitments,

[11] See the Appendix for an alternative formalization in which sentences are treated as functions from contexts to contexts, and those functions are built through compositional interaction between a morpheme contributed by the intonational tune and a morpheme contributed by a clause type marker. I believe the differences between the two formalization to be predominantly aesthetic, though it might be that we can scrounge up reasons to prefer one to the other.

and utterances that add content to the Teleological Table result in teleological commitments:

(148) Discourse Effect of H* L-L% (clause-typed version):

For any utterance, if t = H* L-L%, $DC_{\alpha,sp,n+1} = DC_{\alpha,sp,n} + \bigcup [\![s]\!]$

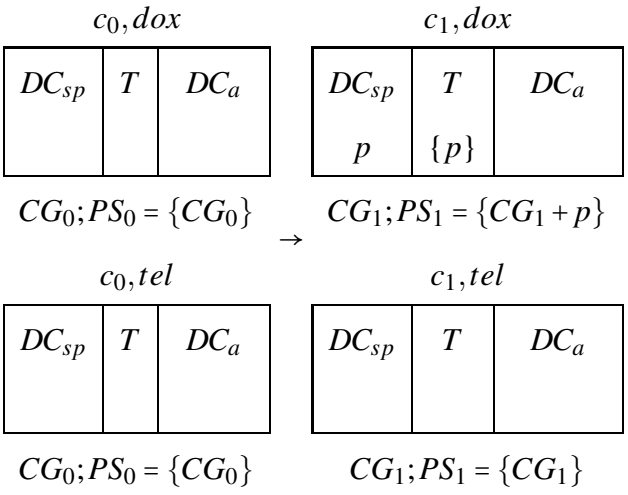
Where α is the modality of the portion of the context modified by the utterance

Utterances accompanied by steep, monotonically falling intonation have the discourse effect of adding the informative content of what they've placed on the Table to the speaker's Discourse Commitments. Which Table the utterance has placed content onto, Doxastic or Teleological, determines which of the speaker's sets of Discourse Commitments the utterance adds content to.

3.5.3 How the model works

At this point, we can stop and look at the effects of canonical utterances of declarative and imperative sentences: those accompanied by falling intonation. Falling declaratives will work exactly as they did before:

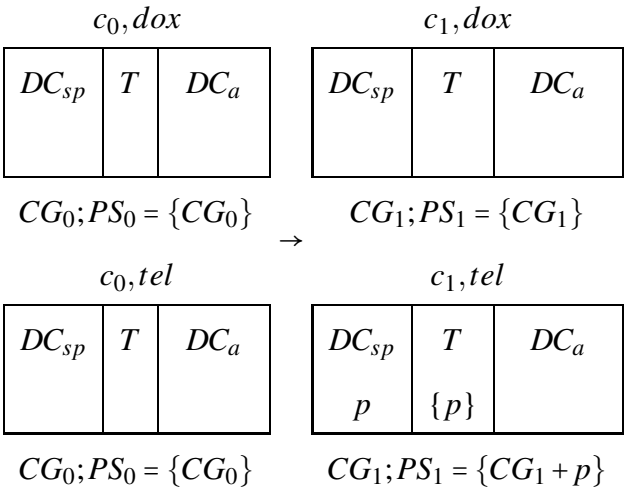
(149) UPDATE WITH A FALLING DECLARATIVE



In this case, because of the clause type of the uttered sentence, nothing is happening in the teleological half of the context. In the doxastic half of the context, we see a familiar assertion: The speaker makes a doxastic commitment to p, and places $\{p\}$ on Table, projecting the Common Ground that would result from that commitment being made mutual. The conversation is primed for default agreement: because the speaker has made a commitment that would resolve the current Issue if made mutual, that commitment will automatically become mutual if nobody objects.

Utterances of falling imperatives will be the mirror image of assertions:

(150) UPDATE WITH A FALLING IMPERATIVE



In this case, the same thing is going on as in the utterance of a falling declarative, with the only difference being that clause typing specifies that the other half of the context is being modified. The speaker again makes a commitment to p, and places $\{p\}$ on the Table. The difference is that that commitment and projection are made relative to a teleological, not a doxastic, modality: the speaker is making a commitment to having an *effective preference* for p, and projecting a Common Ground in which that commitment has been made mutual. Again, the speaker's utterance has left the conversation primed for default agreement: the speaker's commitment would resolve the current Issue if made mutual, and so it will become mutual automatically if nobody

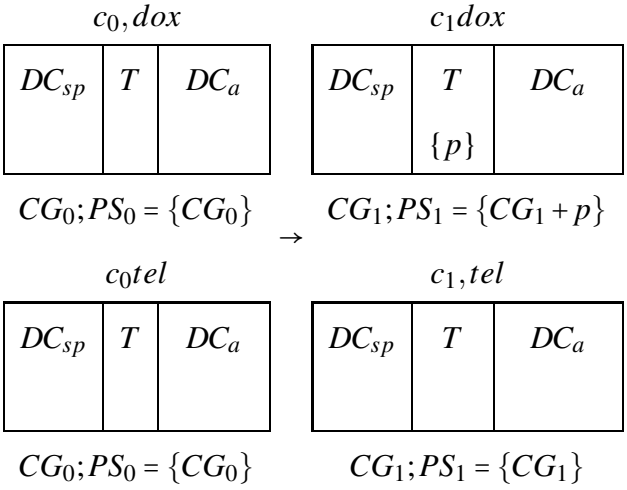
objects.

Finally, rising declaratives still work the same as well. We can safely carry over the discourse effect of L* H-H% from the model as it stood prior to the bifurcation of the context into a teleological half and a doxastic half. I've repeated that definition here:

(151) For any utterance, if t = L* H-H%, $DC_{sp,o} = DC_{sp,i}$

A speaker acquires no new commitments (whether doxastic or teleological) by virtue of an utterance accompanied by steep, monotonically rising intonation. As a quick sanity check, observe that bifurcating the context into a teleological and a doxastic portion has no effect on the behavior of rising declaratives:

(152) UPDATE WITH A RISING DECLARATIVE



The speaker still places only $\{p\}$ on the Doxastic Table while withholding their own commitment; this still comprises a discourse move minimal pair with falling declaratives and rising polar interrogatives over the same sentence radical, so the same pragmatic reasoning applies.

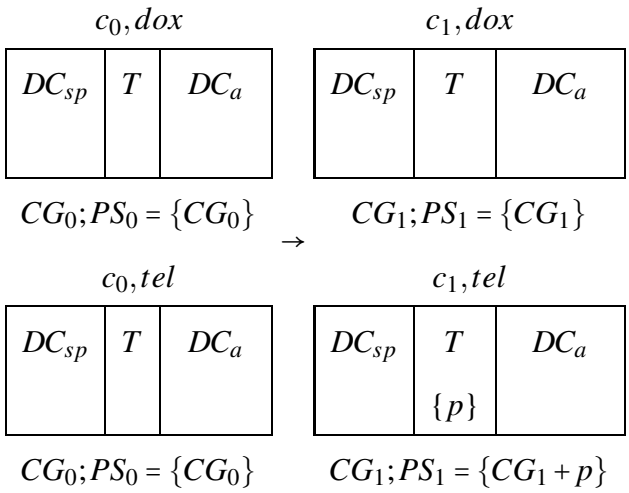
It's worth noting at this point, before moving on to the account of rising imperatives, that this implementation, despite the fact that it borrows technology directly only from Condoravdi & Lauer (2017), borrows several ideas quite directly from other prior

accounts. Perhaps most obviously, it takes from Starr (2017) the idea that the ultimate discourse goal of imperatives is to coordinate on common preferences. It also takes from Portner (2004) and Charlow (2014) the idea that (part of) the discourse goal of imperatives is to assign tasks to the addressee: in order for the imperative to become a common preference, the speaker's commitment to an effective preference for it must be supplemented by the addressee's commitment to an effective preference for it. Intrinsic to the structure of the Farkas & Bruce (2010) model is a particular way of splitting apart individual commitments and shared commitments, and breaking up commitments into those that are an intrinsic part of the effect of an utterance (speaker commitments) and those that would result from the eventual incorporation of the content introduced by an utterance into the context (addressee/mutual commitments). One way to think about this architectural division of labor is that it provides a way to legislate the apparently large differences between prior proposals for the effect of imperatives, which have had a tendency to focus exclusively on speaker commitments (Condoravdi & Lauer), addressee commitments (Portner, Charlow) or mutual commitments (Starr). It may be that, at some level of analysis, everybody is right.

