Division of labor in the interpretation
of declaratives and interrogatives

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Abstract
This paper presents an account of the semantics and discourse effects of a range of sentence types in English, namely falling and rising declaratives, polar interrogatives, and tag interrogatives. The account aims to divide the labor between compositional semantics and conventions of use in a principled way. We argue that falling declaratives and rising polar interrogatives are unmarked sentence types. On our account, differences in their discourse effects follow from independently motivated semantic differences combined with a single, default convention of use, which applies uniformly to both sentence types. As a result, the Fregean ‘illocutionary force’ operators Assertion and Question become unnecessary. In contrast, we argue that rising declaratives and tag interrogatives are marked sentence types. On our account, their discourse effects consist of the default effects, which they share with unmarked sentence types, augmented with special effects that are systematically connected to their formal properties. Thus, a central feature of our approach is that it maintains a parallelism between unmarked and marked sentence types on the one hand, and default and non-default discourse effects on the other.

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1 Introduction

It is often assumed that the interpretation of an utterance involves at least three factors: (i) a compositional procedure which, given the lexical meaning of the words that the uttered sentence consists of and the way in which they are put together, determines the semantic content of the sentence, (ii) certain conventions of use connected to the sentence type involved (e.g., declarative versus interrogative) which, given the semantic content of the sentence, determine the conventional discourse effects of the utterance, i.e., those discourse effects that arise purely in virtue of linguistic conventions and are stable across different contexts of utterance, and (iii) pragmatic considerations about potential speaker intentions in the particular context of utterance which, given the conventional discourse effects of the utterance, determine possible further pragmatic discourse effects.

To exemplify, consider the declarative in (1) and the polar interrogative in (2):

(1) Fido is hungry.
(2) Is /p/ a fricative?

The semantic content of (1) is usually construed as a proposition, i.e., a set of possible worlds, namely those worlds in which Fido is hungry. The conventional discourse effect of uttering (1) is usually assumed to be that the speaker proposes to add the proposition expressed by the sentence to the common ground of the conversation, i.e., the set of propositions that are mutually accepted by the conversational participants (Stalnaker, 1978). Finally, depending on the particular circumstances of utterance, several additional pragmatic discourse effects may arise. For instance, the utterance may function as a request for the addressee to provide some food, or in special circumstances as a warning.

The semantic content of (2) is often construed as a set of two propositions, one consisting of all worlds where /p/ is a fricative and the other consisting of all worlds where /p/ is not a fricative (Hamblin, 1973). The conventional discourse effect of uttering (2) is assumed to be that the speaker raises the issue which of these propositions is true. In this case, too, additional pragmatic discourse effects may arise depending on the particular circumstances of utterance. For instance, the utterance may function as a request for information, conveying that the speaker does not know herself whether /p/ is a fricative, and that she considers it possible that the addressee does. On the other hand, the utterance may also function as a quiz question, testing the addressee’s knowledge rather than requesting information that the speaker lacks. In yet other contexts, the utterance may function as a rhetorical question with the intention of embarrassing the addressee.

This paper is concerned with the first two factors—semantic content and conventional discourse effects—which are tied directly to the sentence form and do not depend on the circumstances of utterance. In particular, it is concerned with the division of labor between semantic interpretation, which determines the semantic content of a given sentence in a compositional way, and conventions of use, which determine the conventional discourse effects of an utterance, based on the semantic content of the uttered sentence and possibly certain aspects of its form. Our first aim is to determine, in general terms, how these two components of grammar should work together in connecting sentences to their conventional discourse effects. Our second, more specific aim is to develop a concrete account of a class of sentence types which divides the labor between semantics and conventions of use in a maximally parsimonious way.

The sentence types that we are concerned with are exemplified in (3)–(8), where ↑ and ↓ are used to indicate rising and falling intonation, respectively:
Whenever differences in intonation are irrelevant, we will simply speak of declaratives, polar interrogatives, and tag interrogatives, without specifying whether they are falling or rising.

The sentences in (3)–(8) have two things in common. First, in terms of form, they all share the same predicate, *leave*, and the same subject, *Amalia*. We will refer to the combination of these two basic constituents, *Amalia left*, as the *sentence radical* of all these sentences. Second, in terms of discourse effects, the sentences in (3)–(8) all induce a choice between two complementary alternatives, the alternative that Amalia left and the alternative that she did not leave.

Besides these commonalities, there are also a number of immediate differences between (3)–(8). First, in terms of form, there are differences in word order, intonation, and the presence/absence of a tag. Second, in terms of discourse function, the most salient difference concerns the type of commitment that a speaker makes in uttering these sentences. Globally speaking, we can distinguish three cases: (i) in uttering a falling declarative, a speaker fully commits to the alternative that Amalia left, (ii) in uttering a polar interrogative, either rising or falling, a speaker remains neutral between the two alternatives, i.e., she signals no bias for one alternative over the other, and (iii) in uttering a rising declarative or tag interrogative, a speaker expresses a bias, though not a full commitment to the alternative that Amalia left. In sum:

<table>
<thead>
<tr>
<th>Sentence type</th>
<th>Type of commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falling declaratives</td>
<td>full commitment to one alternative</td>
</tr>
<tr>
<td>Rising declaratives</td>
<td>bias towards one alternative, but no full commitment</td>
</tr>
<tr>
<td>Tag interrogatives</td>
<td>bias towards one alternative, but no full commitment</td>
</tr>
<tr>
<td>Polar interrogatives</td>
<td>neutral</td>
</tr>
</tbody>
</table>

Besides these global differences, there are also more fine-grained contrasts between the different sentence types. For instance, Malamud and Stephenson (2014) show with examples like (9) and (10) below that there are contexts in which tag interrogatives are felicitous but rising declaratives are not, and vice versa.

(9)  Context: *A and B are looking at the sunset together.*
     A:  It’s a beautiful sunset, isn’t it?
     A:  #It’s a beautiful sunset↑?

(10) Context: *A is going through a pile of job applications. B has not seen any of them yet. A enthusiastically hands B the application that she just finished reading.*
     B:  #This is a good one, isn’t it?
     B:  This is a good one↑.

In order to capture these and other contrasts between the various sentence types, as well as their commonalities, we need to address the following basic questions:
Q1: What exactly are the conventional discourse effects of the different sentence types in (3)–(8)?
Q2: How should differences in conventional discourse effects be connected to differences in form?

In Section 2 we will discuss a number of answers that have been given to these questions in previous work, using the diagram in Figure 1 as a template to visualize and compare the various approaches. This discussion will bring out a number of theoretical desiderata, which, we argue, are not fully satisfied by any existing approach. We then turn to our own proposal. First, in Section 3, we lay out our general assumptions concerning semantic content and discourse contexts, building on recent work in inquisitive semantics and commitment-based discourse models (Farkas and Bruce, 2010; Ciardelli et al., 2013, among others). Then, in Section 4 and 5, we formulate a concrete account of the relevant sentence types, which satisfies the given theoretical desiderata. Finally, in Section 6 we compare our account with some concrete alternative proposals in the recent literature, and Section 7 concludes.

2 Previous approaches and desiderata

There are many approaches to the problem of connecting sentence types with their conventional discourse effects, and we cannot survey all of them in full detail here. Instead, we will identify the general characteristics of some of the most prominent approaches, and assess their high-level advantages and disadvantages. This will lead us to a set of desiderata, which will then serve as a target for our own proposal. We start our discussion with the classical approach, rooted in the work of Frege (1918).

2.1 The meaning/force distinction

Frege proposed to make a distinction between the thought that a sentence expresses—in modern terminology, its semantic content or meaning—and its force. On this view, a falling declarative like (3) and a polar interrogative like (6) have the same semantic content, namely the proposition that Amalia left, but they differ in force. In Frege’s words:

“An interrogative sentence and an indicative one contain the same thought; but the indicative contains something else as well, namely, the assertion. The interrogative

1Since we will not be concerned with pragmatic discourse effects, we will from now on use the unqualified term ‘discourse effects’ to refer to conventional discourse effects.
sentence contains something more too, namely a request. Therefore two things must be
distinguished in an indicative sentence: the content, which it has in common with the
corresponding sentence-question, and the assertion.”

(Frege, 1918, p.294)\(^2\)

To say that the force of a falling declarative is assertive is to say that, when uttering the sentence,
a speaker commits to the truth of the proposition that the sentence expresses. On the other hand,
to say that the force of a polar interrogative is a request is to say that, when uttering a polar
interrogative, a speaker does not commit to the truth of the proposition expressed by the sentence,
but rather, requests information from other conversational participants to determine whether the
proposition expressed by the sentence is true or false.

The distinction between meaning and force that Frege introduced has been very influential,
particularly in work on *speech act theory* (Searle, 1969, et.seq.). The diagram below depicts how this
approach deals with the issue of associating forms to their discourse effects. Forms are associated
with a certain meaning through a compositional semantic interpretation procedure \(I\). Meanings are
taken to be propositions, i.e., sets of possible worlds. Suppose that the forms \(f_1, \ldots, f_4\) all have the
same sentence radical, but a different clause type (falling declarative, rising declarative, etcetera).
Then each of these forms is associated with the same meaning \(m\). Besides a meaning, however,
each form \(f_i\) also has a particular force, \(F_{f_i}\). The discourse effects of a form are partly determined
by its meaning, and partly by its force. A force can be seen as a function that maps meanings to
discourse effects. A discourse effect, in turn, can be modeled as a function over discourse contexts.
For instance, if \(f_1\) is a falling declarative then \(F_{f_1}\) could be construed as a function that takes the
proposition \(p := I(f_1)\) as its input and yields a function that maps any discourse context to a new
context in which the speaker has committed to \(p\) and has proposed to make \(p\) common ground.

\[
\begin{array}{ccc}
\text{Forms} & \text{Meanings} & \text{Effects} \\
\begin{array}{c}
  f_1 \\
  f_2 \\
  f_3 \\
  f_4 \\
\end{array} & \begin{array}{c}
  I \\
  I \\
  I \\
  I \\
\end{array} & \begin{array}{c}
  m \\
  e_1 \\
  e_2 \\
  e_3 \\
  e_4 \\
\end{array} \\
\end{array}
\]

Theories of this general shape thus have two components: (i) a *semantic* component, which
is concerned with the mapping from forms to meanings, and (ii) a *discourse* component, which

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\(^2\)The page reference is to the translated version, Frege (1956).
is concerned with how the discourse effects of a given form are determined by its force and its meaning. The semantic component is kept as simple as possible: all forms with the same sentence radical are assigned the same meaning. Consequently, a heavy burden is placed on the discourse component: differences in discourse effect between forms with the same sentence radical all have to be derived from differences in force. This means that, while there is a single, uniform semantic interpretation function $I$ that maps forms to meanings, many different forces have to be stipulated, one for each sentence type (depicted in the diagram above by arrows with different line patterns).

We will see below that this division of labor is not optimal. There are independent reasons to make the semantic interpretation procedure more discriminative, so as not to assign the same meaning to all sentence types. This, in turn, will make it possible to streamline the discourse component. Differences in discourse effects do not have to be stipulated for each form on a case-by-case basis because some differences in discourse effects become predictable from differences in meaning, and therefore it becomes possible for different forms to share the same force.

Before spelling out these ideas in more detail, however, we first consider another approach, which in a sense embodies the opposite of the Fregean view in that it places the whole burden on the semantic component, to the extent that it renders a separate discourse component superfluous.

### 2.2 Radical dynamics

On the radical dynamic approach, the semantic interpretation procedure directly determines the discourse effects of each form. Sentence meanings are not taken to be propositions but *context change potentials*, i.e., functions over discourse contexts. This dynamic notion of meaning is rooted in the classical work of Kamp (1981), Heim (1982), and Groenendijk and Stokhof (1991), which restricted its attention to falling declaratives. Dynamic semantic theories that are concerned with the discourse effects of both falling declaratives and polar/wh-interrogatives have been developed by Jäger (1996); Hulstijn (1997); Groenendijk (1998); Mascarenhas (2009) and Aloni et al. (2007). On these accounts, discourse contexts comprise both the contextual information, i.e., the *common ground*, and contextual issues, i.e., the *questions under discussion*. Falling declaratives are taken to enhance the common ground, and interrogatives are taken to add questions under discussion. To our knowledge, rising declaratives and tag interrogatives have not been considered explicitly in this line of work, but in principle they may be incorporated as well. However, discourse contexts would then have to be modeled in a more complex way, in order to be able to capture the non-categorical commitments that these sentence types induce. Provided that this extension is feasible, we would arrive at the following picture:

<table>
<thead>
<tr>
<th>Forms</th>
<th>Meanings = Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>$f_1$</td>
<td>$I \rightarrow e_1$</td>
</tr>
<tr>
<td>$f_2$</td>
<td>$I \rightarrow e_2$</td>
</tr>
<tr>
<td>$f_3$</td>
<td>$I \rightarrow e_3$</td>
</tr>
<tr>
<td>$f_4$</td>
<td>$I \rightarrow e_4$</td>
</tr>
</tbody>
</table>

**dynamic semantic interpretation**
Unlike on the Fregean approach, in this setup there is no need to stipulate different forces; there is a direct, compositional mapping from forms to discourse effects. Note, however, that the simplification we arrived at comes at a price. Namely, the notion of meaning that is needed here would have to be much more complex than on the Fregean approach: rather than simple propositions, meanings are construed as functions over discourse contexts, and in order to capture all the relevant differences in discourse effects, discourse contexts would have to be modeled as comprising not only the common ground and the questions under discussion, but also the commitments and biases of all the individual discourse participants. This added complexity of the notion of meaning would percolate down to all corners of the compositional semantics, with serious consequences. For instance, if meanings are simple propositions, then the semantic contribution of connectives like disjunction and negation can be characterized straightforwardly; if, on the other hand, the notion of meaning would be refined in the way we just sketched, these operations would become much more cumbersome.

While it may be possible to implement a compositional interpretation procedure that directly derives all the subtle differences in discourse effects between the various sentence types, it seems to us that the high complexity of such a system is unnecessary and therefore undesirable. This is because the commitments and biases induced by a sentence do not have to be computed recursively; they can simply be determined at the root level.

To see this, first note that sentence types which induce non-categorical commitments, i.e., rising declaratives and tag interrogatives, cannot be embedded in larger structures:

(11) *John told Bill that [Amalia left, didn’t she].
(12) *Don’t tell Bill that [Amalia left†].

This means that we don’t need to worry about how non-categorical commitments are projected by embedding verbs and other operators that form complex sentences out of simpler ones.

