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On Opining: Modal Verbs, Dispositions,

Free Choice, and Negation

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Linguistics

by

Melanie Jane Bervoets

2014

ABSTRACT OF THE DISSERTATION

On Opining: Modal Verbs, Dispositions,

Free Choice, and Negation

by

Melanie Jane Bervoets

Doctor of Philosophy in Linguistics

Univerity of California, Los Angeles, 2014

Professor Yael Sharvit, Co-chair

Professor Benjamin Spector, Co-chair

This dissertation is concerned with the semantics of a specific set of intensional verbs, those that are used to report a subject's standpoint on a given possibility. Among these verbs are *permit*, *promise*, *offer*, *guarantee*, *demand*, *insist on*, *recommend*, *suggest*, *encourage*, and a handful of others. When the objects of these verbs are disjunctive, we find the kind of free choice effects previously observed with possibility and necessity modals. Based on whether the verbs pattern like *may* or like *must* with respect to these inferences, we separate the verbs into two classes, which we call Class I (*may*-like), and Class II (*must*-like). This behavior suggests that at the level of interpretation, these verbs contain quantifiers over possible worlds—an existential one in the case of Class I, and a universal one for the members of Class II. However, motivated by an unexpected range of readings found when sentences built with these verbs are negated, an investigation reveals that the mem-

bers of Class I and II are more than just modal. They also appear to be accomplishment verbs that describe external events. As a result, we give a semantic analysis of these verbs that casts them as complex creatures, describing external events in which subjects indicate their modal opinions.

Taking the verbs to be reporters of external events, we then need to explain why some of the negative sentences built with the Class I/II verbs appear to describe internal cognitive states. The solution to this involves two elements: first, we appeal to a version of the habitual operator that can deliver dispositions that are not necessarily established by repetitive action. Second, after noticing that all habitual sentences have extra, unexpectedly strong readings with negation, we enlarge the scope of the phenomenon previously called Neg-raising, and show how an existing pragmatic account for this (that of Romoli (2013)) can be modified to deal with the broader array of extra strong negative readings.

Along the way, we will account for why dispositions described by habitual Class I/II predicates seem to have different establishment requirements than those described by similar accomplishment verbs. We also address how the performativity of these verbs follows from the semantics proposed.

The dissertation of Melanie Jane Bervoets is approved.

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2014

Contents

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This dissertation was, for the most part, a pleasure to write. This is due in large part to the "destination dissertation" segment of the writing, which took me all around the North American continent, writing like I imagine writers write—surrounded by great people, unreasonably good food, and several of the best dissertation dogs in known history. Without the hospitality of many friends and family, I'd almost definitely be spending eternity (or at least what would feel like it) in the cafés of Los Angeles, convincing myself every day that by the next I'd be finished. Among the hosts I'd like to thank are Sarah Wesseler, Abby Wareham, Aliya Pabani, Eliot Michaelson, and especially the Finifters of Isla Mujeres, with whom I wrote all of Chapter 4, and the Finifters of San Francisco, with whom I did the bulk of my revisions.

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Speaking of friends, among those I haven't yet mentioned there are too many to do

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PUBLICATIONS

Bervoets, M. (2013). Distribution Inferences with DP-Taking Intensional Verbs, in *Proceedings of Sinn und Bedeutung* 17.

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Introduction

On the surface, this project is about a set of verbs. *Promise*, *permit*, *offer*, *guarantee*, *demand*, *insist on*, *recommend*, *suggest*, *encourage*, a handful of others—these form the empirical landscape of this dissertation. In the end though, this project is not just about these lexical items, but also several semantic and pragmatic phenomena, including free choice effects, Neg-raising, and habituality.

The verbs at issue are, on an intuitive level, united by involving reports of what we can think of as opinions, and more specifically, standpoints on future possibilities. To permit something is to indicate the possibility is an accepted one; to demand something is to indicate that the possibility is a required one; to recommend something is to indicate that the possibility is a desirable one. So if Aurelius were taken to heart, we could say that these form a subset of the honest verbs: their use in a sentence explicitly signals that the sentence expresses a particular kind of opinion, the standpoint of the subject on something that is possible. To my knowledge, these particular verbs have never been taken together as a class in the literature, though some of them (especially *promise* and *demand*) are often cited together as examples of performatives (see, e.g., Austin (1961)).

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These verbs are all indeed performative, but of more interest in the present project is that they all partake in certain noteworthy grammatical behaviors.

The first of these behaviors concerns what happens when the object of the verb is disjunctive.

(1)   Zola offered to bring wine or whiskey out to the patio.

(2)   Zola insisted that we have wine or whiskey upon arrival.

In a normal context, an utterance of (1) allows us to infer that both the wine and the whiskey were offered. Maybe having both at the same time was not an option, but having wine and having whiskey were both possibilities. Similarly, an utterance of a sentence like (2) usually conveys that either wine or whiskey would be a viable way for us to satisfy Zola's demands. These inferences, which do not follow from the traditional semantics, look like what are referred to as free choice effects, or distribution inferences, which are known to be available with sentences that feature permission and necessity operators (Kamp (1973), Zimmermann (2000), among many others). We will see that the inferences present with (1) and (2) really do pattern like those found with modals, and so giving these verbs an analysis that captures this will be one of the goals of the present project.

The second intriguing property emerges when we negate these verbs. Sometimes we get a somewhat bland, denial-of-an-event interpretation with negation:

(3)   I wasn't permitting the teenagers to drink wine when the police came in.

This looks just like normal negation:

(4)   I wasn't drinking wine when the police came in.

But sometimes negating these verbs leads to something stronger.

(5)   The rules didn't permit the teenagers to drink wine until they graduated.

This has an interpretation that amounts to more than just the denial of an event—it can be read as expressing a prohibition on teenage drinking (conditional on graduation), something that actually asserts a different, negative kind of eventuality.

But the verbs at issue here are not the first to demonstrate extra readings with negation. So-called "neg-raising" verbs, like *believe* and *want*, can be found in negative sentences that have two readings; one semantically expected and weak, another semantically unexpected and strong (see, *inter alia*, Fillmore (1963) and Horn (1971)). In this thesis, we also introduce one more class of predicates that lead to unexpected readings, the habituals.

(6) Sasha doesn't eat meat.

   (a) *Expected*: Sasha doesn't have a habit of eating meat.

   (b) *Unexpected but attested*: Sasha has a habit of not eating meat.

Besides providing a semantics for our verbs, the most significant part of this project will be an investigation into whether the extra negative readings found with the verbs and with habituals can be dealt with along lines that have been proposed to account for Neg-raising. We will ultimately argue that Romoli (2013)'s pragmatic account of these inferences can be modified in a way that would allow all the extra Neg-readings identified to derive from a single source.

In our quest for the right semantic analysis of these verbs, we will consider a number of possible strategies that address both of the properties above. In particular, we will see that the verbs don't always appear to be simple attitudes, though they share with attitudes a modal element. We will end up arguing that we are dealing with accomplishment verbs, but that they often appear in sentences that include habitual operators. This proposal is conservative (a habitual operator that can deal with certain disposition-like readings of other verbs, has been motivated in many places, such as Krifka et al. (1995)), especially in comparison to its strongest competing strategy, in which we assume that the

verbs are basically attitudes, but that there is an an optional "event-making" operator that can be thrown on top. Our way of characterizing the verbs as modal accomplishments will result in rather complex lexical entries, each of which contains both an eventive indication element, and a modal element expressing the subject's standpoint on the possibility expressed by the propositional object. This decomposition of the verbs, however, allows us to see the different places negation is interpreted in with each reading. Following arguments like those of Beck & Johnson (2004) for the decomposition of certain predicates, we will show that situating the decomposition in the structure responsible for interpretation is a move supported by the readings we get with adverbial modification. Morever, this allows the modal operator contained in the lexical entry to be exposed to the mechanisms thought to derive distribution effects in grammatical accounts of free choice, as in Fox (2006) or Alonso-Ovalle (2006).

This proposal also leads to a solution for a puzzle related to the verbs in question and habituality. There is a curious discrepancy between these and speech reporting verbs, such as *observe*, with which they share the ability to describe episodic indications of objects with propositional content.

(7) Roberto promises that he will bring pastries.

This sentence, which features our verb *promise*, can be true if Roberto has just once indicated, whether verbally or not, that according to his commitments he will be bringing pastries. This is not the same for a speech reporter like *observe*:

(8) Roberto observes that he will bring pastries.

For (8) to be true, Roberto has to actually have repeatedly observed that he will bring pastries.[1] A single utterance, or any kind of non-verbal indication, will not suffice to

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[1]If we imagine (8) to be part of a narration, as below, the present tense is interpreted differently, and in particular, non-habitually:

(1) Roberto walks in. He observes that he will bring pastries.

establish the habit in (8).

On the account we pursue, both these sentences contain a dispositional operator, taken by some to be one with the habitual operator (e.g. Boneh & Doron (2012)), and by others to be a similar but distinct item (e.g. Menendez-Benito (2012)). Taking up the former position, we can show that the difference in truth-making conditions between (7) and (8) will follow from the lexical entries we give to the verbs, and the conditions required to establish dispositions. Our discussion will lead us to conclude that not all habits, or dispositions, are alike in their establishment—some will require repeated action, while others will just require (sometimes non-verbal) reference to an opinion, or a set of propositions. In this context, we will see that a key characteristic of our verbs is that they automatically establish a connection between their subject and a propositional set of opinions, a feature that distinguishes them from other reporting verbs, which do not inherently refer to their subjects' views.

Taking a step back, the overall goal of this project is to delineate a semantics for the verbs in question that can capture their singular nature. In the course of our investigation, we will see that we can readily apply existing accounts of free choice, like Fox (2006), to explain the distribution effects found with the verbs. We will employ an account of the dispositional operator that is inspired by Boneh & Doron (2012), and argue that habits associated with our standpoint-reporting verbs are established differently than habits associated with similar verbs. But the most significant contribution of this work, other than the semantics of the verbs themselves, is what we learn about unexpected negative readings by extending our gaze beyond Neg-raising, and by taking seriously the readings found with our verbs and other habituals. Here we will again take up an existing theory, that of Romoli (2013), but qualify it with significant modifications.

However, note that the same holds of the regular verb, *walk*, and all verbs when in this narrative mood. These interpretations seem to be related to what have been called "film strip" readings (see Zucchi (1998)), and though interesting independently, are not at issue in this project.

The roadmap of the thesis is as follows. We begin in Chapter 1 by describing the distribution effects detected with the verbs we are investigating. This will immediately suggest that the verbs are just like modal attitude verbs, a naive solution that we call into question after we introduce the range of readings found when these verbs are negated.

In Chapter 2 we will investigate why some of these readings describe what look like attitudes, and others describe the non-occurrence of external events. This exploration begins by looking at the event semantic properties of the verbs, a discussion based on Vendler (1957) and Rothstein (2004). We will see that the verbs appear, at least sometimes, in accomplishment predicates, and we will take these manifestations to be basic. Then we can explain the instances where these verbs are found in attitude-like predicates by positing the presence of a habitual operator. We will outline this strategy, then discuss objections to it, including the peculiarities we find when we try to compare habitual predicates made with our verbs to habitual predicates built with other accomplishment verbs. After assuaging these worries, Chapter 3 will contain a detailed presentation of the proposal, followed by demonstrations of how it can explain the free choice inferences and one group of the negative readings observed.

We devote Chapter 4 to the extra negative readings, beginning by introducing and analyzing the readings for all the implicated classes of verbs. Then after arguing, using criteria put forward in Gajewski (2007) and Homer (2012), that these readings appear to form a coherent group with a single grammatical source, we look at previous strategies for dealing with unexpected negative readings. We decide that a pragmatic account will be necessary, and suggest that the recent story in Romoli (2013) can be modified to deal with all the verbs investigated here, where the modifications are based on the full range of negative readings detected.

In the final chapter, we briefly return to performativity, and show how the verbs at issue are performative in virtue of their lexical entries, in a way that does not appear to be consistent across the greater set of performative verbs. In that chapter we will also

consider an alternative to our rather complex account. This competitor, though simpler in certain respects, will not be able to deal with all the properties of the verbs as effectively as the proposal put forward here.

A final note is in order before we dive in. There are certainly other verbs that have unexpected readings with negation and lead to distribution effects, such as *sanction*. However, the main focus of our inquiry will be verbs that lead to free choice inferences and unexpected readings with negation, and also have the ability to take sentential complements. This is not to say that a verb like *sanction*, which does not take propositional complements, is not related in some sense. However, as we will show in the last section of Chapter 5, interpretations of sentences with verbs that lead to distribution effects and extra readings with negation are very unpredictable when their objects are DPs. As a result, throughout Chapters 1-4 we will be talking only about instances of these verbs that have overtly propositional complements.

Chapter 1

Distribution Effects and Extra Readings with Negation

The linguistic domain of this project, verbs like *permit*, *recommend*, and *promise*, have a number of interesting characteristics. The two we are concerned with in this first chapter relate to phenomena known to occur with other lexical items. First, these verbs lead to distribution inferences, or free-choice effects, when their complements are disjunctive. These effects have been well studied in the context of modal operators. Second, negation of the predicates in question appears to have an ambiguous character, sometimes constituting a denial that an event of communication has occurred, and other times reporting a negative claim. The presence of unexpected readings with negation is something that has been observed and investigated for traditional attitude verbs, such as *think* and *believe*.

We will begin in Section 1.1 by presenting the first property, and then go on in Section 1.2 to outline the most natural way of dealing with this, which amounts to a characterization of the verbs as modal attitudes. In Section 1.3, we will present the second property, and show how the range of readings found with negation challenges the simple proposal tendered in Section 1.2.

1.1 Distribution Effects

In this section, we show that verbs like *permit*, and *recommend*, and *promise* are associated with distribution inferences, or free-choice effects, when their objects are disjunctive. We will demonstrate that with respect to these inferences, the verbs fall into two classes: those that pattern with possibility modals, and those that behave like necessity modals. This observation will pave the way for the naive analysis of these verbs presented in 1.2.

1.1.1 Distribution Effects with Overt Modals

Free choice inferences, or distributive possibility entailments, are well-known in modal contexts. In this section, we illustrate the patterns of inference found with overt possibility modals, like *may*, and necessity modals, like *must*. We begin by looking at a permission statement:

(9) Theodore may have pizza or pasta.   *Implies:*

    (i) Theodore may have pizza. *AND*

    ii) Theodore may have pasta.

    (Though he does not have explicit permission to gluttonously eat both meals.)

As described in Horn (1972), Kamp (1973), Zimmermann (2000), Fox (2006), Aloni (2007), Chemla (2008)), and in many other places, (9) has a reading that tells us more than we expect based on the traditional semantics of the sentence, which entails only that one of the following is true: {Theodore may have pizza, Theodore may have pasta}. The extra inferences listed in (9i) and (9ii) are the free choice inferences, giving Theodore (or someone else) the option to choose between pizza and pasta. (9) does not, however, give Theodore the permission to have both pizza and pasta together. So a disjunctive permission statement has a reading that is more like a conjunction (pizza and pasta are both possibilities), though it is not the same as just replacing the *or* with an *and*. Another way to put this

is that from a sentence with a disjunctive object, like *pizza or pasta*, we can infer the two statements that result when we switch the object for one disjunct (*pizza*) or the other disjunct (*pasta*), but not the one that results from switching the object to a conjunction formed with the disjuncts (*pizza and pasta*).

In the realm of necessity statements, take (10) below.

(10)   Theodore must have pizza or pasta.   *Does not imply:*

   (i) Theodore must have pizza. *NOR*

   (ii) Theodore must have pasta.   *BUT Does imply:*

   (iii) Theodore may have pizza. *AND*

   (iv) Theodore may have pasta.

   (Though again, he doesn't necessarily have permission to eat both coincidently, and he certainly isn't required to do so.)

Zimmermann (2000), Alonso-Ovalle (2006), Fox (2006), and Aloni (2007), among others, have observed that we also have inferences of free choice with *must*. Just as we saw with the permission statement, there is a reading of (10) that licenses the inferences in (iii) and (iv), even though these don't follow from the traditional semantics for *or*. Here Theodore has a choice of how to satisfy the disjunctive requirement described, as both having pizza and having pasta are possible ways to do this (even if having pizza and pasta together is not necessarily possible). Importantly though, we don't get these inferences by just replacing the disjunctive object of (10) with one of the disjuncts, as we did for the permission statement above. The necessity inferences that would result from this—(10i) and (10ii)—cannot be inferred from (10).

With these well-known patterns described, we can now turn to our verbs, and we will show that the inferences found with a subset of these mirror those found with possibility modals, and the inferences found with the others follow the same pattern as those we saw for necessity modals.

1.1.2 Free Choice with Verbs

We begin by looking at *offer* and *permit*.

(11) *(Context 1) Joe's evening flight from Paris to Toronto has been cancelled by the airline at the last minute. The next flight is not until the morning, and an airline employee informs Joe that for the inconvenience, they are offering him $200 or a night in a nearby hotel. For whatever reason, Joe doesn't receive either the money or the hotel stay, and he eventually finds himself in court, attempting to collect what he feels he deserves. The following are hypothetical courtroom exchanges:*

Judge: Did the airline offer to give you money?

Joe: ✓ Indeed, they offered to give me $200 or a night in a hotel.

Judge: Did the airline offer to give you a hotel stay?

Joe: ✓ Indeed, they offered to give me $200 or a night in a hotel.

Judge: Did the airline offer to give you money and a hotel stay (as a package)?

Joe: # Indeed, they offered to give me $200 or a night in a hotel.

Or more simply:

(12) The airline offered to give me money or a hotel stay.

   (a) ⇒ The airline offered to give me money.

   (b) ⇒ The airline offered to give me a hotel stay.

   (c) ⇏ The airline offered to give me money and a hotel stay (as a package).

(13) *(Context 2) Salvador is 15 years old, and he is on a flight to Paris. He's very thirsty, so he asks the stewardess if he can have a drink. The stewardess says yes, but that at this point in the flight the passengers are only permitted to have coffee or tea. Salvador takes tea. A minute later, another stewardess comes by, and Salvador requests coffee. Not seeing that he already has a drink, she hands Salvador a coffee. Salvador has never had so much*

caffeine. Salvador becomes boisterous, one thing leads to another, and Salvador has to be restrained by the pilot. Months later, Salvador takes the airline to court, accusing the staff of assault, negligence, and age-related discrimination. The following are hypothetical courtroom exchanges:

Judge: Did the first stewardess permit you to drink coffee?
Salvador: ✓ Yes, she permitted me to drink coffee or tea.

Judge: Did the first stewardess permit you to drink tea?
Salvador: ✓ Yes, she permitted me to drink coffee or tea.

Judge: Did the first stewardess permit you to drink coffee and tea together?
Salvador: # Yes, she permitted me to drink coffee or tea.

Or more simply:

(14)   The first stewardess permitted me to drink coffee or tea.

　　(a) ⇒ The first stewardess permitted me to drink coffee.

　　(b) ⇒ The first stewardess permitted me to drink tea.

　　(c) ⇏ The first stewardess permitted me to drink coffee and tea.

With *offer* and *permit* then, we find that the use of a sentence with a disjunctive object allows us to make two inferences, one replacing the disjunctive object with one of the disjuncts, and the other replacing the disjunctive object with the other disjunct. As a result, Joe in the first context, and Salvador in the second, are free to choose among the disjuncts. In neither case, however, is Joe or Salvador necessarily free to choose both of the disjuncts together; these are either-or situations.

Crucially, note that the inferences of choice do not follow from the normal semantics of a disjunctive sentence; given a normal interpretation of *or*, (12) only entails that one of the two compensations was available to the Joe. Similarly, (14) only entails that either tea was permitted or coffee was permitted, which would not give Salvador a choice. We can

compare this to what we find with most verbs, where the regular semantics is all we get; no extra inferences are present:

(15) The first stewardess drank the coffee or the tea.

    (a) $\not\Rightarrow$ The first stewardess drank the coffee.

    (b) $\not\Rightarrow$ The first stewardess drank the tea.

    (c) $\not\Rightarrow$ The first stewardess drank the coffee and the tea.

So *permit* and *offer*, unlike most verbs, lead to unexpected inferences of choice when their objects are disjunctive. If we look at the form of these inferences, they match exactly the pattern we found with possibility modals: from a disjunctive sentence we can infer both disjuncts, though a conjunction formed with the disjuncts does not follow.

From our set of verbs, *permit* and *offer* are not the only ones that lead to permission-like free choice effects. For example, *okay* and *encourage* also lead to the same pattern of inference with disjunctive objects . For convenience, we will call the class of verbs that lead to these *may*-like inferences "Class I". We can define the membership requirements for Class I as follows—to qualify, a verb needs to meet the criteria that when used in a sentence with a disjunctive propositional complement, (i) we can infer both of the two sentences created by replacing the object with either individual disjunct, and (ii) we cannot infer the stronger statement that features the conjunction of the disjuncts.

The second class of predicates we are interested in will be called "Class II", and these will the verbs that have *must*-like free choice effects. Consider the inferences found with *promise* and *demand* below.

(16) *(Context 3) Similar to Context 1, except that the nearby hotel can only take in twenty guests, and the airline can only distribute $1000 total. There are 25 passengers. So the airline employee tells Joe that they promise to give him cash or a hotel stay, but that they will decide which passenger gets what in a random draw.*

Judge: Did the airline promise to give you money?

Joe: # Yes, they promised to give me $200 or a night in a hotel.

Judge: Did the airline promise to give you a hotel stay?

Joe: # Yes, they promised to give me $200 or a night in a hotel.

Judge: Did the airline promise to give you money and a hotel stay?

Joe: # Yes, they promised to give me $200 or a night in a hotel.

Judge: Was giving money a possible way to satisfy the promise?

Joe: ✓ Yes, they promised to give me $200 or a night in a hotel, so either was possible.

Judge: Was giving a hotel stay a possible way to satisfy the promise?

Joe: ✓ Yes, they promised to give me $200 or a night in a hotel, so either was possible.

Judge: Was giving money and a hotel stay a possible way to satisfy the promise?

Joe: # Yes, they promised to give me $200 or a night in a hotel.

Or more simply:

(17) The airline promised to give me money or a hotel stay.

   (a) $\nRightarrow$ The airline promised to give me money.

   (b) $\nRightarrow$ The airline promised to give me a hotel stay.

   (c) $\nRightarrow$ The airline promised to give me money and a hotel stay.

   (d) $\Rightarrow$ Giving me money was possible.

   (e) $\Rightarrow$ Giving me a hotel stay possible.

   (f) $\nRightarrow$ Giving me both money and a hotel stay together was possible.

(18) *(Context 4) Salvador is 15 years old, and on a flight to Paris. The stewardess comes around, and asks him what he would like to drink. He says he's not thirsty. Concerned about hydration (but somewhat ill-informed about specifics), the stewardess demands that Salvador drink coffee or tea. Salvador takes tea. A minute later, another stewardess comes*

by, and Salvador requests coffee. Not seeing that he already has a drink, she hands Salvador
a coffee. Salvador has never had so much caffeine. Salvador has a panic attack. Months
later, Salvador takes the airline to court, accusing the staff of forcing him to consume an
unreasonable amount of caffeine, leading to psychological distress. The following are hy-
pothetical courtroom exchanges:

Judge: Did the first stewardess demand that you drink coffee?

Salvador: # Yes, she demanded that I drink coffee or tea.

Judge: Did the first stewardess demand that you drink tea?

Salvador: # Yes, she demanded that I drink coffee or tea.

Judge: Did the first stewardess demand that you drink coffee and tea together?

Salvador: # Yes, she demanded that I drink coffee or tea.

Judge: Was drinking coffee only a way to satisfy the stewardess's demands?

Salvador: ✓ Yes, she demanded I drink coffee or tea, so either was possible.

Judge: Was drinking tea only a way to satisfy the stewardess's demands?

Salvador: ✓ Yes, she demanded I drink coffee or tea, so either was possible.

Judge: Was drinking coffee and tea together a way to satisfy the stewardess's demands?

Salvador: # Yes, she demanded I drink coffee or tea.

Or more simply:

(19) The stewardess demanded that Salvador drink coffee or tea.

    (a) $\not\Rightarrow$ The stewardess demanded that Salvador drink coffee.

    (b) $\not\Rightarrow$ The stewardess demanded that Salvador drink tea.

    (c) $\not\Rightarrow$ stewardess demanded that Salvador drink coffee and tea.

    (d) $\Rightarrow$ Drinking coffee was possible.

    (e) $\Rightarrow$ Drinking tea was possible.

(f) $\not\Rightarrow$ Drinking both coffee and tea together was possible.

So for *promise* and *demand*, the use of a disjunctive object leads to particular inferences, but these are different than those found with the Class I verbs. Specifically, we will say we have a Class II verb when a disjunctive complement does not allow us to infer any of the sentences created by replacing the object with an individual disjunct or the conjunction of the disjuncts, but does allow us to infer that every disjunct alone is a possibility (i.e. here, both drinking coffee and drinking tea were both possible ways to satisfy the demands of the stewardess, though not necessarily together). This is exactly the pattern we saw with necessity statements. So Class II is formed of the verbs that have *must*-like distribution inferences, and among these are *promise* and *demand*, as well as *guarantee*, and *insist (on)*.