3.6 Accounting for rising imperatives

As we would expect, an utterance of a rising imperative is the mirror image of the corresponding declarative:

(153) UPDATE WITH A RISING IMPERATIVE



Here, just as in the case of a rising declarative, the speaker places $\{p\}$ on the Table (in this case the Teleological Table), but withholds their own commitment to it. That is to say, the speaker puts the conversation into a state that projects a Common Ground in which p has become a mutual teleological commitment; however, they have not indicated that they have an effective preference for p, and their lack of teleological commitment to p means that this utterance lacks directive force: the conversation has not been put into a state such that p will become a mutual teleological commitment if nobody makes a fuss about it, because the speaker has not made a commitment that would resolve the Issue they've raised if it were made mutual—they've made no commitment at all. The basic dynamics of the model, then, explains why rising imperatives lack the directive force that falling imperatives have: that directive force comes from default agreement. I turn now to a discussion of the pragmatics of utterances of rising imperatives.

3.6.1 Rising imperatives: the basic pragmatics

In order to give a treatment of the pragmatics of utterances of rising imperatives, we must first make sure our house is in order with respect to the application of the relevant

Gricean maxims to imperative utterances. I will make the following assumptions about the application of the maxims of QUALITY and QUANTITY as they apply to making teleological commitments, working in parallel to the proposed maxims as they were applied to doxastic commitments in §2.5.2:

(154) QUALITY (teleological commitment version):

1) Do not add a proposition to DC_{tel} if it is incompatible with the maximal elements of your private effective preference structure.

2) Do not add a proposition to DC_{tel} if it is not a maximal element of your private effective preference structure.

(155) QUANTITY (teleological commitment version):

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

The maxim of QUALITY as applied to teleological commitments works exactly like it did as applied to doxastic commitments. In both case, QUALITY enforces congruence between one's public commitments and the private mental states those commitments are made in reference to. The doxastic version of the maxim specified that public doxastic commitments must be accurate representations of private beliefs. The teleological version of the maxim specified that public teleological commitments must be accurate representations of private effective preferences. As always, QUALITY comes with two clauses. The first clause (QUALITY 1) specifies that one should not make a teleological commitment that is in direct contradiction to one's private effective preferences (cf. the doxastic version: that one should not make a doxastic commitment to what one believes to be false). The second clause (QUALITY 2) specifies that one should not make a teleological commitment that is not entailed by one's effective preferences (cf. the doxastic version: that one should not make a doxastic commitment to something one

is not fully confident is true).[12] The maxim of QUANTITY as applied to teleological commitments is verbatim identical to the maxim as applied to doxastic commitments; no changes are necessary here.

I'll also reformulate the maxims of QUALITY and QUANTITY as applied to teleological projection:

(156) QUALITY (teleological 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 $CG_{tel} + p$ if there is some interlocutor A such that $\bigcap DC_{tel,A} \cap p = \varnothing$)

2) Do not add a hypothetical Common Ground to the projected set if you have reason to believe there is an interlocutor whose private effective preferences are incompatible with that Common Ground (i.e.: don't project $CG_{tel} + p$ if you have reason to believe there is an interlocutor whose private effective preferences entail $\neg p$)

(157) QUANTITY (teleological projection version):

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

These formulations are identical to the formulations of these maxims as applied to projection of doxastic Common Grounds; the only changes are the addition of *tel* subscripts, and the change of 'beliefs' to 'effective preferences.'

Finally, I assume the notion of relevance defined in the §3.5.1, restated here:

[12] When I say that some agent **A**'s effective preferences entail a proposition p, I mean that $\bigcap \textsc{Max}(EP_A) \subseteq p$, where I assume that the function MAX, when applied to an effective preference structure, returns the set of propositions that are maximal with respect to that effective preference structure.

(158) RELEVANCE CONDITION ON ISSUE-RAISING:

For any modality α, a discourse move m that raises an Issue I by placing it on T_α is relevant iff resolving I would (partially) answer QUD_α

As with the analysis of the pragmatics of rising declaratives, I will not take the maxim of MANNER to be crucially relevant.

With these assumptions in hand, we can investigate the basic pragmatics of utterances of rising imperatives, before moving on to discuss the pragmatics that falls out of their competition with their discourse move minimal pair, falling imperatives.

Recall that a rising imperative denoting p simply places $\{p\}$ on T_{tel}, and therefore gives rise to a $PS_{tel} = \{CG_{tel} + p\}$. Without considering competition with alternative utterances, we automatically generate the following two conditions on cooperative utterances of rising declaratives: first, by the maxim of RELATION, p must be relevant, that is to say it must be a potential solution to the contextually salient decision problem QUD_{tel}. Second, by QUALITY, it must be the case that no interlocutor has made a public teleological commitment incompatible with p (QUALITY 1), and that the speaker does not suspect that any interlocutor's private effective preferences are incompatible with p (QUALITY 2). Informally: 'Here's a solution to our decision problem, and I see no reason why we couldn't adopt it.' This, of course, leaves open the possibility that there are other satisfactory solutions to the decision problem.

This last feature is in contrast with utterances of falling imperatives. In the case of a falling imperative denoting p, the speaker makes a teleological commitment to p. If p is indeed a maximal element of the speaker's effective preferences, then no disjoint proposition can also be maximal with respect to those effective preferences. If we follow Kaufmann (2016) in requiring that decision problems are sets of non-overlapping propositions, then if a QUD_{tel}-relevant p is a maximal element of a speaker's effective preferences, then p is the *only* solution to QUD_{tel} that is compatible with the speaker's

effective preferences. In addition, a falling imperative, by virtue of the speaker's commitment, licenses default agreement, meaning that that solution to QUD_{tel} will become Common Ground if nobody objects—again, foregrounding the way that falling imperatives proffer their content as the only acceptable solution to the current decision problem in a way that rising imperatives don't.

I turn now to the inferences that we can derive from pragmatic competition between falling and rising imperatives.

3.6.2 Rising imperatives: competition with falling imperatives

I begin by making the following assumption about discourse move minimal pairs, in reaction to the bifurcation of the Table model developed above: that discourse move minimal pairs must update the same portion of the discourse context as each other. That is to say, imperatives can't form discourse move minimal pairs with declaratives or interrogatives. With this addendum, I retain the definition of discourse move minimal pairs given in §2.5.1. Given that definition, rising declaratives are members of a discourse move minimal pair with falling imperatives, from which they differ only with respect to whether the speaker makes a teleological commitment to p.

Because rising imperatives are members of a discourse move minimal pair, they trigger the inference that for the speaker to have uttered the pairmate of the rising imperative (= the corresponding falling imperative) would have been uncooperative.

Because a falling imperative differs from a rising imperative only with respect to the speaker's teleological commitment to p, if a rising imperative is cooperative but a falling imperative isn't, it must be that to make that commitment would be uncooperative. I assume that rising and falling imperatives are equivalently mannerly; they raise the exact same Issue, so they must always be equivalently relevant; and making a commitment is preferable to not making one with respect to the maxim of QUANTITY.

Therefore, the source of the uncooperativity of the falling imperative must be that to have committed to p would've violated QUALITY.

We can then ask the question: should we infer on the basis of the speaker's utterance of a rising imperative that the speaker's commitment to p would've violated QUALITY 1, or that it would've violated QUALITY 2? We can actually come to a definite answer to this question, reasoning from the assumption that the speaker's utterance of the rising declarative was cooperative. As discussed in the previous section, one condition on the cooperativity of the utterance of a rising imperative is that the speaker has no reason to assume that p is incompatible with any interlocutor's effective preferences. On this basis, we can assume that it is not the case that the speaker's commitment to p would've violated QUALITY 1. That commitment would only violate QUALITY 1 is the speaker's effective preferences were incompatible with p. But if the speaker's effective preferences were incompatible with p, then their projection of a p-incorporating Common Ground would've violated QUALITY: they would've projected a Common Ground that they knew was incompatible with an interlocutor's effective preferences. Therefore, we must conclude that the speaker's commitment to p would've violated QUALITY 2.