Moreover, even if we consider a sentence involving a plain declarative complement clause, like (13) below, the commitment that the embedded declarative would induce, if uttered in isolation, does not need to be taken into account in determining the discourse effects of the entire sentence. All we need is the propositional content of the embedded clause.

(13) John thinks that Amalia left.

It is probably for this reason that the radical dynamic approach has, to our knowledge, only been implemented for a restricted set of sentence types—falling declaratives and polar/wh-interrogatives—with a notion of discourse contexts that comprises the common ground and the questions under discussion, but not the commitments and biases of the individual discourse participants.

2.3 A middle way

The most widespread approach in the contemporary literature is one that, like the Fregean approach, assumes both a semantic component and a discourse component, but divides the labor between these two more evenly (see, e.g., Roberts, 1996; Ginzburg, 1996; Groenendijk, 1999; Beyssade and Marandin, 2006; Gunlogson, 2008; Farkas and Bruce, 2010; Murray and Starr, 2012; van Benthem and Minică, 2012; Condoravdi and Lauer, 2012; Krifka, 2014; Malamud and Stephenson, 2014; Northrup, 2014). In particular, restricting our attention to falling declaratives and polar interrogatives for the moment, while these two sentence types are associated with different conventions of use (in Frege’s terminology, different forces), they are also assigned different semantic values. This is depicted in the following diagram, where different conventions of use are visualized with different
Thus, some of the work in differentiating the two sentence types is done by the semantics, and some of it is done by the discourse component. As such, the approach strikes a middle way between the Fregean view, which places the entire workload on the discourse component, and the radical dynamic view, which places the entire workload on the semantics.

There are strong arguments for adopting a notion of semantic meaning that is more fine-grained than the one assumed on the Fregean approach, and which allows us to assign distinct semantic values to falling declaratives and polar interrogatives. These arguments, which have been articulated in great detail by Groenendijk and Stokhof (1997), can be summarized as follows.

The first argument concerns embedding. Consider the following two sentences:

(14) Bill knows that Amalia left.
(15) Bill knows whether Amalia left.

Clearly, the two sentences as a whole have different meanings. But then, assuming that meaning is determined compositionally, it follows that *that*-clauses and *whether*-clauses with the same sentence radical must differ in meaning as well: they cannot both be associated with the proposition expressed by their common sentence radical. Thus, our notion of meaning needs to be enriched in order to semantically distinguish *that*-clauses from *whether*-clauses. Once this distinction is made at the embedded level, it is desirable to have it at the root level as well, assigning the same semantic value to falling root declaratives and embedded *that*-clauses on the one hand, and to polar root interrogatives and embedded *whether*-clauses on the other.

The second argument is based on the observation that polar interrogatives form a natural class with other kinds of interrogatives. Consider the following:

(16) a. Did Amalia leave?
    b. Who left?
    c. Who left when?
    d. Did Amalia leave today or yesterday?
    e. Did Amalia leave or didn’t she?

As Frege noted himself, the idea that declaratives and polar interrogatives semantically both express a proposition, and differ only in force, does not naturally extend to *wh*-interrogatives like (16b-c). The same holds for disjunctive interrogatives like (16d-e). Disjunctive and *wh*-interrogatives cannot be taken to express a simple proposition, but have to receive a more structured semantic value in order for the discourse component to be able to characterize their discourse effect in a suitable way.
But then again, once such semantic values are made available, there is no longer any theoretical cost to treating polar interrogatives as being semantically different from declaratives. Instead, it becomes natural to assign them the same kind of semantic value that disjunctive and *wh*-interrogatives receive.

To make this more concrete, we briefly sketch the account of Groenendijk (1999). Semantically, Groenendijk assumes that in any given world $w$, a declarative $!\varphi$ denotes a truth value, while an interrogative $?\varphi$ denotes a proposition, corresponding to the true and complete answer to $?\varphi$ in that world $w$ (cf., Groenendijk and Stokhof, 1984). In particular, a polar interrogative $?p$ denotes the proposition expressed by $p$ in every world where $p$ is true, and the proposition expressed by $\neg p$ in every world where $p$ is false; on the other hand, a constituent question $?x.Px$ denotes, in a world $w$, the proposition consisting of all worlds in which the set of individuals that have the property $P$ are exactly the same as in $w$. Thus, polar interrogatives indeed receive the same kind of semantic value as *wh*-interrogatives, diverging in this respect from declaratives.

As for discourse effects, Groenendijk construes a discourse context as an equivalence relation $R$ over a set of worlds $C$. The latter captures the information that is commonly shared by the conversational participants in the given context, i.e., the common ground; the former corresponds to a partition of $C$, which encodes the issues that have been publicly raised in the conversation, i.e., the questions under discussion. With this notion of discourse context in place, Groenendijk proposes that the discourse effect of a declarative $!\varphi$ is to restrict $C$ to those worlds in which $!\varphi$ is true (cf., Stalnaker, 1978, and many others). The discourse effect of an interrogative $?\varphi$, on the other hand, is to restrict the equivalence relation $R$, which technically amounts to a set of *pairs* of worlds, to those pairs in which $?\varphi$ denotes precisely the same proposition, i.e., in which $?\varphi$ has the same true and complete answer. Thus, in Frege’s terminology, declaratives and interrogatives are associated with different forces: a declarative enhances the common ground, while an interrogative adds a question under discussion.

Some recent work within this general approach extends the basic account of falling declaratives and polar/*wh*-interrogatives to special sentence types such as rising declaratives and tag interrogatives (e.g., Beyssade and Marandin, 2006; Gunlogson, 2008; Krifka, 2014; Malamud and Stephenson, 2014). In this work, rising/falling declaratives and tag interrogatives are not differentiated at a semantic level. However, they are associated with different conventions of use. Thus, the general architecture of these approaches can be schematically depicted as follows.

<table>
<thead>
<tr>
<th>Forms</th>
<th>Meanings</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>$f_1$</td>
<td>$I$</td>
<td>$F_{f_1}$</td>
</tr>
<tr>
<td>$f_2$</td>
<td>$I$</td>
<td>$F_{f_2}$</td>
</tr>
<tr>
<td>$f_3$</td>
<td>$I$</td>
<td>$F_{f_3}$</td>
</tr>
<tr>
<td>$f_4$</td>
<td>$I$</td>
<td>$F_{f_4}$</td>
</tr>
</tbody>
</table>

At a semantic level, a distinction is made between two types of meaning: $m_1$, shared by ris-
ing/falling declaratives and tag interrogatives, and $m_2$, assigned to polar interrogatives. As for the mapping from semantic meaning to discourse effects, each sentence type is associated with a different convention of use (as reflected in the diagram by the different line patterns).

In the next section we will see how this picture can be simplified. In particular, we will show that under certain semantic assumptions, which can be motivated independently, it is possible to connect the different sentence types with their discourse effects in a more uniform way: rather than associating every sentence type with a different convention of use, the discourse effects of plain falling declaratives and polar interrogatives can be characterized uniformly based on their semantic meaning.

2.4 Unifying semantic types and conventions of use

Notice that on the approach just discussed, declaratives and interrogatives do not only receive different semantic values, but they are also taken to be of different semantic types. That is, declaratives are taken to express propositions, while interrogatives are either taken to express functions from worlds to propositions, or alternatively, sets of propositions. So declaratives are of type $\langle s, t \rangle$, while interrogatives are either of type $\langle s, \langle s, t \rangle \rangle$ or of type $\langle \langle s, t \rangle, t \rangle$. These different kinds of semantic values are intended to capture different kinds of semantic content. The semantic value of a declarative sentence is intended to capture its truth conditions, i.e., its informative content. On the other hand, the semantic value of an interrogative sentence is intended to capture the issue it raises, i.e., its inquisitive content.

In inquisitive semantics (e.g., Ciardelli et al., 2013, 2015), the semantic value of a sentence, no matter whether it is declarative or interrogative, always captures both its informative and its inquisitive content. In the case of a declarative sentence, the inquisitive content is typically trivial; and vice versa, in the case of an interrogative sentence, the informative content is typically trivial. But having a notion of meaning that comprises both informative and inquisitive content allows for a more integrated semantic treatment of the two sentence types. One reason to pursue such an integrated semantic treatment (among several others which are not directly relevant for our present purposes), is that it makes it possible to simplify the discourse component. To illustrate this, we have to say a bit more about the inquisitive notion of meaning. The comments below will be brief; more details will be provided in Section 3.1.

The proposition expressed by a sentence in inquisitive semantics is not a set of worlds, but rather a set of information states, those information states that are said to support the sentence. Information states are modeled as sets of possible worlds. A falling declarative like *Amalia left* is supported by an information state $s$ just in case every world in $s$ is one in which Amalia left. On the other hand, a polar interrogative like *Did Amalia leave?* is supported by an information state $s$ just in case (i) every world in $s$ is one in which Amalia left, or (ii) every world in $s$ is one in which Amalia did not leave. Thus, the support based notion of meaning applies uniformly to falling declaratives and polar interrogatives, as well as disjunctive and wh-interrogatives; all these sentence types are treated as being of the same semantic type.

As for discourse effects, a speaker who utters a sentence $\varphi$, no matter whether this sentence is a falling declarative, a polar interrogative, or a wh-interrogative, is taken (i) to steer the common ground of the conversation towards an information state that supports $\varphi$, and (ii) to provide the information that the actual world is contained in one of these states, i.e., in $\bigcup \langle \varphi \rangle$. It is customary to refer to $\bigcup \langle \varphi \rangle$ as the informative content of $\varphi$.

Thus, the discourse effects of falling declaratives and polar/wh-interrogatives are determined uniformly by their semantic value.\footnote{This uniformity could also be achieved in Hamblin’s (1973) semantics, where both falling declaratives and po-}
by all these basic sentence types. All differences in discourse effects are derived from differences in semantics. For instance, in uttering the falling declarative *Amalia left* the speaker provides the information that the actual world is contained in a state that supports the sentence, which is to say that it must be a world in which Amalia left. At the same time, the speaker steers the common ground of the conversation to a state that supports the sentence. In order to reach such a state, however, it is sufficient for all other participants to accept the information that the speaker herself provided; no additional information needs to be provided. Thus, a falling declarative is not inquisitive, i.e., its inquisitive content is trivial.

On the other hand, in uttering the polar interrogative *Did Amalia leave?* a speaker provides the information that the actual world is either one where Amalia left or one where Amalia did not leave; this, however, will always be the case, so here the informative content is trivial. At the same time, the speaker steers the common ground of the conversation towards a state that supports the sentence, i.e., a state which is either such that every world in it is one where Amalia left, or such that every world in it is one where Amalia did not leave. In order to reach such a state, it does not help for other participants to just accept the trivial information that the speaker herself provided; rather, additional information needs to be provided. Thus, the sentence is inquisitive, i.e., its inquisitive content is not trivial.

The resulting division of labor between the semantic component and the discourse component is depicted in the diagram below, restricting our attention for the moment to falling declaratives and polar interrogatives. The semantics assigns different meanings to falling declaratives and polar interrogatives, respectively, though now these meanings are of the same type. The discourse component no longer involves two different conventions of use, $F_{f_1}$ and $F_{f_2}$, but rather a single default convention of use, $F_d$, which applies uniformly to both sentence types.

<table>
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<tbody>
<tr>
<td>$f_1$</td>
<td>I</td>
<td>$m_1$</td>
</tr>
<tr>
<td>$f_2$</td>
<td>I</td>
<td>$m_2$</td>
</tr>
</tbody>
</table>

As far as falling declaratives and plain polar interrogatives are concerned, this approach is more parsimonious than the previous we discussed, as well as the Fregean approach that we started out with, because it avoids the stipulation of multiple conventions of use. It does assign more complex semantic values to sentences than Fregean theories do, but this is justified on independent grounds (recall the arguments from Groenendijk and Stokhof, 1997, concerning embedded clauses and the broader spectrum of interrogatives). Thus, the differences in the conventional discourse effects of falling declaratives and polar interrogatives are derived from independently motivated differences in meaning.

/lar/wh-interrogatives are taken to express sets of classical propositions—a singleton set in the case of falling declaratives and typically a non-singleton set in the case of polar/lar/wh-interrogatives. As far as we know, however, work in Hamblin semantics has not explicitly attempted to give a uniform characterization of the conventional discourse effects of declaratives and interrogatives.
However, the picture we arrived at still leaves open how sentence types involving non-categorical commitments, i.e., rising declaratives and tag interrogatives, should be treated. Work on inquisitive semantics has not addressed this question so far. Below we lay out the main desiderata that, in our view, such an extension should satisfy.

2.5 Optimal versus marked forms, default versus special effects

The basic question that we face when considering how to bring rising declaratives and tag interrogatives into the picture is whether we should add complexity to the discourse component, to the semantic component, or to both. The answer, we suggest, is that the additional burden should be carried entirely by the discourse component. This is because, as we argued above when discussing the radical dynamic approach, the non-categorical commitments induced by rising declaratives and tag interrogatives do not have to be built up recursively; they can simply be determined at the root level. Therefore, as long as there is no independent reason to add further complexity to the semantics, it is preferable to associate rising declaratives and tag interrogatives with conventions of use that differ from the default convention of use associated with falling declaratives and plain polar/wh-interrogatives. These non-default conventions of use are then responsible for the special discourse effects of these sentence types, in particular the non-categorical commitments that they induce.

This means that, as on the Fregean approach and unlike on the basic inquisitive approach sketched above, the semantics will no longer do all the work in differentiating the various sentence types—some sentence types will be mapped to the same semantic meaning but will be associated with different conventions of use. For instance, a tag interrogative and a plain polar interrogative that have the same sentence radical will be assigned the same semantic value.

Crucially, however, among the different forms that are mapped to the same semantic value, we make a distinction between marked and unmarked forms. One form may be more marked than another either because it is formally more complex or because it is less likely to be interpreted as intended. For instance, tag interrogatives are more verbose than plain polar interrogatives, and therefore more marked. Borrowing terminology from optimality theory (Prince and Smolensky, 2008), we will refer to the least marked form(s) expressing a given meaning $m$ as the optimal form(s) for $m$, and to all other forms expressing $m$ as marked forms.

Now, given such a distinction between optimal and marked forms, we want our theory to satisfy the following principle:

\[ 17 \] Division of labor principle

\[ 17 \] Division of labor principle

a. All optimal forms should be associated with the same default convention of use, $F_d$. Only marked forms may be associated with non-default conventions of use.

b. Moreover, the discourse effects associated with marked forms should always involve a combination of (i) the discourse effects that are directly dictated by the semantic value of the sentence and the default convention of use $F_d$, and possibly (ii) a special discourse effect connected to the particular sentence type involved.