At this point, we can contrast both the Class I and II predicates with other verbs that take the same kind of complement, like *manage*:

(20) *(Context 3) Again, the same situation as in (11), except that in court, an airline represen-
tative testifies that the employee did indeed manage to give Joe the money or the hotel stay.*

Judge: Did the employee manage to give Joe the money?
Airline Rep: # Yes, she managed to give Joe the money or the hotel stay.

Judge: Did the employee manage to give Joe the hotel stay?
Airline Rep: # Yes, she managed to give Joe the money or the hotel stay.

Judge: Did the employee manage to give Joe the money and the hotel stay?
Airline Rep: # Yes, she managed to give Joe the money or the hotel stay.

Judge: ?? Was giving money possible (as a way to satisfy what was managed)?
Airline Rep: # Yes, I know that he was given the money or the hotel stay.

Judge: ?? Was giving a hotel stay possible (as a way to satisfy what was managed)?

Airline Rep: # Yes, I know that he was given the money or the hotel stay.

Judge: ?? Was giving money and a hotel stay possible (as a way to satisfy what was managed)?

Airline Rep: # Yes, I know that he was given the money or the hotel stay.

Or more simply:

(21) The employee managed to give Joe the money or the hotel stay.

    (a) $\not\Rightarrow$ The employee managed to give Joe the money.

    (b) $\not\Rightarrow$ The employee managed to give Joe the hotel stay.

    (c) $\not\Rightarrow$ The employee managed to give Joe the money and the hotel stay.

    (d) $\not\Rightarrow$?? Giving him money was a possible way to satisfy what was managed.

    (e) $\not\Rightarrow$?? Giving him a hotel stay was a possible way to satisfy what was managed.[1]

    (f) $\not\Rightarrow$?? Giving him money and a hotel stay was a possible way to satisfy what was managed.

In brief, sentences with Class I predicates are permission-like, in that they have free choice effects that allow us to infer from a statement with a disjunctive object to the two sentences formed when the object is replaced with either of the disjuncts (but not the sentence formed with the conjunction of the disjuncts). Statements with Class II predicates and disjunctive objects are necessity-like: they don't lead to these replacive inferences, though they do allow us to infer distribution inferences over the disjuncts as possibilities—i.e., they allow us to infer that either of the disjuncts are possible, and a way to satisfy the original eventuality described by the predicate (e.g. the promise, or the demand, etc.).

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[1]Note that there is a sense in which giving money and giving a hotel stay are possible—epistemically, these are the possibilities. This is fine: there is an epistemic/ignorance reading of the sentences of (11-14) and (16-19) as well; the critical point is that there is no non-epistemic/ignorance way to interpret the disjuncts in this extensional case.

Having identified these associations between Class I and the possibility modals, and Class II and the necessity modals, we can try to capitalize on previous work on distribution effects to account for the inferences introduced here. The initial strategy will be a sort of brute force association of Class I with possibility modals, and Class II with necessity modals. After we introduce this simple idea below, we will run through one of the existing accounts of free choice effects with modal sentences, to demonstrate how it could apply directly to sentences with Class I/II predicates.

1.2 Class I/II Verbs as Attitudes

In this section, we directly translate the alignment of the Class I verbs with possibility modals and Class II verbs with necessity modals into an analysis: Class I verbs are attitudes with existential force, and Class II verbs are attitudes with universal force. This is inspired by analyses of canonical attitude verbs, like *think* and *believe*, which are taken to encode modal quantification in a straightforward manner. For instance, following Hintikka (1969), *believe* is often given the following semantics:

(22) ⟦believe⟧^{w,g} = $\lambda p.\lambda x.\forall w'$ compatible with what x believes in w: $p(w')$=1

In discussions below, we will, following more recent work, include an event argument in lexical entries for attitude verbs. For now though, this purely modal style of entry will be sufficient.

Turning to the Class I and II verbs, we account for the different distribution patterns by assigning a universal quantifier to the Class II verbs, and an existential one to those in Class I:

(23) ⟦insist-on⟧^{w,g} = $\lambda p.\lambda x.\forall w'$ compatible with what x says is good in w: $p(w')$=1

(24) ⟦permit⟧^{w,g} = $\lambda p.\lambda x.\exists w'$ compatible with what x says is good in w: $p(w')$=1

Beyond varying the force of the quantifier, the difference between *believe* and the Class I and II verbs is in the set of worlds quantified over: for *believe* these are the subject's doxastic alternatives, for *permit* and *insist on* these are the worlds that are acceptable to the subject in the world w.

With this proposal, sentences like *Hunter insists on going to Koreatown* and *Hunter permits you to drive to school* would have the following truth conditions:

(25) Hunter insists on going to Koreatown.

TRUE iff $\forall w$ compatible with what is acceptable to *Hunter* in w_0: Hunter-goes-to-Koreatown(w)=1

(26) Hunter permits you to drive to school.

TRUE iff $\exists w$ compatible with what is acceptable to *Hunter* in w_0: you-drive-to-school(w)=1

Now, before jumping into a demonstration of how we can bring this proposal together with existing work on free choice effects for modals, we note that there is independent evidence for characterizing the Class I/II verbs as modal. This is the observation that these predicates are intensional, and the intensionality is often associated with quantification over possible worlds.

The intensionality of these predicates is signaled by the fact that they take propositional complements, and further demonstrated by the fact that they possess the properties commonly taken to diagnose intensionality. Since at least Quine (1953), two characteristics have been associated with intensional contexts. The first is that the use of an existential term in an intensional context may fail to lead to existential quantification. We show this below for *seek*, a paradigmatic intensional verb, and then for the Class I *offer* and the Class II *promise*.

(27) *Failure of necessary existential quantification*

(a) After his tiger ran away, Marc sought a unicorn to help pass the time.

$\not\Rightarrow \exists x\ \text{unicorn}(x)$

(b) Marc offered/promised to bring a unicorn to the next department party.

$\not\Rightarrow \exists x\ \text{unicorn}(x)$

The second traditional property is that substitution of objects with extensionally equivalent DPs does not preserve the truth of a sentence. Again, we exemplify this with *seek*, and then apply the test to the *promise* and *offer*:

(28) *Non-truth-preserving substitution of objects with extensionally equivalent DPs*

(a) Marc sought Clark Kent (he was looking for a reporter).

$\not\Rightarrow$ Marc sought Superman.

(b) Marc offered/promised to hand over Clark Kent (in exchange for the hostages).

$\not\Rightarrow$ Marc offered/promised to hand over Superman (in exchange for the hostages).

Other properties have been associated with intensionality through the years. Moltmann (1997), for example, proposes three criteria that identify intensional constructions. As with all intensionality-detecting characteristics I have seen, each of these is possessed by the Class I and II verbs. I give one of Moltmann's properties as a representative example, first showing how it works for the intensional *look for*:

(29) *Lack of Anaphora Support*

(a) Marc is looking for a new car. # Danny is looking for it too.

(b) *Class I*: Marc is permitting Mel to get a tiger. # Danny is permitting her to get it too.

Class II: Marc is promising to get a tiger. # Danny is promising to get it too.

So according to existing measures, the Class I and II verbs are intensional. Given the intensional character of modal operators, this immediately follows on the above analysis of the Class I and II predicates.

At this point, we can look at how the present hypothesis allows us to use existing work on distribution inferences to account for the data introduced in 1.1.1. A number

of theories exist that purport derive the free choice facts for modals, e.g. Zimmermann (2000), Alonso-Ovalle (2006), Aloni (2007), Fox (2006), and Chemla (2008).[2] The goal here will not be to evaluate and choose between theories of free choice, but only to show that to the extent existing proposals work for sentences with overt modals, some of them will work for the Class I/II sentences on the proposals we outline in this project. As a result, though each of the existing theories of free choice accounts for these inferences in a different way, for expository purposes, we present only Fox (2006). We proceed by presenting this hypothesis in an uncritical manner, simplifying where convenient.

1.2.1 Fox (2006)

The proposal in Fox (2006)) is a part of a debate about the nature of scalar and free choice implicatures. Traditionally taken to belong to the world of pragmatic inferences derived by taking seriously the conventions on conversation described by Grice (1975), a lot of recent attention has been paid to whether the wider range of inferences observed since Grice can truly be accounted for by these means. While we will not critique or contribute to this important discussion, it is important to note that Fox's account (which in this sense belongs to a set of work inspired by Landman (1998) and Chierchia (2004), among others) argues that these inferences actually result from the presence of a covert exhaustivity operator in the syntax. Other accounts of free choice differ in this respect, so if your

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[2]Some of these theories can also be applied to the corresponding inference patterns found with other existential and universal operators:

(1) Some students had pizza or pasta. *Implies:*
(i) Some students had pizza. AND
(ii) Some students had pasta.

(2) Every student ate pizza or pasta. *Implies:*
(i) Some students had pizza. AND
(ii) Some students had pasta.

Though interesting, this data is not directly relevant for the current project, so we leave it aside in the discussion here.

syntax-semantics-pragmatics interface inclinations object to pragmatic operators in the syntax, another theory may be more palatable. Alonso-Ovalle (2006), for instance, takes the free choice effects present with modals to result from two special semantic interpretation functions (in addition to the traditional one). Despite this difference, importing his theory into an account of the Class I and II free choice data would proceed along the same lines as those we present here for Fox.

Very roughly, Fox's exhaustivity operator, EXH, can attach to a sentence, and if that sentence is associated with alternatives, EXH can deliver a stronger sentence. The alternatives are determined by the lexical items in the sentence (and focus, though we will not need to make reference to this here). As an example, because the lexical item *some* is taken to have the alternative *all*, the sentence *Thea likes some of the Hollywood people she knows*, has as an alternative *Thea likes all of the Hollywood people she knows*. For a sentence S, its set of alternatives, Alt(S), will contain S, and each of these lexically-sourced alternatives. Then the stronger sentence, S^+=EXH(Alt(S))(S) will be the conjunction of S and the negation of every member of Alt(S) that can be negated without making another member of Alt(S) necessarily true. In the present case, S^+ will be *Thea likes some of the Hollywood people she knows and Thea doesn't like all of the Hollywood people she knows* (because negating the alternative doesn't make another alternative necessarily true).

This is the general picture, but like any fully articulated theory, a number of motivated refinements have been made to this mechanism of exhaustivity over time. (See, for example, Chierchia et al. (in press).) Taking into account these modifications, Fox (2006) presents the following lexical entry for EXH.

(30) (Fox (2006), ex.61b)

   $[\![EXH]\!]$ $(A_{\langle st,t \rangle})(p_{st})(w) \Leftrightarrow p(w)$ & $\forall q \in$ I-E(p,A) $\rightarrow \neg q(w)$

   where I-E(p,A) = $\cap \{A' \subseteq A$: A' is a maximal set in A, s.t. $A'^{\neg} \cup \{p\}$ is consistent$\}$

   where $A^{\neg} = \{\neg p: p \in A\}$

In words, an exhaustified sentence *p* with alternatives *A*(*p*) is true iff *p* is true and all the "innocently excludable" alternatives from A(p) are false. Innocent exclusion (associated with the "I-E" in the above formulation) is a concept that prevents us from excluding too much. In Fox's own words: "To see if a proposition q is innocently excludable, we must look at every maximal set of propositions in A such that its exclusion is consistent with the prejacent [*p* in (30)]. Every such set could be excluded consistently as long as nothing else in A is excluded. Hence the only propositions that could be excluded non-arbitrarily are those that are in every one of these sets (the innocently excludable alternatives)" (Fox (2006), p.26).

We'll see how this can deliver the free choice inferences found with modal statements, but let's first see what happens with a simple case of unembedded disjunction.

(31)   Booker went to the beach or the park.

The basic semantics of this sentence give us that at least one of the following is true: {Booker went to the beach, Booker went to the park}. According to normal Gricean reasoning, the use of *or* here implicates that an utterer of (38) is ignorant about which of the possible statements is true. If this ignorance inference seems inappropriate, Fox says we use the parsing strategy below:

(32)   *Fox (2006), ex.68*

Recursive Parsing Strategy:

If a sentence S has an undesirable Ignorance Inference, parse it as EXH(Alt(S))(S)

So if the ignorance inferences found with a bare utterance of (31) are inappropriate, we append EXH. Note that the alternatives of a simple disjunction are as in (33) below:

(33)   *Letting p=Booker went to the beach and q=Booker went to the park:*

Alt(p ∨ q) = {p ∨ q, p ∧ q, p, q}

We get this set of alternatives from Sauerland (2004), who argues that *or* has the alternatives *or*, *and*, L (an operator that outputs the left disjunct of a disjunction), and R (an

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operator that outputs the right disjunct of a disjunction). Note that the alternatives in (33) are propositional: it is *or* that is originally associated with alternatives, but then these grow with the structure. For instance:

(34) (a) Alt(a cookie or a banana) = {a cookie or a banana, a cookie and a banana, a cookie, a banana}

(b) Alt(Myron ate a cookie or a banana) = {Myron ate a cookie or a banana, Myron ate a cookie and a banana, Myron ate a cookie, Myron ate a banana}

For more complicated structures, the alternatives are provided by an algorithm identified in Fox & Katzir (2011). The interested reader should refer to an appendix in that work for the precise formulation of this algorithm; for our purposes, this intuitively entails that when a sentence *S* has multiple lexical items with alternatives, the set of alternatives will be the set of all combinations of substitution of the lexical items with their alternatives. For instance, in the permission case we will get to shortly, *S = Booker may go to the beach or the park* has two terms with alternatives: the modal *may*, and *or*. *May* has itself and its necessity counterpart (call it *must*) as alternatives, so the alternatives for *S* would be {may(Booker goes to the beach), may(Booker goes to the park), may(Booker goes to the beach or the park), may(Booker goes to the beach and the park), must(Booker goes to the beach), must(Booker goes to the park), must(Booker goes to the beach or the park), must(Booker goes to the beach and the park)}.

Looking back at our simple case, the alternatives in (33) are used to get the exhaustified meaning of the sentence.

(35) *Letting p=Booker went to the beach and q=Booker went to the park:*

EXH(Alt($p \lor q$))($p \lor q$)

$= p \lor q \ \& \ \neg(p \land q)$

To see why $(p \land q)$ is the only alternative that is innocently excludable, start by assuming that the original sentence, $p \lor q$, is true. Then the maximal sets of the other alternatives

that can be false at the same time are $\{p \wedge q, p\}$ and $\{p \wedge q, q\}$. Only $p \wedge q$ is in both of these, so this is the only innocently excludable alternative. As a result, (35) is our strengthened meaning.

We still have an ignorance inference though, so we could apply EXH again:

(36)   *Letting p=Booker went to the beach and q=Booker went to the park:*

EXH(A')(35)

$= p \vee q \mathbin{\&} \neg(p \wedge q)$

Note that A' is the set of alternatives to an already exhaustified structure. With the use of Fox & Katzir (2011)'s algorithm, A' is the set in (37):

(37)   A' = {EXH(Alt(S))(p $\vee$ q), EXH(Alt(S))(p $\wedge$ q), EXH(Alt(S))(p), EXH(Alt(S))(q)}

A' = {p $\wedge$ q, p $\wedge$ ¬q, q $\wedge$ ¬p, (p $\wedge$ ¬q) $\vee$ (q $\wedge$ ¬p)}

We don't lay out all the calculations of this set here for reasons of space, but if interested, the reader can look at the details in Fox (2006) or Fox & Katzir (2011). Now note that if the sentence we're exhaustifying, $p \vee q \mathbin{\&} \neg(p \wedge q)$, is true, then the negation of the first alternative is already entailed. For the last alternative, this can never be false when the sentence is true. So we're left with the second and third alternatives. If our sentence, $p \vee q \mathbin{\&} \neg(p \wedge q)$, is true, and we negate the second alternative, the third becomes necessarily true. In the same way, if our sentence is true and we negate the third alternative, the second must be true. So neither the second nor the third alternative can be in all maximal sets of negated alternatives, so neither is innocently excludable. As a result, the maximal set of alternatives that can be false when the sentence is true is $\{p \wedge q\}$, and the negation of this is already entailed by the sentence. So the second exhaustification has no effect.[3]

For the simple disjunction case then, recursive exhaustification gets us the inference that the conjunctive alternative isn't true, but that's it. There are, in particular, no free

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[3]Fox claims that subsequent exhaustifications will also have no consequence. Please see his p.30 for details.

choice effects.

Turning to a permission case, things turn out somewhat differently. Take (38):

(38)   Booker may go to the beach or the park.

Without an exhaustivity operator, (38) tells us only that one of the following two things is true: {Booker may go to the beach, Booker may go to the park}. As above, we can exhaustify to try to get rid of the ignorance inference.

(39)   *Letting p=Booker goes to the beach and q=Booker goes to the park:*

EXH(Alt($\Diamond$(p $\lor$ q)))($\Diamond$(p $\lor$ q))[4]

= $\Diamond$(p $\lor$ q) & $\neg\Diamond$(p $\land$ q)

For our purposes, the alternatives of $\Diamond$(p $\lor$ q) are $\Diamond$p, $\Diamond$q, $\Diamond$(p $\lor$ q), and $\Diamond$(p $\land$ q).[5] The two sets of maximal propositions in Alt($\Diamond$(p $\lor$ q)) that can be excluded while $\Diamond$(p $\lor$ q) is true are {$\Diamond$(p $\land$ q), $\Diamond$p} and {$\Diamond$(p $\land$ q), $\Diamond$q}. Only $\Diamond$(p $\land$ q) is in both of these, and so this is the only innocently excludable alternative, as reflected in (39).

At this point though, we have yet to derive the free choice inferences. Moreover, we still have an ignorance inference: a speaker who utters (39) is taken to not believe that going to both the beach and the park is permitted, but we still infer that she is ignorant about which of the locations is an acceptable destination. Here then is where the recursive nature of EXH, as described in (32), actually comes in handy. Because we still have an undesirable ignorance inference, we can append a second EXH:

(40)   *Letting p=Booker goes to the beach and q=Booker goes to the park:*

EXH(A'')(EXH(Alt($\Diamond$(p $\lor$ q)))($\Diamond$(p $\lor$ q)))

= $\Diamond$(p $\lor$ q) & $\neg\Diamond$(p $\land$ q) & $\Diamond$p & $\Diamond$q

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[4]Here we slip into an informal modal logic formulation that we will use throughout this thesis, especially in the later chapters, when our semantic calculations start to get unwieldy.

[5]As we mentioned, the actual set of alternatives would include additional alternatives, in particular, those with a $\Box$ in place of $\Diamond$. Fox leaves these out of the computation, however, as they do not affect the results, so we do the same.

Fox arrives at this in the same manner as above: calculating the set of alternatives A″, and then negating all those that can be excluded innocently while the sentence we are exhaustifying, (39) = EXH(Alt($\Diamond(p \lor q)$))($\Diamond(p \lor q)$) = $\Diamond(p \lor q)$ & $\neg\Diamond(p \land q)$, is true.

(41) *Letting p=Booker goes to the beach and q=Booker goes to the park:*

A″ = {EXH(Alt(S))($\Diamond(p \lor q)$), EXH(Alt(S))($\Diamond(p \land q)$), EXH(Alt(S))($\Diamond p$),

EXH(Alt(S))($\Diamond q$)}

A″ = {$\Diamond(p \lor q)$ & $\neg\Diamond(p \land q)$, $\Diamond(p \land q)$, ($\Diamond p \land \neg\Diamond q$), ($\Diamond q \land \neg\Diamond p$)}[6]

With these alternatives, the maximal excludable set is the whole set minus the sentence itself, or {$\Diamond(p \land q)$, ($\Diamond p \land \neg\Diamond q$), ($\Diamond q \land \neg\Diamond p$)}. So we have (42a) below:

(42) *Letting p=Booker goes to the beach and q=Booker goes to the park:*

EXH(A′)(EXH(Alt($\Diamond(p \lor q)$)))($\Diamond(p \lor q)$))

(a) = $\Diamond(p \lor q)$ & $\neg\Diamond(p \land q)$ & $\neg\Diamond(p \land q)$ & $\neg(\Diamond p \land \neg\Diamond q)$ & $\neg(\Diamond q \land \neg\Diamond p)$

(b) ⇒ $\Diamond(p \lor q)$ & $\neg\Diamond(p \land q)$ & $\Diamond p$ & $\Diamond q$

To get from (42a) to (42b), imagine that (42a) was true, but so was $\neg\Diamond(p)$. But $\Diamond(p \lor q)$ and $\neg\Diamond(p)$ would give us $\Diamond(q)$, and so we would have ($\Diamond q \land \neg\Diamond p$), contradicting the last conjunct of (42a). A similar argument shows how we get $\Diamond q$ in (42b).

In this way then, two applications of EXH allow us to account for the free choice effects found with possibility modals. The situation with necessity modals is actually simpler: we only need one application of EXH. Let's walk through this for (43) below.

(43) Booker must go to the beach or the park.

With an utterance of the unexhaustified sentence, we have the ignorance inference that Booker either is required to go to the beach, or Booker is required to go to the park, but the speaker doesn't know which. If this seems unlikely, we employ the Recursive Parsing Strategy, and append an EXH.

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[6]Again, for the derivation of these alternatives, the interested reader can refer to the source, Fox (2006), p.31, or Fox & Katzir (2011).

(44) *Letting p=Booker goes to the beach and q=Booker goes to the park:*

EXH(Alt($\Box$(p $\lor$ q)))($\Box$(p $\lor$ q))

= $\Box$(p $\lor$ q) & $\neg\Box$(p $\land$ q) & $\neg\Box$p & $\neg\Box$q

In this case, the members of Alt($\Box$(p $\lor$ q)) that matter are $\Box$(p $\lor$ q), $\Box$(p $\land$ q), $\Box$p, and $\Box$q. The maximal excludable set of these is {$\Box$(p $\land$ q), $\Box$p, $\Box$q}, as Booker can be required to go to one of the beach or the park, but not required to go to both, or either specific place. From this one move we also get the possibility inferences associated with necessity modals—imagine (44) is true, but $\Diamond$p is not. Then $\Box$(p $\lor$ q) together with $\neg\Diamond$p would give us $\Box$q, contradicting the last conjunct of (44). Again, we could use the same argument to show that we can also infer $\Diamond$q.

1.2.2   Fox (2006) and the Simple Attitude Proposal

With all this set out for possibility and necessity modals, we can directly apply the strategy to our Class I and II cases. We do this by noting that on the current proposal for the Class I and II verbs, these are, in essence, modals. Take the Class I verb *permit*. Recall that we gave this an interpretation involving existential quantification over worlds. We can simplify this in our presentation by using a $\Diamond$ operator (and specifying that the modal base is those worlds that are compatible with what is acceptable to the subject). Let's look at the example in (45).

(45)   Hunter permits you to go to the show or the bar.

⟦Hunter permits you to go to the show or the bar⟧^{w_0}

= $\exists w$ compatible with what is acceptable to *Hunter* in w_0: you-go-to-the-show-or-the-bar(w)=1

= $\Diamond$(you go to the show or the bar) *(if we let the $\Diamond$ operator take on what is acceptable to Hunter as the modal base)*

With just this basic semantics, we have an ignorance inference, that the speaker doesn't know which is actually permitted by Hunter—going to the show, or going to the bar. When we append EXH, we get the following:

(46) *letting p=you go to the show and q=you go to the bar*

EXH(Alt($\lozenge$(p $\vee$ q)))($\lozenge$(p $\vee$ q))

= $\lozenge$(p $\vee$ q) & $\neg\lozenge$(p $\wedge$ q)

Because *permit* has existential force, we get the same result here as we did for the plain possibility modal above—that Hunter hasn't permitted you to go to both the show and bar, but we still have an ignorance inference pertaining to which possibility he actually permits. So just as above, we can apply EXH again in order to get the inferences we found with the double exhaustification of a possibility statement:

(47) *letting p=you go to the show and q=you go to the bar*

EXH(A')(EXH(Alt($\lozenge$(p $\vee$ q)))($\lozenge$(p $\vee$ q)))

= $\lozenge$(p $\vee$ q) & $\neg\lozenge$(p $\wedge$ q) & $\lozenge$p & $\lozenge$q

So exhaustifying twice gives us that Hunter permits you to go to the show or the bar but not both, and that he is allowing you to choose between the two activities, as either is permitted. That is, exhaustifying twice gives us the free choice inferences found with Class I verbs.

Moving on to Class II, we note that these verbs are just like necessity modals, and proceed in the same way as above.

(48) Hunter insists you go to the show or the bar.

⟦Hunter insists you to go to the show or the bar⟧^{w_0}

= $\forall w$ (w compatible with what is acceptable to *Hunter* in $w_0 \rightarrow$ you-go-to-the-show-or-the-bar(w)=1)

= $\square$(you go to the show or the bar) *(if we let the $\square$ operator take on what is acceptable to Hunter as the modal base)*

With the basic semantics, we have an ignorance inference (that it's not known which location Hunter requires you to go to). So we apply EXH:

(49) *letting p=you go to the show and q=you go to the bar*

EXH(Alt($\Box$(p $\vee$ q)))($\Box$(p $\vee$ q))

= $\Box$(p $\vee$ q) & $\neg\Box$(p $\wedge$ q) & $\neg\Box$p & $\neg\Box$q

This exhaustified meaning gives us all the inferences we observed in our initial presentation of the data—that neither disjunct is required on its own (nor that they both are), and that either disjunct is possible.