In other words, on the basis of competition with falling imperatives, we infer that the speaker avoided committing to p because it is not maximal with respect to their effective preferences; however, we also infer that it is not *incompatible* with their effective preferences, otherwise the rising imperative would not be cooperative in the first place.

The overall picture of the pragmatics of rising imperatives is this: an utterance of a rising imperative denoting p is only cooperative if p resolve the contextually salient decision problem, p is not currently a maximal element of the speaker's effective preferences, and to the best of the speaker's knowledge no interlocutor's effective preferences are incompatible with p.

One might wonder whether rising imperatives are accompanied by an addressee-oriented bias of the sort we've observed for rising declaratives: does an utterance of a rising imperative denoting p signal that the speaker suspects p to be the effective preference of the addressee? I believe that, empirically, this is not so (*pace* Portner 2015). And the pragmatics of rising imperatives I've outlined here indeed predicts that rising imperatives will pull apart from rising declaratives with respect to this bias. In the pragmatics of rising declaratives, this bias is derived from competition between rising declaratives and rising polar interrogatives. However, there is not such a discourse move minimal pair available for rising imperatives. There is not a clause type corresponding to interrogatives that operates on the teleological portion of the discourse context. Without such a competitor, we have no way of deriving an inference that the addressee is biased toward an effective preference for p.

3.6.3 Accounting for contradictory sequences

As we saw above, sequences of imperatives that are infelicitous with falling intonation can become felicitous when accompanied by rising intonation. A relevant example is repeated here:

(159) **A:** I'm having trouble managing my time lately. I don't know what my plans should be for this evening, do you have any advice?

a. **B:** Work on your paper? Blow it off and go to the beach?

b. **B:** Work on your paper. #Blow it off and go to the beach.

The proposal for the discourse effect of falling imperatives correctly predicts that (159b) will be contradictory. Assume that in the context above *Work on your paper* denotes the proposition that the speaker spends her evening working on her paper, and that *Blow it off and go to the beach* denotes the proposition that the speaker doesn't

work on her paper, and goes to the beach instead. These propositions are obviously disjoint. If the speaker adds two disjoint propositions p and q to her Teleological Discourse Commitments, then the set of worlds compatible with all of her teleological commitments ($\bigcap DC_{tel,sp}$) will be the empty set; in (159b), the speaker has made incompatible commitments. Seen another way, if both imperatives go unobjected-to and license default agreement thereby, both p and q will be added to CG_{tel}, and CS_{tel} will thereby become the empty set, signaling an incoherent discourse.

The proposal also correctly predicts that (159a) will be fine: the speaker has made no commitments of any kind, and therefore cannot have made incompatible ones. Seen another way, the speaker's utterances do not license default agreement, and so there's no way her discourse moves could lead to CS_{tel} becoming the empty set, because there's no way they could lead to modification of CG_{tel}.

Even at a glance, the proposal correctly predicts the crucial asymmetry between sequences of mutually incompatible imperatives with rising and falling intonation. I will turn now to further discussion of what exactly the speaker communicates by way of a sequence of rising imperatives, and what state the discourse is in following such a sequence.

First, assume that **A**'s utterance introduces a decision problem that we could gloss as *What should I do this evening?*, a set of disjoint propositions characterizing different ways **A** could spend the evening, each of which is compatible with CS_{dox}: {***A*** *spends her evening singing karaoke*, ***A*** *spends her evening at the gym*, ***A*** *spends her evening watching King of the Hill*, ***A*** *spends her evening working on her dissertation*...}.

Given the pragmatics of uttering rising declaratives described above, **B**'s first rising imperative, denoting p, will be cooperative iff p is a solution to that decision problem, p is not currently **B**'s effective preference, and **B** has no reason to believe p is incompatible with either **A** or **B**'s effective preferences. In effect: 'Here's a solution to our

decision problem, and I see no reason why we couldn't adopt it.'

B's second rising imperative, denoting q, works the same way: it's cooperative iff q is a solution to that decision problem, q is not currently **B**'s effective preference, and **B** has no reason to believe p is incompatible with either **A** or **B**'s effective preferences. In effect: 'Here's another solution to our decision problem, and I see no reason why we couldn't adopt it either.'

After **B**'s utterance of the sequence of rising imperatives, we've learned, via the assumption that **B** is being cooperative, that **B**'s effective preference do not entail but also are not incompatible with either p or q, and that **B** does not believe that **A**'s effective preferences are incompatible with p or q either. As for the state of T_{tel}, after **B**'s two imperatives its maximal element is q, underneath which sits p, dictating the anaphoric potential of response particles.

3.6.4 Accounting for *I insist*

As we saw in §3.2.1, even weak uses of falling imperatives allow the speaker to felicitously respond to a negative response with *I insist*, but such responses are infelicitous with rising imperatives. I repeat the crucial data here:

(160) Have a cookie. I insist.

(161) #Have a cookie? I insist.

On my proposal, the crucial difference between a rising and a falling imperative is whether or not the speaker has made a teleological commitment to the proposition denoted by the imperative by virtue of their utterance. I will assume that in these examples, *I insist* involves null complement anaphora (i.e., we should read it as *I insist* <*that p*>). I will assume further that the interpretation of the elided p is anaphoric

to the preceding imperative—*I insist* is interpreted as *I insist that you have a cookie.* Finally I will assume that *I insist that p* entails that the speaker is committed to *p*.

Recall that part of the pragmatics of uttering a rising imperative denoting *p* is that they signal that it would be uncooperative for the speaker to commit to *p*. Following up with *I insist*, then, is infelicitous because in order for it to be cooperative, the speaker must be committed to *p*; yet, the rising imperative is cooperative only if it would be *un*cooperative for the speaker to commit to *p*. Therefore, there is no way to reconcile (161) with the assumption that the speaker is being cooperative—either it's cooperative to commit to *p*, or it isn't.

The important conclusion to draw from the *I insist* facts is this: my proposal is that rising imperatives are *conventionally* weak. That is to say, utterances of rising imperatives make a weaker discourse move than utterances of falling imperatives: they do not commit the speaker to anything, and they do not put the context into a state that licenses default agreement; therefore, they cannot in and of themselves be responsible for updating the Teleological Common Ground, as utterances of falling imperatives can. 'Offer' uses of falling imperatives, however, like *Have a cookie*, are not conventionally weak; they're *pragmatically* weak. They're canonically directive imperatives, used in context in which it's clear that the speaker's reason for trying to make *p* a mutual teleological commitment is, for instance, that they're being a generous host. Diagnostics like the felicity of *I insist* pull pragmatic weakness apart from conventional weakness.

3.7 Crosslinguistic Variation in the Meaning of L* H-H%: The Case of Hindi

Though I've focused predominantly on English in this thesis, I've provided evidence that in Hebrew, French, Dutch, and German, imperatives accompanied by L* H-H%

behave comparably to how they behave in English. Alert readers will have noticed that this set of languages hardly comprises a random sample, and indeed, we have no reason to expect that intonational tunes will do the same work in every language. In this final section of the chapter, I provide one example of a language in which L* H-H% patterns differently, and I argue that that difference is illuminating.

I show that in Hindi, declarative sentences accompanied by L* H-H% are unbiased and license NPIs, contra English rising declaratives on both counts, and that in Hindi, imperative sentences accompanied by L* H-H% are infelicitous, contra English rising imperatives. I analyze these facts by proposing that in Hindi, L* H-H% contributes a semantic operator that converts a proposition p to a set $\{p, \neg p\}$—that is to say, it converts the denotation of a declarative sentence to the denotation of the corresponding polar interrogative (cf. Farkas & Roelofsen's 2017 account of rising intonation in English).

I proceed as follows: first, I present the relevant generalizations about rising declaratives and imperatives in English, and reiterate how they follow from the proposal that L* H-H% signals lack of speaker commitment. Then, I show how the Hindi facts differ from the English facts. Finally, I show how taking Hindi L* H-H% to contribute a semantic question-formation operator captures those facts.

3.7.1 Reviewing the English pattern

I'll highlight three important properties of English sentences accompanied by L* H-H% that I argue are intimately linked. In the following section, I'll show that Hindi sentences accompanied by L* H-H% display none of these properties, suggesting that L* H-H% is not playing the same role in Hindi that it plays in English.