This is depicted in the diagram in Figure 2. This diagram is schematic in the sense that it may turn out that the different forms are to be distributed among the two different meanings in a different

\[ 4 \] Clearly, this principle is in the spirit of Horn’s principle of pragmatic division of labor: “The use of a marked (relatively complex and/or prolix) expression when a corresponding unmarked (simpler, less ‘effortfull’) alternative expression is available tends to be interpreted as conveying a marked message (one which the unmarked alternative would not or could not have conveyed)” (Horn, 1984, p.22).
meanings

Figure 2: Desired division of labor between semantic interpretation and conventions of use.

way, e.g., it may be that more than two of them will be mapped to the same meaning—this will depend on compositionality considerations. The general constraint that the diagram is intended to visualize is just that all optimal forms should have the same default force, while marked forms may add ‘special effects’.

In the remainder of the paper we will develop a theory that satisfies this principle. First, in Section 3, we briefly lay out our general assumptions about semantic content and discourse contexts. Then, in Sections 4 and 5, we articulate our account of the various types of declaratives and interrogatives.

3 Assumptions on semantic content and discourse contexts

In Section 3.1 we lay out our general assumptions about the kind of objects that the semantic interpretation procedure assigns to sentences. These assumptions are drawn from recent work on inquisitive semantics (e.g., Ciardelli et al., 2013, 2015), which in turn builds on a large body of work on questions (e.g. Hamblin, 1973; Karttunen, 1977; Groenendijk and Stokhof, 1984; Groenendijk, 1999) and other alternative-inducing expressions like disjunction and indefinites (e.g., Kratzer and Shimoyama, 2002; Simons, 2005; Alonso-Ovalle, 2006; Aloni, 2007).

In Section 3.2 we specify our basic assumptions about discourse contexts. These assumptions are drawn from recent work on commitment-based models of discourse (Gunlogson, 2008; Farkas and Bruce, 2010), which in turn also builds on a long tradition of previous work (e.g., Hamblin, 1971; Stalnaker, 1978; Carlson, 1983; Clark, 1992; Ginzburg, 1996; Roberts, 1996; Gunlogson, 2001; Asher and Lascarides, 2003; Büring, 2003).
3.1 Semantic content in inquisitive semantics

Traditionally, the proposition expressed by a sentence is construed as a set of possible worlds, embodying the informative content of the sentence. A proposition, construed in this way, can be thought of as carving out a particular region in the set of all possible worlds. When a sentence is uttered, the speaker can be taken to provide the information that the actual world is located in the region that the proposition expressed by the sentence carves out. In this way, the proposition expressed by the sentence captures the informative content of the sentence, i.e., its potential to provide information when uttered.

In inquisitive semantics, the proposition that a sentence expresses is not just intended to capture the informative content of the sentence, but also its inquisitive content, i.e., its potential to raise an issue. This means that propositions cannot simply be construed as sets of possible worlds.

However, there is a very natural generalization of the classical notion of propositions. Namely, rather than construing propositions as sets of possible worlds, we may construe them as sets of information states, which in turn are modeled as sets of possible worlds. The basic effect of uttering a sentence expressing a proposition \( \mathcal{P} \) can then be taken to be two-fold. First, the speaker steers the common ground of the conversation towards one of the states in \( \mathcal{P} \). Second, the speaker provides the information that at least one of the states in \( \mathcal{P} \) must be compatible with the actual state of affairs, i.e., that the actual world must be contained in \( \bigcup \mathcal{P} \).

Intuitively, a proposition in the sense of inquisitive semantics can be thought of as embodying a proposal to update the common ground in one or more ways. The information states that the proposition consists of determine precisely what is needed to comply with the proposal: namely, the common ground needs to be enhanced in such a way that one of these states is reached.

It is natural to assume that if a certain update complies with a given proposal, then any stronger update complies with the proposal as well. This means that propositions are downward closed, i.e., if they contain a certain information state \( s \), they also contain any of its substates \( t \subseteq s \).

The most restrained way to comply with a given proposal is to establish enough information for the common ground to reach one of the desired states, but not more information than is necessary to achieve this. Such updates are ones that lead the common ground to one of the maximal elements of the given proposition. These elements are referred to as the alternatives in the proposition.

Two simple propositions are depicted in Figure 3. It is assumed here that there are just four possible worlds in total: 11 is a world where both Amalia and Bill left, 10 a world where Amalia left but Bill didn’t, 01 a world where Bill left but Amalia didn’t, and 00 a world where neither Amalia nor Bill left. In visualizing a proposition, we just depict the alternatives that it contains. Since propositions are downward closed, we know that they contain all substates of the alternatives as well, but explicitly depicting these substates would make the diagrams much less transparent.
Consider the proposition $P_a$ depicted in Figure 3(a), which may be associated with the falling declarative “Amalia left”. As specified above, the basic effect of uttering a sentence that expresses this proposition is two-fold. First, the speaker provides the information that the actual world must be contained in $\bigcup P_a = \{11, 10\}$; i.e., she provides the information that Amalia left. Second, she steers the common ground towards a state in $P_a$, i.e., one in which it is commonly established that Amalia left. In order to reach such a common ground, it is sufficient for other participants to accept the information that the speaker herself provided; it is not necessary to provide additional information. In this sense, the issue that the sentence raises is trivial.

Next, consider the proposition $P_b$ depicted in Figure 3(b), which may be associated with the polar interrogative “Did Amalia leave?”. The effect of uttering a sentence expressing this proposition is again two-fold. On the one hand, the speaker provides the information that the actual world must be contained in $\bigcup P_b$. Notice, however, that this information is trivial, since in this case $\bigcup P_b$ amounts to the set of all possible worlds, and clearly the actual world must be one of them. On the other hand, the speaker steers the common ground towards some state in $P_b$. In order to reach such a state, it is not sufficient for other participants to just accept the trivial information that the speaker herself provided in uttering the sentence; rather, it is necessary to provide additional information, either to the effect that Amalia left or to the effect that she didn’t leave.

**Informative and inquisitive propositions.** For any proposition $P$, we refer to $\bigcup P$ as the informative content of $P$, and denote it as $\text{info}(P)$. We say that $P$ is informative just in case its informative content is non-trivial: $\text{info}(P) \neq W$, where $W$ is the set of all possible worlds. Similarly, we say that $P$ is inquisitive just in case it raises a non-trivial issue, which obtains just in case $\text{info}(P) \not\in P$. According to these definitions $P_a$ is informative but not inquisitive, while $P_b$ is inquisitive but not informative.

If one has a picture of a proposition $P$ it is straightforward to determine whether it is inquisitive or not. This is because, under the assumption that there are only finitely many possible worlds—which is a safe assumption to make for all the examples to be considered in this paper—a proposition $P$ is inquisitive just in case it contains at least two alternatives. For instance, $P_a$ contains a single alternative, while $P_b$ contains two. From this we can immediately conclude that $P_b$ is inquisitive, while $P_a$ is not.

**Projection operators.** As depicted in Figure 4, propositions in inquisitive semantics can be thought of as inhabiting a two-dimensional space. On the horizontal axis, there are propositions that are purely informative, i.e., whose inquisitive content is trivial. On the vertical axis, there are propositions that are purely inquisitive, i.e., whose informative content is trivial. All other propositions, which are both informative and inquisitive, are located somewhere in the plane, off the axes.
Figure 5: Projection operators applied to a proposition that is both informative and inquisitive.

Given this picture, it is natural to consider operations that project any proposition onto one of the axes, trivializing either its inquisitive or its informative content. These operators are denoted in inquisitive semantics as $!$ and $?$, respectively. $!$ is the non-inquisitive projection operator: it trivializes the inquisitive content of a proposition, while leaving its informative content untouched. $?$ is the non-informative projection operator: it trivializes the informative content of a proposition, while minimally weakening its inquisitive content (inquisitive content cannot be left completely untouched in this case, because then the informative content would also remain intact, see Roelofsen, 2013, for discussion). These projection operators will play an important role in our analysis of clause types (declarative/interrogative) and intonation (fall/rise).

The operators are defined as follows ($\wp$ denotes the powerset operator, which takes a set as its input and yields the set of all subsets of this set as its output):

$$
!\mathcal{P} = \wp(\bigcup \mathcal{P}) \\
?\mathcal{P} = \mathcal{P} \cup \wp(\bigcup \overline{\mathcal{P}})
$$

To illustrate how the operators work, consider the proposition $\mathcal{P}_c$ depicted in Figure 5(a). Notice that this proposition is informative, since $\text{info}(\mathcal{P}_c) \neq W$, and also inquisitive, since $\text{info}(\mathcal{P}_c) \notin \mathcal{P}_c$. Now consider $!\mathcal{P}_c$, depicted in Figure 5(b). This proposition contains a single alternative, which means that it is no longer inquisitive. At the same time, its informative content is the same as that of $\mathcal{P}_c$ itself, because $\bigcup !\mathcal{P}_c = \bigcup \mathcal{P}_c$. Thus, indeed, $!$ trivializes the inquisitive content of the proposition while leaving its informative content intact. Next, consider $?\mathcal{P}_c$, depicted in Figure 5(c). This proposition contains three alternatives: two of these were already present in $\mathcal{P}_c$, and the third one is the complement of $\bigcup \mathcal{P}_c$. The three alternatives together cover the set of all possible worlds, which means that $?\mathcal{P}_c$ is not informative. Thus, indeed, $?$ trivializes informative content, while it weakens inquisitive content in a minimal way.

**Highlighting.** As mentioned above, the polar interrogative “Did Amalia leave?” may be taken to express the proposition depicted in Figure 3(b), which contains two alternatives: one consisting of all worlds where Amalia left and the other consisting of all worlds where Amalia did not leave. This proposition suitably captures what kind of information is needed to resolve the issue that a speaker raises in uttering the polar interrogative. However, it does not capture the fact that the sentence form lends much more prominence to the first alternative, consisting of all worlds where Amalia left, than to the second, consisting of all worlds where she didn’t. We say that the first alternative is highlighted (Roelofsen and van Gool, 2010; Farkas, 2011; Roelofsen and Farkas, 2015).

Highlighted alternatives function as propositional discourse referents, providing potential antecedents for subsequent anaphoric expressions. Such anaphoric expressions include particles like otherwise and if so, as well as answer particles like yes and no. For instance, in response to “Did
Amalia left?”, yes confirms the highlighted alternative, establishing that Amalia indeed left, while no denies the highlighted alternative, establishing that Amalia did not leave.

We will see that the distinction between highlighted and non-highlighted alternatives is also needed to characterize the non-categorical commitments that a speaker makes in uttering a rising declarative or a tag interrogative.\footnote{In Herbstritt et al. (2015) it is argued that highlighting does not only play a role in determining the discourse behavior of root interrogatives, but also in determining the semantic contribution of embedded interrogatives.}

### 3.2 Commitment-based discourse contexts

Having spelled out the notion of semantic content that we assume, our next task is to specify a suitable notion of discourse contexts. We first recall the basic notion of discourse contexts proposed by Farkas and Bruce (2010) (building on much previous work, see references above). Once this notion is in place, we will further refine it taking inspiration from Gunlogson (2008), Northrup (2014), and Heritage and Raymond (2005).

One auxiliary notion that is needed is that of a piece of information, formally modeled as a set of possible worlds (just like information states), namely, those worlds that are compatible with it. For brevity, we will generally refer to a piece of information as a possibility. With this notion in place, we can specify what we take the basic components of a discourse context to be.

\[(18)\] A basic discourse context is a triple \((\text{participants}, \text{table}, \text{commitments})\), where:

a. \text{participants} is the set of discourse participants;

b. \text{table} is a stack of propositions, representing the proposals made so far;

c. \text{commitments} is a function that maps every participant \(x \in \text{participants}\) to a set of possibilities, those possibilities that \(x\) has publicly committed to so far.

In terms of these basic discourse context components, several other notions may be defined. For instance, we may define the commitment set of a participant \(x\), \(cs(x)\), as the set of worlds that are compatible with all the possibilities that \(x\) has publicly committed to so far: \(cs(x) = \bigcap \text{commitments}(x)\).

In terms of the commitment sets of all the individual participants, the common ground may be defined as the smallest set of possible worlds \(s\) such that all discourse participants are publicly committed to the actual world being contained in \(s\). In other words: \(cg = \bigcup_{x \in P} cs(x)\). Thus, the standard Stalnakerian notion of the common ground/context set can be derived here, but is not taken as a basic component, let alone the defining characteristic, of a discourse context.\footnote{For a general discussion of reasons to keep track of the commitments of all the individual discourse participants, rather than just the common ground, we refer to Farkas and Bruce (2010).}

The initial context of every discourse is one in which \(\text{table} = \emptyset\), which means that no proposals have been made yet, and for every discourse participant \(x\), \(\text{commitments}(x) = \emptyset\), which means that the discourse participants have not made any public discourse commitments yet.\footnote{Discourse commitments, in our technical sense, do not include general background assumptions. Of course, such assumptions play a crucial role in discourse at large but not for the phenomena considered here.}

We say that the discourse participants have commonly decided on a proposition \(P\) either if \(cg \in P\) or if \(cg \cap s = \emptyset\) for all \(s \in P\). In the first case, the discourse participants have complied with the proposal embodied by \(P\). In the second case, they have commonly established that it is impossible to comply with the proposal. In a cooperative discourse, the goal of the participants is always to work towards a context in which every proposition \(P \in \text{table}\) has been commonly decided.

This basic notion of discourse contexts is sufficient to capture the discourse effects of sentences that induce a categorical commitment, like falling declaratives and polar interrogatives. However,
in order to be able to capture the non-categorical commitments resulting from rising declaratives and tag interrogatives, we need a more refined notion of discourse contexts.

The first refinement that is needed, we propose, is a distinction between actual commitments and conditional commitments, which only become actual when ratified by the addressee. This distinction has been introduced by Gunlogson (2008), who uses it to capture the discourse effects of rising declaratives. On our account, both rising declaratives and tag interrogatives will be taken to induce a conditional commitment to the possibility highlighted by the sentence radical. For instance, both (19) and (20) will be taken to induce a conditional commitment to the alternative consisting of all worlds where Amalia left (a detailed account of the semantics and discourse effects of rising declaratives and tag interrogatives will be provided in Sections 4 and 5; for now these examples just serve to illustrate the notion of conditional commitments and the role they will play in our account).