So we see that our simple theory—characterizing the Class I and II verbs as modal attitudes—allows us to easily employ existing theories of distribution effects to account for the data we introduced in 1.1.1.

1.3   Negation and the Class I/II Verbs

But if this simple solution seemed too easy, it's because it is. In this section, we present the second phenomenon that concerns us with the Class I/II verbs: unexpected readings with negation. We will see that for Class I and II, negated instances of these predicates come in two flavors—one that denies that an event of communication has occurred, and another that reports a negative view or standpoint. As we lay out these readings, we will uncover data that gives us reason to doubt the simple attitude proposal given above. In particular, we will see that there is a reading that calls into question whether these predicates can really be attitudes. This, we will argue, motivates a more nuanced investigation of the verbs in question, which will lead us to see, in the next chapter, that non-attitude-like readings are found in the positive domain as well. All these readings will help us to form a proposal for the semantics for the members of Class I and II in Chapter 3, at which point we will be able to effectively address the range of negative readings presented here.

Let's begin with Class I. The idea is that a sentence like (50) has two readings.

(50)   Raoul didn't permit his daughter to walk downtown.

One interpretation, which is most obvious out of the blue, is that Raoul's standpoint on his daughter walking downtown was a negative one. But there is a second reading, which simply denies that Raoul told his daughter she could go downtown (this can be made salient by continuations like *... Yao did*, or *... even though Yao asked him to remember to do so*). With this reading, we don't necessarily know how Raoul feels about his daughter walking to that area.

To properly tease these readings apart, we can look at the interpretations we get when we include negative polarity items, such as *either* or *until*.

Either is a negative polarity item, or NPI (see, e.g. Rullman (2003)), and it generally requires a negative antecedent. (For the complexity of defining the requirements on this antecedent, see Levinson (2008).) Appending this term in some linguistic contexts allows for only one reading (so long as the correct antecedent is furnished), but in other contexts, such as with negated Class I/II predicates, we find two possible readings. Note that *either* is a focus-sensitive particle, so I keep the focused term constant (and underlined) to avoid irrelevant ambiguities.

(51)   *On Tuesday, Raoul watched his niece, Lena. On Wednesday, her mother complained that Raoul didn't tell her that Lena rode a bike when she picked her up.*

(a) Raoul didn't report that she <u>swam</u> either.

(i) *Similar thing that didn't happen: Raoul reported that Lena rode a bicycle.*

So with an embedding predicate like *report*, we only get one reading with *either*. However, when we attach it to a sentence with *permit*, we find that the sentence describes two different kinds of situations. The first of these is brought out by the context in (52) below.

(52)   *On Tuesday, Raoul watched his niece, Lena. Her mother asked him to explicitly tell Lena that she was allowed to practice swimming and doing gymnastics (otherwise Lena would*

say she assumed the activities weren't allowed as an excuse to not practice). On Wednes-

day, Lena's mother complained that Raoul forgot to permit Lena to do gymnastics.

(a) Raoul didn't permit her to <u>swim</u> either.

(i) *Similar thing that didn't happen: Raoul did not tell Lena that she could swim.*

(ii) # *Similar negative situation that held: Raoul forbade Lena to swim.*

In this context, the negative sentence in (52a) has what we will call a "weak" flavor, which amounts to Raoul not partaking of a particular action, specifically, telling Lena she could swim. We can contrast this with the most likely interpretation of the same sentence in the context of (53):

(53)   *After being watched by her uncle Raoul, Lena comes home and complains to her mother that he wouldn't let her practice gymnastics.*

(a) Raoul didn't permit her to <u>swim</u> either.

(i) # *Similar thing that didn't happen: Raoul did not tell Lena that she could swim.*

(ii) *Similar negative situation that held: Raoul forbade Lena to swim.*

With (53a), we get what we term a "strong" reading, where instead of the non-occurrence of an action, what is described is a negative standpoint: Raoul was against his niece swimming.[7]

Including *either* then shows us that negated Class I sentences can be given what we are calling weak readings, those that describe the lack of an action, as well as strong readings, which describe negative views on a possibility. On its own though, this isn't totally compelling: even in the context given (53a) could, strictly speaking, also be used to describe to non-occurrence of an event of permission, though it is certainly most natural to give the sentence the interpretation in (53ii). So we draw these readings out in a more cogent way using a strict NPI like *until*. First, note that punctual *until* requires a negative

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[7]The rationale for the labels "strong" and "weak" will become clear once we've given a semantics for the Class I/II verbs and explained the source of the readings.

context:[8]

(54) (a) Marie didn't ride a bike until she was ten.

(b) * Marie rode a bike until she was ten.

Most embedding verbs block the licensing of embedded strict NPIs by matrix negation:

(55) Jamie didn't remark that Marie would ride a bike until she was ten.

(i) *Available interpretation:* It wasn't until Marie turned ten that Jamie remarked that she would ride a bike.

(ii) *Not available:* Jamie remarked that it wouldn't be until Marie turned ten that she would ride a bike.

So matrix negation with an embedding verb like *remark* only allows *until* to be interpreted in the matrix clause. Certain embedders though, such as the so-called Neg-raising attitude verbs (which we will discuss in much more detail below and in Chapter 4), do allow for the strict NPI to attach in either the matrix or the embedded clause:

(56) Jamie didn't believe that Marie would ride a bike until she was ten.

(i) *Available interpretation:* It wasn't until Marie turned ten that Jamie believed that she would ride a bike.

(ii) *Available interpretation:* Jamie believed that it wouldn't be until Marie turned ten that she would ride a bike.

In a similar way, the Class I verbs allow for two interpretations of embedded strict NPIs under matrix negation.

(57) Jamie didn't permit Marie to ride her bike until after she did the dishes.

(i) *Available interpretation:* It wasn't until after Marie did the dishes that Jamie said

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[8]Technically, strict NPIs require more than a negative context (see, e.g. Gajewski (2007)). We will discuss this in more detail in Chapter 4 when we review how these NPIs have been used to detect Neg-raised readings.

she could ride her bike.

(ii) *Available interpretation:* Jamie indicated that Marie could not ride her bike until after she did the dishes.[9]

The weak reading in (57i), which describes the absence of an event before a certain time, is the only available reading with the following continuation:

(58)   Jamie didn't permit Marie to ride her bike until after she did the dishes—I know, because they met for the first time that day, and when, after finishing the chore she asked if she could ride her bike, he said, "Of course—as far as I'm concerned, you can always ride your bike!"

On the other hand, the strong reading in (57ii), which describes Jamie's negative view on the possibility of bike riding, is the only available reading with the following continuation:

(59)   Jamie didn't permit Marie to ride her bike until she did the dishes—I know because I overheard him say to her that he knew she knew better, and to put away the bike until she had finished washing the dishes.

Where the *until* is interpreted brings out the two truth-functionally different readings with negation—(57i) would be used to assert that a particular event happen didn't happen until a certain time, but (57ii) describes a negative position that held well before that time. We note though that the situation isn't exactly parallel to the *believe* case: in (56), the two readings could be described as having the negation and strict NPI being interpreted in either the matrix clause, or the embedded clause. Neither of the readings in (57) find the negation and strict NPI in the embedded clause in any straightforward sense. That is, neither available interpretation of (57) can be paraphrased as *Jamie permitted Marie to*

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[9]There is a third, though much less likely interpretation here, that Jamie did not give Marie permission to keep riding her bike until after the time she started to do the dishes. This is a case of durative *until* (see, e.g., Giannakidou (2002) for discussion of the differences between the two *until*s), and we will not be concerned with this reading here.

not ride her bike until she did the dishes. We will try to sort out what is happening here in Chapter 4.

For now though, we see that negated Class I predicates appear to come in two flavors: one that describes a negative view, and another that describes the non-occurrence of events. This pattern is found with the Class II predicates as well, as we see first with *either*:

(60) *On Tuesday, Raoul watched his niece, Lena. She is a difficult child, who will only do things she doesn't like if she is promised she can do something she likes later. Lena's mother said that if Lena wasn't eating her vegetables, Raoul should tell Lena that he would let her swim and do gymnastics if she finished. On Wednesday, Lena's mother complained that though Raoul was totally fine with letting Lena swim and do gymnastics, he forgot to promise that he would let her to do gymnastics at dinner, and she didn't eat her vegetables.*
(a) Raoul didn't promise to let her to <u>swim</u> either.
(i) *Similar thing that didn't happen: Raoul did not tell Lena that she would be allowed to swim.*
(ii) # *Similar negative situation that held: Raoul was not committed to letting Lena swim.*

With the context in (60), (a) is the denial that an event of promising occurred. This is the weak reading, which can be contrasted with (61):

(61) *After being watched by her uncle Raoul, Lena comes home and complains to her mother that he said he might not be able to let her practice gymnastics next weekend.*
(a) Raoul didn't promise to let her to <u>swim</u> either.
(i) # *Similar thing that didn't happen: Raoul did not tell Lena that she would be allowed to swim.*
(ii) *Similar negative situation that held: Raoul was not committed to letting Lena swim.*

What we have in (61a) can describe a negative position on being committed to letting Lena swim, or the strong reading.

We again find even clearer evidence for the two kinds of readings with negated Class II sentences when we add in a strict NPI:

(62)   The mason didn't promise to finish until Tuesday.

(i) *Available interpretation:* The mason said he couldn't guarantee to be done before Tuesday.

(ii) *Available interpretation:* It wasn't until Tuesday that the mason said he would finish the job.

The strong reading in (62i) is the only available reading with the following continuation:

(63)   The mason didn't promise to finish until Tuesday—I know, because on Saturday I overheard the head contractor ask him to finish by Monday like everyone else, and I heard the mason respond that because of material shortages, he couldn't say for sure he'd be finished before Tuesday.

The weak reading in (62ii) is the only available reading with the following continuation:

(64)   The mason didn't promise to finish until Tuesday—I know, because on Tuesday I heard him begrudgingly say, "Fine! I'll finish just so that you stop bothering me".

So the *until* helps us see the two different readings with negated Class II sentences, though again we note that neither reading corresponds to one in which the negation and NPI straightforwardly migrate to the embedded clause—neither of (62i) and (62ii) can be paraphrased as *The mason promised to not finish until Tuesday*. Nonetheless, we do have two readings: in the (i) case, a negative standpoint held before Tuesday, and in the (ii) case, a denial that an event occurred before that time.

Assuming that the meaning of sentential negation is itself constant, these two very different readings found with negated Class I and II sentences give us a second desiderata for a semantics of these verbs: not only to we want them to be modal, so that we can account for the distribution effects, we need them to somehow act as the base for both the weak and strong negative readings.

We haven't yet fully elucidated the nature of these readings, but we know enough to discredit a strategy for explaining the multiple readings that is based on the Class I/II verbs being attitudes. This is true whether we go along with the Hintikka-style entries given in given in (23) and (24) above, or if we take a different approach to attitude verbs, in which their lexical entries contain an event variable. This latter way of bringing attitude verbs in line with other verbs has been taken up by Kratzer (2006) and Hacquard (2010). Their approach would assign a lexical entry like (65) to *believe*:

(65)   *Predicate of event analysis of* **believe** (modified from Hacquard (2010))

   $[\![$believe$]\!]=\lambda p\lambda x\lambda e\lambda w.$ Experiencer(e,x) & belief'(e,w) & $\forall w' \in \cap$CON(e,w): $p(w')=1$

We are going to take these lexical entries seriously in Chapter 3, so I leave until then a proper introduction of the new elements included here, and just give a paraphrase for an example: *Gertrude believes that Sarah left* would be true in this world if Gertrude is the experiencer of a state of belief, and in all the worlds compatible with that state, Sarah left.

   With this style of lexical entry, we would have something like the following for *permit*:

(66) $[\![$permit$]\!] = \lambda p\lambda x\lambda e\lambda w.$ Experiencer(e,x) & acceptance'(e,w) & $\exists w' \in \cap$CON(e,w): $p(w')=1$

We can see that negating a Class I sentence with a Hintikka-style entry will give us different results than if we use a Hacquard-style entry. We show this for (67).

(67)   Raoul didn't permit his daughter to walk downtown

   (a) ... because he thought it was too dangerous.

   (b) ... again tonight because he didn't want to be redundant.

Using the Hintikka-style entry for *permit* given in (24), negation gives us something fairly strong (a negated existential). This could work for (67a):

(68) $\neg\exists w'$ compatible with what Raoul says is good in *w*, such that his daughter walks downtown in *w'*.

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Using the Hacquard-style entry for *permit* given in (66), we'd have the following for (67):

(69) $\neg\exists e.$ Experiencer(e,Raoul) & acceptance'(e,w_0) & $\exists w \in \cap$CON(e,w_0): *his-daughter-walks-downtown(w')*=1

This is weaker than (68). It only asserts that Raoul is not the experiencer of a state of acceptance from which there is an accessible world where his daughter walks downtown.

On either formulation though, we have yet to predict two readings for the sentence. At this point, we can try to do what we did above for free choice effects: look at existing theories of extra readings with negation and see if they can be applied, or mined for inspiration. In this line, we have the literature on "Neg-raising", a well-studied phenomenon involving unexpectedly strong interpretations of sentences in which certain attitude verbs are negated (see, *inter alia*, Fillmore (1963), Bartsch (1973), or Gajewski (2007)). With the Hintikka-style semantics of *believe* we gave above, consider (70) below:

(70) (a) Gertrude doesn't believe that Sarah left. *Can mean:*
      (b) Gertrude believes that Sarah didn't leave.

The expected reading of (70a) is given in (71):

(71) $[\![$Gertrude doesn't believe that Sarah left$]\!]^{w_0} = \neg\forall w$ compatible with what Gertrude believes in w_0: *Sarah-left(w)*=1

This is weak—all (71) can be used to declare is that Gertrude is not convinced that Sarah left. The interpretation given in (70b), on the other hand, is stronger, that not only is Gertrude not convinced Sarah left, she is convinced that Sarah didn't leave.

We find this kind of strong Neg-raised reading with other attitude verbs too, though not all: *want* and *think* are Neg-raisers, but not *desire* or *is certain*. A number of proposals have been offered to account for these extra strong interpretations, some syntactic, as in Fillmore (1963), some semantic, as in Gajewski (2007)), and some pragmatic, as in Romoli (2013). We will discuss these strategies in Chapter 4, and for now just note that there have been a variety of ways proposed to get from sentences like (70a) to (70b).

What is significant here is that most of these accounts have focused on how, with a Neg-raising verb α, a subject x, and a proposition p, $\neg\alpha(x, p)$ can be read as $\alpha(x, \neg p)$. That is, these stories of Neg-raising, which I call "naive" for the purpose of easy reference, try to show how a matrix negation gets interpreted in an embedded clause. We can already see that a direct application of these accounts will not help us. No matter whether we are assuming the Hintikka- or Hacquard-style of attitudes, the extra reading that the naive accounts will derive for (67) will be *Raoul permits his daughter to not walk downtown*. This is because if we let α=*permit*, x=Raoul, and p=Raoul's daughter walks downtown, naive Neg-raising gives us $\alpha(x, \neg p)$. This doesn't correspond to either of the attested readings for (67), and in fact, this reading is not even available. This is the difference we noted between the readings of negated Class I/II sentences and the readings of negated attitude sentences above, when we were discussing NPIs like *until* and where they are interpreted. The upshot of this is that naive theories of Neg-raising won't help us out, whether we go the way of Hintikka or Hacquard.

Of course, there are theories of Neg-raising that do not count as naive in this idiosyncratic sense. Among these are certain semantic and pragmatic theories, such as Gajewski (2007), which focus on the modal aspect of the Neg-raising verbs. We'll come back to these in Chapter 4, devoting a whole section to Gajewski (2007), but for now note that there is a bigger problem. No account of Neg-raising, naive or otherwise, will help us so long as we characterize the Class I and II verbs as attitudes. This is because the biggest difference between the readings of (67) is that while (a) describes a stative (in a sense we make precise shortly) attitude, (b) describes the non-existence of an external, non-stative event. Existing accounts of Neg-raising can deliver negative attitudes from the absence of attitudes, but none of these accounts have anything to say about non-stative events. In the next chapter we pick up on this observation, and discuss what we can discover about the Class I and II verbs by looking at their event semantics. We will see that reference to non-stative events is not restricted to negative contexts, and we will outline a way to

account for both the attitude-like and non-attitude-like manifestations of these verbs.

In this section though, we've seen that negating predicates with Class I and II verbs can lead to two different kinds of interpretation, which we brought out using the terms *either* and the strict NPI *until*: one reading that denies that a non-stative eventuality occurred, and another that describes a negative standpoint on a possibility. We noted that having two readings with negation is, in fact, a property associated with some attitude verbs, like *believe* and *want*. However, the extra, unexpected readings found with the Class I/II verbs are not like those found with the other attitudes, as we can't get them by simply moving the matrix negation into the embedded clause. As a result, the negation data seems to occasion a revisitation of Class I/II. This is what we will do in the next chapter.

Chapter 2

Event Structure, Habituality, and Speech Reports

In Chapter 1, we saw that the free choice patterns available with the Class I (*permit*-style) and Class II (*promise*-style) predicates strongly suggest that the verbs are modal in nature. However, given the interpretations that are available when we negate these predicates, we have reason to doubt that any simple identification of the members of Class I and II with the modal attitude verbs will suffice. In this chapter, we discuss the event semantic properties of the Class I/II verbs, which constitute a body of evidence that points away from their alignment with the stative attitudes. We will see that simple predicates built with the members of Class I and II can be classified as accomplishments, and that we can attribute the attitude-like manifestations of these verbs to the presence of a habitual operator. We will identify some apparent differences between these predicates and other "habitual accomplishment" structures, and discuss whether these could follow from an account of habituality. In this way, the present chapter lays the groundwork and motivation for the explicit semantic proposal set out in Chapter 3.

2.1 Classes of Verbal Predicates

There is a long tradition of classifying verbs according to properties associated with events, and how particular verbal predicates built with particular verbs describe those events. There are different views on which system of classification (if any) is most valuable (see, e.g. Verkuyl (1972)), but here we present evidence based on Vendler (1957), a classic account that has withstood the test of time. We briefly outline this system, following the presentation in Rothstein (2004), which is in turn based on Dowty (1979).

Vendler's system makes a four-way distinction between states, activities, accomplishments, and achievements, examples of which are given below:

(72) *states*: dislike, believe, want, know, have

activities: jump, run, pull a wagon, loiter

accomplishments: shovel the driveway, shave one's beard, sketch a tree, paint one's nails

achievements: notice, recognize, die, reach

In the words of Rothstein (2004), "states are non-dynamic situations … activities are open-ended processes … achievements are near-instantaneous events which are over as soon as they have begun … and accomplishments are processes which have a natural endpoint … " (Rothstein (2004), p.6). Apart from these intuitive descriptions, we can turn to two properties to determine which class a verb falls into. The first is whether an event type can be said to develop, that is, whether or not it has distinct stages. This is known as "dynamicity", and we can indicate it with [+/- stages]. The test for this property is whether a verbal predicate can be found in progressive or not. We try this out with some of the examples above:

(73) *States:*

(a) # Gene is believing in dragons right now.

(b) # Gene was in the middle of wanting to adopt a dog when his brother barged in.

(c) # Gene is having bad vision over there.

(74) *Activities:*

(a) Gene is jumping right now.

(b) Gene was in the middle of pulling a wagon when his brother barged in.

(c) Gene is loitering over there.

(75) *Accomplishments:*

(a) Gene is shoveling the driveway right now.

(b) Gene was shaving his beard when his brother barged in.

(c) Gene is painting his nails over there.

(76) *Achievements:*

(a) # Gene is noticing Este's dragon right now.

(b) # Gene was in the middle of recognizing Este when his brother barged in.

(c) # Gene is reaching the end of the book over there.

So if a verbal predicate is [+stages], it is an activity or an accomplishment, and if it is [-stages], it is a state or an achievement.

The other distinguishing property is whether or not an event is telic, or whether it is associated with a natural stopping point. We can test for this using the temporal modifiers *in α time* and *for α time*. Those predicates that are associated with natural stopping points go with *in α time*, and those that are not go with *for α time*.

(77) *States:*

(a) Gene believed in dragons for sixteen years/# in sixteen years.

(b) Gene wanted to adopt a dog for sixteen years/# in sixteen years.[1]

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[1]This is okay if the *in sixteen years* is associated with the adoption, but here we are only interested in

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(c) Gene had bad vision for sixteen years/# in sixteen years.

(78) *Activities:*

(a) Gene jumped for ten minutes/# in ten minutes.

(b) Gene pulled a wagon for sixteen minutes/# in sixteen minutes.

(c) Gene loitered for two hours/# in two hours.

(79) *Accomplishments:*

(a) Gene shoveled the driveway in half an hour/#/? for half an hour.

(b) Gene shaved his beard in three minutes/#/? for three minutes.

(c) Gene painted his nails in four minutes/#/? for four minutes.

(80) *Achievements:*

(a) Gene noticed Este's dragon in a few seconds/# for a few seconds.

(b) Gene recognized Este in a few seconds/# for a few seconds.

(c) Gene reached the end of the book in two hours/# for two hours.

So finding a predicate to be [-telic] puts it in with the states and activities, whereas finding it to be [+telic] tells us we're dealing with an accomplishment or an achievement. The table below summarizes how these two properties delineate the four classes:

	[+telic]	[-telic]
[+stages]	accomplishments	activities
[-stages]	achievements	states

Now we can see where predicates built with Class I/II verbs and propositional complements fit in this system. First, they are [+stages]:

(81) (a) Gene was encouraging us to visit the Magic Castle when I interrupted him.

(b) Why is Gene talking to Hedda?

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whether or not the *in sixteen years* can modify the matrix predicate *want to adopt a dog*, which it cannot do.

He's recommending she drive Johanna to the airport.

(c) Gene was permitting the kids to smoke when the vicar intervened.

(d) Don't go over there! Gene is insisting that Johanna return the painting.

(e) Gene was in the middle of demanding that Johanna bring coffee at the time.

(f) Oh good—Gene is promising to be more reasonable tomorrow.

Second, they are [+telic], though because they describe such short events, we have to pick short time spans:

(82) (a) Hedda is long-winded in her recommendations, but Gene encouraged us to visit the Magic Castle in two seconds.

Can mean: Gene's act of encouragement took two seconds from start to finish.

(b) Gene permitted the kids to smoke in the five seconds that the vicar was out of the room.

Can mean: Gene's act of permission took place in those five seconds.

(c) Gene set a new record for speech: he insisted that Johanna return the painting in 0.1 seconds.

Can mean: Gene's act of insisting took 0.1 seconds from start to finish.

(d) Gene promised to be more reasonable in two seconds; Hedda had hoped for a more protracted conciliatory guarantee.

Can mean: Gene's act of promising took two seconds from start to finish.

Based on these tests, the Class I and II verbs come out as telic and dynamic, making them accomplishments, just like *build his dream house* or *paint his nails*. Importantly, this means that Class I and II verbs are not states, though, as we saw for *believe* and *want* in (73) and (77), the attitudes are. We've shown this difference between the attitudes and the Class I/II verbs by applying Vendler (1957), but I note that we could have used other indicators of stativity, such as compatibility with imperative mood (see e.g. Lakoff (1966)) or appearance in cleft constructions (see e.g. Larson & Lefebvre (1991)) (though this latter

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diagnostic shows more specifically that attitudes are individual-level states, and Class I/II verbs are not). To my knowledge, any test that determines whether a predicate is stative will show that the attitudes are states, and the members of Class I/II are not. This, in addition to the negation facts presented in the last chapter, suggests that the Class I/II verbs are not attitudes, but non-states (and more specifically, according to Vendler (1957), accomplishments).

2.2 Habitual Predicates

This section deals with the observation that though Class I/II predicates meet all the qualifications for being accomplishments in Vendler (1957)'s system, there is a complication. We also find Class I/II predicates that are compatible with temporal modification by *for α time*, which is said to indicate that a predicate is [-telic]:

(83) (a) Gene encouraged us to visit the Magic Castle for decades before we finally went.

Can mean: For decades, Gene encouraged a visit.

(b) Gene permitted the kids to smoke for two months.

Can mean: For two months, Gene allowed the kids to smoke.

(c) Gene insisted that Johanna return the painting for months.

Can mean: For months, Gene insisted that Johanna return the painting.

(d) Gene promised to quit smoking for a year before he actually did.

Can mean: For a year, Gene promised to quit smoking.

This isn't totally unexpected though, as we do sometimes find other accomplishment verbs in predicates modified by *for α time*:

(84) (a) Gene shoveled the driveway for twenty years (before buying a snowblower).

(b) Gene shaved his beard for twenty years.

(c) Gene painted his fingernails for twenty years.

However, all the cases in (84) describe habitual, repeated action, and can be attributed to the presence of a habitual operator. That is, it is the habit of shoveling the driveway that lasted twenty years, the habit of painting his nails that lasted twenty years, and the habit of shaving that lasted twenty years. Can we, in this way, label the Class I/II verbs as accomplishment verbs, and explain their occurrence in predicates modified by *for α time* by characterizing these predicates as habitual?

This seems right, some of the time. The examples below do seem to refer to habitual, repeated actions of offering and demanding, respectively:

(85)   Danny offered to make tea (after dinner) for thirty years.