The first property is that declaratives sentences accompanied by L* H-H% indicate bias (q.v. §2.2.3 & 2.2.4). The discussion in chapter 2 focused on how exactly that

bias should be characterized; here we'll simply focus on the fact that rising declaratives conventionally indicate bias at all. This is most clearly demonstrated by the observation that rising declaratives cannot be used in contexts that enforce neutrality. I present here data from Gunlogson (2001); the reader is referred to her §2.2 for further empirical discussion.

(162) *[on a tax form]* (cf. Gunlogson ex. 13)

a. During the tax year, did you receive a distribution from a foreign trust?

b. #During the tax year, you received a distribution from a foreign trust?

(163) *[as an exam question]* (cf. Gunlogson ex. 15)

a. Is the empty set a member of itself?

b. #The empty set is a member of itself?

On tax forms, the same list of questions has to be asked of everyone, regardless of what the expected answer is; writers of exams assume a pretense of unbiasedness so as not to influence the testees. In both of these mandatorily-neutral contexts, polar interrogatives are felicitous, but rising declaratives are not. The weakest generalization we could make is this: though, just like polar interrogatives, rising declaratives request information from the addressee about whether some proposition *p* is true, polar interrogatives can be used in situations that require that the speaker has no bias about whether or not *p* is true; in these contexts rising declaratives are infelicitous.

Another salient distinction between polar interrogatives and rising declaratives is that only the former license NPIs (discussed in §2.7.2 above, and in Gunlogson 2001 p.28):[13]

[13]The same facts hold for French (Jérémie Beauchamp, p.c.):

(1) *Est-ce que Dan a vu qui que ce soit?*
is-it that Dan has seen who that it would.be

(164) a. Is anybody home? (Gunlogson ex. 38)

b. #Anybody's home?

(165) a. Did he ever finish? (Gunlogson ex. 39)

b. #He ever finished?

These two properties of rising declaratives lead Gunlogson (2001) to treat them as sharing a denotation with falling declaratives, not with polar interrogatives—I've followed her in this thesis. Farkas & Roelofsen (2017) and Jeong (2018) treat rising declaratives as sharing a denotation with polar interrogatives, and propose additional discourse effects specific to the form-tune pairing to account for the differences between the patterning of rising declaratives and polar interrogatives.

The third property I'd like to highlight is a simple one: that in English, imperatives can be felicitously accompanied by L* H-H% (see §3.2).

I've shown in this thesis that all three properties follow from an account of L* H-H% in which it signals that the speaker's discourse commitments are not being altered by virtue of their utterance. Bias follows from the denotation of declarative sentences: the speaker has projected only a p-incorporating Common Ground, and no $\neg p$-incorporating Common Ground. NPI licensing follows on any account in which NPIs are licensed on the basis of the semantic properties of their environment: the rising declarative has the exact same semantics as the falling declarative, so NPIs will be

'Has Dan seen anybody?'

(2) * *Dan a vu qui que ce soit(./?)*
Dan has seen who that it would.be
'Dan saw anybody(./?)'

The idiomatic NPI *qui que ce soit* (≈ *anybody*) is licensed in polar interrogatives created via syntactic inversion, as shown in (1); however, in uninverted sentences with positive polarity, the NPI is ungrammatical, regardless of intonation.

either licensed or unlicensed in exactly the same places in both kinds of sentences. Felicity with imperatives follows from a proposal in which discourse commitment plays a comparable role in utterances of imperatives to the role it has been held to play in utterances of declaratives—the commitment portion of the speech act can be withheld by L* H-H% in the same way as it can be withheld for declaratives.

I turn now to a language in which none of these properties hold of utterances accompanied by L* H-H%: Hindi.

3.7.2 The Hindi pattern

Consider a basic declarative sentence in Hindi:[14]

(166) *Koii aayaa*
some come-PERF
'Someone came.'

There are two basic ways to convert a declarative sentence denoting *p* into an interrogative sentence asking whether or not *p* is true. The first is the addition of a sentence-initial question particle:

(167) *Kyaa koii aayaa*
what some come-PERF
'Did someone come?'

The second way to convert a declarative sentence into a corresponding polar interrogative is by accompanying it with L* H-H%:

(168) *Koii aayaa?*
some come-PERF
'Did someone come?'

[14]Thanks to Pranav Anand and Ashwini Deo for discussion of the facts.

I've chosen to translate this sentence into English using a polar interrogative instead of a rising declarative, because it does not display the crucial properties that distinguish English rising declaratives from polar interrogatives.

First, there does not seem to be a clear distinction between (167) and (168) in terms of biasedness. Rather, the distinction appears to be one of register: consultants report that questions formed using a particle sound 'more formal' than questions formed using only intonation.

Second, and more compellingly, both kinds of Hindi questions license NPIs. I'll use the example of *bhii*, which we could gloss as *ever*, but which, in combination with *koii* has a similar distribution as *anyone*.[15] Just like *anyone*, *koii bhii* is licensed by the presence of negation in declarative sentences:

(169) a. *Koii bhii nahiiN aayaa*
some ever not come-PERF
'Nobody came'

b. * *Koii bhii aayaa*
some ever come-PERF
'Anyone came.'

As we would expect by analogy to English *anyone*, *koii bhii* is also grammatical in interrogatives formed with an overt question particle:

(170) *Kyaa koii bhii aayaa*
what some ever come-PERF
'Did anyone come?'

But unlike in English, Hindi declaratives accompanied by L* H-H% license *koii bhii* in the absence of any other overt markers of questionhood:

[15]Pranav Anand (p.c.) notes that *koii* appears to be a DP that has undergone NPE, as in with the default interpretation of the missing NP being *person*.

(171) *Koii bhii aayaa?*
some ever come-PERF
'Did anyone come?'

To summarize: the behavior of Hindi rising declaratives with respect to the first two properties of English rising declaratives that I highlighted above does not provide the same motivation for analyzing Hindi rising declaratives as anything other than semantically identical to polar interrogatives. There is no reason, on the basis of this data, to propose that Hindi rising declaratives do not denote a polar question set $\{p, \neg p\}$, and there is no reason, on the basis of this data, to propose that Hindi rising declaratives involve a special marked discourse effect beyond the normal effect of uttering a sentence with such a denotation.

Moving on to the third property: in Hindi, imperatives accompanied by L* H-H% are infelicitous.[16]

(172) *Mein kya karoon?*
I what do-SUBJ.1SG
'What should I do?'

a. *Yahaan ao!*
here come-IMP.2SG
'Come here!'

b. # *Yahaan ao?*
here come-IMP.2SG
'Come here?'

(173) a. *Mujhe ye chitti do!*
me-to this letter give-IMP.2SG
'Give me the letter!'

b. # *Mujhe ye chitti do?*
me-to this letter give-IMP.2SG

[16]Note that Diti Bhadra (p.c.) does not share this judgment. Further investigation of cross-speaker variation is necessary here.

'Give me the letter?'

In Hindi, an imperative that is felicitous when accompanied by falling intonation become infelicitous when accompanied by the same L* H-H% tune that turns declarative sentences into questions. Consultants report these sentences as being strongly infelicitous—perhaps even ungrammatical.[17]

In the rest of this section, I'll explore the possibility that this constellation of properties is not accidental: that all three of these properties of L* H-H% in Hindi can be given a unified account in which the meaning of L* H-H% in Hindi is different than the meaning of L* H-H% in English. Specifically, I'll argue that this is exactly the cluster of properties that we'd expect if in Hindi, L* H-H% contributes a semantic question-formation operator, contributing to the meaning of an utterance by altering the denotation of the uttered sentence, rather than by changing the way that utterance updates the discourse context.

[17]Pranav Anand (p.c.) notes that there is a tune that ends in a rise that can felicitously accompany these imperatives, but it is not a monotonic rise, and is not comparable to the tune that accompanies questions. This rise communicates something akin to the Surprise-Redundancy Contour in English (Sag & Liberman, 1975): "it either indicates that the person is somehow overlooking the obvious, or confusion about why the person isn't clear on what they should do" (Anand, p.c.). He also notes that the infelicitous rising imperatives can be replaced with infinitivals accompanied by L* H-H%, which are felicitous in the same contexts, e.g.:

(1) *Yahaan aanaa?*
here come-INF
'Come here?'