(19) Amalia left↑?
(20) Amalia left, didn’t she↑?

In conditionally committing to an alternative \( \alpha \) a speaker signals that she expects the addressee to commit to \( \mathcal{P} \). Furthermore, if the addressee indeed commits to \( \mathcal{P} \), the speaker’s conditional commitment to \( \mathcal{P} \) becomes an actual commitment, one that cannot felicitously be retracted. The following examples provide evidence that rising declaratives and tag interrogatives indeed involve conditional commitments of this kind. In particular, they show that after a confirming response, the commitment can indeed not be felicitously retracted.\(^8\)

(21) A: You got a haircut↑?
B: Yes, I did.
A: # Really? It doesn’t look like it. (from Northrup, 2014, p.33)

(22) A: Amalia left, didn’t she↑?
B: Yes, she did.
A: # I don’t think so.

Thus, what rising declaratives and tag interrogatives have in common on our account is that they both induce a conditional commitment. This distinguishes them from falling declaratives and polar interrogatives.

A further refinement is needed, however, to capture the contrasts that exist between rising declaratives and tag interrogatives. Recall from the introduction that there are contexts in which rising declaratives are felicitous but tag interrogatives are not, and vice versa (the examples, repeated below, are parallel to ones discussed by Malamud and Stephenson (2014); more examples will be considered in Section 5).

(23) Context: \( A \) is going through a pile of job applications. \( B \) has not seen any of them yet.
\( A \) is smiling while reading one of the applications.

\(^8\)If a speaker makes a conditional commitment to \( \mathcal{P} \) and her addressee commits to \( \mathcal{P} \) the speaker may, before accepting the addressee’s response, question the addressee’s grounds for making the commitment as in (i):

(i) A: Amalia left↑?
B: Yes, she did.
A: Are you sure?/Have you actually seen her leave?

Once the addressee’s epistemic credentials are established, however, the original speaker’s conditional commitment does indeed become actual.
To capture these and other contrasts we will assume that in making a conditional commitment to a certain possibility $\alpha$ a speaker may indicate the level of epistemic authority she has w.r.t. $P$. In particular, we will assume that a rising declarative signals that the speaker’s epistemic authority w.r.t. the possibility she conditionally commits to is low, while a tag interrogative signals that her epistemic authority w.r.t. the possibility she conditionally commits to is not low, i.e., somewhere in the interval between moderate and high. This explains why a tag interrogative is infelicitous in (23), where the speaker is contextually assumed to have low epistemic authority w.r.t. the possibility she conditionally commits to, and why a rising declarative is infelicitous in (24), where the speaker is contextually assumed to have high epistemic authority w.r.t. the possibility she conditionally commits to. After having developed the account in more detail in Sections 4 and 5, we will see that it explains a number of other contrasts as well.

Now let us return to the representation of discourse contexts. Given the above considerations, we refine our basic notion of discourse contexts in two ways. Namely, as depicted in Figure 6, we divide the set of public discourse commitments of a participant $x$, $\text{commitments}(x)$, into a set of actual commitments, $\text{commitments}^a(x)$, and a set of conditional commitments, $\text{commitments}^c(x)$. Furthermore, we subdivide conditional commitments into ones involving low speaker authority, $\text{commitments}_<(x)$, and ones involving moderate to high speaker authority $\text{commitments}_{\geq}(x)$. With this refined notion of discourse contexts in place, we are now ready to turn to our account of the various sentence types.

4 Semantic interpretation

In this section we provide a simple compositional semantics for the sentence forms we are concerned with, thereby specifying the $I$ function that connects sentence forms with their meanings in the diagram in Figure 2. All sentence forms will be treated to be of the same semantic type, i.e., they will all be treated as expressing propositions in the sense of inquisitive semantics. However, we will draw a semantic distinction between falling declaratives on the one hand, and rising declaratives, polar interrogatives, and tag interrogatives on the other hand, in that falling declaratives will be associated with non-inquisitive propositions while typical tokens of the other sentence types will be
associated with inquisitive propositions.

In Section 4.1 we specify the internal structure of each sentence type, in Section 4.2 we provide a compositional semantics, and finally, in Section 4.3 we draw a distinction between marked and unmarked sentence forms. This distinction will play a crucial role in our treatment of the connection between sentence forms and conventions of use in Section 5.

4.1 Sentence forms

We assume that the syntactic representation of the sentence forms we consider involves two kinds of clause type markers:

(25) **Clause type markers**

a. DEC / INT
b. CLOSED / OPEN

In English root clauses, declarative word order marks the presence of DEC, and interrogative word order marks the presence of INT. In standard English embedded clauses, the distinction is not encoded by means of word order but by the presence of *that* versus *if/whether*. CLOSED is marked by sentence-final falling intonation, which we indicate by ↓, while that of OPEN is marked by a sentence-final rise, which we indicate by ↑.⁹,¹⁰

These two sets of clause type markers join forces to encode the distinction between inquisitive and non-inquisitive sentence meaning. We assume that this fundamental semantic distinction is formally marked in most languages, although the particular markers and their distribution will of course vary from language to language.

The separation of CLOSED and OPEN from DEC and INT is an important feature of our account, one that it shares with Gunlogson (2001).¹¹ To justify it, recall first that rising intonation occurs in English with both interrogative and declarative sentences, and when it occurs with the latter, it has significant interpretive consequences. Thus, as mentioned in Section 1, the conventional discourse effect of a falling declaratives is to provide information, while that of a rising declarative is to raise an issue and indicate a speaker bias for one of its resolutions. We see this distinction at work in the examples in (26), which involve postposed main phrases whose complements have the formal marks of root clauses:

(26)  

a. ‘Amalia left↓’, she claimed/*asked/*inquired.

b. ‘Amalia left↑’, she asked/inquired/*claimed.

c. ‘Did Amalia leave?’, she asked/inquired/*claimed.

To explain the contrast between (26a) and (26c) we suggest that the verbs *ask* and *inquire* require complements expressing inquisitive propositions, while *claim* requires complements expressing non-inquisitive propositions. In (26b) we see that rising declaratives pattern with polar interrogatives

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⁹We are assuming a one way connection between OPEN/CLOSED and rising/falling intonation, respectively. Thus, we leave open the possibility that the contrast between rising and falling intonation has further uses in the language, one of which will be discussed below.

¹⁰We assume that rising/falling intonation in English has semantic significance only in root clauses. This makes sense from the point of view of communicative efficiency: an intonational contrast used distinctively in embedded environments would raise the possibility of potentially confusing interaction with matrix prosody. Correspondingly, we assume that OPEN and CLOSED occur only in root clauses.

¹¹In Gunlogson (2001) DEC signals commitment, and the rising or falling intonation signal whether the commitment is the speaker’s (↓) or one that the speaker attributes to the addressee (↑). Our account is similar to Gunlogson’s in separating the two components but the semantic contribution we assign to them is very different.
rather than with falling declaratives in that they can occur as complements of postposed *ask* and *inquire* but not as complements of postposed *claim*. In our account, this fact follows from the presence of OPEN in (26b), which renders the meaning of the clause inquisitive.

Next, note that in ‘fragment answers’, intonation is the sole formal mark of the distinction between an inquisitive and an informative response:

(27) a. Amalia: What is the capital of South Korea?
   c. Bert: Seoul↑?

Bert’s response in (27b) fully answers Amalia’s question, as it happens, correctly; his response in (27c) on the other hand, can only be taken as a further question, albeit one that indicates a bias towards the correct answer. Note that the sole difference between these two responses is their intonation, which therefore must be able to encode the interpretive contrast. For further discussion and further examples of semantic contrasts encoded in the distinction between rising and falling intonation signaling the presence of OPEN and CLOSED in disjunctive interrogatives, we refer to Roelofsen and Farkas (2015).

Next, we turn to the issue of how the clause type markers combine with a sentence radical. At the most basic level, we assume that a sentence radical $\varphi$ combines first with $\text{dec}$ or $\text{int}$ and then the result combines with $\text{closed}$ or $\text{open}$, as shown below:

```
  CLOSED/OPEN
     /\      /
    DEC/INT  $\varphi$
```

In root clauses, which are the focus of our paper, the combination of the two kinds of clause type markers is unconstrained, resulting in two possible intonation patterns for both declarative and interrogative sentences. The assumed structures of falling and rising declaratives are given below:

```
  CLOSED
     /\      /
    DEC  $\varphi$
```
```
  OPEN
     /\      /
    DEC  $\varphi$
```

The structures of rising and falling interrogatives differ from their declarative counterparts only in that the $\text{int}$ operator replaces the $\text{dec}$ operator in the structures above.

For tag interrogatives we assume a more complex structure corresponding to their more complex surface form. We treat them as being composed of a falling declarative, their anchor, and the tag, which in turn is made up of $\text{int}$ and either OPEN or CLOSED, as illustrated below:

```
  OPEN/CLOSED
     /\      /
    INT  CLOSED
         /\        /
        DEC$\varphi$
```
Rising tag interrogatives differ from falling tag interrogatives in that the topmost operator of the former is *open*, while the topmost operator of the latter is *closed*.12

Thus, we assume that tag interrogatives result from combining INT with a clause that already contains DEC. Normally, the presence of either INT or DEC is signalled by interrogative or declarative word order in the clause. In the case of tag interrogatives, the word order of the clause is already fixed by DEC. The formal mark of INT in this case is the tag, which has interrogative word order. The final OPEN or CLOSED operator determines the rising or falling intonation of the tag, while the lower CLOSED operator determines the falling intonation of the declarative anchor. Next, we turn to the compositional semantics of these structures.

### 4.2 Compositional semantics

In this subsection we specify a compositional semantics for the syntactic structures introduced above.13 We start with sentence radicals. The semantic value of a sentence radical is a proposition in the sense of inquisitive semantics, i.e., a downward closed set of information states. For instance, the proposition expressed by the sentence radical *Amalia left* is the set of all information states that consist exclusively of worlds in which Amalia left. This set contains a single alternative, namely the set of all worlds in which Amalia left, plus all subsets of this alternative. To make our formal notation compact and transparent, we will write $S^\downarrow$ for the downward closure of any set of information states $S$, i.e., for the set $\{ t \subset s \mid s \in S \}$. Thus, for [ Amalia left ] we write:

(28) $[ \text{Amalia left} ] = \{ \{ w : \text{Amalia left in } w \} \}^\downarrow$

The proposition expressed by a disjunctive sentence radical such as *Amalia or Bill left*, given in (29), is inquisitive. It contains two alternatives: the set of worlds in which Amalia left, and the set of worlds in which Bill left.

(29) $[ \text{Amalia or Bill left} ] = \{ \{ w : \text{Amalia left in } w \}, \{ w : \text{Bill left in } w \} \}^\downarrow$

We now turn to the clause type markers, whose semantic contribution we specify in terms of the two projection operators discussed in Section 3.1. First, we treat DEC as an operator that takes the proposition $P$ expressed by the sentence radical as its input, and applies the non-inquisitive projection operator $!$ to it, yielding $!P$:

(30) $[ \text{DEC} ] = \lambda P. !P$

When $P$ is already non-inquisitive, we have that $!P = P$, so the semantic effect of DEC is vacuous, as exemplified in (31). When $P$ is inquisitive, the semantic effect of DEC is non-vacuous, as exemplified in (32):

(31) $[ \text{DEC Amalia left} ] = !\{ \{ w : \text{Amalia left in } w \} \}^\downarrow = \{ \{ w : \text{Amalia left in } w \} \}^\downarrow$

(32) $[ \text{DEC Amalia or Bill left} ] = !\{ \{ w : \text{Amalia left in } w \}, \{ w : \text{Bill left in } w \} \}^\downarrow$

$= \{ \{ w : \text{Amalia or Bill left in } w \} \}^\downarrow$

Turning now to the semantics of INT, we take its role to be that of ensuring inquisitiveness. Thus, when the proposition $P$ that it applies to is not yet inquisitive, INT applies the non-informative

---

12We are dealing here only with reverse tag interrogatives. In order to capture the distinction between reverse and same polarity tag interrogatives (e.g., *Amalia left, did she*?), our analytical machinery would have to be enriched.

13What follows is a simplified version of the semantics for the four clause type markers DEC, INT and CLOSED, OPEN presented in Roelofsen and Farkas (2015). We abstract away here from details that are not relevant for our present concerns.
projection operator \(?\) to it, yielding \(\text{info}(P)\). In the typical case in which \(P\) is neither a tautology nor a contradiction, the result is a proposition containing two alternatives, \text{info}(P)\) and its complement, \text{info}(\neg P)\). When \(P\) is already inquisitive, \text{INT} has no semantic effect. We need this latter requirement in order to account for the interaction of interrogative sentence type and intonation in disjunctive sentences, an issue that we do not explicitly deal with here but see Roelofsen and Farkas (2015) for details. The interpretation of \text{INT}, then, is given in (33):

(33) \[ [\text{INT}] = \lambda P. \langle?\rangle P \]

The \(\langle?\rangle\) notation is used to mark the fact that \text{INT} contributes the non-informative projection operator \(?\) when applied to a non-inquisitive proposition and is vacuous otherwise.

We illustrate below with a case where \text{INT} takes a non-inquisitive proposition as its argument:

(34) \[ [\text{INT Amalia left}] = \langle?\rangle \{w : \text{Amalia left in } w\} \]
\[ = \{\{w : \text{Amalia left in } w\}, \{w : \text{Amalia didn’t leave in } w\}\} \]

In sum, applying \text{INT} to the proposition \(P\) expressed by the sentence radical will typically result in an inquisitive proposition, containing two alternatives, the informative content of the sentence radical and its complement. Applying \text{DEC} to the proposition \(P\) expressed by the sentence radical will typically result in a non-inquisitive proposition containing a single alternative that is the informative content of \(P\).

Next, we turn to the semantics of \text{CLOSED} and \text{OPEN}. We assume here that the semantic contribution of \text{CLOSED} is vacuous, and that \text{OPEN} applies the \(?\) operator to its input proposition:\footnote{With respect to \text{CLOSED} this is an simplification; in a full account that applies to disjunctive interrogatives as well as polar ones, \text{CLOSED} should contribute an exclusive strengthening operation. This, however, is irrelevant for the cases we discuss here. We refer the reader again to Roelofsen and Farkas (2015) for the disjunctive cases.}

(35) a. \[ [\text{CLOSED}] = \lambda P. P \]
   b. \[ [\text{OPEN}] = \lambda P. ?P \]

Thus, the result of \text{OPEN} applied to a proposition \(P\) that is not a tautology or a contradiction will be an inquisitive proposition, independently of whether \(P\) itself is inquisitive or not. Therefore, in case \(P\) is neither a contradiction nor a tautology, the result of applying \text{INT} or \text{OPEN} to \(P\) is an inquisitive proposition while the result of applying \text{DEC} to \(P\) is a non-inquisitive proposition.