(86)   Ben demanded tea (after dinner) for thirty years.

But many such cases with Class I/II verbs do not appear to be habitual in this sense. Take (83b) above—this can be true if Gene only indicated once that the kids could smoke, but didn't retract his permission for two months. Even more clearly, when we find the Class I/II verbs in simple present, which, unless a predicate is stative usually indicates that it is habitual (see, e.g. Bybee (1994)), we don't necessarily find repeated action:

(87)   (a) Gene encourages us to go to the Magic Castle.

(b) Gene recommends that we drive Johanna to the airport.

(c) Gene permits us to smoke in his backyard.

(d) Gene demands that Johanna bring coffee.

(e) Gene promises to quit smoking.

An example like (87a) can be true if there has been only one verbal expression that a trip to the Magic Castle would be desirable. This seems generally true for all the the sentences in (87)—only one action is necessary (though repeated action is certainly possible). In none of the cases do we require habitual actions, and we have what look more like descriptions of attitudes.

This is not as problematic as it seems though, when we note that there are sentences that are taken to be habitual that don't actually describe repeated action, such as (88) below.

(88)   This copy machine prints posters.

The sentence in (88) can be true even if the copy machine has not habitually been printing posters. In fact, it can be true if the machine has yet to print anything at all. All that is required is that the machine be programmed in such a way as to have the capacity to print posters. This kind of reading has been called "dispositional" in the literature, and has been analyzed as resulting from the same structure as a canonical habitual (see, e.g. Boneh & Doron (2009), or Krifka et al. (1995)).[2]

On this general story, the habitual operator has to be characterized in a such a way that it can lead to both the canonically habitual (or repetitive) and dispositional readings of sentences. Then the apparent difference between dispositional and habitual readings for sentences like (89) below, has to be attributable to different circumstances satisfying the sentence, not to the presence of different operators.

(89)   (a) My food processor makes bread dough. (I'm excited to use it for the first time!)
       dispositional

       (b) My food processor makes bread dough. (So it's got some scratches and chips.)
       habitual

Moving forward, it will be useful to refer to an explicitly defined habitual operator, and for this purpose we will take up Boneh & Doron (2012). On their account, they are able to deliver the two readings with a modal treatment of the habitual operator that is compatible with a "habit" being actualized or not actualized after an initiating event. The habit in (89a) is initiated by the design and manufacture of the food processor, but has not been

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[2]For the dissenting view that dispositionals result from the presence of a similar, but distinct operator, see Menendez-Benito (2012).

actualized: no bread dough has been made. In (89b), we actually have habitual action, and so clearly an actualized habit.

So their HAB is designed to deliver an initiated stative disposition, but all that is required of the initiation is that it exists—it could be an occurrence of the type of event described by the verb (in (89b), a bread dough making event), but it could also be some other way to establish a propensity, as in (89a) above. As a result, an actual instance of the action described by the predicate (here *make bread dough*) need not have occurred to make a sentence with HAB true, as the actual world may not have had the chance to align with all of the subject's dispositions. However, an event corresponding to the predicate is necessary for any world to qualify as one in which the subject's dispositions are actualized.

The formal lexical entry for Boneh and Doron's HAB (which we'll call $HAB_{B\&D}$) is as follows:

(90)   *Boneh & Doron (2012)'s HAB operator*

$[\![HAB_{B\&D}]\!]=\lambda P\lambda s\lambda w.\ [Init(P,s,w)\ \&\ \forall w' \in MB_{(\tau(s),w)}\ \exists e\ [\tau(s) \subseteq \tau(e)\ \&\ ITER(P,e,w')]]$

In this formula, $\tau(s)$ indicates the running time of a stative eventuality s, and $MB_{(\tau(s),w)}$ is a modal base consisting of "a set of gnomic alternatives to world w at time $[\tau(s)]$, ordered with respect to an ideal world where dispositions hold constantly once initiated" (Boneh & Doron (2009), p.15). *Init(P,s,w)* means that the state s of being disposed to P has been initiated in w. As above, the initiating event might be a P event, but is not necessarily so—it could, for example, be the design of an inanimate object, or a verbal expression of proclivity. Formally:

(91)   Init(P,s,w) iff $\exists e[\tau(e) < \tau(s)$ & e is an event initiating the disposition to P in w]

Finally, ITER is given as below:

(92) $[\![ITER]\!] = \lambda P\lambda e\lambda w.[P(e,w)\ \&\ e = \sigma e'\ [P(e',w)\ \&\ e' \subset e]]$

Taking σ as Link (1983)'s sum operator, *ITER(P)* is true of an event e in w if e is the plural event that is the sum of all P events in w.

Putting this all together, applying $\text{HAB}_{\text{B\&D}}$ to a predicate P will give us a property of states in which there is an initiated disposition for P to hold, and that this state will hold over some interval in all worlds "close to the ideal world of the modal base $MB_{(\tau(s),w)}$", and "there is an event e, which temporally extends the state s, such that e is an iteration of P-events in w'". Because quantification is over a restricted set of worlds, the use of $\text{HAB}_{\text{B\&D}}$ is compatible with an initiated disposition being actualized with iterative events or not in the utterance world. That is, $\text{HAB}_{\text{B\&D}}$ can be used to describe repetitively instantiated habits or initiated but unactualized dispositions.

When we turn, in Chapter 3, to our explicit proposal for the semantics of Class I and II verbs, we will make use of a habitual operator that preserves the spirit of this entry, though we will abstract away from some particulars. For now though, what is important is that there are characterizations of habituality that take dispositional sentences to be the result of the habitual operator. Then when we come across examples where we find Class I/II predicates modified by *for a time*, as in (83), or in simple present, as in (87), we can say that though these cases, on the face of it, challenge our classification of the verbs as accomplishments, these sentences actually contain a habitual operator. Because this operator delivers dispositional readings that don't require repetitive action, these cases look very similar to those built with stative attitude verbs, but it is the presence of HAB, not the verb, that makes the predicate stative in these cases.

2.3 Habit Formation, and Class I/II vs. Speech Reporting Verbs

Framing of the Class I and II verbs as accomplishments optionally accompanied by a habitual operator gives us a tidy way of accounting for the different types of predicate in which we find the verbs. However, if it is the simple inclusion of a habitual operator like $HAB_{B\&D}$ that gives us the attitude-like Class I/II sentences, we will need to address why these habitual predicates can get a reading that describes a disposition that has been initiated but not actualized with repetitive action, while other habitual accomplishment predicates cannot. Most saliently, we find a perplexing distinction between the members of Class I/II and the set of verbs that function to describe utterances. A sample of these is given below.

(93)   declare, state, announce, remark, observe, mention, comment, note, add, repeat

These verbs are [+stages], as indicated in (94):

(94)   (a) Gene was observing that we should visit the Magic Castle when I interrupted him.
       (b) Why is Gene announcing the news now?
       (c) Oh good—Gene is adding that we'll have more selection tomorrow.

And these verbs are [+telic], in the same way as the Class I/II verbs:

(95)   (a) Hedda is long-winded in her observations, but Gene observed that we were outside the Magic Castle in 0.5 seconds.
       Can mean: Gene's report took 0.5 seconds from start to finish.
       (b) Gene announced that the kids were smoking in the five seconds that the vicar was out of the room.
       Can mean: Gene's announcement took place in those five seconds.

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(c) Gene set a new record for speech: he added that Johanna stole the painting in 0.1 seconds.

Can mean: Gene's act of speech took 0.1 seconds from start to finish.

So the speech reporters are both [+stages] and [+telic], classifying them as accomplishments, just like the Class I and II verbs.

Beyond this, we also find that the members of Class I and II, at least in certain contexts, intuitively function as reporters of speech acts:

(96) (a) George quietly suggested that we leave through the back door.

(b) During his conversation with Marlene, George insisted that she pick up her own drycleaning.

(c) Marlene invited Fred in, offered tea, then launched into a description of last night.

(d) Over the phone, Fred promised to deal with the problem.

Looking at the sentences below, which feature speech reporting verbs in simple present, the alignment with the Class I/II verbs continues:

(97) (a) The first section observes that tomatoes are not vegetables.

(b) That poster announces that there will be a parade next week.

(c) The pamphlet adds that meals are provided.

The examples in (97) are felicitous without repetitive action, as we saw for the Class I and II verbs in (87) above. But the similarities end when we look a little closer at (97). We find a restriction here that we don't find with the Class I/II verbs: we have no problem getting non-repetitive dispositional readings with these inanimate subjects, but when we switch these out for animate subjects, as in (98), we suddenly get only (somewhat odd) iterative interpretations.

(98) (a) George observes that tomatoes are not vegetables.

(b) Marlene announces that there will be a parade next week.

(c) Fred adds that meals are provided.

This means that for animate subjects, while Class I and II verbs can be used in the simple present after only a single speech act, this cannot be said of the members of (93). Compare:

(99) (a) *After Mac has recommended once that Zoe have the ice cream (but before Zoe has chosen her desert):*

Mac recommends that Zoe have the ice cream.

(b) *After Mac has demanded once that Zoe have the ice cream (but before Zoe has chosen her desert):*

Mac demands that Zoe have the ice cream.

(100) (a) *After Mac has observed once that Zoe should have the ice cream (but before Zoe has chosen):*

Mac observes that Zoe should have the ice cream.

(b) *After Mac has replied (once) that Zoe should have the ice cream (but before Zoe has chosen):*

Mac replies that Zoe should have the ice cream.

After we set out our account of the semantics of the Class I and II verbs, we will return to this puzzle, and argue that Class I and II verbs are really just normal accomplishment verbs that are sometimes found in predicates containing habitual operators. The apparent differences between the interpretations of habitual accomplishment predicates will boil down a more general requirement on what can count as an initiation of a habit, something we will be able to fruitfully discuss once we've set out the lexical entries for Class I and II verbs in Chapter 3. In that chapter, we flesh out an account that capitalizes on the observations presented here: that the Class I and II verbs are themselves not stative, but that they are often found in habitual predicates.

Chapter 3

Decomposing Class I/II Verbs

In this chapter, we present an analysis of Class I and II verbs, with a view to accounting for the properties discussed in Chapters 1 and 2. Following what we observed in Chapter 2, this proposal will cast the Class I/II verbs as accomplishment verbs, and then make use of the dispositional operator to help us account for their appearance in predicates that are not themselves accomplishments. In particular, we will take the members of Class I and II to describe external indications of their subject's modal standpoints. In this way, the verbs themselves will be modal, and the modal quantification we associate with the standpoint will account for the distribution effects that began Chapter 1. Because the lexical entries will contain both an indication part and a modal one, there will be two spots in which we can interpret negation, giving us the weak and strong readings reported above. On this proposal, the Class I/II verbs are very similar to speech reporters, except that what they report will not be just any old speech, but indications of standpoints. This difference will be exploited in our explanation for the diverging requirements on the establishment of habits.

3.1   A Semantics for Class I/II

The analysis we aim to build here takes the eventuality described by a Class I/II verb to be an external indication of the subject's standpoint on a given possibility. The subject's

standpoint, which we will sometimes refer to as their view, will be modal, so though the Class I/II verbs are not themselves stative attitudes, they share a modal nature with the canonical attitude verbs. For this reason, we begin building our entries for the members of Class I and II by looking at how attitudes are analyzed. As mentioned above, we will focus on the strategy taken up by Kratzer (2006) and Hacquard (2010), which takes attitude verbs to be predicates of events. This is in opposition to the Hintikka-style story we discussed above, in which attitudes are quantifiers over possible worlds. Kratzer and Hacquard bring attitudes in line with other verbs, each of which has, whether stative or eventive, a Davidsonian eventuality argument.[1]

However, attitudes are different than other verbs, as we've noted; they involve quantification over possible worlds, i.e. they are modal. Kratzer and Hacquard encode this in their lexical entries by having the attitudes take both an object—the entity in complement position that expresses a proposition—and an eventuality that has "content". The content of the eventuality will be a set of propositions, which determine a set of possible worlds in which we say that object holds. For example, the content of a belief state is the set of propositions held to be true by the state's experiencer, and so the intersection is the set of doxastic alternatives of the experiencer, or the worlds in which each of the experiencer's propositional beliefs hold. Then the object of the belief state is said to hold in all these doxastic alternatives. Putting the proposed entries for *believe* side by side, we can see the contrast between this kind of account and the traditional Hintikka-style characterization of attitudes:

(101) *Hintikka-style analysis of* **believe**

$\llbracket believe \rrbracket = \lambda p \lambda x \lambda w. \forall w' \in DOX(x,w): p(w')=1$

(102) *Predicate of event analysis of* **believe** (modified from Hacquard (2010))

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[1]"Eventive" is meant as a cover term for all the non-stative categories of predicates; on Vendler (1957)'s account, this means all of the activities, accomplishments, and achievements are eventive. "Eventuality" is intended to describe both states and non-stative events.

⟦believe⟧ = λpλxλeλw. Exp(e,x) & belief'(e,w) & ∀w' ∈ ∩CON(e,w): p(w')=1

(where e *is a variable over eventualities,* Exp(e,x) = *"the experiencer of* e *is* x*", and*

∩CON(e,w)=DOX(ιx (Exp(e,x)), w))

We've made a minor modification to Hacquard's entry, including a world argument for CON, so that we clearly associate the content of a belief in a world to the doxastic alternatives, in the same world, of the experiencer of that belief.

With this lexical entry, an assertion of belief involves not just quantification over possible worlds, but also explicit reference to an eventuality. For example, on the Kratzer/ Hacquard story, we have the following:

(103)   Bubbles believes that McNulty is honest.

True in w iff ∃e. Exp(e,Bubbles) & belief'(e,w) & ∀w' ∈ ∩CON(e,w): McNulty-is-honest(w')=1

For the Class I and II verbs, we can use the format above and modify where necessary to reflect both their eventive and modal natures. Proceeding by example, we take one verb from each of Class I and II, *permit* and *promise* respectively. Jumping right in, the lexical entries for these two verbs might be along the following lines:

(104)   ⟦permit⟧ = λpλxλeλw. Source(e,x) & publicly-indicate(e,w) & ∀w' ∈ ∩CON(e,w):

∃w'': (w' $R_{x,accept}$ w'') & p(w'')=1

(where e *is a variable over eventualities,* Source(e,x) = *"the source of* e *is* x*", and*

∩CON(e,w)=IND(ιx (Exp(e,x)), w)={w': w' is compatible with x's public indication in w})

(105)   ⟦promise⟧ = λpλxλeλw. Source(e,x) & publicly-indicate(e,w) & ∀w' ∈ ∩CON(e,w):

∀w'': (w' $R_{x,commit}$ w'') → p(w'')=1)

(where e *is a variable over eventualities,* Source(e,x) = *"the source of* e *is* x*", and*

∩CON(e,w)=IND(ιx (Exp(e,x)), w)={w': w' is compatible with x's public indication in w})

Unpacking this, we begin by pointing out the similarities between these entries and that for *believe*: we have a variable ranging over eventualities, and the kind of eventuality described is one that has propositional content. Cognitive belief states and public indications are different things, of course, but both contain propositions that determine a set of possible worlds over which we can quantify. The difference in the kind of eventuality is critical though. It is this element of the analysis, that at a basic level *permit* and *promise* describe indications and not cognitive states, that aligns these verbs with the accomplishments, because *indicate* is an accomplishment:

(106)   Aliya was in the middle of indicating that the pond water was contaminated when the mailman came around the side of the house.

(107)   Aliya was known for her brevity—she indicated what was wrong with the pond water in two seconds. (It took Mabel a good two minutes to do the same.)

Because *indicate* is perfectly acceptable in the progressive, (106) shows that *indicate* is [+stages]. The use of *in α time* in (107) shows that *indicate* is [+telic], though like the Class I/II verbs and the speech reporters, only short time intervals can be substituted for the α *time*. These two properties tell us that *indicate* is an accomplishment, and this will account for why *permit* and *promise*, being indications at heart, are themselves accomplishments, and not cognitive states like *believe*.

Related to this, the external argument will not be an experiencer of a state, but the source of an event. I will not give a precise definition of "source" here, but it is intended to be the entity primarily responsible for an event that conveys propositional information. This could be a sentient being or something inanimate, so long as it can contain or express propositional content (e.g. *the poster promised there would be live entertainment* vs. # *the table promised there would be live entertainment*). Typical sources are people, written documents, and signs.

The other significant difference between the entry for *believe* and those for *permit* and

promise is an added layer of quantification. For *believe*, what had content was the state, and we used a universal quantifier over the worlds compatible with the content of this state to say that a simple, non-modal proposition held in all of these worlds. For *permit* and *promise*, it is the indicating event that has content, and we say that in all of the worlds compatible with this, a certain thing is possible (amounting to existential quantification over worlds), or necessary (universal quantification). That is, for *permit* and *promise*, the proposition that is said to hold in the worlds compatible with the contentful eventuality is itself modal.

Looking at *permit*, we have that for all the worlds w' compatible with the subject's indication, there is a world accessible from w' via a relation that encodes what the subject accepts in w' in which object of the indication holds. That is, from any world compatible with the indication, if we look at the worlds that are acceptable to the subject, we will find at least one where the object proposition holds. As an example, take (108), where we give both formal and informal illustrations of truth conditions:

(108)   Aliya permitted the children to play outside.

   True in w *iff:* $\exists e$. Source(e,Aliya) & publicly-indicate(e,w) & $\forall w' \in \cap$CON(e,w):
   $\exists w''$: (w' R$_{Aliya,accept}$ w'') & the-children-play-outside(w'')=1
   True in w *iff:* there is an indication event in w of which Aliya is the source, and from any world compatible with the content of this event, there is one that is acceptable to Aliya in which the children play outside.

There are two differences between *permit* and *promise* themselves. First is that for *promise*, the embedded quantifier over possible worlds is universal, not existential. Second, the accessibility relation that we encode within the content of the indication is determined by what the subject is committed to, not what is acceptable to her.

(109)   Aliya promised to let the children play outside.

   True in w *iff:* $\exists e$. Source(e,Aliya) & publicly-indicate(e,w) & $\forall w' \in \cap$CON(e,w):

$\forall$w": (w' R$_{Aliya,commit}$ w")) $\rightarrow$ Aliya-lets-the-children-play-outside(w")=1

True in w *iff:* there is an indication event in *w* of which Aliya is the source, and from any world compatible with the content of this event, Aliya lets the children play outside in all of the worlds compatible with what she is committed to.

Another way to paraphrase these examples would be to use the terms *view* or *standpoint*. The sentence in (108) could be used to express that Aliya has made a public indication, and that in all the worlds compatible with that indication, Aliya holds the view that it is acceptable for the children to play outside (or: the children can play outside according to what is acceptable). And the sentence in (109) could be used to express that Aliya has made a public indication, and that in all the worlds compatible with that indication, Aliya holds the standpoint that she is committed to letting the kids play outside (or: she must let the children play outside according to her commitments). Importantly, the view/standpoint is modal, corresponding to either existential or universal quantification over possible worlds.

So for these Class I/II verbs, the lexical entries contain two modals—the first a necessity modal corresponding to the contentful indication, and the second delivering the strength and flavor of the subject's view on the object. This is the critical part of this proposal—the members of Class I and II are not attitudes or normal speech reporters; they lexically contain both an indication and a view, which, on the current formation, are delivered by the presence of two successive modal operators.[2]

At this point, we can ask how these complex lexical entries will be represented in the structure. If they contain two parts, an indication and a modal view, do these correspond to two nodes in the structure? This kind of decomposition has been postulated for other verbs, such as *open* and *close* (see, e.g. Beck & Johnson (2004)). One argument for this

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[2]The initial inspiration for these complex entries came from Quine (1960), who, to account for the presence of non-specific readings, decomposed the intensional transitive *seek* into the propositional attitude *try* and the binary relation *find*.

decomposition relies on the interpretations available with sentences modified by *again*.

(110) Faye opened the window again.

   (a) *Repetitive reading:* Faye had already opened the window; now she did it again.

   (b) *Restitutive reading:* the window had previously been open; now Faye opened it again.

Arguing that we want to keep the meaning of *again* constant, von Stechow (1995) deals with the ambiguity of (110) by attributing to the VP *open the window* two predicates—one describing an event of opening, another describing a state of openness.

(111) Faye opened the window again.

   (a) *Repetitive reading:*

   [$_{vP}$ [$_{vP}$ Faye [$_{v'}$ v [$_{VP}$ V* [$_{VP}$ BECOME [$_{AP}$ open the window]]]]] again]

   (b) *Restitutive reading:*

   [$_{vP}$ Faye [$_{v'}$ v [$_{VP}$ V* [$_{VP}$ BECOME [$_{AP}$ [$_{AP}$ open the window] again]]]]]

With two predicates, the *again* can attach to either one, giving either the repetitive reading in (a), that it was Faye's action of opening the window that happened again, or the restitutive reading in (b), that Faye's action of opening the window resulted in it being in a state of openness again.

   Looking at the Class I/II cases, we find this kind of ambiguity when we append *again* (as well as an additional reading we're not interested in here, in which the *again* is interpreted in the embedded clause). Consider (112) and (113):

(112) The new prince was permitting the nomads to marry again.

   (a) Reading 1: ...after divorce. *(embedded clause modification)*

   (b) Reading 2: ...they were denied the right for decades.

   (c) Reading 3: ...he had forgotten he had already done so the day before.

(113) The new prince was promising to marry his cousin again.

   (a) Reading 1: ...after their divorce. *(embedded clause modification)*

(b) Reading 2: ...he had given up the campaign for a few months.

(c) Reading 3: ...he had forgotten he had already done so the day before.

The two readings we are concerned with for (112) are (b) and (c), the first of which can be paraphrased as *the new prince was indicating that as was true sometime in the past, he again allows the nomads to marry*. The reading in (c) can be glossed as *the new prince was once again indicating that he allows the nomads to marry*. Paraphrasing the (b) and (c) readings in (113), we have *the new prince was indicating that as was true sometime in the past, he is again committed to marrying his cousin*, versus *the new prince was once again indicating that he is committed to marrying his cousin*. As we did for *open*, we can account for these two readings by splitting the verbs into two predicates:

(114)   The new prince was permitting the nomads to marry again.[3]

(a) [$_{vP}$ the new prince [$_{v'}$ v [$_{VP}$ V* [$_{VP}$ INDICATE [$_{◊P}$ [$_{◊P}$ the nomads may [marry again]]]]]]]

(b) [$_{vP}$ the new prince [$_{v'}$ v [$_{VP}$ V* [$_{VP}$ INDICATE [$_{◊P}$ [$_{◊P}$ the nomads may marry] again]]]]]

(c) [$_{vP}$ [$_{vP}$ the new prince [$_{v'}$ v [$_{VP}$ V* [$_{VP}$ INDICATE [$_{◊P}$ the nomads may marry]]]]] again]

(115)   The new prince was promising to marry his cousin again.

(a) [$_{vP}$ the new prince [$_{v'}$ v [$_{VP}$ V* [$_{VP}$ INDICATE [$_{□P}$ [$_{□P}$ the prince must [marry his cousin again]]]]]]]

(b) [$_{vP}$ the new prince [$_{v'}$ v [$_{VP}$ V* [$_{VP}$ INDICATE [$_{□P}$ [$_{□P}$ the prince must marry his cousin] again]]]]]

(c) [$_{vP}$ [$_{vP}$ the new prince [$_{v'}$ v [$_{VP}$ V* [$_{VP}$ INDICATE [$_{□P}$ the prince must marry his cousin]]]]] again]

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[3]In (114) and (115), I follow Beck & Johnson (2004)) and use syntactic terms to label the brackets. This (as well as the similar labels on the simplified trees in this chapter) is for convenience of reference—as we will discuss shortly, we are talking about interpretation structure, not necessarily syntactic structure.

By having the modal proposition (the view/standpoint, as we've called it) stand alone as a predicate in the structure, we can attach *again* to it, giving us the (b) readings for (112) and (113). The other reading, of a repeated indication, is derived by attaching the *again* to the bigger predicate, the one that corresponds to the indication.

Note that this strategy of modification by adverbs respects the modal nature of the view/standpoint. Fodor & Lepore (2001) use modification by *on purpose* to show that some verbs should not be decomposed. In (116) we check what happens with the Class I/II verbs.

(116)   (a) The prince permitted them to fall on purpose.

(b) The prince promised to fall on purpose.

Each of these has only two readings. For (a), these are that the prince intentionally indicated permission for them to fall, and that the prince indicated that they could intentionally fall. For (b), the readings are that the prince intentionally made a promise that he would fall, and that the prince made a promise that he would intentionally fall. There is no reading where the *on purpose* modifies the modal view in either case. This is expected, as *on purpose* does not modify modal predicates:

(117)   (a) # The prince may have short fingers on purpose.

(b) # The prince must have short fingers on purpose.

The *on purpose* is infelicitous in these examples because the stative predicate *have short fingers* does not describe something that can happen intentionally, and the bigger, modal structure is not modifiable by the term. Compare this to *again*:

(118)   (a) The prince may have short fingers again.

(b) The prince must have short fingers again.

The *again* in these two examples can be modifying the bigger, modal structure, delivering the readings *it is once again acceptable that the prince have short fingers*, and *it is once again*

necessary that the prince have short fingers. So whether we get a reading where an adverb is modifying the modal standpoint is dependent on whether that adverb can independently modify modal structures.