3.7.3 Hindi L* H-H% as a semantic operator

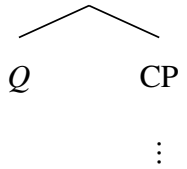
I propose that in Hindi, L* H-H% contributes a semantic operator Q that has the effect of converting propositional denotations into polar question denotations, while leaving alone denotations that are already sets of propositions (cf. the ? operator defined by Roelofsen & Farkas 2015):

(174) For any proposition p, $Q(p) = \{p, \neg p\}$

For any set of propositions P, $Q(P) = P$

Farkas and Roelofsen take a comparable operator to be contributed by intonation in English rising declaratives; though I've taken a different path in my analysis of English in this thesis, I'll follow them in assuming this operator to sit in the left periphery, above the material necessary to derive the denotation of the sentence radical:

(175)



The Q morpheme is present in this position only in Hindi sentences accompanied by the L* H-H% tune. If the denotation of the CP it is attached to is a proposition p, the Q morpheme will convert that denotation to the set $\{p, \neg p\}$.

In other words, declarative sentences accompanied by L* H-H%, by virtue of the contribution of the Q morpheme, will be semantically identical to standard polar interrogatives. This delivers the NPI licensing facts, at least on any view in which NPIs are licensed on the basis of the semantic properties of their environment.

It also delivers the fact that Hindi declaratives accompanied by L* H-H% are unbiased questions: their utterances will carry out the same speech act as utterances of polar interrogatives, by virtue of the fact that their denotations are the same, and the proposal

that both declaratives and interrogatives achieve their discourse effects by placing their denotations on the Doxastic Table.

What is less immediately obvious is how this proposal predicts the third property of sentences accompanied by L* H-H% in Hindi: that imperatives accompanied by that tune are infelicitous. I turn to that property now.

3.7.4 Why can't you turn imperatives into questions?

In this section I propose a possible explanation for why the Q operator doesn't play well with imperatives. The solution that I propose involves tinkering with the representation of the teleological portion of the context. It's important that the Doxastic Table be a stack of sets of propositions, because interrogatives denote sets of propositions, and we want their content to be able to be placed on the Doxastic Table. However, the only reason why I proposed that the Teleological Table is also a stack of propositions was by analogy to the doxastic portion of the context—I designed the teleological portion of the context to be its mirror image in every respect. However, if imperatives denote propositions, and nothing else interacts with the teleological portion of the context, we might instead reconceptualize T_{tel} as a set of propositions. In that case we would have a ready explanation for why imperatives cannot contain the Q morpheme: the resulting denotation would not be a proposition, and so a type clash would prevent it from being able to be added to T_{tel}.

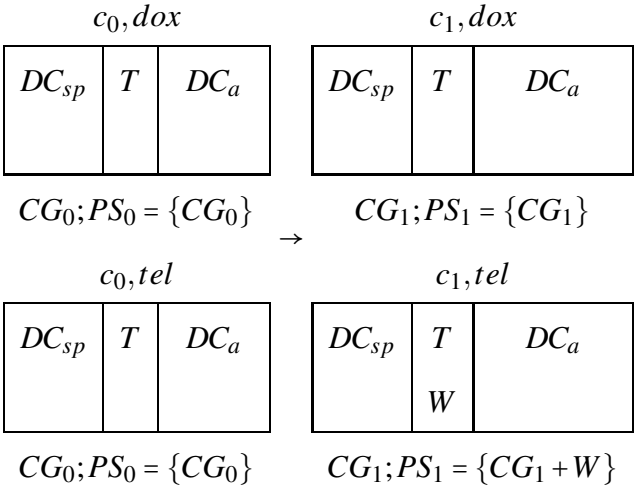
But this explanation might be a little too pat. After all, I've proposed, following Farkas & Roelofsen (2017), that though interrogative sentences denote sets of propositions, their content can nonetheless be added to a speaker's discourse commitments: a type-lowering operator converts their denotations to denotations of the appropriate semantic type, via grand union. We could say that T_{tel} is a stack of propositions, and that in the case that a sentence both denotes a set of propositions P and is clause-typed

for interaction with the teleological portion of the context, what is pushed onto T_{tel} is $\bigcup P$.

Happily, even if we make this move, we predict that imperatives with the Q morpheme in their left periphery will comprise intrinsically useless discourse moves. Q as applied to p will return the set $\{p, \neg p\}$. The informative content of that set will be W.

(176) UPDATE WITH *Yahaan ao?*

(hypothetical propositional stack version)



Observe that there's no way for this move to be relevant: no reasonable decision problem is solved by adopting W as an effective preference.

It appears, then, that making the move of reconceptualizing T_{tel} as a stack of propositions, rather than as a stack of sets of propositions, provides a workable account of why imperatives with Q operators are infelicitous: even if we provide a way for sentences that denote Hamblin sets to add their content to T_{tel}, the resulting discourse update for imperatives with Q is inherently uncooperative.

Though this account delivers the result that imperatives don't play well with the Q operator, I am not convinced that it is satisfying. It stipulates the problem away, leaving the deeper question unanswered: *why* would the context rule out sentences that prompt consideration of multiple teleological alternatives simultaneously? Put another way, is

there some deeper reason why we don't seem to have polar-interrogativey versions of imperatives, that denote a set $\{p, \neg p\}$?

There are of course always ways of providing technical, stipulative solutions for any body of data; in this case, something satisfyingly explanatory does not appear to be forthcoming. I close the chapter by pointing out that other approaches to imperatives have less trouble explaining why imperatives don't play well with the Q operator than mine does.

3.7.5 Imperatives and Q in other accounts

3.7.5.1 Non-propositional accounts

Accounts in which imperatives denote something very different than a proposition have no problem explaining why imperatives would not interact well with an operator that converts propositions to sets of propositions. For instance, as discussed in chapter 3.1, Portner (2004) treats imperatives as denoting properties of individuals, Charlow (2014) treats imperatives as denoting properties of plans, and Portner (2017) treats imperatives as denoting partitions. On all three of these accounts, trying to get the Q operator to compose with the denotation of an imperative would pose severe compositional problems, as the Q operator takes a proposition as its argument.

3.7.5.2 Alternative-promoting accounts

Starr (2017) gives a treatment of imperatives within a dynamic framework, in which their denotation is a function from contexts to contexts. This is achieved, however, by proposing an imperative operator ! that takes a proposition as its argument: $!p$ has the dynamic effect of updating a contextual preference relation with a preference for p over $\neg p$. If the Q operator were applied to that proposition, this would cause an immediate

compositional problem, as the imperative operator would be fed an argument that is not of the semantic type it desires. However, we could resolve this compositional difficulty in the same way that compositional difficulty was resolved above: by taking the imperative operator to combine with $\bigcup(P)$ when it is provided with a set of propositions P.

In this case, we'd derive the exact same result that we derived in above: if a Q operator applies to the proposition p delivered by the sentence radical, prior to combination with !, the result will be the set $\{p, \neg p\}$. $\text{INFO}(\{p, \neg p\}) = W$. $!W$ would have the dynamic effect of updating a contextual preference relation with a preference for W over $\varnothing$; a strictly trivial update. This account would deliver the prediction that imperatives accompanied by Q are inherently trivial, explaining their infelicity.

3.7.5.3 Propositional accounts

In this subsection I discuss two accounts which treat imperatives as having propositional denotations: Condoravdi & Lauer (2012, 2017) and Kaufmann (2012a, 2016). Both of these accounts propose that imperatives involve a covert operator that is a function from propositions to propositions, providing a variety of compositional options in terms of where to place the Q operator with respect to that operator; I won't step through every single compositional possibility here, and instead focus on how things would proceed if the Q operator had widest scope.

Condoravdi & Lauer

Condoravdi & Lauer give an account in which an imperative denotes the proposition p that the speaker has a public effective preference for a prejacent proposition q delivered by the sentence radical before the application of a covert imperative operator. Because this is a perfectly normal proposition, it should interact with Q in a perfectly normal way: Q will return the polar question set containing that proposition and its

negation.

In other words, an imperative with a Q operator added to it should denote a question paraphrasable as the following: "Do I have a public effective preference for q?"