We are now ready to go through the compositional interpretation of each of the sentence types we are concerned with. The interpretation of a falling declarative sentence is schematized in (36).

(36)

\[
\begin{array}{c}
!P \\
\text{CLOSED} \\
\text{DEC} \\
P
\end{array}
\]

\text{DEC} contributes the \(!\) operator. Thus, the result of combining \text{DEC} with the sentence radical is a non-inquisitive proposition, even if the proposition expressed by the sentence radical itself is inquisitive. Since \text{CLOSED} has no semantic effect, a falling declarative always expresses a non-inquisitive proposition.

The interpretation of a rising or falling interrogative whose sentence radical expresses a non-inquisitive proposition \(P\) is schematized in (37).
INT contributes the ? operator yielding an inquisitive proposition, provided that \( \mathcal{P} \) is not a tautology or a contradiction. Thus, applying INT to an argument that expresses a typical non-inquisitive proposition \( \mathcal{P} \) yields a proposition that contains two alternatives, info(\( \mathcal{P} \)) and its complement. If, on the other hand, \( \mathcal{P} \) were inquisitive, INT would have no semantic effect. As for the highest operator, if it is closed it has no semantic effect by definition; if it is open, it has no semantic effect because its argument is already non-informative. In sum, an interrogative sentence whose sentence radical is not a tautology or a contradiction will always express an inquisitive proposition, independently of whether its intonation is rising or falling.

Turning now to rising declaratives, their interpretation is schematized in (38):

\[
(38) \quad ?! \mathcal{P}
\]

In this case, the result of combining dec with the proposition expressed by the sentence radical is the non-inquisitive proposition \( \{\text{info}(\mathcal{P})\} \) because dec contributes the non-inquisitive projection operator !. The argument of open is now a non-inquisitive proposition, and therefore the result of applying open to it is a proposition made up of info(\( \mathcal{P} \)) and its complement. In the typical case in which \( \mathcal{P} \) is not a tautology or a contradiction, this proposition is inquisitive.

Note that a rising declarative and a polar interrogative that have the same sentence radical are predicted to express the same proposition. In the case of a polar interrogative intonation has no semantic effect, because INT already applies the ? operator. In the case of a rising declarative, the rise signals the presence of open, and this clause type marker contributes the ? operator.

We now turn to the interpretation of tag interrogatives, schematized in (39):

\[
(39) \quad ?! \mathcal{P}
\]

In the case of tag interrogatives, a falling declarative clause is embedded under an interrogative operator. In the typical case when \( \mathcal{P} \) is not a tautology or a contradiction, the result is an inquisitive
Finally, note that the intonation of tag interrogatives is semantically vacuous, in the same way as it is in simple polar interrogatives.

On our account then, a rising declarative and a tag interrogative express the same proposition as a polar interrogative with the same sentence radical, although this proposition comes about in different ways. In particular, in the case of polar interrogatives and tag interrogatives, it is INT that contributes the crucial ? operator; OPEN and CLOSED have no semantic effect in this case. On the other hand, in the case of rising declaratives, it is OPEN that contributes the ? operator.

To sum up, from the point of view of semantic interpretation, our sentence forms divide into the two groups in (40):

(40) Semantic classification of sentence forms considered
   a. Typically informative, non-inquisitive:
      • falling declaratives
   b. Typically inquisitive, non-informative:
      • rising or falling polar interrogatives,
      • rising or falling tag interrogatives,
      • rising declaratives.

Falling declaratives are non-inquisitive and informative unless tautological. The operator that ensures this is dec. Polar interrogatives, rising declaratives and tag interrogatives are non-informative and inquisitive unless tautological.

Finally, recall that, following Roelofsen and Farkas (2015), we assume that the alternative contributed by the sentence radical is highlighted. The operators under consideration here do not affect highlighting, and in order not to complicate matters unnecessarily, we are considering here only examples where a single alternative is highlighted.

To illustrate, the proposition expressed by our falling declarative example in (41a) is given in (41b), where we use boldface to indicate the highlighted alternative (in this case the only alternative in the given proposition):

(41) a. Amalia left↓.
    b. \{\{w : Amalia left in w\}\}↓

The proposition expressed by our examples of rising or falling polar interrogatives, rising declaratives and rising or falling tag interrogatives in (42a) is given in (42b):

(42) a. Did Amalia leave? / Amalia left↑? / Amalia left, didn’t she?
    b. \{\{w : Amalia left in w\}, \{w : Amalia didn’t leave in w\}\}↓

The first alternative in (42b), the set of worlds in which Amalia left, is contributed by the sentence radical and is therefore highlighted; the second alternative, the set of worlds in which Amalia did not leave, is contributed by INT in the case of polar and tag interrogatives, and by OPEN in the case of rising declaratives.

Under the assumption that postposed ask and inquire require the proposition expressed by the quoted sentence to be inquisitive, while postposed claim requires the proposition expressed by the quoted sentence to be informative, we account for the contrast noted in (26), repeated and

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15The opposite situation, i.e., a structure where an interrogative sentence would be embedded under a declarative operator is ruled out because it would be useless: such a combination would always result in a tautology.
expanded in (43) (intonation is left unspecified in the case of polar and tag interrogatives because in these sentence types it is semantically insignificant):

(43) a. ‘Amalia left↓’, she claimed/*asked/*inquired.
b. ‘Amalia left↑?’, she asked/inquired/*claimed.
c. ‘Did Amalia leave?’, she asked/inquired/*claimed.
d. ‘Amalia left, didn’t she?’, she asked/inquired/*claimed

In this section we have specified the \( I \) function in Figure 2, by giving a compositional semantics for the sentence forms we are considering. We now turn to markedness considerations, which will result in a classification that cross-cuts the one in (40) above. These markedness distinctions will be essential in determining how to connect sentence forms to conventions of use in a non-stipulative way, which will be done in Section 5. Recall from Section 2 that we aim to account for the conventional discourse effects of unmarked forms by means of a single default convention of use; additional non-default discourse effects can only be associated to marked forms.

4.3 Marked and unmarked sentence forms

Inspired by Optimality Theory, and in the spirit of neo-Gricean pragmatics advocated in the work of Horn and many others, we look at the form-meaning connection both from the point of view of ensuring economy of form, and from the point of view of ensuring communicative success. Economy of form involves minimizing speaker effort; ensuring communicative success involves making sure that the intended message is successfully conveyed.

The meaning of a falling declarative is a non-inquisitive, typically informative proposition. If this is the type of meaning the speaker wishes to convey, a falling declarative is her only choice. This is so because, as we have seen above, an interrogative, with or without tag, or a rising declarative, if involving a sentence radical that is not a tautology or a contradiction, would receive an inquisitive interpretation, the former because of the presence of \( \text{int} \), the latter because of the presence of \( \text{open} \). A falling declarative is therefore the only, and thereby the optimal form for the meaning it expresses, and because of that we consider it an unmarked form.

If, on the other hand, the speaker wishes to convey an inquisitive proposition \( \mathcal{P} \) containing two complementary alternatives, \( \alpha \) and \( \bar{\alpha} \), several candidate forms are available: a rising or falling polar interrogative, a rising or falling tag interrogative, or a rising declarative. We show next that the optimal form in this case is a rising polar interrogative.

Tag interrogatives, whether rising or falling, are less optimal than rising polar interrogatives simply because they are more complex in form. We thus have the markedness relation in (44):

(44) \[ \text{Rising polar interrogatives vs. tag interrogatives} \]

\[ \text{rising polar interrogative} < \text{rising or falling tag interrogative} \]

A rising declarative is less optimal than a rising polar interrogative because in the case of the rising declarative, the only formal mark that signals inquisitiveness is rising intonation, marking the presence of \( \text{open} \). Were this signal to be missed, the conveyed proposition would not be the intended one, \( \mathcal{P} = \{\alpha, \bar{\alpha}\} \), but rather \( \mathcal{P}' = \{\alpha\} \). In the case of a rising polar interrogative on the other hand, if the word order clue alerting the addressee to the presence of \( \text{int} \) were missed, the rising intonation, signaling the presence of \( \text{open} \) would still be there to ensure that the intended interpretation is conveyed. Considerations of communicative success, then, lead to treating a rising polar interrogative as less marked than a rising declarative when it comes to conveying the type of inquisitive meaning associated to these forms.
Rising polar interrogatives vs. rising declaratives

When it comes to the choice between a rising and a falling polar interrogative, we assume that a rising polar interrogative is again optimal based also on considerations of communicative success. Having both open and int in the makeup of a sentence meant to convey a proposition of the form $P = \{\alpha, \overline{\alpha}\}$ reinforces the inquisitive nature of the meaning conveyed as mentioned above. In the case of a falling polar interrogative on the other hand, interrogative word order is the only clue that ensures that the intended meaning is conveyed. If that clue is missed, the conveyed meaning is the non-inquisitive proposition $P' = \{\alpha\}$. We therefore have the markedness relation in (46):

Rising vs. falling polar interrogatives
rising polar interrogative < falling polar interrogative

The conclusion we reach is that falling declaratives are optimal forms to express non-inquisitive propositions of the form $\{\alpha\}$, while rising polar interrogatives are optimal forms to express inquisitive propositions of the form $\{\alpha, \overline{\alpha}\}$. In terms of markedness then, our sentence forms are classified as in (47):

Markedness classification
a. Unmarked forms:
   - falling declaratives
   - rising polar interrogatives
b. Marked forms:
   - rising declaratives
   - falling or rising tag interrogatives
   - falling polar interrogatives

The markedness distinction between rising polar interrogatives and rising declaratives is relevant to English, where inquisitiveness at the root level can be marked both by int and by open. In languages where the main signal of inquisitive meaning is rising intonation, and there is no systematic word order difference between interrogative and declarative sentences, such a contrast does not arise. In such languages then, rising intonation accompanying declarative word order would be the optimal form for expressing an inquisitive proposition of the form $\{\alpha, \overline{\alpha}\}$.

In the next section we turn to the connection between sentence form, sentence meaning, and conventions of use. In order to conform to our desiderata schematized in Figure 2 in Section 2, all the sentence forms under consideration should be associated with a single default convention of use. For unmarked forms (that is, for falling declaratives and rising polar interrogatives) this default convention of use should suffice to characterize their conventional discourse effects. Additional effects can only be associated to marked forms, and these should be connected to the particular forms in question. Below we will be dealing with only three of the four marked forms we discussed above, namely rising declaratives and rising and falling tag interrogatives. Treating falling polar interrogatives as marked relative to their rising counterparts aligns with observations in the literature concerning the frequency of rising intonation with polar interrogatives noticed as early as Bolinger (1978). We leave open here the question of what the systematic differences in discourse effects between the two types of polar interrogatives are.
5 Conventions of use

In this section we show how sentence form and sentence meaning interact in determining the conventional discourse effects of each sentence type we consider here, thereby specifying the relevant conventions of use. This amounts to characterizing the $F$ functions on the right hand side of Figure 2. As mentioned at the end of the previous section, unmarked sentence forms are to be associated with a unique, default convention of use. That is, there should be no need to stipulate separate conventions of use for falling declaratives and rising polar interrogatives. The conventional discourse effects of marked sentence forms will partly be determined by the default convention of use as well, but in this case there will be additional effects associated with each particular marked form. We start with the unmarked forms and then move on to the marked ones.

5.1 The default convention of use

We assume that the default convention of use specifies the conventional discourse effects spelled out in (48):

\[(48)\quad \text{Default conventional discourse effects dictated by the default convention of use}\]

If a discourse participant $x$ utters a sentence $\varphi$, the discourse context is affected as follows:

1. The proposition expressed by $\varphi$, $[\varphi]$, is added to the table, at the top of the stack.
2. The informative content of $\varphi$, $\bigcup[\varphi]$, is added to $\text{commitments}^a(x)$, the actual, unconditional commitments of $x$.

The result of the first step is to steer the conversation towards a context such that for some state $s \in [\varphi]$, the participants in the conversation mutually agree that $w_a$, the world in which the conversation takes place, is a member of $s$.

The second step commits $x$, the participant who uttered the sentence, to the claim that $w_a$ must be a member of some element of $[\varphi]$, i.e., in $\bigcup[\varphi]$. The second step is closely connected to the first: for $x$ to commit to $w_a$ being contained in $\bigcup[\varphi]$ is just for her to subscribe to her own proposal to pursue mutual agreement that, for some $s \in [\varphi]$, $w_a$ is in $s$.

Since unmarked forms in our view are associated with the default convention of use, the default conventional effects of both falling declaratives and rising polar interrogatives are those specified in (48). Whatever differences there are in the conventional ways in which these two sentence types affect their input contexts should therefore follow from differences in the semantics of the two sentence types. We turn now to showing that this is indeed the case.

Falling declaratives. The proposition $\mathcal{P}$ expressed by a falling declarative is non-inquisitive, given that at the top level such $\text{commitments}^a(x)$ sentences involve the $\text{DEC}$ operator embedded under $\text{CLOSED}$. In this case, then, $\mathcal{P}$ contains a unique alternative $\alpha$ and this alternative is highlighted, so $\mathcal{P} = \{ \alpha \}^\downarrow$. Putting such a proposition on the table amounts to steering the conversation towards a state where the participants mutually agree that $w_a \in \alpha$. At the same time, $\alpha$ is added to $\text{commitments}^a(x)$. The speaker is thereby categorically committed to $\alpha$ and proposes that the other participants commit to it as well so as to establish mutual agreement. If at a subsequent stage of the conversation the same speaker utters, without further qualification, a declarative sentence expressing a proposition whose informative content is incompatible with $\alpha$ she would be guilty of inconsistency.
Thus, the conventional discourse effects obtained by applying (48) to the meaning of a falling declarative can be summarized as follows:

\[
\begin{align*}
(49) \quad \text{Conventional discourse effects of a falling declarative expressing the proposition } & \mathcal{P} = \{\alpha\}^\downarrow \\
& \\
1. \quad \{\alpha\}^\downarrow \text{ is placed on the table} \\
2. \quad \alpha \text{ is added to commitments}^a(\text{Sp})
\end{align*}
\]

Recall that we are restricting our attention to conventional discourse effects. Pragmatic considerations concerning the particular circumstances of utterance, including considerations concerning the speaker’s reasons for uttering the sentence she uttered, are involved in achieving further effects and determining whether the utterance serves, e.g., to inform the addressee of something she is not supposed to know yet, or to remind her of something she is supposed to know already, etcetera.