This modification data acts as evidence that at least at the level of interpretation, we have reason to believe that the Class I/II predicates are decomposed into two: an indication, and a modal proposition. We will not try to address whether this means that we we need two nodes in the syntax; among other concerns, this will depend on your commitments regarding the relationship between syntactic and semantic structures. Above and in what follows, the claims made are based on the nature and availability of interpretations, and so the claims made will be about the structure from which we extract interpretations, not necessarily about what is present in the syntax. The proposal here then, is that the Class I/II predicates are semantically complex, corresponding to two different nodes in the interpretable structure.

We can now give example trees that represent (up to existential closure and leaving out details of tense) how this proposal would work for sentences like *Tyrone permitted Ming-Ming to borrow his suitcase*, and *Tyrone promised to bring Ming-Ming his suitcase*. (For now we include both a full version of these trees and a simplified one, which will we revert to for expository clarity in our discussions below.)

(119)　*Tyrone permitted Ming-Ming to borrow his suitcase.*

TP
├─ ∃
└─ vP
　　├─ Tyrone
　　└─ VP
　　　　├─ Indicate
　　　　└─ ◇P
　　　　　　├─ ◇
　　　　　　└─ CP
　　　　　　　　Ming-Ming to borrow his suitcase

λw. ∃e. Source(e,Tyrone) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
∃w″: (w′ R$_{Tyrone,accept}$ w″) & Ming-Ming-borrow-his-suitcase(w″)=1

├─ ∃
└─ λeλw. Source(e,Tyrone) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
　　∃w″: (w′ R$_{Tyrone,accept}$ w″) & Ming-Ming-borrow-his-suitcase(w″)=1

　　├─ Tyrone
　　└─ λxλeλw. Source(e,x) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
　　　　∃w″: (w′ R$_{x,accept}$ w″) & Ming-Ming-borrow-his-suitcase(w″)=1

　　　　├─ α = λpλxλeλw. Source(e,x) &
　　　　│　publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
　　　　│　p$_x$(w′)=1
　　　　└─ β = λxλw. ∃w′: (w R$_{x,accept}$ w′) &
　　　　　　Ming-Ming-borrow-his-suitcase(w′)=1

　　　　　　├─ λpλxλw. ∃w′:
　　　　　　│　(w R$_{x,accept}$ w′) & p(w′)=1
　　　　　　└─ λw. Ming-Ming-borrow-his-suitcase(w)
　　　　　　　　Ming-Ming to borrow his suitcase

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(120) *Tyrone promised to bring Ming-Ming his suitcase.*

TP
∃   vP
Tyrone   VP
Indicate   □P
□   CP
to bring Ming-Ming his suitcase

λw. ∃e. Source(e,Tyrone) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
∀w″: (w′ R$_{Tyrone,commit}$ w″) → Tyrone-bring-Ming-Ming-his-suitcase(w″)=1

∃   λeλw. Source(e,Tyrone) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
∀w″: (w′ R$_{Tyrone,commit}$ w″) → Tyrone-bring-Ming-Ming-his-suitcase(w″)=1

Tyrone   λxλeλw. Source(e,x) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
∀w″: (w′ R$_{x,commit}$ w″) → Tyrone-bring-Ming-Ming-his-suitcase(w″)=1

α = λpλxλeλw. Source(e,x) &
publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
p$_x$(w′)=1

β = λxλw. ∀w′: (w R$_{x,commit}$ w′) →
Ming-Ming-borrow-his-suitcase(w′)=1

λpλxλw. ∀w′:
(w R$_{x,commit}$ w′) → p(w′)=1

λw.Tyrone-bring-Ming-Ming-his-suitcase(w)

to bring Ming-Ming his suitcase

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The watchful reader will note that the variable *p* in the α nodes (which are represented as *Indicate* on the abbreviated trees) is not over propositions, but over functions from individuals to propositions. This matches with the modal entity in the β node, which is looking for both a world and an individual. However, this individual won't serve as a subject, or an object, or as anything that would correspond to a case-marked position in the syntax—it is needed only to specify whose view is encoded in the modal relation *R* in β. Overt modal terms like *may* and *must* are known to be unspecified as to the nature of this kind of relation, or background, with context filling in the required information (see, e.g. Kratzer (1981), Kratzer (1991)). In keeping with this, we could have just left out the λ*x.* ... *x* part of β and let the modal relation be supplied by the context. In the case of the Class I/II verbs though, this is not as informative as it could be. With these verbs, the modal relation is constant: each verb provides its own unchanging flavor (e.g. acceptability for *permit*, and commitment for *promise*), and, as first noticed for a subset of our verbs in Boyd & Thorne (1969), we always have subject-orientation—it is acceptability according to the subject of the Class I/II verb, and what has been committed to by the subject of the Class I/II verb. To represent this connection between the subject and the modal relation, we include the λ*x.* ... *x* term in β, but call the variable *p* to remind us that what α combines with is basically a modal proposition.

Now we turn to dispositional sentences built with *permit* and *promise*, like *Tyrone permits Ming-Ming to borrow his suitcase* and *Tyrone promises to bring Ming-Ming his suitcase*. In Chapter 2, we outlined how we get these cases using the habitual operator, and presented Boneh & Doron (2012)'s version of this.

(121)　　*Boneh & Doron (2012)'s HAB operator*

$\llbracket \text{HAB}_{\text{B\&D}} \rrbracket = \lambda P \lambda s \lambda w. [\text{Init}(P,s,w) \,\&\, \forall w' \in \text{MB}_{(\tau(s),w)} \,\exists e\, [\tau(s) \subseteq \tau(e) \,\&\, \text{ITER}(P,e,w')]]$

In what follows, we will use a similar entry for HAB, which importantly still allows for both repetitive and dispositional readings. However, we make some changes that reflect

how HAB will combine with its arguments in our structures. The HAB we will use is given below:

(122) ⟦HAB⟧ = λqλxλeλw. Exp(e,x) & Disp(e,w) & ∀w′ ∈ ∩CON(e,w): ∃E. q(x,E,w′)

(where e *is a variable over eventualities,* Exp(e,x) = *"the experiencer of* e *is* x*",*

Disp(e,w) = *"e is an initiated disposition state in* w*",* ∩CON(e,w)=DIS(ιx (Exp(e,x)),

w)={w': dispositions of x initiated in w hold constantly in w', and dispositions are not

prevented from being actualized}, and E is a variable over plural (1+) eventualities)*

In this formulation, we draw out a comparison between habits or dispositions and other

states. In particular, we can compare HAB to Hacquard's entry for *believe*, repeated below:

(123) ⟦believe⟧ = λpλxλeλw. Exp(e,x) & belief′(e,w) & ∀w′ ∈ ∩CON(e,w): p(w′)=1

(where e *is a variable over eventualities,* Exp(e,x) = *"the experiencer of* e *is* x*", and*

∩CON(e,w) = DOX(ιx (Exp(e,x)), w))*

I take *x* being the subject of a belief state to mean that something like *x puts credence in a set of propositions being true now* is true, and I take *x* being the subject of a dispositional state to mean that something like *x is disposed to let/make a set of propositions be true in the future* is true. The similarities here are built into the shared structure between the entries in (123) and (122), which sets out that the subject is the experiencer of a state that has content. The differences are reflected in type (*believe* combines with propositions whereas HAB combines with predicates), the kind of stative eventuality (belief vs. initiated disposition), as well as the worlds that make up the content of the state (doxastic alternatives vs. what we could call dispositional alternatives, or worlds in which dispositions are constant and actualized). Finally, to reflect the possibly iterative nature of actualized dispositions, we have a variable over plural eventualities in (122), where plural means one or more.

Before putting HAB into action, I note that it is meant to be a convenient working definition, which enables us to explain how the analysis of the Class I and II verbs might work. For a precise articulation of the habitual operator, some of the nuance found in

HAB$_{\text{B\&D}}$ would surely be necessary (reference to time, for example), though we leave these details aside for the present purposes.

We look now at an example of HAB in action. Take the habitual sentence, *Tyrone eats meat.*

(124)   *Tyrone eats meat.*

TP
∃   vP
Tyrone   VP
HAB   V′
eat meat

λw. ∃e. Exp(e,Tyrone) & Disp(e,w) & ∀w′ ∈ ∩CON(e,w): ∃E. Agent(E,Tyrone) & eat-meat(E,w′)

∃   λeλw. Exp(e,Tyrone) & Disp(e,w) & ∀w′ ∈ ∩CON(e,w): ∃E. Agent(E,Tyrone) & eat-meat(E,w′)

Tyrone   λxλeλw. Exp(e,x) & Disp(e,w) & ∀w′ ∈ ∩CON(e,w): ∃E. Agent(E,x) & eat-meat(E,w′)

λqλxλeλw. Exp(e,x) & Disp(e,w) & ∀w′ ∈ ∩CON(e,w): ∃E. q(x,E,w′)   λxλeλw. Agent(e,x) & eat-meat(e,w)

eat meat
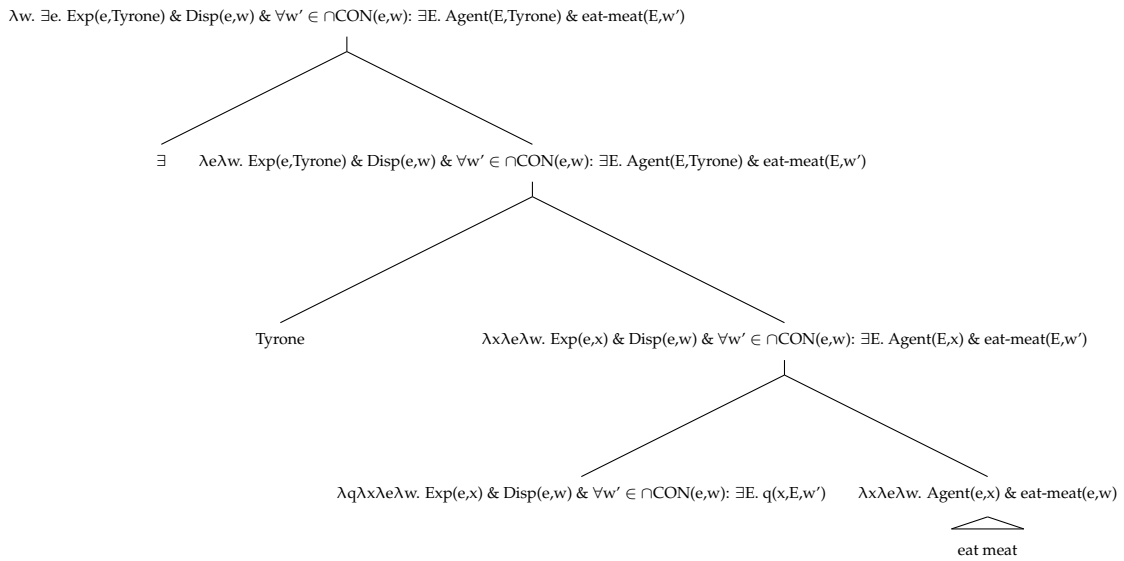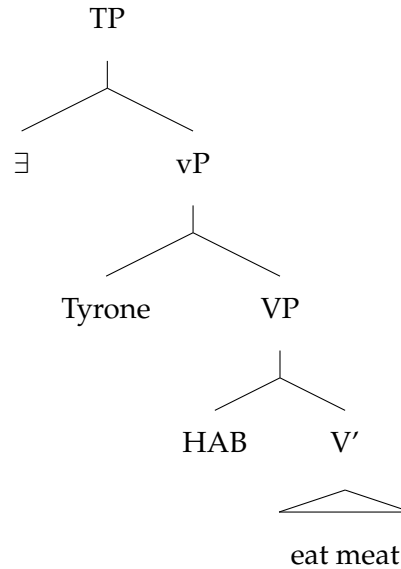
This sentence can be satisfied by two different sets of circumstances. The first, which corresponds to a proper repetitive habitual reading, is where the disposition is actualized in the real world (that is, w_0 belongs ∩CON(e,w)). The second is one in which Tyrone has

decided to take up eating meat, so initiating the disposition, but he may not yet have been able to consume meat in w_0. So whether the circumstances give us a proper actualized habit or just a disposition, these can both be described the HAB operator.

Turning back to our Class I and II verbs, we can set out the habitual versions of (119) and (120):

(125)　*Tyrone permits Ming-Ming to borrow his suitcase.*

TP
├── ∃
└── vP
    ├── Tyrone
    └── VP
        ├── HAB
        └── V′
            ├── Indicate
            └── ◊P
                ├── ◊
                └── CP
                    └── Ming-Ming to borrow his suitcase

λw. ∃e. Exp(e,Tyrone) & Disp(e,w) & ∀w' ∈ ∩CON(e,w):

∃E. Source(E,Tyrone) & publicly-indicate(E,w') &

∀w'' ∈ ∩CON(E,w'): ∃w''': (w'' R$_{Tyrone,accept}$ w''') &

Ming-Ming-borrow-his-suitcase(w''')=1

∃

λeλw. Exp(e,Tyrone) & Disp(e,w) & ∀w' ∈ ∩CON(e,w):

∃E. Source(E,Tyrone) & publicly-indicate(E,w') & ∀w'' ∈ ∩CON(E,w'):

∃w''': (w'' R$_{Tyrone,accept}$ w''') & Ming-Ming-borrow-his-suitcase(w''')=1

Tyrone

λxλeλw. Exp(e,x) & Disp(e,w) & ∀w' ∈ ∩CON(e,w):

∃E. Source(E,x) & publicly-indicate(E,w') & ∀w'' ∈ ∩CON(E,w'):

∃w''': (w'' R$_{x,accept}$ w''') & Ming-Ming-borrow-his-suitcase(w''')=1

λqλxλeλw. Exp(e,x) &

Disp(e,w) & ∀w' ∈ ∩CON(e,w):

∃E. q(x,E,w')

λxλeλw. Source(e,x) & publicly-indicate(e,w) &

∀w' ∈ ∩CON(e,w): ∃w'': (w' R$_{x,accept}$ w'') &

Ming-Ming-borrow-his-suitcase(w'')=1

λpλxλeλw. Source(e,x) &

publicly-indicate(e,w) &

∀w' ∈ ∩CON(e,w):

p$_x$(w')=1

λxλw. ∃w': (w R$_{x,accept}$ w') &

Ming-Ming-borrow-his-suitcase(w')=1

λpλxλw. ∃w':

(w R$_{x,accept}$ w') &

p(w')=1

λw.Ming-Ming-borrow-his-suitcase(w)

Ming-Ming to borrow his suitcase

(126) *Tyrone promises to meet Ming-Ming at the station.*

```
                              TP
                     ┌─────────┴─────────┐
                     ∃                   vP
                              ┌──────────┴──────────┐
                           Tyrone                   VP
                                          ┌──────────┴──────────┐
                                         HAB                    V′
                                                      ┌──────────┴──────────┐
                                                  Indicate                 □P
                                                               ┌───────────┴───────────┐
                                                               □                       CP
                                                                            ┌──────────┴──────────┐
                                                                   PRO to meet Ming-Ming at the station
```

$\lambda w.\ \exists e.\ \mathrm{Exp}(e,\mathrm{Tyrone})\ \&\ \mathrm{Disp}(e,w)\ \&$
$\forall w' \in \cap\mathrm{CON}(e,w){:}\ \exists E.\ \mathrm{Source}(E,\mathrm{Tyrone})\ \&$
$\mathrm{publicly\text{-}indicate}(E,w')\ \&\ \forall w'' \in \cap\mathrm{CON}(E,w'){:}$
$\forall w'''{:}\ (w''\ R_{\mathrm{Tyrone,commit}}\ w''') \rightarrow$
$\mathrm{Tyrone\text{-}meet\text{-}Ming\text{-}Ming\text{-}at\text{-}the\text{-}station}(w''')=1$

$\exists$

$\lambda e\lambda w.\ \mathrm{Exp}(e,\mathrm{Tyrone})\ \&\ \mathrm{Disp}(e,w)\ \&\ \forall w' \in \cap\mathrm{CON}(e,w){:}$
$\exists E.\ \mathrm{Source}(E,\mathrm{Tyrone})\ \&\ \mathrm{publicly\text{-}indicate}(E,w')\ \&\ \forall w'' \in \cap\mathrm{CON}(E,w'){:}$
$\forall w'''{:}\ (w''\ R_{\mathrm{Tyrone,commit}}\ w''') \rightarrow$
$\mathrm{Tyrone\text{-}meet\text{-}Ming\text{-}Ming\text{-}at\text{-}the\text{-}station}(w''')=1$

Tyrone

$\lambda x\lambda e\lambda w.\ \mathrm{Exp}(e,x)\ \&\ \mathrm{Disp}(e,w)\ \&\ \forall w' \in \cap\mathrm{CON}(e,w){:}$
$\exists E.\ \mathrm{Source}(E,x)\ \&\ \mathrm{publicly\text{-}indicate}(E,w')\ \&\ \forall w'' \in \cap\mathrm{CON}(E,w'){:}$
$\forall w'''{:}\ (w''\ R_{x,\mathrm{commit}}\ w''') \rightarrow$
$\mathrm{Tyrone\text{-}meet\text{-}Ming\text{-}Ming\text{-}at\text{-}the\text{-}station}(w''')=1$

$\lambda q\lambda x\lambda e\lambda w.\ \mathrm{Exp}(e,x)\ \&$
$\mathrm{Disp}(e,w)\ \&\ \forall w' \in \cap\mathrm{CON}(e,w){:}$
$\exists E.\ q(x,E,w')$

$\lambda x\lambda e\lambda w.\ \mathrm{Source}(e,x)\ \&\ \mathrm{publicly\text{-}indicate}(e,w)\ \&$
$\forall w' \in \cap\mathrm{CON}(e,w){:}\ \forall w''{:}\ (w'\ R_{x,\mathrm{commit}}\ w'') \rightarrow$
$\mathrm{Tyrone\text{-}meet\text{-}Ming\text{-}Ming\text{-}at\text{-}the\text{-}station}(w'')=1$

$\lambda p\lambda x\lambda e\lambda w.\ \mathrm{Source}(e,x)\ \&$
$\mathrm{publicly\text{-}indicate}(e,w)\ \&$
$\forall w' \in \cap\mathrm{CON}(e,w){:}$
$p_x(w')=1$

$\lambda x\lambda w.\ \forall w'{:}\ (w\ R_{x,\mathrm{commit}}\ w') \rightarrow$
$\mathrm{Ming\text{-}Ming\text{-}borrow\text{-}his\text{-}suitcase}(w')=1$

$\lambda p\lambda x\lambda w.\ \forall w'{:}$
$(w\ R_{x,\mathrm{commit}}\ w') \rightarrow$
$p(w')=1$

$\lambda w.\mathrm{Tyrone\text{-}meet\text{-}Ming\text{-}Ming\text{-}at\text{-}the\text{-}station}(w)$

Tyrone to meet Ming-Ming at the station

As with (124), (125) and (126) are compatible with multiple scenarios: obviously habitual ones, with repeated acts of permitting or promising in the real world, and dispositional ones, where the habit is initiated but unactualized.

Summing up the story so far, the fact that Class I/II verbs can be classified as accomplishments is attributed to their basic nature as indicators, but they can also appear predicates with HAB, which outputs a stative disposition or habit.

At this point though, we've only discussed one verb from each of our classes. What

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about other members of Class I and II? The basic structures of *permit* and *promise* are meant to act as representative templates for all members of their respective classes. For Class I, what will change between *permit* and the other class members will be the accessibility relation that delivers a world in which the verb's complement will hold. For instance, for *offer*, whose modal standpoint would seem to be something like *there is a world acceptable according to what the subject is willing to do*, the lexical entry would be along the following lines:

(127) $[\![offer]\!] = \lambda p \lambda x \lambda e \lambda w.$ Source(e,x) & publicly-indicate(e,w) & $\forall w' \in \cap$CON(e,w):
$\exists w'': (w' \ R_{x,willingness} \ w'') \ \& \ p(w'')=1$

The template for Class I would then be the following:

(128) $[\![Class \ I \ verb]\!] = \lambda p \lambda x \lambda e \lambda w.$ Source(e,x) & publicly-indicate(e,w) &
$\forall w' \in \cap$CON(e,w): $\exists w'': (w' \ R_{x,\_\_\_} \ w'') \ \& \ p(w'')=1$

For Class II, the template would differ in the force of the quantifier that corresponds to the subject's standpoint:

(129) $[\![Class \ II \ verb]\!] = \lambda p \lambda x \lambda e \lambda w.$ Source(e,x) & publicly-indicate(e,w) &
$\forall w' \in \cap$CON(e,w): $\forall w'': (w \ R_{x,\_\_\_} \ w') \rightarrow p(w'')=1$

So for *insist*, whose modal view part would need to encode something like *all the worlds compatible with the subject's demands*, we might have something like (130):

(130) $[\![insist]\!] = \lambda p \lambda x \lambda e \lambda w.$ Source(e,x) & publicly-indicate(e,w) & $\forall w' \in \cap$CON(e,w):
$\forall w'': (w \ R_{x,demands} \ w') \rightarrow p(w'')=1$

Crucially, we have set things up so that each of the Class I verbs contains both a universal operator (corresponding to the indication), and a possibility modal that gives the force of the subject's standpoint or view. For each of the Class II verbs, we have two universals: the one corresponding to the indication, and the necessity modal associated with the

subject's view. For both classes, the standpoint modal gets its flavor from the particular verb.

With this template in hand, we can now work through how the distinctive properties of Class I/II verbs follow. In the next section, we go through each of these properties in turn.

3.2   Decomposition and Properties of Class I/II

In this section, we walk through how the strategy outlined above might account for all the discussed properties of the Class and II verbs. We begin with distributivity.

3.2.1   Class I/II and Distributivity

Recall that with a Class I verb we found the kind of free choice inferences associated with possibility modals, and with a Class II verb we found distribution effects like those seen with necessity operators.

(131)   Jarvis permitted Faisel to have coffee or tea.

Can infer: Faisel was permitted to have coffee AND Faisel was permitted to have tea.

(132)   Jarvis promised to bring coffee or tea to the meeting.

Can infer: Jarvis's promise could be satisfied by coffee AND it could be satisfied by tea.