This seems like a weird question to ask: we might assume that speakers are aware of their own discourse commitments. Perhaps the infelicity of imperatives with Q operators could be enforced by an admissibility constraint on commitment states that states like the following (cf. the admissibility constraints in Condoravdi & Lauer 2017 ex. 20):

(177) If C is the commitment state of agent a, then C is admissible only if:
If $C \vDash_{PEP} p$, then $C \vDash_{PB} PEP_a(p)$

This condition would enforce that if an agent has a public effective preference, they are also publicly committed to a belief that they have that public effective preference. If this is so, then it should be strange indeed for an agent to question whether or not they have a public effective preference.

Kaufmann

On Kaufmann's account, imperatives also contain a covert operator which, in addition to contributing strong priority modality, also carries presuppositions ensuring that the utterance is interpreted performatively (see §3.1.1 for details). I'll refer to the proposition delivered by applying this covert operator to the proposition delivered by the sentence radical as $\Box_{imp} p$. Applying a Q operator to this proposition returns the set $\{\Box_{imp} p, \neg \Box_{imp} p\}$. This question will still carry the presuppositions of $\Box_{imp} p$: that the speaker is an epistemic authority with respect to a modality that can provide an solution to the addressee's decision problem, and that p comprises an answer to that decision problem. How could we interpret the speaker's decision to ask the question whether or not p is necessary with respect to that modality? The presupposition ensure

that the speaker has perfect knowledge of the relevant modality, and so they cannot not know whether or not p is necessary with respect to it. Again, this seems inherently uncooperative.

3.7.6 Summary

The main contribution of this section is to propose a generalization, which is worth further exploration. That generalization is that in languages where rising declaratives are biased questions and don't license NPIs, the same intonation that is used for rising declaratives should be felicitous on imperatives; in languages where rising declaratives are unbiased questions and license NPIs, the same intonation that is used for rising declaratives should be infelicitous on imperatives.

I've proposed that this generalization could be linked to two different possible meanings for L* H-H% across languages: in some languages, it is a speech act modifier that enforces lack of speaker commitment; in others, it is a semantic operator that builds questions out of propositions. Presumably there are further languages in which L* H-H% does neither of these things.

If this proposal is on the right track, then we should take the ability to derive the fact that imperatives don't interact well with a Q operator to be a desideratum for the success of theories of imperatives.

Chapter 4

Conclusion

In this thesis I've proposed a compositional account of the contribution of L* H-H% and H* L-L% to the meaning of an utterance: H* L-L% signals that the speaker is committing to the informative content of their utterance; L* H-H% signals that the speaker is making no commitments by virtue of their utterance. I've argued that this account allows for an explanation of the behavior of declarative and interrogative sentences accompanied by those two intonational tunes that does not rely on any effects specific to particular form-tune pairings. Rather, the distribution of rising declaratives falls out of the pragmatics that accompany the speaker's choice of a rising declarative over a falling declarative and over a rising polar interrogative.

I've also extended the Table model to incorporate utterances of imperative sentences, and argued that the proposal for L* H-H% and H* L-L% captures some important facts about the behavior of rising vs. falling imperatives as well.

In my implementation of imperatives within the Table model, I haven't addressed many of the compositional issues that are crucial in the development of theories of imperatives: the behavior of imperatives conjoined or disjoined with imperatives, and the behavior of conditionalized imperatives (for various perspectives, see Kaufmann 2012a; Starr 2017; Condoravdi & Lauer 2017). What I'm willing to fully commit to is the usefulness of decomposing the meaning of imperative utterances into denotation,

commitment, and Table-mediated projection—i.e., the decomposition Farkas & Bruce (2010) provide for declarative and interrogative sentences. I hope that decomposition can be a helpful tool for navigating the current terrain of theories of imperatives, and a helpful tool for developing the next generation of such theories. As for how I've chosen to fill in those boxes—what a suitable notion of denotation, commitment, and projection is for imperatives—what I've proposed here is ripe for further development.

I want to close with a lament.

In accounting for imperatives, I've proposed a complete bifurcation of the context into a portion interacted with by declaratives and interrogatives, and a portion interacted with by imperatives. Some such bifurcation is assumed, in one way or another, by Portner (2004; 2015; 2017), by Charlow (2014), by Starr (2017), and by Condoravdi & Lauer (2012; 2017). They vary in whether they propose a bifurcation on the level of the components of the discourse context that are updated by an imperative utterance, a bifurcation in the procedure by which an utterance updates the discourse context, or a bifurcation in the kinds of commitments that a speaker incurs by virtue of their utterance. See also Northrup (2014) §3.5, which posits parallel notions of epistemic and deontic authority to explain the meaning of particles that can accompany both declarative and imperative sentences. The only account of imperatives that I'm aware of that avoids such bifurcation completely is Kaufmann (2012a; 2016).

A major breakthrough of the framework of Inquisitive Semantics (Ciardelli et al., 2013), which is made use of to great effect by Farkas & Roelofsen (2017), is the way it allows a completely unified account of declarative and interrogative sentences: they denote objects of the same semantic type and they update the context via the exact same mechanism—the differences in their discourse behavior follow entirely from systematic differences in their semantic content. I've tried to take a step in the direction of that kind of unification in my proposal for the meanings of L* H-H% and H* L-L%: I've

attempted to derive an understanding of the meaning of rising declaratives, for instance, that can explain their force entirely from the force of declarative sentences and the force of their rising intonation, in addition with some basic Gricean assumptions about their pragmatics. However, that step forward has been accompanied by a step back: in my account of imperatives, I stipulate a binary distinction between two different kinds of context updates, however parallel they might be. That imperatives perform an update to a different portion of the context has been stipulated, not derived in any way from their semantic content.

The dream, which lurks somewhere off in the distance, over the horizon, is a fully unified notion of commitment and a fully unified notion of update that can give us a unified account of the contribution of declarative, interrogative, and imperative utterances that derives the differences between them from differences in their content.

Appendix A

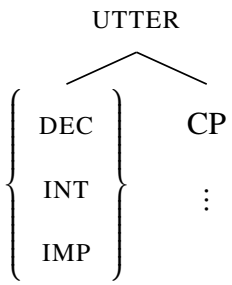
Alternative Formalization

In the main text, I've assumed, following Farkas & Roelofsen (2017), that utterances are functions from contexts to contexts, that take sentences as an argument. In this appendix, I explore an alternate formalization, showing how the meanings I've assigned to intonational tunes could be implemented in a version of the Table model that treats sentences themselves as functions from contexts to contexts (as in dynamic semantics; see Heim 1982; Kamp & Reyle 1993; Veltman 1996 and many others). Likewise, in the main text I treat speaker commitment not as a default, but as the contribution of falling intonation. In this appendix, I treat speaker commitment as a default, and I take rising intonation to overwrite that default. This implementation delivers the exact same results as the implementation given in the main body of the thesis in terms of the mapping from context to context enacted by utterances of rising and falling declaratives, interrogatives, and imperatives; I provide it to show that the decision to treat intonational tunes and clause type markers as arguments to an utterance function, as opposed to treating them as contributing morphemes to the clausal spine, is not a crucial one, nor is the decision to treat speaker commitment as contributed specifically by falling intonation. What is crucial to my proposal—the mapping from context to

context enacted by an utterance—is not leashed to either of those implementational choices.

Assume first that CPs are dominated by a covert layer of illocutionary structure (Cinque 1999; Truckenbrodt 2006, and many others); I'll call this layer UTTER as a placeholder:

(178)



This layer hosts a morpheme corresponding to the clause type of the root CP, which is a function from propositions to functions from contexts to contexts (or, more specifically, functions from speakers, addressees, and contexts to contexts).