We turn next to the second unmarked sentence type we are considering, namely rising polar interrogatives.

**Rising polar interrogatives.** Rising polar interrogatives are associated with the same default convention of use as falling declaratives, but because of the semantic difference between falling declaratives and rising polar interrogatives the resulting discourse effects are different.

Recall that because of the \(\text{int} \) operator, rising polar interrogatives express an inquisitive proposition (unless they are tautological) containing two alternatives: a highlighted alternative \(\alpha\), which is the informative content of the proposition expressed by the sentence radical, and its complement, \(\overline{\alpha}\). According to the default convention of use given in (48), when uttering a rising polar interrogative, the proposition expressed by the sentence is placed on the table, and the informative content of this proposition is added to the categorical commitments of the speaker.

In the typical (non-tautological) case then, the proposition placed on the table contains two complementary alternatives, \(\alpha\) and \(\overline{\alpha}\). Placing such a proposition on the table steers the conversation towards a context where the participants either mutually agree that \(w_a\) is in \(\alpha\) or that it is in \(\overline{\alpha}\). Since the two alternatives are complementary, the categorical commitment entered on the speaker’s discourse commitment list is the trivial commitment that \(w_a\) is an element of \(\alpha \cup \overline{\alpha}\), which is the set of all possible worlds, \(W\). In this case then, the speaker makes a trivial commitment and she remains neutral with respect to which alternative in the proposition expressed contains \(w_a\); she presents herself as open to either settling the proposition by agreeing that \(w_a\) is an element of \(\alpha\) or by agreeing that \(w_a\) is an element of \(\overline{\alpha}\). This is summarized in (50).

\[
(50) \quad \text{Conventional discourse effects of a rising polar interrogative expressing the proposition } \mathcal{P} = \{\alpha, \overline{\alpha}\}^\downarrow \\
& \\
1. \quad \{\alpha, \overline{\alpha}\}^\downarrow \text{ is placed on the table} \\
2. \quad W \text{ is added to commitments}^a(\text{Sp})
\]

Thus, even though falling declaratives and rising polar interrogatives are associated with the same convention of use, a falling declarative registers categorical commitment of the speaker to \(w_a\) being an element of the alternative highlighted by the sentence radical, and steers the conversation towards a context where the other participants share this commitment, whereas a rising polar interrogative registers the speaker as neutral with respect to whether \(w_a\) is an element of the alternative highlighted by the sentence radical, and steers the conversation towards a context where participants have either agreed that \(w_a\) is an element of this alternative, or that it is not. These differences in conventional discourse effects are due entirely to an independently motivated semantic difference between the two sentence forms.
Again, pragmatic considerations concerning the particular circumstances of utterance would be involved in deriving further effects. Thus, in an ordinary conversation one would assume that Amalia uttered the polar interrogative in (50) precisely because she did not know whether Paul was coming to dinner or not, and assumed that Bert might know. Amalia’s utterance then would function as an information seeking question. On the other hand, in a test situation, one assumes that the person uttering the interrogative in fact knows the answer and her reason for uttering the rising polar interrogative is to check whether the addressee knows the answer as well. In yet other circumstances the discourse context may be such that it is already commonly established that \( w_a \) is in one or the other of the two alternatives placed on the table. In that case, a speaker may utter her sentence to point out the obviousness of the answer. This is the case in at least some rhetorical questions. As mentioned, such pragmatic discourse effects are not our main concern here. What (50) aims to capture are the conventional discourse effects of a rising polar interrogative, which are taken to be constant across contexts.

Note that although a speaker who utters a rising polar interrogative does not signal a bias for one alternative in the proposition expressed over the other, her actual epistemic state may in fact favor one over the other. When a speaker utters a falling declarative, on the other hand, she registers categorical commitment to the unique alternative in the proposition expressed. In this case the speaker signals that her actual epistemic state fully supports this commitment.\(^{16}\)

In sum, the distinctions between the conventional discourse effects of a falling declarative and that of a rising polar interrogative are the following; (i) falling declaratives place a non inquisitive proposition on the table and (ii) register categorical commitment to the informative content of this proposition. Rising polar interrogatives (i) place an inquisitive (unless tautological) proposition on the table containing two complementary alternatives and (ii) do not register a preference for one alternative over the other. We have an account then of the conventional discourse effects of falling declaratives and rising polar interrogatives in which they are associated with the same default convention of use; the differences between the effects of these two sentence types are due entirely to independently motivated differences in their semantics. This conforms to the first part of our division of labor principle, stated in (17), which we take to be an important result of our approach. Next, we turn to the non-default discourse effects induced by marked sentence types.

5.2 Non-default discourse effects

In line with the goals formulated at the outset, the discourse effects induced by the marked forms we deal with here, namely rising declaratives and tag interrogatives, will be taken to consist of the default effects specified in (48), augmented by special effects connected to each marked form.

Recall that the semantic interpretation of the marked forms under consideration here is identical to that of rising polar interrogatives. Assuming that the sentence radical *Amalia left* expresses the proposition \( \mathcal{P} = \{\alpha\}^\downarrow \), the proposition expressed by (51a)-(51c) is the one in (51d), with highlighting indicated by bold face:

\[
\text{(51) a. Did Amalia leave?} \\
\text{b. Amalia left}^\uparrow? \\
\text{c. Amalia left, didn’t she?} \\
\text{d.} \quad \{\alpha, \bar{\alpha}\}^\downarrow
\]

\(^{16}\)The speaker may, of course, be lying. It may also happen that both the speaker and her addressee know that the speaker’s actual epistemic state does not support her commitment, as in the case of conversations that are meant to deliberately mislead an eavesdropper, for instance. Lying and misleading are possible precisely because in making an utterance a speaker undeniably presents herself, in virtue of linguistic conventions, to make a certain commitment.
In virtue of the default convention of use, when one of the sentences in (51a)-(51c) is uttered, the inquisitive proposition in (51d) is placed on the table and the trivial possibility \( \alpha \cup \bar{\alpha} = W \) is placed on commitments^0(Sp). As a result, by uttering any of these sentences the speaker signals openness to both \( \alpha \) and \( \bar{\alpha} \) as possible resolutions of the issue she raises, and steers the conversation towards a context in which it is either mutually agreed that \( w_a \in \alpha \) or that \( w_a \in \bar{\alpha} \). These are the conventional discourse effects that polar interrogatives, rising declaratives and tag interrogatives share in virtue of their common semantics.

Because rising declaratives and tag interrogatives are marked forms, their conventions of use involve additional conventional discourse effects. The first such effect we discuss is one that rising declaratives and tag interrogatives share: they signal a bias in favor of the highlighted alternative in the proposition expressed by the sentence. Rising declaratives and tag interrogatives are like rising polar interrogatives, then, in that they signal that the speaker raises an issue that can be resolved in two ways. On the other hand, these sentence forms are like falling declaratives in that they signal a bias in favor of the highlighted alternative. However, unlike in the case of falling declaratives, this bias is not categorical.

In the discourse model we use, presented in Section 3.2, the type of non-categorical bias we deal with here is modeled as a conditional commitment. Both rising declaratives and tag interrogatives then, involve adding the highlighted alternative in the proposition expressed, \( \alpha \), to the speaker’s conditional discourse commitments, commitments^0(Sp). We propose that this effect is connected to the fact that both rising declaratives and tag interrogatives involve a declarative clause expressing the proposition \( \{\alpha\}^\downarrow \). In our account then, just like in Gunlogson (2001), declarative form always signals commitment. The difference between the unmarked case of falling declaratives and the marked case of rising declaratives and tag interrogatives is that in the former case the commitment is actual, while in the latter case it is conditional. For rising declaratives, this is close to the proposal in Gunlogson (2008).

The difference between rising declaratives and tag interrogatives concerns further refinements of the nature of the evidence the speaker has for favoring the highlighted alternative. This involves, we suggest, a distinction in epistemic authority. Following Northrup (2014), we assume that epistemic authority involves two parameters: (i) absolute epistemic authority, which concerns the assumed strength of epistemic evidence the speaker has for the possibility she commits to, and (ii) relative epistemic authority, which concerns the strength of the speaker’s evidence in comparison to the evidence that her addressee is assumed to have.

We propose that for the sentence types we are dealing with, absolute epistemic authority has the most direct significance. However, because the forms we analyze involve conditional commitment, absolute authority distinctions have consequences concerning assumed relative authority as well.

More specifically, we propose that the relevant distinction is one that marks the speaker’s absolute epistemic authority over her conditional commitment either as being low, or as being moderate to high. Conditional commitments marked for low epistemic speaker authority are entered on commitments^\leq(Sp), while conditional commitments marked for moderate to high epistemic speaker authority are entered on commitments^\geq(Sp).

**Rising declaratives.** A rising declarative induces a conditional commitment to the highlighted alternative in the proposition expressed, and signals low epistemic speaker authority w.r.t. this commitment. Since the commitment is conditional, the speaker signals that she expects her addressee to have enough epistemic authority to ratify the commitment. Since she signals low epistemic authority, the distance between her own epistemic authority and that of her addressee is assumed to be substantial. Thus, in using a rising declarative the speaker presents herself as relying on her
addressee’s significantly superior epistemic authority to decide the issue.

(52) **Conventional discourse effects of a rising declarative**

When a discourse participant \( x \) utters a rising declarative sentence \( \varphi \), the discourse context is affected as follows:

1. The proposition expressed by \( \varphi \), \([\varphi]\) is added to the table, at the top of the stack.

2. The informative content of \( \varphi \), \( \bigcup[\varphi] \), is added to commitments\(^a(x)\), the actual commitments of \( x \).

3. The highlighted alternative in \([\varphi]\) is added to commitments\(^c_<(x)\), the conditional commitments of \( x \), marked for low epistemic authority.

The effects in 1 and 2 are the default discourse effects that rising declaratives share with falling declaratives and rising polar interrogatives. The effect in 3 is specific for rising declaratives.

A typical example is given in (53), modeled after an example in Gunlogson (2001) (the account will be tested against more examples in Section 5.3):\(^\text{17} \)

(53) *Amalia walks in and Bert is struck by her new hairstyle.*

Bert: You’ve had a haircut?

Here Bert registers his readiness to commit to the possibility that Amalia had a haircut, provided that the Amalia makes the expected move of confirming this possibility. At the same time he indicates that he takes his epistemic authority over this alternative to be low, substantially lower than that of his addressee, an eminently reasonable position in the given circumstances.

In order for a rising declarative to be felicitous then, the context of utterance should be such as to make it reasonable to assume that the speaker has some evidence in favor of the highlighted alternative in order to justify her conditional commitment to it. At the same time, the circumstances should make it reasonable to assume that the speaker’s epistemic authority is low and for her to

\(^\text{17} \)We should note here that there are cases of declarative sentences with a final rise that clearly fall beyond the scope of our account. For instance, as illustrated below, there are cases where a speaker seems to signal that she is unsure about the relevance, sufficiency, appropriateness, or clarity of her contribution, rather than to raise an issue and signal a particular bias towards one of the resolutions of this issue.

(i) A: Was John at the party?
   B: Well, it was raining\(\dagger\).
   \(\sim\) not sure whether relevant (Westera, 2013)

(ii) A: Do you speak Ladino?
    B: I speak Spanish\(\dagger\).
    \(\sim\) not sure whether sufficient (Ward and Hirschberg, 1985)

(iii) A: I’m pregnant with triplets.
     B: Congratulations\(\dagger\).
     \(\sim\) not sure whether appropriate (Malamud and Stephenson, 2014)

(iv) (English tourist in a French café)
    I’d like... err... je veux... black coffee\(\dagger\).
    \(\sim\) not sure whether clear (Westera, 2013)

Westera (2013) proposes a unified account of such cases, which assumes, roughly, that the final rise signals that the speaker is not sure whether she complies with all the maxims that govern cooperative behavior in the given type of conversation. The empirical coverage of this account seems to be complementary to the proposal developed in the present paper. Namely, while Westera’s theory covers cases like (i)-(iv), it does not (at least not directly) account for the fact that a final rise can render a declarative sentence inquisitive. The present proposal focuses precisely on those rising declaratives that are inquisitive. For now, we assume that the rises in cases like (i)-(iv) are of a different nature than the rise that we are concerned with, although eventually we would of course like to better understand the connection between the two or even come to a fully unified theory.

33
expect that her addressee’s epistemic authority is high enough to decide the issue. Thus, we correctly predict that, under normal circumstances, it would be strange for Bert to say (54) to Amalia, because we someone normally knows full well whether he had a haircut or not, certainly better than their conversation partner.

(54) #I’ve had a haircut?

In the same vein, asking a quiz question or a rhetorical question using a rising declarative is correctly predicted to be inappropriate because in both cases the speaker is supposed to have enough authority over the highlighted alternative in proposition expressed to decide the issue.

**Rising tag interrogatives.** Rising tag interrogatives are pronounced with falling intonation on the declarative and rising intonation on the tag. Here too the speaker signals a conditional commitment to $\alpha$, the highlighted alternative in the proposition expressed. But we propose that in this case she indicates that her epistemic authority over $\alpha$ falls somewhere in the interval from moderate to high.

Since the speaker is making a conditional commitment, the addressee is supposed to be authoritative, so rising tag interrogatives are predicted to be felicitous in cases in which the speaker’s and the addressee’s levels of authority over the alternative in question are close.

(55) Conventional discourse effects of rising tag interrogatives

When a discourse participant $x$ utters a rising tag interrogative sentence $\varphi$, the discourse context is affected as follows:

1. The proposition expressed by $\varphi$, $[\varphi]$ is entered on the table, at the top of the stack.
2. The informative content of $\varphi$, $\bigcup[\varphi]$ is added to commitments$^a(x)$, the actual commitments of $x$.
3. The highlighted alternative in $[\varphi]$, is added to commitments$^c(x)$, the conditional commitments of $x$ marked for moderate to high epistemic authority.

The effects in 1 and 2 are again the default discourse effects that rising tag interrogatives share with all the other sentence types under consideration. The effect in 3 is specific for rising tag interrogatives.