Starting with a non-habitual instance of (131), we can set out how this will follow from the present account. As in Chapter 1, we take up Fox (2006)'s account of distribution effects to show how this works in a concrete way. According to Fox (2006), the presence of (possibly recursive instances of) EXH is the source of the free choice effects found with sentences with modal operators and the term *or*. Note that without EXH, (131) has an ignorance inference: that one of *Jarvis permitted Faisel to have coffee* or *Jarvis permitted Faisel*

to have tea is true, but an utterer does not know which. If this is unlikely result, then the Recursive Parsing Strategy allows us to append an EXH:

(133)   *Jarvis permitted Faisel to have coffee or tea.*

```
                        TP
                       /  \
                      ∃    vP
                           |
                          / \
                     Jarvis   VP
                              |
                             / \
                      Indicate   EXH(◊P)
                                  |
                                 / \
                              EXH   ◊P
                                    |
                                   / \
                                  ◊    CP
                                      /___\
                              Faisel to have coffee or tea
```
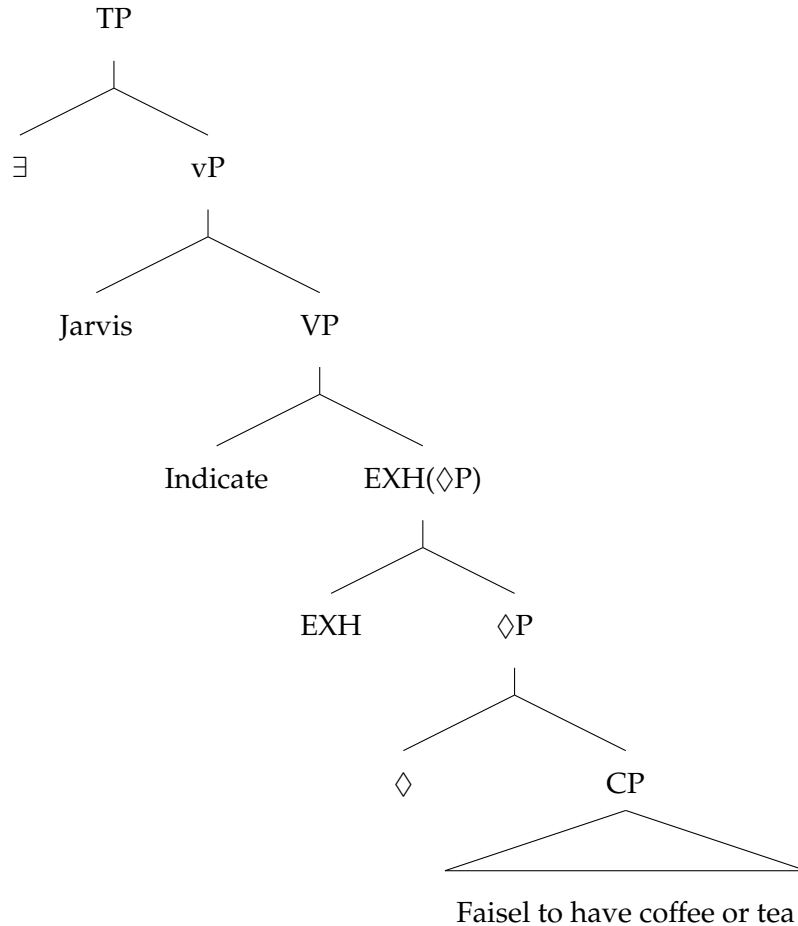
The interpretation of EXH(◊P) is calculated just as we saw above for the possibility modal case:

(134)   *Letting p=Faisel has coffee and q=Faisel has tea:*

EXH(◊P) = EXH(Alt(◊(p ∨ q)))(◊(p ∨ q))

= ◊(p ∨ q) & ¬◊(p ∧ q)

We can innocently exclude ◊(p ∧ q), because it belongs to both maximal sets of alternatives from EXH(Alt(◊(p ∨ q)))={◊(p ∨ q), ◊(p ∧ q), ◊p, ◊q} that can be negated while ◊(p ∨ q) is true. That is, we can innocently exclude ◊(p ∧ q) because it is in both {◊(p ∨ q),

◇p} and {◇(p ∨ q), ◇q}. As a result, the first exhaustification allows us to exclude Jarvis's allowance of Faisel having both beverages. But we're still left inferring that the utterer is ignorant about which drink Jarvis actually permits. So we throw in another EXH:

(135) *Jarvis permitted Faisel to have coffee or tea.*
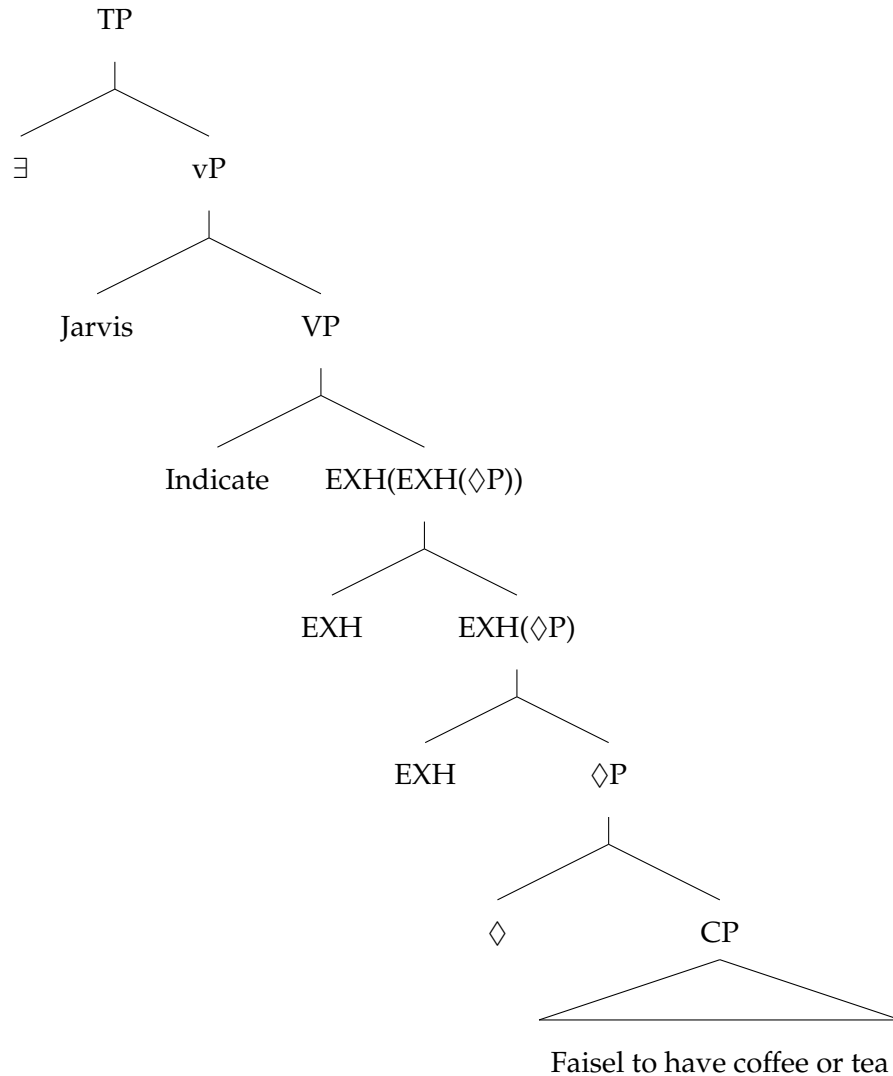
The second exhaustification gives us the inferences we need:

(136) *Letting p=Faisel has coffee and q=Faisel has tea:*

EXH(EXH(◇P)) = EXH(A')(EXH(Alt(◇(p ∨ q)))(◇(p ∨ q)))

(a) = ◇(p ∨ q) & ¬◇(p ∧ q) & ¬(◇p ∧ ¬◇q) & (◇q ∧ ¬◇p)

(b) ⇒ ◇(p ∨ q) & ¬◇(p ∧ q) & ◇p & ◇q

Just like in Chapter 1, we arrive at (a) by innocently excluding all the alternatives possible from A′= {◇(p ∨ q) & ¬◇(p ∧ q), (◇p ∧ ¬◇q), (◇q ∧ ¬◇p)} (a set again obtained by using the algorithm from Fox & Katzir (2011)). The maximal subset of A′ that can be negated while (134) is true is {(◇p ∧ ¬◇q), (◇q ∧ ¬◇p)}, so we innocently exclude both in (a). Then (b) follows from (a), according to the same reasoning given below (42) above—assume both (a) is true but ◇p (or ◇q) is not. This leads us to contradict the last (or second last) disjunct in (a), so we must have ◇p (or ◇q).

At this point, we are rid of the ignorance inference, and we have what looks like a free choice effect for the EXH(EXH(◇P)) node. Now ⟦EXH(EXH(◇P))⟧ is fed to ⟦Indicate⟧, and so we get that in all the worlds compatible with Jarvis's indication, (136a) is true, i.e we get that in all the worlds compatible with Jarvis's indication, (136b) is true. In other words, the presence of two occurrences of EXH gives us an interpretation of (131) in which it follows from the content of Jarvis's indication that Faisel is permitted to have coffee, Faisel is permitted to have tea, but Faisel is not permitted to have both together.

Thus we see that with Fox (2006) and our structurally decomposed analysis, we easily derive the distribution inferences present with non-habitual Class I sentences. Before moving on, we note that this works in the same way for a habitual Class I statement:

(137)   *Jarvis permits Faisel to have coffee or tea.*

```
                        TP
                   ┌────┴────┐
                   ∃        vP
                        ┌────┴────┐
                      Jarvis     VP
                            ┌─────┴─────┐
                          HAB          V′
                                  ┌─────┴─────┐
                              Indicate   EXH(EXH(◇P))
                                        ┌─────┴─────┐
                                      EXH       EXH(◇P)
                                            ┌─────┴─────┐
                                          EXH          ◇P
                                                  ┌─────┴─────┐
                                                  ◇          CP
                                                        ┌──────┴──────┐
                                                  Faisel to have coffee or tea
```
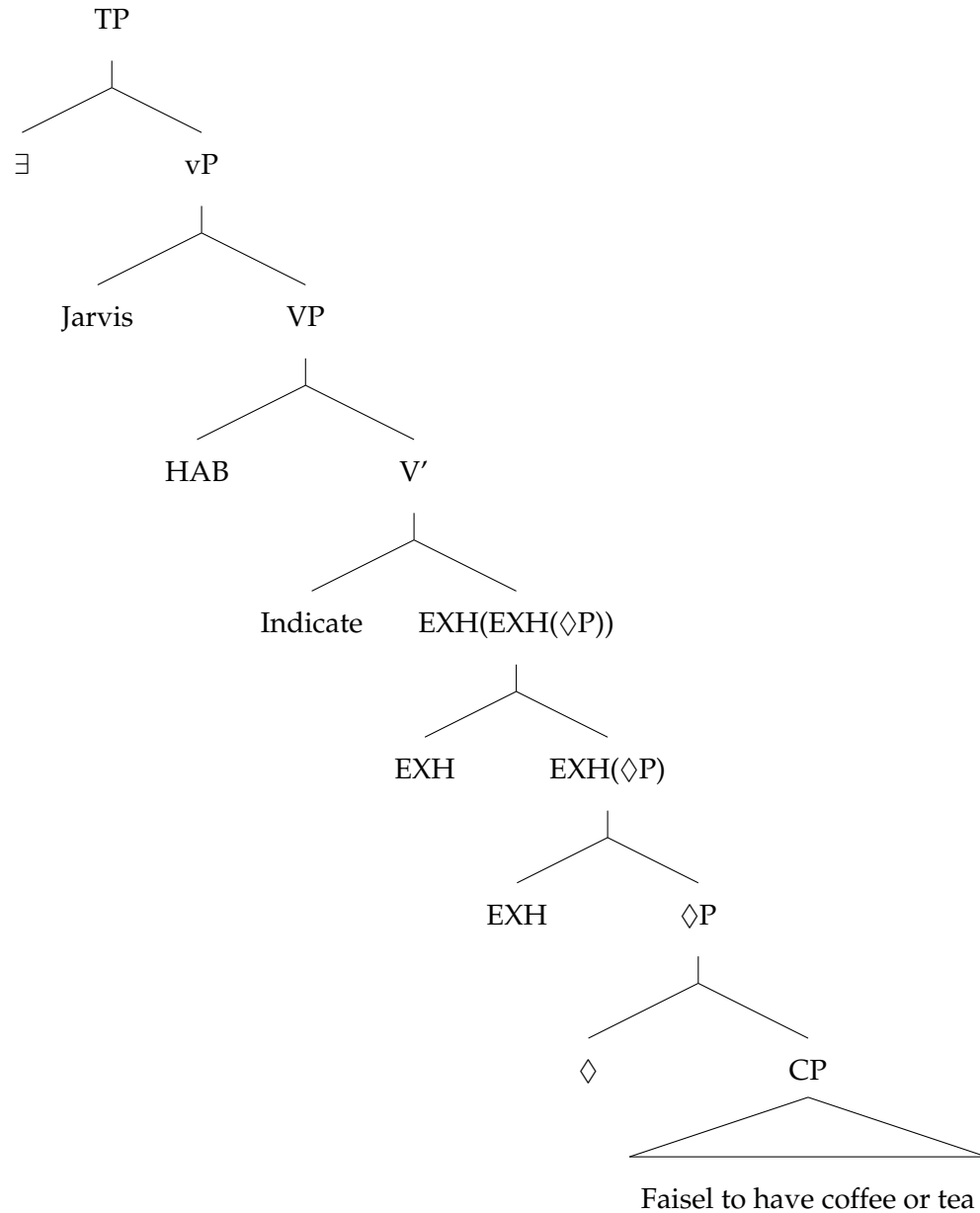
We get the free choice inferences at EXH(EXH(◇P)) in exactly the same way as above, and then this exhaustified meaning is what follows from the indication(s) Jarvis is disposed to make.

We turn now to the Class II case in (132), *Jarvis promised to bring coffee or tea to the meeting.* As for (131), we get an ignorance inference with an utterance of the bare sentence,

that Jarvis either promised to bring coffee or Jarvis promised to bring tea, but the speaker doesn't know which. So we add on an EXH:

(138) *Jarvis promised to bring coffee or tea to the meeting.*

```
                    TP
                  /    \
                 ∃      vP
                      /    \
                  Jarvis    VP
                          /    \
                    Indicate   EXH(□P)
                              /      \
                           EXH        □P
                                     /    \
                                    □      CP
                                        /‾‾‾‾‾\
                               to bring coffee or tea to the meeting
```
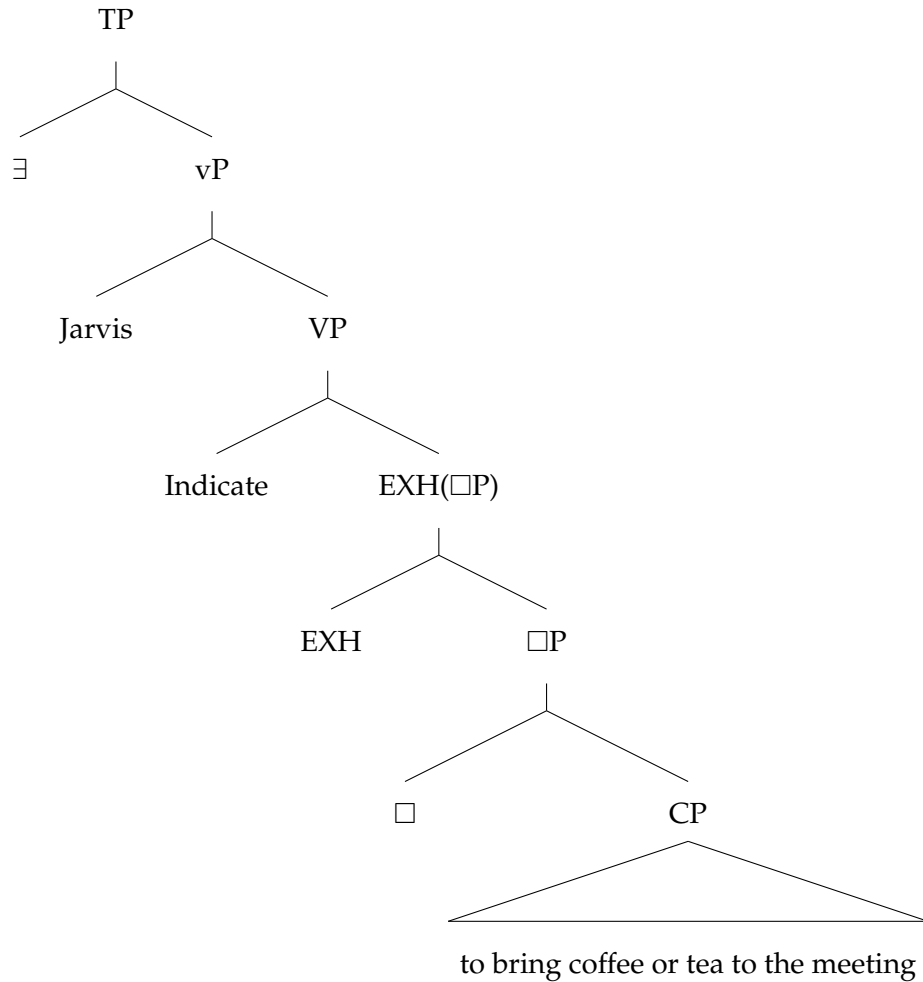
The key node in this tree is EXH(□P), whose meaning we get in the same way as we got exhaustification for the necessity case in Chapter 1:

(139) *Letting p=Jarvis brings coffee to the meeting and q=Jarvis brings tea to the meeting:*

EXH(Alt(□(p ∨ q)))(□(p ∨ q))

(a) = □(p ∨ q) & ¬□(p ∧ q) & ¬□p & ¬□q

(b) ⇒ □(p ∨ q) & ¬□(p ∧ q) & ¬□p & ¬□q & ◊p & ◊q

The relevant members of Alt($\Box$(p $\vee$ q)) are $\Box$(p $\vee$ q), $\Box$(p $\wedge$ q), $\Box$p, and $\Box$q, and we can exclude all of the last three while the pre-exhaustification $\Box$(p $\vee$ q) is true. From the result of this, (a), we get (b), because assuming that (a) is true but not $\Diamond$p (or $\Diamond$q) leads to $\Box$q (or $\Box$p), which is a contradiction.

This exhaustified meaning is then what is fed to $[\![$Indicate$]\!]$, and so we have an interpretation of (131) in which it follows from Jarvis's indication that he will bring one (but not both) of coffee or tea to the meeting, and that both beverages are live options. That is, there is a reading of (131) where Jarvis has promised to bring one (and only one) of the beverages, and that either is possible way for him to satisfy that promise. And again, if we made this into a habitual sentence (with the inclusion of a HAB operator in the structure), this would work in exactly the same way.

So we've seen that the analysis presented in Chapter 2 can work together with the account of free choice effects in Fox (2006) to obtain all the distribution effects reported for Class I and II verbs. Furthermore, we can now see that we have additional, though conditional, support for the structural decomposition of Class I/II verbs—we need to have a spot in the structure for (one or more instances of) EXH, and this spot needs to go just above the embedded modal that corresponds to the subject's standpoint, i.e. above the $\Diamond$ for Class I, and the deeper $\Box$ for Class II. This allows EXH to compose with the right modal node. If we did not decompose, we would not be able to do this. To see why this is a problem, it will help to have a non-abbreviated interpretation tree. We give one below for (131).

(140)   *Jarvis permitted Faisel to have coffee or tea.*

$\gamma = \lambda w.\ \exists e.\ \text{Source}(e,\text{Jarvis})\ \&\ \text{publicly-indicate}(e,w)\ \&\ \forall w' \in \cap\text{CON}(e,w):$
$\exists w'': (w'\ R_{Jarvis,accept}\ w'')\ \&\ \text{Faisel-to-have-coffee-or-tea}(w'')=1$

$\exists$ $\lambda e\lambda w.\ \text{Source}(e,\text{Jarvis})\ \&\ \text{publicly-indicate}(e,w)\ \&\ \forall w' \in \cap\text{CON}(e,w):$
$\exists w'': (w'\ R_{Jarvis,accept}\ w'')\ \&\ \text{Faisel-to-have-coffee-or-tea}(w'')=1$

Jarvis $\beta = \lambda x\lambda e\lambda w.\ \text{Source}(e,x)\ \&\ \text{publicly-indicate}(e,w)\ \&\ \forall w' \in \cap\text{CON}(e,w):$
$\exists w'': (w'\ R_{x,accept}\ w'')\ \&\ \text{Faisel-to-have-coffee-or-tea}(w'')=1$

$\lambda p\lambda x\lambda e\lambda w.\ \text{Source}(e,x)\ \&\ \text{publicly-indicate}(e,w)\ \&$
$\forall w' \in \cap\text{CON}(e,w): p_x(w')=1$

$\alpha = \lambda x\lambda w.\ \exists w': (w\ R_{x,accept}\ w')\ \&$
$\text{Faisel-to-have-coffee-or-tea}(w')=1$

$\lambda p\lambda x\lambda w.\ \exists w': (w\ R_{x,accept}\ w')\ \&\ p(w')=1$ $\lambda w.\ \text{Faisel-to-have-coffee-or-tea}(w)$

Faisel to have coffee or tea
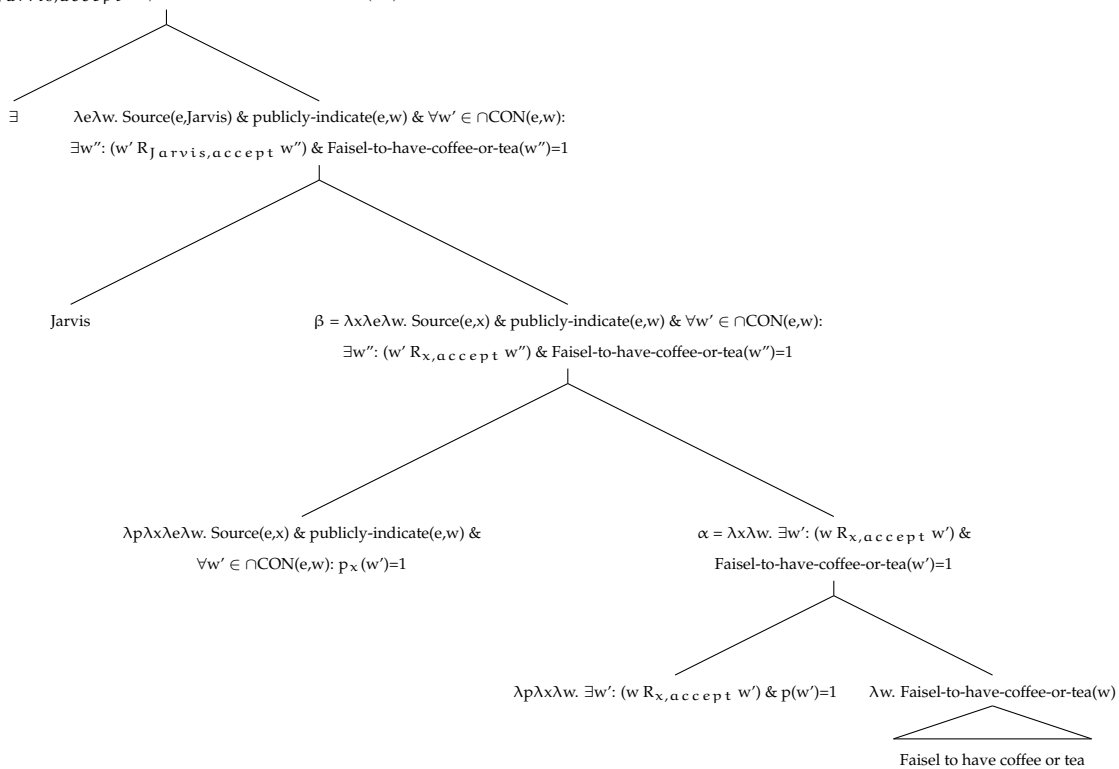
As it stands, EXH is inserted just above α.[4] If we did not decompose there would be no α, and the only places for EXH to go would be γ, and maybe β (if EXH can combine with VPs). Leaving type concerns aside, neither of these locations will help us in our efforts to derive the free choice effects. For both, note that the alternatives are going to be things like, roughly, *x publicly indicated something from which "Faisel is allowed to have coffee" follows*, *x publicly indicated something from which "Faisel is allowed to have tea" follows*, and *x publicly indicated something from which "Faisel is allowed to have coffee and tea" follows*. (*x* will be replaced with *Jarvis* for γ.) These will not be the only alternatives, but what is important to us is that the first two will be innocently excludable. To see this in an informal way, we can have the following be true, *x publicly indicated something from which "Faisel is allowed*

---

[4]Here we assume that EXH can be made to take something of type (e,(s,t)). If EXH ends up only being able to take propositions, we would have to come up with a way to deal with the $\lambda x \dots x$ term in α, perhaps by typeshifting.

to have coffee or tea" follows, in a case where x publicly claimed that something from which "Faisel is allowed to have coffee or tea" follows is true, but also that x doesn't know which is allowed (though x does know that having both coffee and tea together is forbidden). Because this is a viable case, the first exhaustification of the sentence allows us to exclude both of *x publicly indicated something from which "Faisel is allowed to have coffee" follows* and *x publicly indicated something from which "Faisel is allowed to have tea" follows*, so dashing any hopes for the free choice inference attested.

As a result, if we want to use a Fox (2006) story for free choice effects, decomposition is necessary in order to give EXH access to the right modal propositions. This is true for any account of free choice that requires direct access to the modal part of Class I/II predicates. If we end up being otherwise compelled to squeeze all of a Class I/II verb onto one node, we would need a different kind of account for all the distribution inferences reported in Chapter 1.

3.2.2 Class I/II and Weak Readings with Negation

In Chapter 1, we saw that negative Class I and II sentences have two interpretations. There were "strong" readings, which we will take up in Chapter 4, but this section will be concerned with demonstrating how the "weak" interpretations follow straightforwardly from the account outlined above.

We can look simultaneously at the Class I and the Class II cases. Recall that the proposed lexical entries for *permit* and *promise* are as below:

(141) $[\![\text{permit}]\!]$ = $\lambda p\lambda x\lambda e\lambda w$. Source(e,x) & publicly-indicate(e,w) & $\forall w' \in \cap\text{CON}(e,w)$:

$\exists w''$: $(w'\ R_{x,accept}\ w'')$ & $p(w'')$=1

(142) $[\![\text{promise}]\!]$ = $\lambda p\lambda x\lambda e\lambda w$. Source(e,x) & publicly-indicate(e,w) & $\forall w' \in \cap\text{CON}(e,w)$:

$\forall w''$: $(w'\ R_{x,commit}\ w'') \rightarrow p(w'')$=1

Starting with non-habitual cases, the trees in (143) and (144) represent our semantics for statements like *Tyrone didn't permit Ming-Ming to borrow his suitcase (his brother did)*, and *Tyrone didn't promise to bring Ming-Ming his suitcase (though he had meant to)*. Again, we ignore tense facts.