(179) Let k be the type of a context.

a. $[\![\text{DEC}]\!] = \lambda p_{st}.\lambda sp_e.\lambda A_{et}.\lambda c_k.$
$$\begin{bmatrix} DC_{dox,sp} & = & DC_{dox,sp,c} + p \\ DC_{tel,sp} & = & DC_{tel,sp,c} \\ CG & = & CG_c \\ CS & = & CS_c \\ T_{dox} & = & T_{dox,c} + \{p\} \\ PS_{dox} & = & \{CG_{dox} + p\} \\ T_{tel} & = & T_{tel,c} \\ PS_{tel} & = & PS_{tel,c} \\ \forall a \in A, DC_a & = & DC_{a,c} \end{bmatrix}$$

b. $[\![\text{INT}]\!] = \lambda P_{(st)t}.\lambda sp_e.\lambda A_{et}.\lambda c_k.\begin{bmatrix} DC_{dox,sp} & = & DC_{dox,sp,c} + \bigcup P \\ DC_{tel,sp} & = & DC_{tel,sp,c} \\ CG & = & CG_c \\ CS & = & CS_c \\ T_{dox} & = & T_{dox,c} + P \\ PS_{dox} & = & \{CG_{dox} + p : p \in P\} \\ T_{tel} & = & T_{tel,c} \\ PS_{tel} & = & PS_{tel,c} \\ \forall a \in A, DC_a & = & DC_{a,c} \end{bmatrix}$

c. $[\![\text{IMP}]\!] = \lambda p_{st}.\lambda sp_e.\lambda A_{et}.\lambda c_k.\begin{bmatrix} DC_{dox,sp} & = & DC_{dox,sp,c} \\ DC_{tel,sp} & = & DC_{tel,sp,c} + p \\ CG & = & CG_c \\ CS & = & CS_c \\ T_{dox} & = & T_{dox,c} \\ PS_{dox} & = & PS_{dox,c} \\ T_{tel} & = & T_{tel,c} + \{p\} \\ PS_{tel} & = & \{CG_{tel} + p\} \\ \forall a \in A, DC_a & = & DC_{a,c} \end{bmatrix}$

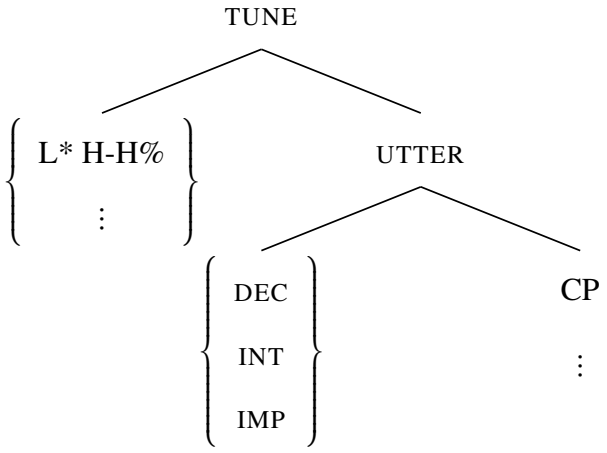
DEC takes a proposition p, a speaker, a (potentially singleton) set of addressees, and an input context, and returns an output context that differs from the input context only in terms of p being added to the speaker's doxastic commitments and $\{p\}$ being pushed onto T_{dox} (modulo the effect the maximal element of T_{dox} has on PS_{dox}).

INT takes a Hamblin set P, a speaker, a (potentially singleton) set of addressees, and an input context, and returns an output context that differs from the input context only in terms of $\bigcup P$ being added to the speaker's doxastic commitments and P being pushed onto T_{dox} (modulo the effect the maximal element of T_{dox} has on PS_{dox}).

IMP takes a proposition p, a speaker, a (potentially singleton) set of addressees, and an input context, and returns an output context that differs from the input context only in terms of p being added to the speaker's teleological commitments and $\{p\}$ being pushed onto T_{tel} (modulo the effect the maximal element of T_{tel} has on PS_{tel})

This provides the basic discourse effects of utterances of declarative, interrogative, and imperative sentences. I assume that intonational tunes contribute a morpheme in a layer above the basic illocutionary layer that hosts clause type markers. I'll call this layer TUNE:

(180)



Let K be an abbreviation for the type $e(et)kk$ (the type of a function from contexts to contexts).

(181) $$[\![\text{L* H-H\%}]\!] = \lambda K_K.\lambda sp_e.\lambda A_{et}.\lambda c_k.\begin{bmatrix} DC_{sp} & = & DC_{sp,c} \\ CG & = & CG_{K(sp,A,c)} \\ CS & = & CS_{K(sp,A,c)} \\ T_{dox} & = & T_{dox,K(sp,A,c)} \\ PS_{dox} & = & PS_{dox,K(sp,A,c)} \\ T_{tel} & = & T_{tel,K(sp,A,c)} \\ PS_{tel} & = & PS_{tel,K(sp,A,c)} \\ \forall a \in A, DC_a & = & DC_{a,K(sp,A,c)} \end{bmatrix}$$

The morpheme contributed to the TUNE layer by L* H-H% takes a function from contexts to contexts and returns a function from contexts to contexts that differs from the original function only in ensuring that there are no differences between the speaker's discourse commitments in the input and output contexts.

References

AnderBois, Scott. 2011. *Issues and alternatives*: University of California, Santa Cruz dissertation.

Asher, Nicholas & Alex Lascarides. 2005. *Logics of conversation*. Cambridge University Press.

Bach, Kent & Robert Harnish. 1979. *Linguistic communication and speech acts*. Cambridge, MA: MIT Press.

Barker, Chris. to appear. Negative polarity as scope marking. *Linguistics and Philosophy* .

Bartels, Christine. 1999. *The intonation of English statements and questions: A compositional interpretation*. Routledge.

Beckman, Mary E. & Janet B. Pierrehumbert. 1986. Intonational structure in English and Japanese. *Phonology Yearbook* 3. 255–309.

Beltrama, Andrea. 2018. *Totally* between subjectivity and discourse: Exploring the pragmatic side of intensification. *Journal of Semantics* .

Bolinger, Dwight. 1985. *Intonation and its parts: Melody in spoken English*. Stanford University Press.

Bolinger, Dwight. 1989. *Intonation and its uses: Melody in grammar and discourse*. Stanford University Press.

Büring, Daniel. 2016. *Intonation and meaning*. Oxford: Oxford University Press.

Charlow, Nate. 2014. Logic and semantics for imperatives. *Journal of Philosophical Logic* 43. 617–664.

Ciardelli, Ivano, Jeroen Groenendijk & Floris Roelofsen. 2013. Inquisitive Semantics: A new notion of meaning. *Language and Linguistics Compass* 7(9). 459–476.

Cinque, Guglielmo. 1999. *Adverbs and functional heads: A cross-linguistic perspective*. Oxford University Press.

Condoravdi, Cleo & Sven Lauer. 2012. Imperatives: meaning and illocutionary force. In Christopher Piñón (ed.), *Empirical issues in syntax and semantics 9*, 37–58.

Condoravdi, Cleo & Sven Lauer. 2016. Anakastic conditionals are just conditionals. *Semantics and Pragmatics* .

Condoravdi, Cleo & Sven Lauer. 2017. Conditional imperatives and endorsement. In A. Lamont & K. Tetzloff (eds.), *Proceedings of NELS 47*, vol. 1, 185–204.

Constant, Noah. 2012. English rise-fall-rise: a study in the semantics and pragmatics of intonation. *Linguistics and Philosophy* 35(5). 407–442.

Farkas, Donka & Kim Bruce. 2010. On reacting to assertions and polar questions. *Journal of Semantics* 27. 81–118.

Farkas, Donka & Floris Roelofsen. 2017. Division of labor in the interpretation of declaratives and interrogatives. *Journal of Semantics* .

von Fintel, Kai. 1999. NPI licensing, Strawson entailment, and context dependency. *Journal of Semantics* 16(2). 97–148.

von Fintel, Kai & Sabine Iatridou. 2017. A modest proposal for the meaning of imperatives. In Ana Arregui, Maria Luisa Rivero & Andres Salanova (eds.), *Modality across syntactic categories*, Oxford University Press.

Fitzpatrick, Justin. 2006. Deletion through movement. *Natural Language and Linguistic Theory* 24. 399–431.

Gazdar, Gerald. 1979. *Pragmatics: Implicature, presupposition, and logical form*. Academic Press.

Ginzburg, Jonathan. 1996. Dynamics and the semantics of dialogue. In J. Seligman & Dag Westerståhl (eds.), *Language, logic, and computation*, vol. 1, 1–16. CSLI.

Goodman, Noah D. & Andreas Stuhlmüller. 2012. Knowledge and implicature: Modeling language understanding as social cognition. In *Proceedings of the thirty-fourth annual conference of the Cognitive Science Society*, .

Grice, Paul. 1975. Logic and conversation. In P. Cole & J. Morgan (eds.), *Syntax and semantics 3: Speech acts*, 41–58. Cambridge, MA: Academic Press.