A typical example is given in (56):

(56) Context: Amalia and Bert are a couple looking to furnish their new apartment. They make purchasing decisions together. They are in a store, looking at a table they are thinking of buying, whose price is higher than what they would have expected. Amalia really likes it but she’s not quite sure whether they can afford it.

Amalia: It’s a bit too expensive for us, isn’t it↑?

Here, the speaker is registering her readiness to commit to the highlighted alternative provided that the addressee makes the expected move of committing to this alternative as well. This is similar to what happens in rising declaratives but this time the speaker’s epistemic authority over the highlighted alternative is signalled to be moderate to high. Given that the addressee’s authority is assumed to be high, in relative terms, the speaker marks her own epistemic authority as close to that of her addressee. This sentence type, therefore, is felicitous in situations like the above, where both speaker and addressee are equally authoritative relative to the highlighted alternative and
agreement of both parties is needed in order to settle the issue. Were Amalia to have uttered the rising declarative *This is too expensive?* she would have signaled low epistemic authority, consistent with a situation where Bert is the one who decides what is too expensive for them and what is not.

**Falling tag interrogatives.** The last sentence type we consider are falling tag interrogatives. In this case, we suggest, the speaker makes a conditional commitment to the highlighted alternative in the proposition expressed, as with the other marked forms we consider here, and, just as with rising tag interrogatives, she signals that her epistemic authority w.r.t. this alternative is moderate to high. The falling intonation on the tag emphasizes the signalled level of epistemic authority.

(57)  

*Conventional discourse effects of falling tag interrogatives*

When a discourse participant $x$ utters a rising tag interrogative sentence $\varphi$, the discourse context is affected as follows:

1. The proposition expressed by $\varphi$, $\left[\varphi\right]$ is entered on the table, at the top of the stack.
2. The informative content of $\varphi$, $\bigcup\left[\varphi\right]$ is added to commitments$^a(x)$, the actual commitments of $x$.
3. The highlighted alternative in $\left[\varphi\right]$, is added to commitments$^{c_{\geq h}}(x)$, the conditional commitments of $x$ marked for moderate to high epistemic authority; the signalled level of epistemic authority is emphasized.

The first two effects are again the ones common to all sentence types considered. The effect in 3 is specific to falling tag interrogatives.

A typical example is given in (58):

(58)  

**Context:** *Amalia and Bert are a couple in the process of furnishing their new apartment. They are in a store looking at a table that sells for $3000. They have agreed that they won’t spend more than $4000 on new furniture, and they need other items besides a table. Amalia is convinced they cannot afford it. But Bert is sometimes inclined towards extravagance and has spent quite some time admiring this expensive table.*

*Amalia: It’s too expensive for us, isn’t it↓?*

By using a tag interrogative Amalia is signaling her bias towards the highlighted alternative, i.e., that the table is too expensive, as in (56), and by using falling intonation on the tag she stresses her authoritativeness over this issue and therefore her heightened expectation that Bert will agree with her.

To sum up, the common formal property of rising declaratives and tag interrogatives is that they are marked forms in the sense that they involve a non-optimal form-meaning connection. Because they are marked forms their discourse effects do not only involve the default ones but also ones that are specifically connected to their form. The non-default effects associated with the marked forms considered here have one aspect in common, namely that of registering a conditional commitment to the highlighted alternative in the proposition expressed. We take this property to be connected to the fact that the different marked forms all have a declarative clause as their core, and it is this clause that contributes the highlighted alternative. The various forms differ in that they signal varying levels of epistemic speaker authority w.r.t. the commitment that the speaker makes, a factor that plays a crucial role in shaping the participants’ contributions to conversations.
more generally. For the cases discussed here, a binary distinction in absolute epistemic authority between low and moderate-to-high suffices.

So far, then, we have specified the conventions of use associated with each of the marked forms we consider. The account meets the division of labor principle formulated in Section 2. All unmarked forms are associated with the same default convention of use. Marked forms induce discourse effects made up of the default ones augmented by special effects triggered by the particular marked form in question. Before testing the predictions of our account in more detail in the next subsection, we draw connections between the particular intonation that characterizes the marked forms and the details of their special discourse effects.

**Connections between special effects and intonation in marked forms.** On our account, rising declaratives and tag interrogatives signal different levels of epistemic authority over the possibility that the speaker conditionally commits to. We suggest that the signalled level of epistemic authority is connected to intonational features of the forms involved. In particular, we propose that rising and falling intonation, signalling the presence of OPEN or CLOSED, respectively, may also signal the speaker’s level of epistemic authority w.r.t. the commitment she makes. Rising intonation may indicate that the speaker considers her epistemic authority to be low; falling intonation may indicate that she considers her epistemic authority not to be low, i.e., to be somewhere in the interval between moderate and high.

Thus, the rising intonation contour in rising declaratives signals low epistemic authority. In rising tag interrogatives, we have a mixed intonation pattern: a fall on the declarative anchor and a rise on the tag. In this case we assume that the fall on the anchor is decisive in signalling the level of speaker authority w.r.t. her conditional commitment, since it is this declarative anchor that induces the commitment. It follows then that rising tag interrogatives signal moderate to high epistemic authority. Finally, a falling tag interrogative exhibits falling intonation both on the declarative anchor and on the interrogative tag. The fall on the declarative anchor signals moderate to high epistemic authority, and we assume that the fall on the tag emphasizes this level of authority.

Schematically, then, the level of epistemic authority signalled by rising declaratives and tag interrogatives is connected to their intonation as follows:

(59)  
   a. \((\alpha) \uparrow \sim\) low epistemic authority of speaker over \(\alpha\).
   b. \((\alpha) \downarrow \uparrow \sim\) moderate to high epistemic authority of speaker over \(\alpha\).
   c. \((\alpha) \downarrow \downarrow \sim\) emphasized moderate to high speaker authority over \(\alpha\).

Thus, the special discourse effects of rising declaratives and tag interrogatives are connected in a systematic way to their declarative syntax (commitment) and their intonation (level of authority).

### 5.3 Testing the account

We now turn to checking the predictions of the account by considering the various sentence types in contexts that clearly determine the participants’ level of epistemic authority concerning the information relevant to the sentence form in question. Judgments that distinguish different intonation patterns, especially those involving rising and falling tag interrogatives, are not always very sharp, a fact consistent with our account. We will concentrate below on contexts where contrasts are relatively strong, at the expense of being non-exhaustive.

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18 The important role of epistemic authority marking has been especially prominent in work on conversation analysis; see Heritage (2012) for an overview.

19 This section owes a lot to the context descriptions in Malamud and Stephenson (2011). We are also indebted to Gunlogson (2001) and to Northrup (2014) for examples and insightful discussion of various relevant contexts.
First, recall that the semantics of falling declaratives coupled with their default convention of use results in a categorial commitment on the part of the speaker to the alternative contributed by the sentence radical. The semantics of the other sentence forms discussed here coupled with the default convention of use result in the speaker signaling that she is open to resolving the issue she raises in either of two ways, even if, as in the case of the marked forms, she registers a bias in favor of the alternative contributed by the sentence radical. We therefore predict that in contexts where the speaker is assumed to have complete epistemic authority over that alternative while the addressee is assumed to be lacking such epistemic authority, falling declaratives will be appropriate but the other sentence forms will not be. This is exemplified in (60):

(60)  Doctor to patient, handing him a prescription:
       a. This medicine will make you feel better.
       b. #Will this medicine make you feel better↑?
       c. #This medicine will make you feel better↑?
       d. #This medicine will make you feel better, won’t it↑?
       e. #This medicine will make you feel better, won’t it↓?

Recall now that on our account, rising polar interrogatives are compatible with contexts where the speaker is assumed to be neutral relative to the possible resolutions of the issue she raises while the addressee is assumed to be authoritative. This is so because rising polar interrogatives express no bias, while falling declaratives, rising declaratives and tag interrogatives express speaker bias, whether categorical (as in the case of falling declaratives) or conditional (as in the case of rising declaratives and tag interrogatives). We see this prediction confirmed in the example below:

(61)  Belinda comes home and has no reason whatsoever to have any assumptions about what happened while she was gone; Chris was home all day. Belinda says to Chris:20
       a. #Ben called.
       b. Did Ben call↑?
       c. #Ben called?
       d. #Ben called, didn’t he↑?
       e. #Ben called, didn’t he↓?

We turn now to contexts that differentiate between rising declaratives and tag interrogatives. The prediction our account makes is that in contexts where it is clear that the epistemic authority of the speaker w.r.t. her conditional commitment is high, and therefore her authority over it is relatively close to that of her addressee, tag interrogatives will be felicitous but rising declaratives will not be. This situation is exemplified in (62):

(62)  Belinda and Chris are looking at a sunset. Belinda says to Chris:
       a. This is a beautiful sunset.
       b. #Is this a beautiful sunset↑?
       c. #This is a beautiful sunset?
       d. This is a beautiful sunset, isn’t it↑?
       e. This is a beautiful sunset, isn’t it↓?

Here we assume that Belinda and Chris are equally competent in deciding over the beauty of the sunset. A falling declarative is predicted to be felicitous in this situation; such sentence forms are compatible with situations where both interlocutors are authoritative, and the speaker assumes

20See Gunlogson (2008) example (9) for a parallel case.
that her authority is equal to her addressee’s. A rising polar interrogative is infelicitous since in this case the speaker is presenting herself as neutral with respect to whether the sunset is beautiful or not, a situation that is at odds with ordinary assumptions about people’s competence to assess the beauty of sunsets. A rising declarative is also infelicitous because in this case the speaker presents herself as having low epistemic authority over deciding the beauty of the sunset, significantly lower than that of her addressee. This is again at odds with common sense assumptions about people’s competence to assess the beauty of sunsets.\footnote{Note that there is a special intonation pattern, different from the ordinary rising intonation we assume in rising declaratives, which is used derisively to indicate disagreement with a previous statement of the interlocutor. If Chris has claimed that the sunset was beautiful, Belinda could use a declarative with this intonation to signal that she sharply disagrees with Chris.}

Falling and rising tag interrogatives, which signal moderate to high epistemic speaker authority, are correctly predicted to be felicitous.

Rising declarative or a polar interrogative become appropriate in a situation that differs from the one in (62) in that Belinda is not quite sure of what the applicability range of the adjective is and Chris is supposed to be authoritative. This is exemplified in (63):

(63) Belinda and Chris are looking at a painting depicting a sunset. Belinda is Chris’s daughter and Chris has been teaching her to distinguish between ‘real art’ and ‘kitsch’. Belinda says to Chris:
   a. This is kitsch.
   b. Is this kitsch?
   c. This is kitsch?
   d. This is kitsch, isn’t it↑?
   e. ?This is kitsch, isn’t it↓?

A falling declarative is fine, under the assumption that Belinda has become confident that her assessment is true in this case. The polar interrogative and the rising declarative are felicitous here as well because the context is consistent with Belinda marking low authority over the assessment, and assuming that Chris is more authoritative than she is in deciding whether the painting they are looking at is kitsch or not. A rising tag interrogative is felicitous as well, since the context is also consistent with Belinda marking moderate to high authority. A falling tag interrogative seems somewhat deviant, which can be explained by the fact that there is no reason for Belinda to stress her epistemic authority in this case.

In (64), we have a case where a rising declarative is more felicitous than a rising tag interrogative because here the context clearly determines that the addressee has more epistemic authority than the speaker. While rising declaratives and rising polar interrogatives are predicted to be felicitous here, rising and falling tag interrogatives are predicted to be odd.

(64) Belinda is going through a pile of job applications. Chris has not seen any of them yet. Belinda enthusiastically hands Chris the application that she just finished reading. Chris to Belinda:
   a. #This is a good one.
   b. Is this a good one↑?
   c. This is a good one↑?
   d. #This is a good one, isn’t it↑?
   e. #This is a good one, isn’t it↓?

In this situation, there is a marked distinction between Belinda and Chris, in favor of Belinda, when it comes to epistemic authority over the relevant alternative. A neutral polar interrogative or a
rising declarative, expressing a bias but also marking the speaker’s authority as low are appropriate. Sentence forms which indicate that the speaker assumes moderate to high epistemic authority are not felicitous.

Our account also makes correct predictions concerning responses that question a presupposition of a previous utterance by the addressee.²² We predict that in such cases a rising declarative is appropriate but a rising tag interrogative is not. We exemplify this in (65):

(65)  
Belinda:  
My sister will be in town next week.  

Chris:  
a. You have a sister↑?  
b. #You have a sister, don’t you↑?

With both responses, Chris indicates that he is not quite ready to accommodate Belinda’s presupposition. A rising declarative is appropriate here because it indicates bias for the highlighted alternative with a mark of low authority. Chris is signalling that his own epistemic base does not lend much support to the conditional commitment. Presumably his main, or even only, piece of evidence for the claim that Belinda has a sister is the fact that Belinda’s previous move presupposed it. The rising tag interrogative on the other hand is odd precisely because by using it Chris indicates that his authority w.r.t. this claim is moderate to high, presumably caused by support for it in his own epistemic base. If that is the case, however, it would have been most appropriate to just accommodate Belinda’s presupposition.²³

We also predict that the speaker may request addressee ratification for her own presupposition with a rising tag interrogative but not with a rising declarative in contexts such as (66):

(66)  
Chris to Belinda:  
You could ask your sister to help with this translation.  

Still Chris:  
a. #You have a sister↑?  
b. You have a sister, don’t you↑?

Chris’s initial utterance presupposes that Belinda has a sister. For such an utterance to be appropriate, Chris’s epistemic base must lend support to this fact. If he suddenly realizes that perhaps this support is not quite solid he can elicit Belinda’s ratification with a tag interrogative, which reflects his strong bias in favor of Belinda having a sister, as well as his assumption that Belinda can resolve this issue better than himself. A rising declarative on the other hand is not appropriate because the low authority it signals is not consistent with the relatively high confidence required

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²²This example and the next are parallel to Malamud and Stephenson (2014), examples (27) and (28). Malamud and Stephenson present these examples as problematic for their own account.

²³While in (65), as in many other contexts, information provided by the immediate context is relevant for the weak bias that the speaker of a rising declarative forms, it is not necessary that this information be contextually provided, as has been shown by the example in (i), from Poschmann (2008):

(i)  
Agent: Schiphol Information.  
Caller: Hello, this is G.M. I have to go to Helsinki, from Amsterdam. Can you tell me which flights leave next Sunday?  
Agent: Just a moment. Yes, there are several flights. One leaves at 9.10, one at 11.10 and one at 17.30.  
Caller: The flight takes about three hours?