(143) *Tyrone didn't permit Ming-Ming to borrow his suitcase.*

```
                    NegP
                   /    \
                 Neg     TP
                        /  \
                       ∃    vP
                           /  \
                      Tyrone   VP
                              /  \
                       Indicate  ◊P
                                /  \
                               ◊    CP
                                   /____\
                          Ming-Ming to borrow his suitcase
```

λw. ¬∃e. Source(e, Tyrone) & publicly-indicate(e,w) &
∀w′ ∈ ∩CON(e,w): ∃w″: (w′ R$_{Tyrone,accept}$ w″) &
Ming-Ming-borrow-his-suitcase(w″)=1

¬   λw. ∃e. Source(e,Tyrone) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
∃w″: (w′ R$_{Tyrone,accept}$ w″) & Ming-Ming-borrow-his-suitcase(w″)=1

∃   λeλw. Source(e,Tyrone) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
∃w″: (w′ R$_{Tyrone,accept}$ w″) & Ming-Ming-borrow-his-suitcase(w″)=1

Tyrone   λxλeλw. Source(e,x) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):
∃w″: (w′ R$_{x,accept}$ w″) & Ming-Ming-borrow-his-suitcase(w″)=1

λpλxλeλw. Source(e,x) &
publicly-indicate(e,w) &
∀w′ ∈ ∩CON(e,w): p$_x$(w′)=1

λxλw. ∃w′: (w R$_{x,accept}$ w′) &
Ming-Ming-borrow-his-suitcase(w′)=1

λpλxλw. ∃w′:
(w R$_{x,accept}$ w′) & p(w″)=1

λw. Ming-Ming-borrow-his-suitcase(w)
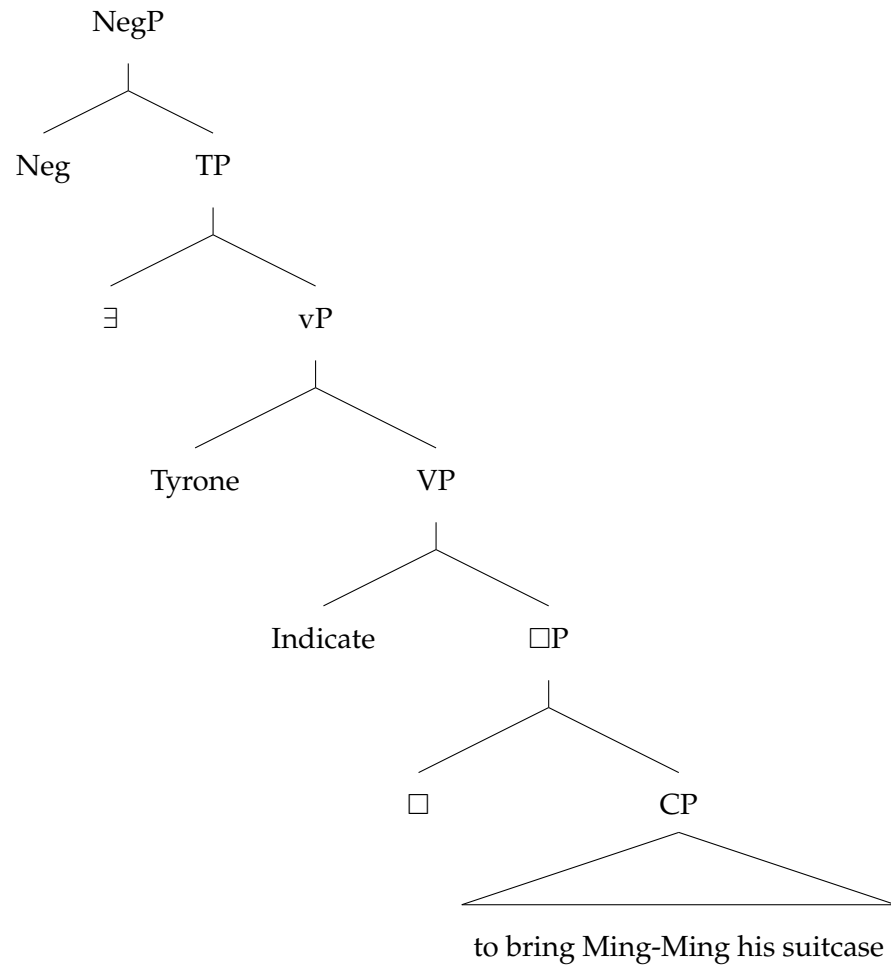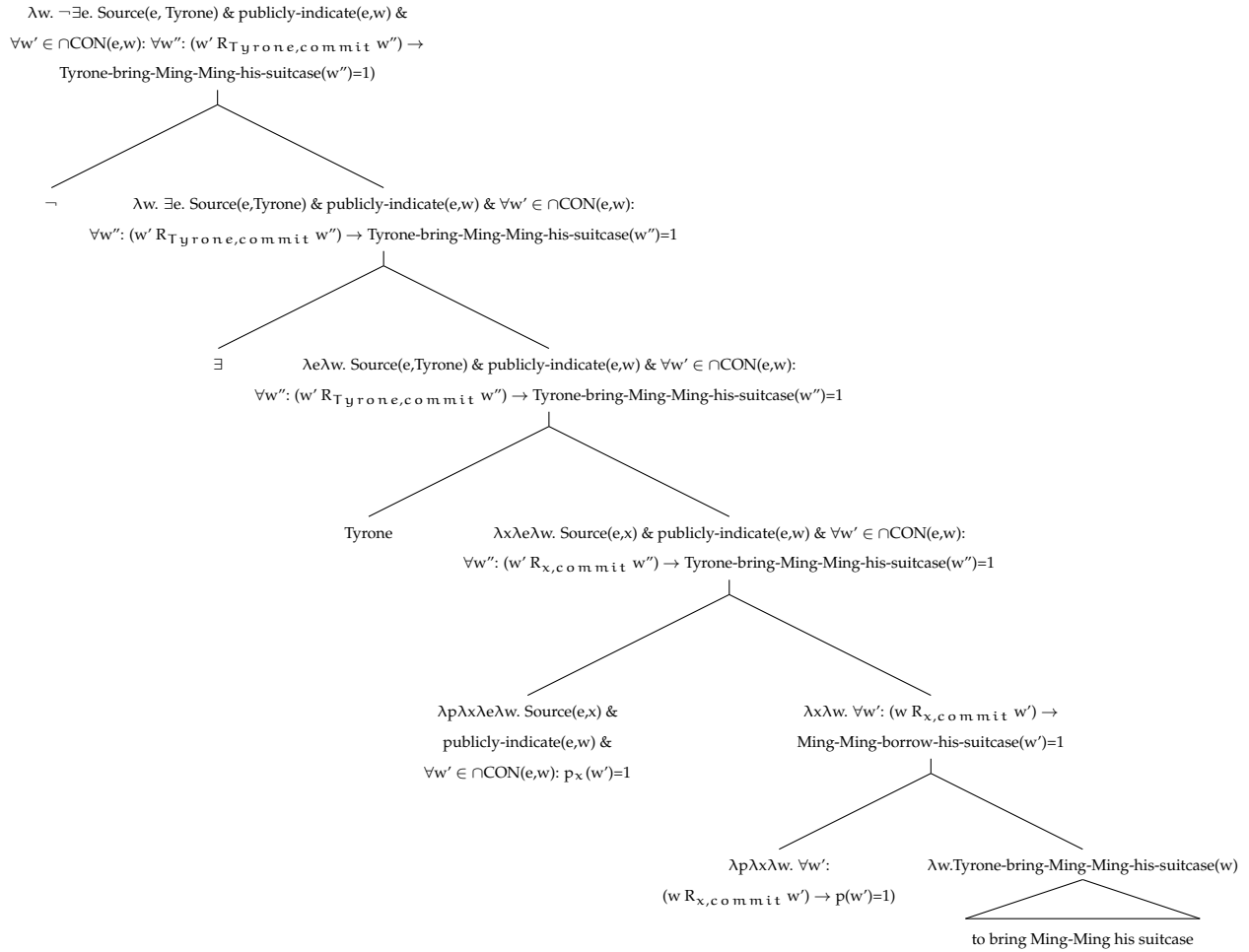
Ming-Ming to borrow his suitcase

The negation applies to the existence of an event of indication, immediately deriving the
weak denial-of-an-eventuality reading for (143). The same simple story gives us the Class
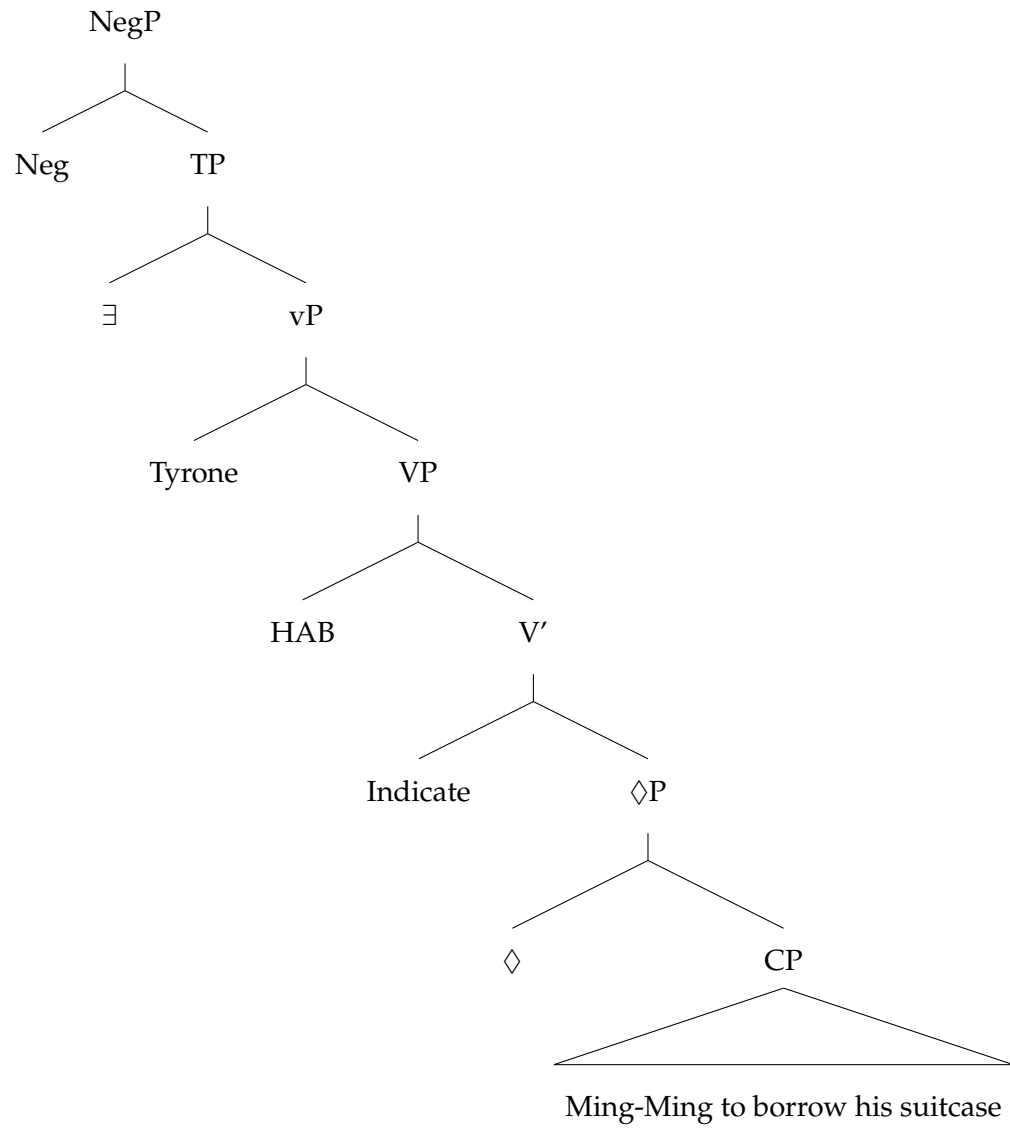II case below:

(144) *Tyrone didn't promise to bring Ming-Ming his suitcase.*

NegP
- Neg
- TP
  - ∃
  - vP
    - Tyrone
    - VP
      - Indicate
      - □P
        - □
        - CP
          - to bring Ming-Ming his suitcase

λw. ¬∃e. Source(e, Tyrone) & publicly-indicate(e,w) &

∀w′ ∈ ∩CON(e,w): ∀w″: (w′ R$_{Tyrone,commit}$ w″) →

  Tyrone-bring-Ming-Ming-his-suitcase(w″)=1

¬   λw. ∃e. Source(e,Tyrone) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):

  ∀w″: (w′ R$_{Tyrone,commit}$ w″) → Tyrone-bring-Ming-Ming-his-suitcase(w″)=1

∃   λeλw. Source(e,Tyrone) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):

  ∀w″: (w′ R$_{Tyrone,commit}$ w″) → Tyrone-bring-Ming-Ming-his-suitcase(w″)=1

Tyrone   λxλeλw. Source(e,x) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):

  ∀w″: (w′ R$_{x,commit}$ w″) → Tyrone-bring-Ming-Ming-his-suitcase(w″)=1

λpλxλeλw. Source(e,x) &   λxλw. ∀w′: (w R$_{x,commit}$ w′) →

publicly-indicate(e,w) &   Ming-Ming-borrow-his-suitcase(w′)=1

∀w′ ∈ ∩CON(e,w): p$_x$(w′)=1

λpλxλw. ∀w′:   λw.Tyrone-bring-Ming-Ming-his-suitcase(w)

(w R$_{x,commit}$ w′) → p(w′)=1)
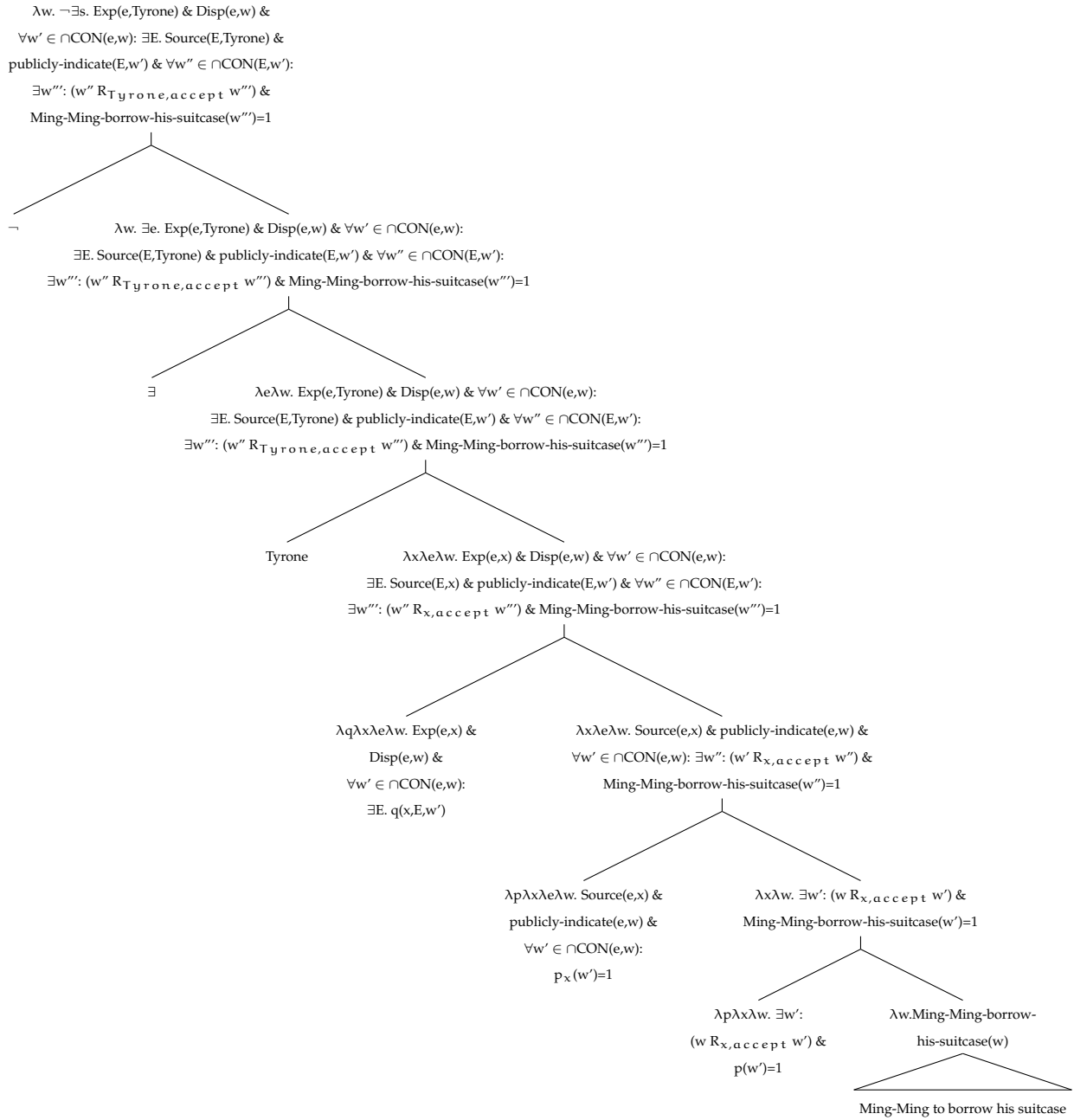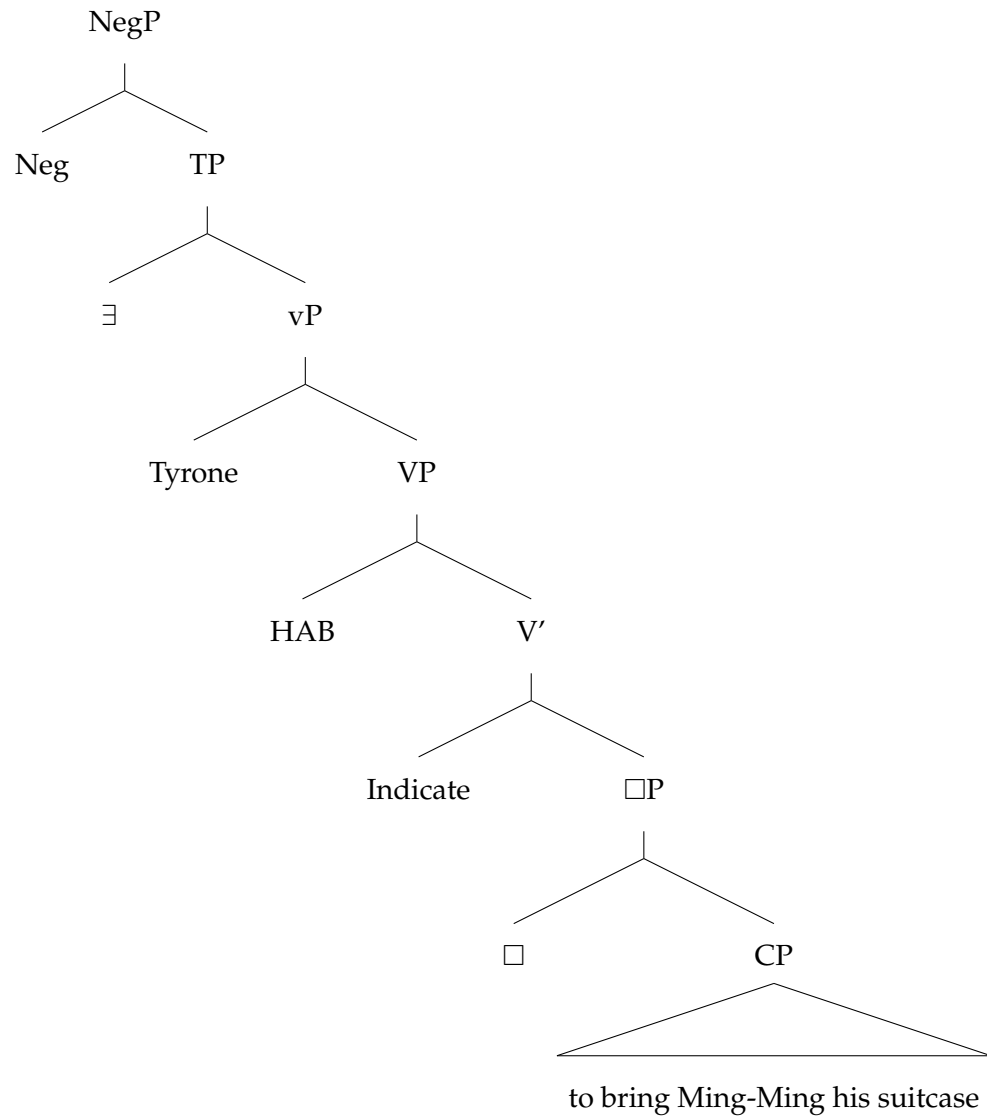
  to bring Ming-Ming his suitcase

We can also find weak readings with habitual Class I/II sentences, as in *Tyrone doesn't permit Ming-Ming to borrow his suitcase (that's his brother)*, and *Tyrone doesn't promise to bring Ming-Ming his suitcase (his brother does)*. Again, these result from a routine application of the NEG operator to an existentially quantified TP.
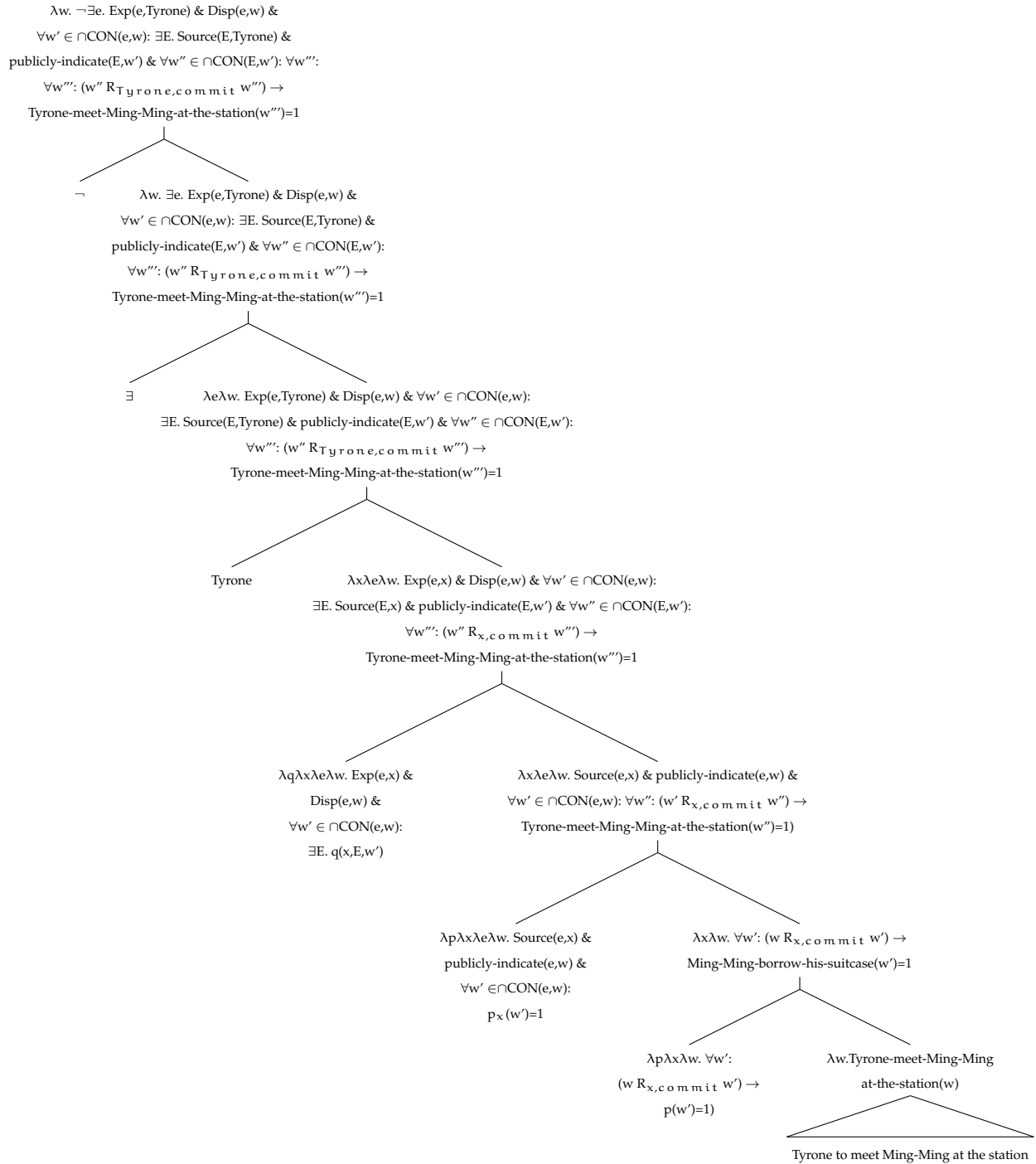
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(145)   *Tyrone doesn't permit Ming-Ming to borrow his suitcase.*

```
                    NegP
                   /    \
                 Neg     TP
                        /  \
                       ∃    vP
                           /  \
                      Tyrone   VP
                              /  \
                           HAB    V′
                                 /  \
                          Indicate   ◇P
                                    /  \
                                   ◇    CP
                                       /  \
                              Ming-Ming to borrow his suitcase
```

λw. ¬∃s. Exp(e,Tyrone) & Disp(e,w) &
∀w′ ∈ ∩CON(e,w): ∃E. Source(E,Tyrone) &
publicly-indicate(E,w′) & ∀w″ ∈ ∩CON(E,w′):
∃w‴: (w″ R$_{Tyrone,accept}$ w‴) &
Ming-Ming-borrow-his-suitcase(w‴)=1

¬

λw. ∃e. Exp(e,Tyrone) & Disp(e,w) & ∀w′ ∈ ∩CON(e,w):
∃E. Source(E,Tyrone) & publicly-indicate(E,w′) & ∀w″ ∈ ∩CON(E,w′):
∃w‴: (w″ R$_{Tyrone,accept}$ w‴) & Ming-Ming-borrow-his-suitcase(w‴)=1

∃

λeλw. Exp(e,Tyrone) & Disp(e,w) & ∀w′ ∈ ∩CON(e,w):
∃E. Source(E,Tyrone) & publicly-indicate(E,w′) & ∀w″ ∈ ∩CON(E,w′):
∃w‴: (w″ R$_{Tyrone,accept}$ w‴) & Ming-Ming-borrow-his-suitcase(w‴)=1