Gunlogson, Christine. 2001. *True to form: Rising and falling declaratives as questions in English*: University of California, Santa Cruz dissertation.

Gunlogson, Christine. 2008. A question of commitment. *Belgian Journal of Linguistics* 22. 101–136.

Hamblin, C.L. 1971. Mathematical models of dialogue. *Theoria* 37. 130–155.

Hamblin, C.L. 1973. Questions in Montague English. *Foundations of Language* 10(1). 41–53.

Hankamer, Jorge & Ivan Sag. 1976. Deep and surface anaphora. *Linguistic Inquiry* 7(3). 391–426.

Hardt, Daniel. 1999. Dynamic interpretation of verb phrase ellipsis. *Linguistics and Philosophy* 22(2). 187–221.

Heim, Irene. 1982. *The semantics of definite and indefinite noun phrases*: University of Massachusetts, Amherst dissertation.

Horn, Laurence. 1972. *On the semantic properties of logical operators in English*: UCLA dissertation.

Horn, Laurence. 1984. Toward a new taxonomy for pragmatic inference: Q-based and R-based implicature. In Deborah Schiffrin (ed.), *Meaning, form, and use in context: Linguistic applications*, 11–42. Georgetown University Press.

Horn, Laurence. 2016. Licensing NPIs: Some negative (and positive) results. In *Meaning, form, and use in context*, Georgetown University Press.

Jeong, Sunwoo. 2018. Intonation and sentence type conventions: Two types of rising declaratives. *Journal of Semantics* .

Jeong, Sunwoo & Cleo Condoravdi. 2017. Imperatives with the calling contour. To appear in *Proceedings of WCCFL*.

Kadmon, Nirit & Fred Landman. 1993. Any. *Linguistics and Philosophy* 16. 353–422.

Kamp, Hans & Uwe Reyle. 1993. *From discourse to logic*. Springer.

Karttunen, Lauri. 1972. Possible and must. In John Kimball (ed.), *Syntax and semantics*, vol. 1, 1–20. Academic Press.

Kaufmann, Magdalena. 2012a. *Interpreting imperatives*, vol. 88 Studies in Linguistics and Philosophy. Dordrecht: Springer Netherlands.

Kaufmann, Magdalena. 2012b. The modal operator theory of imperatives: Revisiting assets and drawbacks. Lecture notes from 'Topics in Modality' seminar, MIT.

Kaufmann, Magdalena. 2016. Fine-tuning natural language imperatives. *Journal of Logic and Computation* .

Keough, Megan, Elise McClay, Molly Babel & Lisa Matthewson. 2016. Intonational qualities of strong and weak imperatives. Poster presented at LabPhon15.

Kraus, Kelsey. 2018. *Great intonations*: University of California, Santa Cruz dissertation.

Krifka, Manfred. 2015. Bias in commitment space semantics: Declarative questions, negated questions, and question tags. In *Proceedings of SALT 25*, 328–345.

Ladd, D. Robert. 1981. A first look at the semantics and pragmatics of negative questions and tag questions. In *Proceedings of Chicago Linguistic Society 17*, 164–171.

Ladd, D. Robert. 2008. *Intonational phonology*. Cambridge University Press second edition edn.

Ladusaw, William. 1979. *Polarity sensitivity as inherent scope relations*: University of Texas, Austin dissertation.

Lahiri, Utpal. 2002. *Questions and answers in embedded contexts*. Oxford University

Press.

Lewis, David. 1979. Scorekeeping in a language game. *Journal of Philosophical Logic* 8. 339–359.

Malamud, Sophia & Tamina Stephenson. 2015. Three ways to avoid commitments: Declarative force modifiers in the conversational scoreboard. *Journal of Semantics* 32. 275–311.

Merchant, Jason. 2004. Fragments and ellipsis. *Linguistics and Philosophy* 27. 661–738.

Ninan, Dilip. 2005. Two puzzles about deontic necessity. In J. Gajewski, V. Hacquard, B. Nickel & S. Yalcin (eds.), *New work on modality*, 149–178. MIT Working Papers in Linguistics.

Northrup, Oliver. 2014. *Grounds for commitment*: University of California, Santa Cruz dissertation.

Pierrehumbert, Janet & Julia Hirschberg. 1990. The meaning of intonational contours in the interpretation of discourse. In P. Cohen, J. Morgan & M. Pollack (eds.), *Intentions in communication*, 271–311. MIT Press.

Pierrehumbert, Janet B. 1980. *The phonology and phonetics of English intonation*: MIT dissertation.

Pitrelli, John F., Mary E. Beckman & Julia Hirschberg. 1994. Evaluation of prosodic transcription labeling reliability in the tobi framework. In *Icslp 1*, 123–126. Yokohama.

Portner, Paul. 2004. The semantics of imperatives within a theory of clause types. In Robert B. Young (ed.), *Proceedings of SALT 14*, 235–252. Evanston, IL: Northwestern University.

Portner, Paul. 2007. Imperatives and modals. *Natural Language Semantics* 15. 351–383.

Portner, Paul. 2015. Commitment to priorities. To appear in *New Work in Speech Acts*, eds. Daniel Harris, Matt Moss & Daniel Fogal.

Portner, Paul. 2017. On the relation between verbal mood and sentence mood. Manuscript, Georgetown.

Roberts, Craige. 1996. Information structure in discourse. In J.H. Yoon & A. Kathol (eds.), *Osu working papers in linguistics 49: Papers in semantics*, 1–53. Ohio State University.

Roelofsen, Floris & Donka Farkas. 2015. Polarity particle responses as a window onto the interpretation of questions and assertions. *Language* 91(2). 359–414.

Romero, Maribel & Chung-Hye Han. 2004. On negative yes/no questions. *Linguistics and Philosophy* 27(5). 609–658.

Rooth, Mats. 1992a. Ellipsis redundancy and reduction redundancy. In Steve Berman & Arild Hestvik (eds.), *Proceedings of the Stuttgart ellipsis workshop*, Stuttgart: University of Stuttgart.

Rooth, Mats. 1992b. A theory of focus interpretation. *Natural Language Semantics* 1. 75–116.

Sag, Ivan & Mark Liberman. 1975. The intonational disambiguation of indirect speech acts. In Robert E. Grossman, L. James San & Timothy J. Vance (eds.), *Proceedings of Chicago Linguistic Society 11*, 487–497.

Schmerling, Susan. 1982. How imperatives are special, and how they aren't. In *Proceedings of Chicago Linguistic Society*, .

Sharvit, Yael. 2008. The puzzle of free indirect discourse. *Linguistics and Philosophy* 31. 353–395.

Stainton, Robert. 2005. In defense of non-sentential assertion. In Zoltan Szabo (ed.), *Semantics versus pragmatics*, 383–457. Oxford University Press.

Stalnaker, Robert. 1978. Assertion. In Peter Cole (ed.), *Syntax and semantics 9*, 315–32. Academic Press.

Starr, William. 2017. A preference semantics for imperatives. Manuscript, Cornell.

Truckenbrodt, Hubert. 2006. On the semantic motivation of syntactic verb movement to c in german. *Theoretical Linguistics* 32(3). 257–306.

Veltman, Frank. 1996. Defaults in update semantics. *Journal of Philosophical Logic* 25(3). 221–261.

Ward, Gregory & Julia Hirschberg. 1985. Implicating uncertainty: The pragmatics of fall-rise intonation. *Language* 61(4). 747–776.

Weir, Andrew. 2016. The prosodic licensing of left-edge ellipsis and implications for clausal ellipsis. Invited presentation at Ellipsis and Prosody workshop, Leiden University.

Westera, Matthijs. 2013. 'Attention, I'm violating a maxim!' a unifying account of the final rise. In *Proceedings of the 17th Workshop on the Semantics and Pragmatics of Dialogue (SemDial)*, .

Westera, Matthijs. 2017. *Exhaustivity and intonation: A unified theory*: Institute for Logic, Language and Computation, Universiteit van Amsterdam dissertation.

Williamson, Timothy. 2000. *Knowledge and its limits*. Oxford University Press.

Zwicky, Arnold & Geoffery Pullum. 1983. Deleting named morphemes. *Lingua* 59. 155–175.