Here Caller’s epistemic support for her conditional commitment is not rooted in information provided by the context.
to make his initial utterance felicitous.

The contrast between rising declaratives and tag interrogatives observed in (66) does not only arise in cases where the speaker elicits ratification from her addressee of a presupposition that she made, but also in cases where she seeks ratification of implicit assumptions that were not explicitly presupposed. This is exemplified in (67) and (68):

(67)  
Chris to Belinda:
You should tell Alfred to be more polite when talking to customers.
Still Chris:
  a. #After all, you are his boss↑?
  b. After all, you are his boss, aren’t you↑?

(68)  
Chris to Belinda:
I suspect Bill has a special announcement to make tonight.
Still Chris:
  a. #He normally doesn’t dress up like this↑?
  b. He normally doesn’t dress up like this, does he↑?

In (67), Chris uses the discourse marker “after all” in his second utterance to indicate that Belinda’s being Alfred’s boss provides the ground for the advice that he gave Belinda in his first utterance. A rising declarative is predicted to be infelicitous here (and more generally in combination with the discourse marker “after all”) because if Chris’s epistemic authority w.r.t. Belinda being Alfred’s boss were low, then he would have lacked justification for his initial utterance. On the other hand, a tag interrogative is predicted to be felicitous here (and again more generally in combination with “after all”) because a tag interrogative is compatible with the possibility that Chris’s epistemic authority w.r.t. Belinda being Alfred’s boss is high, which in turn would justify his initial utterance.24

A similar explanation can be given for the contrast in (68).

In accounting for (66) and (67), our assumption that rising declaratives and tag interrogatives signal the speaker’s absolute level of epistemic authority, rather than her epistemic authority relative to the addressee, is crucial. Consider an alternative account, on which a rising declarative indicates that the speaker takes herself to have lower epistemic authority w.r.t. the alternative she conditionally commits to than the addressee. The rising declaratives in (66) and (67) would then be predicted to be felicitous, since Belinda is certainly in a better position than Chris to know whether she has a sister or not, and whether she is Alfred’s boss or not. Thus, the explanation of the observed contrasts would be lost.

In accounting for (66) and (67), we do not, however, claim that relative epistemic authority is not needed for other cases. For instance, Northrup (2014) has persuasive evidence that the account of the Japanese discourse particles yo and ne is to be understood in terms of relative authority marking.

To conclude, we have presented an account of the sentence forms under consideration that fits both our general theoretical desiderata concerning the association of conventional discourse effects with sentence form and sentence meaning, and the main empirical properties of these sentence types. In the next section we briefly compare this account with some previous proposals.

24Our example (68) was inspired by examples (6) and (7) in Reese and Asher (2007), which show that tag interrogatives can be used in combination with “after all”, just like falling declaratives and unlike polar interrogatives. Reese and Asher do not, however, observe the contrast between tag interrogatives and rising declaratives.
6 Comparison with some related approaches

We briefly discuss some representative proposals whose empirical reach and theoretical aims overlap considerably with ours. As we will see, an important distinguishing feature of our account is its concern with dividing the labor between sentence form, compositional semantics, and conventions of use in a principled way.


Gunlogson’s influential work on rising declaratives has served as an inspiration to the approach we have developed here. A fundamental insight we take over from this work is the distinction between the contribution of sentence form (declarative vs. interrogative) and intonation (rising or falling). A major conceptual difference, however, is that Gunlogson’s account relies entirely on the discourse component, while our approach divides the analytical burden between semantics and conventions of use.

Gunlogson focuses on rising declaratives, with falling declaratives and polar interrogatives receiving minimal attention. Gunlogson’s 2008 proposal refines her 2001 account by introducing two new distinctions: one between committing as source and committing as dependent, and one between actual and contingent (in our terms, conditional) commitments. The former distinction is rooted in the type of evidence the speaker has to support her commitment. The latter distinction concerns the issue of whether the speaker requires addressee ratification for her commitment or not.

Both distinctions have influenced our account of marked forms. We took over the distinction between actual and conditional commitments in our account of sentence types that mark a bias for the alternative contributed by their sentence radical. In further refining this bias we did not use the notions of source and dependent here but rather, the distinctions in epistemic authority that they are rooted in.

6.2 Condoravdi and Lauer (2012)

On the theoretical side, an important feature that our account shares with that of Condoravdi and Lauer (2012) is the recognition that the full impact of an utterance on the context in which it is made is determined not only by its semantic content and the conventions of use associated with the sentence, but also by effects brought about via pragmatic reasoning as to why the speaker made that particular contribution to the conversation. We have borrowed the term ‘convention of use’ from their work, and take it that their discussion of this issue is fully compatible with what we have proposed here.

On the empirical side, Condoravdi and Lauer (2012) are concerned only with falling declaratives and rising polar interrogatives. The semantics they assume is a classical one: they take the semantic value of declaratives to be a proposition in the classical sense, while the semantic value of an interrogative is assumed to be a different type of entity, one that determines the set of possible answers to the issue that the interrogative raises.

Condoravdi and Lauer assume that declaratives and interrogatives do not only have different types of semantic values, but also come with different conventions of use. The convention of use associated with declaratives commits the speaker to a belief in the proposition expressed by the declarative. On the other hand, the convention of use associated with interrogatives commits the speaker to an effective preference for the addressee to commit to a belief in one of the possible answers determined by the semantic value of the interrogative.

Thus, Condoravdi and Lauer’s account instantiates the ‘middle way’ approach we discussed in general terms in Section 2.3. What is characteristic for this approach, as we schematized in the
diagram on page 9, is that declaratives and interrogatives are differentiated both in their semantics and in their conventions of use.

In this paper we have attempted to streamline this approach. The account we propose is couched in a semantic framework that allows us to assign the same type of semantic values to declaratives and interrogatives. This in turn makes it possible to associate unmarked declaratives and interrogatives with a single default convention of use. Differences in their discourse effects follow from independently motivated differences in their semantics.

Our proposal also differs from that of Condoravdi and Lauer (2012) in the details of the convention of use associated with interrogatives. While their account evokes a speaker preference for the addressee to commit to one of the possible answers in the semantic value of the interrogative, we rely on the notion of steering the conversation towards a context in which the issue raised is settled, thus unifying the conventional effects of declaratives and interrogatives. By not directly involving the addressee in the formulation of this convention of use, our approach generalizes more directly to cases in which the addressee is not necessarily the participant supposed to commit to a belief in an answer to the question, such as when polar interrogatives function as rhetorical or deliberative questions.

Finally, our account concerns marked cases as well, and aims to account for the similarities and contrasts between marked and unmarked sentence types.

6.3 Krifka (2014)

The major common thread between our approach and that of Krifka (2014) is one we share with Gunlogson’s work as well, namely the separation of the role assigned to sentence form (declarative vs. interrogative) and sentence intonation (fall vs. rise). But the use made of these components in Krifka’s approach and ours is different. As we have seen, for us these elements play a role in the compositional semantics of the sentence while for Krifka, just as for Gunlogson, they only determine the relevant convention of use – in Krifka’s terms, the speech act operator that determines how the sentence affects the input context.

Krifka’s account also instantiates the ‘middle way’ approach in that it associates declaratives and interrogatives with different semantic values, as well as different conventions of use. We have seen that a more parsimonious division of labor is possible; this result could in principle be incorporated into Krifka’s theory while keeping other components intact.

At a more detailed level, Krifka assumes that falling declaratives and polar interrogatives differ syntactically in the following two respects. First, declaratives involve the speech act operator ASS while polar interrogatives involve the speech act operator QU. The job of these operators is to determine the relevant conventional discourse effects of an utterance of the sentence. Second, there must be an additional syntactic difference, responsible for the different semantic value of declaratives and interrogatives, the former denoting a proposition and the latter a set of propositions. From our perspective, this is an unnecessary multiplication of syntactic operators.

As for the various speech act operators that Krifka assumes in his account of falling and rising declaratives, polar interrogatives, and tag interrogatives, it is not directly clear how these operators and their combinations may account for the various felicity contrasts discussed here.

6.4 Malamud and Stephenson (2014)

Malamud and Stephenson’s insightful discussion focuses on what we call here marked sentence forms. They cover rising declaratives, and in the realm of tag interrogatives they consider both ‘reverse’ tag interrogatives and ‘same’ tag interrogatives, i.e., cases where the polarity of the anchor
and the tag are the same. Within the former group, they do not, however, distinguish between rising and falling tag interrogatives. With respect to falling declaratives and polar interrogatives, they adopt the account in Farkas and Bruce (2010), which assigns them separate meanings and separate conventions of use.

Similar to the other work discussed in this section, Malamud and Stephenson do not frame their approach in terms of marked and unmarked sentence forms and default and non-default conventions of use. Instead, they specify for each form a particular series of discourse effects which remain unrelated to the semantics or the form of the particular sentence types they are associated with, so they too, fall within the ‘middle way’ category discussed in Section 2.3.

Turning now more specifically to rising declaratives and tag interrogatives, Malamud and Stephenson’s account relies on the notion of ‘projected commitments’ rather than on ‘conditional commitments’, as our account does. Projected commitments represent ‘the expected next stage of the conversation’ (p. 14). By projecting a commitment rather than going ahead and making it, a speaker gives rise to ‘an implicature of tentativeness’. The notion of conditional commitment we rely on is different in that it encodes directly the notion of addressee ratification, needed in order for the commitment to become categorical.

The contrast between tag interrogatives and rising declaratives is dealt with differently in Malamud and Stephenson than in our proposal. For us, the contrast concerns a difference in epistemic authority marking; in Malamud and Stephenson’s account, it involves the presence or absence of a meta-linguistic issue regarding the proposition on the table. The precise nature of this issue is determined contextually. We framed our account in terms of epistemic authority for three reasons. First, because this notion has been shown to be relevant more generally both to conversation strategies (Heritage and Raymond, 2005) and to the distribution and interpretation of particular linguistic forms (Gunlogson, 2008; Northrup, 2014). Second, relying on differentiations in terms of epistemic authority seemed to us more concrete and transparent than relying on the type of meta-linguistic issues invoked by Malamud and Stephenson. And finally, distinctions in terms of epistemic authority seemed to make clearer and better predictions concerning the precise nature of contexts in which the various sentence types can be used (in particular for cases like (65)-(67) discussed above).

There is, however, a use of rising intonation that indeed appears to involve a meta-linguistic issue, which Malamud and Stephenson (2014) account for and we don’t, namely one that signals speaker uncertainty concerning the appropriateness of what she is saying (see footnote 17).

6.5 Northrup (2014)

Northrup (2014) discusses in detail the discourse effects of rising declaratives, high negation polar interrogatives, and the full repertory of tag interrogatives in English, as well as two Japanese discourse particles, yo and ne. Northrup’s approach and ours agree in treating rising declaratives and tag interrogatives as sharing the semantics of polar interrogatives and as encoding a bias for one of the two alternatives, with further differentiations concerning the nature of the evidence the bias is rooted in.

An essential conceptual difference between Northrup’s approach and ours is that in his account there is no connection between the semantics of a sentence and its default convention of use, as in the current proposal. Just like in Gunlogson (2001, 2008), Krifka (2014), and Malamud and Stephenson (2014), the main analytical burden is on the discourse component.

When it comes to the details of the proposals, Northrup’s account of yo and ne in Japanese is based on relative epistemic authority considerations, while his account of tag interrogatives relies on a temporal differentiation of epistemic bases into bases prior to the current point in the
conversation, and current epistemic bases that include current contextual evidence. Our analysis of tag interrogatives does not make use of this temporal contrast, and therefore it is closer in spirit to Northrup’s account of Japanese particles than to his account of tag questions. We do not, however, rule out the possible relevance of a temporally based distinction for marked interrogatives that we have not considered here, such as high negation polar questions.25

7 Conclusion

The major advantage of the account proposed here w.r.t. previous work is the fact that it associates sentences with their conventional discourse effects in a non-stipulative fashion, in line with the division of labor principle formulated in Section 2.

Unmarked forms—falling declaratives and rising polar interrogatives—are associated with a single default convention of use. The differences between their conventional discourse effects are entirely due to independently motivated semantic differences. The marked forms we have considered here—rising declaratives and tag interrogatives—have conventional discourse effects that involve a combination of the default effects, dictated by their semantics and the default convention of use, with special effects systematically connected to the particular marked sentence type involved.

The special discourse effects of rising declaratives and tag interrogatives concern bias, which we modelled as conditional commitments, as well as a binary distinction in epistemic speaker authority over the conditional commitment she makes. Similar distinctions have been argued to be relevant more generally, both for the analysis of other linguistic constructions and for the analysis of conversational strategies. The two parameters we assumed were sufficient to account for the distribution of rising declaratives and tag interrogatives across a substantial range of contexts.

The proposed account makes some general typological predictions. Across different languages, we generally expect to find sentence types corresponding to the unmarked sentence types of English considered here, namely falling declaratives and rising polar interrogatives. We expect these sentence types to be differentiated in their semantics in the same way as their English counterparts and to have the same conventional discourse effects. We also expect these two sentence types to be formally distinguished, though of course the particular means to do so will vary from language to language. Finally, we expect these sentence types to be unmarked.

We also expect languages to have marked forms similar to the marked forms in English considered here, forms whose convention of use is non-default in that they express bias for the highlighted alternative in the inquisitive proposition they express. Again, the particular means of marking these forms will vary from language to language.

What we do not expect is a language that has a simple form used to pose biased questions and a complex form used to pose neutral ones. We also do not expect to find a language where the conventional discourse effect associated with falling declaratives in English, for instance, is associated with a complex form.

Among the many issues that remain open is a typology of marked forms whose semantics is that of polar interrogatives. The marked cases we have considered here all involve bias for the highlighted alternative in the proposition expressed by the sentence. Is this the only type of special effect such marked forms can have? At a more finer-grained level, are there other factors besides epistemic authority that can be involved? And even with respect to epistemic authority, what kinds of distinctions are likely to be signalled and what kinds of distinctions are likely not to be?

See also Büring and Gunlogson (2000), Roelofsen et al. (2012), and Sudo (2013) for discussion of high negation polar questions based on such a distinction, Romero and Han (2004), AnderBois (2011), and Krifka (2014) for different approaches and, finally, Ladd (1981) for an early insightful discussion.
Finally, the terms in which we have characterized bias here brings the domain of biased questions close to two other important domains, evidentiality and modality. Understanding how the relevant type of bias fits into the larger picture that includes evidentiality and modality largely remains to be explored, though see Northrup (2014) for insightful recent discussion of this issue.

References