Tyrone

λxλeλw. Exp(e,x) & Disp(e,w) & ∀w′ ∈ ∩CON(e,w):
∃E. Source(E,x) & publicly-indicate(E,w′) & ∀w″ ∈ ∩CON(E,w′):
∃w‴: (w″ R$_{x,accept}$ w‴) & Ming-Ming-borrow-his-suitcase(w‴)=1

λqλxλeλw. Exp(e,x) &
Disp(e,w) &
∀w′ ∈ ∩CON(e,w):
∃E. q(x,E,w′)

λxλeλw. Source(e,x) & publicly-indicate(e,w) &
∀w′ ∈ ∩CON(e,w): ∃w″: (w′ R$_{x,accept}$ w″) &
Ming-Ming-borrow-his-suitcase(w″)=1

λpλxλeλw. Source(e,x) &
publicly-indicate(e,w) &
∀w′ ∈ ∩CON(e,w):
p$_x$(w′)=1

λxλw. ∃w′: (w R$_{x,accept}$ w′) &
Ming-Ming-borrow-his-suitcase(w′)=1

λpλxλw. ∃w′:
(w R$_{x,accept}$ w′) &
p(w′)=1

λw.Ming-Ming-borrow-
his-suitcase(w)

Ming-Ming to borrow his suitcase

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(146)   *Tyrone doesn't promise to bring Ming-Ming his suitcase.*

```
                    NegP
                   /    \
                 Neg     TP
                        /  \
                       ∃    vP
                           /  \
                      Tyrone   VP
                              /  \
                            HAB   V'
                                 /  \
                            Indicate  □P
                                     /  \
                                    □    CP
                                          /\
                                         /  \
                              to bring Ming-Ming his suitcase
```

λw. ¬∃e. Exp(e,Tyrone) & Disp(e,w) &
∀w′ ∈ ∩CON(e,w): ∃E. Source(E,Tyrone) &
publicly-indicate(E,w′) & ∀w″ ∈ ∩CON(E,w′): ∀w‴:
∀w‴: (w″ R$_{Tyrone,commit}$ w‴) →
Tyrone-meet-Ming-Ming-at-the-station(w‴)=1

¬   λw. ∃e. Exp(e,Tyrone) & Disp(e,w) &
∀w′ ∈ ∩CON(e,w): ∃E. Source(E,Tyrone) &
publicly-indicate(E,w′) & ∀w″ ∈ ∩CON(E,w′):
∀w‴: (w″ R$_{Tyrone,commit}$ w‴) →
Tyrone-meet-Ming-Ming-at-the-station(w‴)=1

∃   λeλw. Exp(e,Tyrone) & Disp(e,w) & ∀w′ ∈ ∩CON(e,w):
∃E. Source(E,Tyrone) & publicly-indicate(E,w′) & ∀w″ ∈ ∩CON(E,w′):
∀w‴: (w″ R$_{Tyrone,commit}$ w‴) →
Tyrone-meet-Ming-Ming-at-the-station(w‴)=1

Tyrone   λxλeλw. Exp(e,x) & Disp(e,w) & ∀w′ ∈ ∩CON(e,w):
∃E. Source(E,x) & publicly-indicate(E,w′) & ∀w″ ∈ ∩CON(E,w′):
∀w‴: (w″ R$_{x,commit}$ w‴) →
Tyrone-meet-Ming-Ming-at-the-station(w‴)=1

λqλxλeλw. Exp(e,x) &
Disp(e,w) &
∀w′ ∈ ∩CON(e,w):
∃E. q(x,E,w′)

λxλeλw. Source(e,x) & publicly-indicate(e,w) &
∀w′ ∈ ∩CON(e,w): ∀w″: (w′ R$_{x,commit}$ w″) →
Tyrone-meet-Ming-Ming-at-the-station(w″)=1

λpλxλeλw. Source(e,x) &
publicly-indicate(e,w) &
∀w′ ∈∩CON(e,w):
p$_x$ (w′)=1

λxλw. ∀w′: (w R$_{x,commit}$ w′) →
Ming-Ming-borrow-his-suitcase(w′)=1

λpλxλw. ∀w′:
(w R$_{x,commit}$ w′) →
p(w′)=1

λw.Tyrone-meet-Ming-Ming
at-the-station(w)

Tyrone to meet Ming-Ming at the station

In sum then, the current account easily captures the weak readings found with negated Class I/II sentences. But what of the stronger interpretations? Showing how these can be derived from the story here is a more involved process, one that interacts with other (non-Class I/II) cases of extra strong readings found with negation. Chapter 4 is devoted

to discussing these data, and demonstrating how the proposal here comes together with an updated account of Neg-raising to obtain the strengthened readings.

3.2.3 Class I/II and Habituality

Finally, we turn back to the puzzle outlined at the end of Chapter 2, which pointed out that Class I/II predicates diverge from similar accomplishment predicates with respect to how habits/dispositions can be established.

We had compared the Class I/II verbs, themselves reporters of a sort, with the speech reporters repeated in (147) below.

(147)   declare, state, announce, remark, observe, mention, comment, note, add, repeat

In particular, with animate subjects, Class I/II verbs, but not the speech reporters in (147), can be used felicitously in simple present after a single speech event.

(148)   (a) *After Arthur has promised once to be on time the next day:*

Arthur promises that he will be on time tomorrow.

(b) *After Remy has remarked once that he will definitely be on time the next day:*

Remy remarks that he will definitely be on time the next day.

With the HAB operator we have outlined, we can account for an example like (148a): this describes a disposition to promise that has been initiated by a single act of promising, though we haven't yet seen repetitive promising in the actual world. But then why can't HAB just apply in sentences with speech reporters like *remark*, to give the same dispositional results for (148b)?

In a word, I would like to say that HAB can indeed apply to these verbs, but because the semantics of speech reporters like those in (147) differ in a critical way from the Class II verbs, the result has slightly different properties.

Before we try to address this discrepancy between the members of Class I and II and the other speech reporters, recall that the difference dissolves for inanimate subjects. Neither (149a) nor (149b) require habitual action:

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(149) (a) The pamphlet promises that you will make your money back with a year.

(b) The article remarks that the scam was particularly successful in the outskirts of the city.[5]

Our question then is this: what is the relevant difference between the members of Class I/II and other reporting verbs that allows habits built with the two kinds of verbs to have different initiation conditions with animate subjects, but the same conditions with inanimate subjects?

Stepping back for a second, recall the copy machine case discussed in 2.4.2. There we said that the machine gets its disposition to print posters in virtue of its design or programming. As a result, no external indication of ability is required; we just need acts of creation and design. The examples in (149a) and (149b) are similar. Each describes a disposition to be a source of a contentful event, and this disposition appears to be the result of the inanimate subject's creator setting into motion a series of steps that result in

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[5]Curiously, at first glance, it appears that neither Class I/II verbs nor speech reporters are available in what we take to be their basic non-habitual accomplishment forms with inanimate subjects:

(1) (a) # The pamphlet was promising at that moment that you will make your money back with a year.
     (b) # The article was remarking that the scam was particularly successful in the outskirts of the city.

So not only are promising or remarking events not necessary to initiate dispositions, they appear to not even be possible as events. However, if we can attribute something like animacy (or better yet, variability over time) to these traditionally inanimate objects, these events become possible:

(2) At that moment, the electronic billboard was guaranteeing that the lawyer will win your case, or his services will be free of charge.

As of 2014, we don't have electronic versions of pamphlets and articles, but when we do (or when we imagine we are living in a Disney-type world where any object can be animate), we will have no problem accepting these descriptions of events.

Note that when inanimate things become variable over time, we find the same contrast between Class I/II verbs and speech reporters illustrated in (148) for animate subjects:

(3) (a) *After the electronic billboard has once displayed a promise that the lawyer will win your case:*
     The electronic billboard promises that the lawyer will win your case.
     (b) *After the electronic billboard has remarked once that the lawyer will win your case:*
     # The electronic billboard remarks that the lawyer will win your case.

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its inscription with sentences, from which propositions can follow.[6] So the initiating event of any inanimate object's disposition to be the source of a contentful report or indication is its inscription, and so whether we're dealing with *promise* or *remark*, the disposition is initiated without any event beyond the thing's creation.

(150) The pamphlet promises that you will make your money back within a year.

True in w iff: $\exists$e. Exp(e,the-pamphlet) & Disp(e,w) & $\forall$w' $\in \cap$CON(e,w):

$\exists$E. Source(E,the-pamphlet) & publicly-indicate(E,w') & $\forall$w'' $\in \cap$CON(E,w'): $\forall$w''':

(w'' $R_{pamphlet,commit}$ w''') $\rightarrow$ you-make-your-money-back-within-a-year(w''')=1

(151) The article remarks that the scam was particularly successful in the outskirts of the city.

True in w iff: $\exists$e. Exp(e,the-article) & Disp(e,w) & $\forall$w' $\in \cap$CON(e,w):

$\exists$E. Source(E,the-article) & say-as-a-comment(E,w) & $\forall$w' $\in \cap$CON(E,w):

the-scam-was-particularly-successful-in-the-outskirts-of-the-city(w')=1[7]

Both of these sentences could be true in virtue of the subject's inscription with propositional material, and we have no need for further initiation or for a further event of any kind. When it comes to inanimate subjects then, we get dispositional sentences without repeated action just because the initiation requirements for these particular dispositions are very modest—the subject simply needs to have the relevant propositional information ascribed to it via some physical or metaphorical act of inscription. And together with the Boneh & Doron-inspired semantics we've chosen for HAB, this means that an actual event corresponding to the predicate need never occur.

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[6]Some inanimate objects that contain propositional information, like books, poems, etc., can be either tokens of non-physical types, or types themselves. Types seem to belong to an abstract realm, where inscription, if it's going on at all, is quite possibly not anything like putting pencil to paper, or fingers to a keyboard. Sadly though, this is not the place to explore how abstract objects get their properties, so I leave abstract types aside for present purposes.

[7]We motivate the formulation of *remark* assumed here below.

With this in mind, we now return to animate subjects. We saw in (148) that for Class I/II verbs, we need only a single indication to establish a disposition; with other speech reporters, we required actual habitual action (or some other more conventional indication of a habit—like the assertion of an inclination). I would like to suggest that just like for the inanimate subjects, what is crucial here is the connection to a set of propositional information. For the inanimate subjects, their inscription generated this propositional information. For animate subjects with Class I/II verbs, the propositional information corresponds to the subject's presumably ongoing standpoint—whether the object is acceptable, desired, required, etc. according to the subject. That is, the use of *promise* expresses that the object of the promising is something compatible with the subject's (always the subject's) indicated commitments, so an explicit connection is established between the propositional commitments and the verb's subject. Just as with the inscription of inanimate subjects, the indication of this propositional standpoint appears to be enough to establish a disposition. In the case of (148a), the relevant propositions are Arthur's commitments, and the reference to these serves to establish a disposition for Arthur to indicate things that follow from them.

This connection is not present with speech reporters like *remark*—a remark does not inherently involve its source's modal views, and so establishes no explicit link between the subject and a set of propositional information.[8] So the lexical entry for *remark* would be along the lines of (152) below:

(152) ⟦remark⟧ = λpλeλw. Source(e,x) & say-as-a-comment(e,w) & ∀w′ ∈ ∩CON(e,w): p(w′)=1[9]

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[8]Of course, a remark may describe a view in its object, as in *Kendrick remarked that Jay allows his daughter to play in Prospect Park*. Critically though, such a view need not belong to the source of the remark, and there is no connection between the matrix subject and the view. We also note that a remark (or observation, etc.) may lead to inferences about its source's opinions through other means, e.g. through pragmatic reasoning about the utterance.

[9]The *say-as-a-comment* part of this is lifted from the entry for *remark* in the Oxford American Dictionaries

Then the interpretation for a sentence like *Remy remarked that he will definitely be on time the next day* would be something like (153) below.

(153) $\lambda w.\exists e.$ Source(e,Remy) & say-as-a-comment(e,w) & $\forall w' \in \cap$CON(e,w): Remy-will-definitely-be-on-time-tomorrow(w')=1

Contrast this with the Class II verb *promise* in *Remy promised to be on time the next day*:

(154) $\lambda w.\exists e.$ Source(e,Remy) & publicly-indicate(e,w) & $\forall w' \in \cap$CON(e,w): $\forall w''$: (w' $R_{Remy,commit}$ w'') $\rightarrow$ Remy-is-on-time-tomorrow(w'')=1)

The remark in (153) is not necessarily associated with a set of propositional information representing the subject's views. But what this means is that with a single utterance of (153), we haven't established a set of propositions tied to the subject from which the object follows. As a result, a single utterance of (153) does not suffice to initiate a disposition. This is unlike what we find when Class I/II verbs have animate subjects, and unlike the situation when any of the verbs we've discussed have inanimate subjects: in all of these cases, a connection to a set of propositions is made with a single act of creation, design, or indication, and because of the presumably continuing existence of this set of propositions, we have the basis for an ongoing disposition.

So for a disposition involving a reporting or indicating verb to hold, this needs to be initiated either by the establishment of a set of propositional information from which the object follows (either as an indicated subject-oriented view or in virtue of the subject's inscription), or this needs to be initiated in some more conventional way—by straightforward habitual action, or a literal indication of an habit. Thus the discrepancy between Class I/II verbs and other speech reporters amounts to the existence of necessary connection between the subject and an opinion that forms an element of each Class I/II entry, and the absence of this kind of connection to propositional information with the other

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program on my computer.

speech reporters.

I conclude this section with a note about the verb *say*. This verb has a number of uses, but among these is one in which it describes a subject's opinion about what should happen, as in *Cohen says to leave*, or *Abby says to bring the bicycle*. As with the Class I/II verbs, these examples seem to be made true by rather weak initiating conditions–a single utterance (or even a nod, or a gesture) will do. In this guise then, *say* could be classified as a Class II verb, and given a semantics something like (155):

(155) $\lambda p\lambda x\lambda e\lambda w.$ Source(e,x) & publicly-indicate(e,w) & $\forall w' \in \cap$CON(e,w): $\forall w''$: (w'
$R_{x,opinion}$ w'') $\rightarrow$ p(w'')=1)

The connection between the modal standpoint and the subject in this entry for *say* allows us to use the term, like all Class I/II verbs but unlike other speech reporters, in the simple present after only one external indicating event (which may or may not be itself a saying event). This is because we can establish a propositional standpoint with just one indication, and this serves as the initiating basis for the disposition.

In sum then, this chapter has laid out our chosen semantics for the Class I and II predicates. We have shown that the verbs are complex, incorporating an indication and a modal view, and we have argued that there is reason to believe this complexity is reflected in the semantic structure, with each Class I/II verb occupying two nodes. This analysis allows us to deal with the distribution effects observed, as well as the weak readings found with negation. Finally, we showed that the initiation requirements for dispositions built with Class I/II verbs are different from similar accomplishment verbs, and this led us to conclude that without repetitive action, dispositions are initiated by the association of propositional information to a subject.

In the next chapter we investigate the strong readings we observed when negating Class I and II sentences. These readings are unexpected on the current proposal, and we now focus on how they can be derived, alongside other unexpectedly strong interpreta-

tions found with negation.

Chapter 4

Neg$^+$ Readings

The purpose of this chapter will be to determine the source of the "stronger readings" found when we negate sentences with Class I and Class II predicates. Recall that based on distribution inferences and event semantic properties, our working characterizations of the Class I and II verbs are determined by the following templates, respectively.

(156) ⟦Class I verb⟧ = λpλxλeλw. Source(e,x) & publicly-indicate(e,w) &

$\forall$w' $\in$ ∩CON(e,w): $\exists$w'': (w' R$_{x,}$___ w'') & p(w'')=1

(157) ⟦Class II verb⟧ = λpλxλeλw. Source(e,x) & publicly-indicate(e,w) &

$\forall$w' $\in$ ∩CON(e,w): $\forall$w'': (w' R$_{x,}$___ w'') $\rightarrow$ p(w'')=1

As noted in Chapter 1, the extra-strong readings we find when we negate these verbs are not completely alien creatures: there are well studied cases of extra-strong readings with negation, known as instances of "Neg-raising". These readings are found with certain attitude predicates, and involve the unexpected interpretation of matrix-level negation in the embedded object clause.

(158) *Neg-Raising verb* **believe**

(a) Frank doesn't believe that Roger is responsible.

(b) *Can be interpreted as:* Frank believes that Roger is not responsible.

(159) *Non-Neg-Raising verb* **know**

(a) Frank doesn't know that Roger is responsible.

(b) *Cannot be interpreted as:* Frank knows that Roger is not responsible.

In this chapter, we will look more closely at a range of extra-strong negative readings (called *Neg$^+$* readings from here on), including those found with the so-called Neg-raisers, like *believe*, and the Class I/II predicates. With respect to Neg$^+$, the Class I/II predicates will fit in with other verbs that have habitual readings—we'll see that habitual statements uniformly admit of Neg$^+$ readings. Take (160) below:

(160)   *Habitual version of* **shampoo**

(a) Frank doesn't shampoo his hair.

(b) *Licenses the inference:* Next time Frank showers, he will not shampoo his hair.

As we will show in greater detail, the preferred interpretation of the negated habitual in (160a) is stronger than we would expect from the simple denial of the existence of a habit.[1] In particular, we interpret (160a) as an assertion of a negative habit, which licenses the extra inference given in (b).

In what follows, I will address Class I/II verbs and other verbs that appear in habitual predicates separately, due to the extra complexity that follows from our lexical entries for Class I/II. However, this is merely a convenience, and I do not intend to imply that Class I/II predicates are categorically different than the others. This should become clear as the positive proposal presented here is fleshed out.

I aim to convince the reader that while this broader field of Neg$^+$ readings does not appear to be homogeneous at first glance, it may not be necessary to think of the three cases as three distinct phenomena, with three distinct derivational origins. To this effect, the chapter will begin by looking in more detail at the Neg$^+$ inferences present with Neg-raisers, Class I and II predicates, and habituals. I will demonstrate that though these

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[1]A non-Neg$^+$ reading of this sentence is available, though less salient. We can find it in the following kind of context: Frank has never lived somewhere where shampoo is accessible, so he doesn't have a habit of shampooing his hair. This would not preclude him from being happy, excited even, to shampoo his hair tomorrow if he finds himself in a situation where shampoo is available.

do not all look like classical cases of Neg-raising, all Neg$^+$ readings share several crucial properties. Furthermore, all the readings share a relationship to some form of excluded middle claim, which suggests that these claims may play a role in the calculation of the inferences. With the resulting conviction that all the identified Neg$^+$ readings group together, we can look at existing accounts of extra strong negative readings, and evaluate whether any has promise for dealing with the expanded set of data. We will end up arguing for an extension of the pragmatic account of Neg-raising in Romoli (2013), placing us one one side of a current debate in the literature on Neg-raising, which asks what part of the grammar or pragmatic system is responsible for unexpected readings with negation.

The general roadmap for this chapter is as follows. In Section 4.1, we survey the array of identified Neg$^+$ readings, and observe that though they can all be characterized as optional, unexpectedly strong interpretations, they do not appear to be identical. In particular, they do not uniformly match the surface form of Neg-raising inferences. Nevertheless, in Section 4.2 we run through two proposed sets of diagnostics for Neg-raising, and show that these both group all of the Neg$^+$ readings together. Having shown that, on at least these important measures, the Neg$^+$ inferences form what appears to be a unified group, we ask whether all Neg$^+$ inferences can have the same source. In Section 4.3, we argue that that this looks reasonable, and outline how an account based on an Excluded Middle Inference would have to look to be able to capture the full range of Neg$^+$ readings. Then we turn to the implementation, and discuss, in the context of previous characterizations of the Excluded Middle Inference, how and where our version should be employed in the grammar. In 4.4, we review two recent accounts, one semantic and one pragmatic, and see how each fares when we consider the diverse class of Neg$^+$ inferences as a cohesive whole. The results suggest that a pragmatic explanation is the way to go, and so we propose an extension to Romoli (2013) that makes his pragmatic account applicable to the broader class of Neg$^+$ predicates.

4.1 Neg⁺ Predicates: Neg-raisers, Habituals, and Class I/II Verbs

We begin with the Neg-raisers—in terms of attention the senior members of the Neg⁺ field. As indicated above, Neg-raised readings are available only for certain attitude verbs. Above we saw the pair of *believe* and *know*, but there are others, e.g. *want* but not *wish*; *think* but not *is certain*.

(161)   *Neg-Raising verb* **want**

(a) Frank doesn't want Roger to be present.

(b) *Can be interpreted as:* Frank wants Roger to not be present.

(162)   *Non-Neg-Raising verb* **wish**

(a) Frank doesn't wish that Roger was here.

(b) *Cannot be interpreted as:* Frank wishes that Roger wasn't here.

(163)   *Neg-Raising verb* **think**

(a) Frank doesn't think that Roger is responsible.

(b) *Can be interpreted as:* Frank thinks that Roger is not responsible.

(164)   *Non-Neg-Raising verb* **is certain**

(a) Frank is not certain that Roger is responsible.

(b) *Cannot be interpreted as:* Frank is certain that Roger is not responsible.

We mentioned that there have been a number of explanations for these NEG-raised readings, and these range from the syntactic (e.g. Fillmore (1963)) to the pragmatic (e.g. Horn (1971)). We also mentioned that many of these approaches (the ones we called "naive") have the same general goal: to derive how for a Neg-raising verb α, when x is a subject and p a proposition, $\neg\alpha(x, p)$ can be interpreted as $\alpha(x, \neg p)$.

These Neg-raised interpretations, it should be noted, are optional. While (158), (161), and (163) have Neg$^+$ readings, they also have "weaker" readings, given below.

(165)   (a) Frank doesn't believe that Roger is responsible.

(b) *Can be interpreted as:* Frank has no opinion as to whether or not Roger is responsible.

(166)   (a) Frank doesn't want Roger to be present.

(b) *Can be interpreted as:* Frank has no opinion as to whether or not Roger is present.

(167)   (a) Frank doesn't think that Roger is responsible.

(b) *Can be interpreted as:* Frank has no opinion as to whether or not Roger is responsible

Most people find the Neg$^+$ readings to be more prominent out of the blue, but with the right context, these regular weak readings are perfectly acceptable. For the examples here, just imagine a situation in which Frank has never heard of Roger.

In Chapter 1, we illustrated two kinds of reading found with negated Class I/II sentences, one we called "weak", which described the absence of an event, and one we called "strong" which described a negative standpoint. These two readings were made most salient with modification by the strict NPI, *until*. We'll talk more about NPI licensing shortly (when we see how other authors have used it to identify Neg-raising), but for now just recall that these NPIs are able to attach in two different locations in negated Class I/II sentences. We replicate the patterns here for *Frank didn't permit the kids to leave*, and *Frank didn't promise to pay child support*.

(168)   Frank didn't permit the kids to leave until 3 pm.

(a) *Weak reading:* There was not an event of Frank giving permission until 3 pm.

(b) *Strong reading:* At some point earlier, Frank forbade the kids to leave until 3 pm.

(169)   Frank didn't promise to pay child support until Marie was four.

(a) *Weak reading:* There was not an event of Frank promising to pay until Marie turned four.

(b) *Strong reading:* At some point earlier, Frank said he would pay child support, but only after Marie turned four.

The weak (a) readings are the ones expected by the story laid out in the previous chapter—in both cases we find the denial of the occurrence of a particular kind of event before a given time, but no necessary inference that Frank has a negative view on the possibilities described. So it is the (b) readings, in which we find a description of Frank's negative views, that are not yet accounted for.[2]

Along with Neg-raised readings, we will classify these strong readings with negation as Neg$^+$ interpretations. However, as we noted in Chapter 1, the Neg$^+$ readings detected with Class I/II predicates do not, at least naively, look the same as standard Neg-raised readings, as they do not involve an inference from $\neg\alpha(x, p)$ to $\alpha(x, \neg p)$.

(170)   Frank didn't permit his students to leave class early.

(a) *Attested Neg$^+$ reading:* According to Frank, his students were forbidden to leave class early.

(b) *Naive (and unattested) Neg-raised reading:* Frank permitted his students to not leave class early.

The available Neg$^+$ inference for (170) is in (a), and this doesn't lead to the naive Neg-raised reading, given in (170b). In fact, this reading is not even available as a possible interpretation for (170). Similarly, the Neg$^+$ reading for (171) is not the one that fits the mold of classical Neg-raising:

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[2]Note that simply assuming these past tense predicates are habitual won't solve things: this just gives us the prediction that the meaning of the sentences in (168) and (169) have a reading that can be paraphrased beginning with *Frank is not the experiencer of an initialized habit to indicate . . .*

(171) Frank didn't promise to visit Theresa until next month.

   (a) *Attested Neg$^+$ reading:* According to Frank's commitments, he doesn't have to visit Theresa until next month.

   (b) *Naive (and unattested) Neg-raised reading:* Frank promised to not visit Theresa until next month.

Indeed, the (b) reading is not even available for (171).

So we have Neg$^+$ readings with both Class I and II predicates, but they don't look like Neg-raised readings. We find a similar pattern with habitual predicates. Take (172) below.

(172) Frank didn't smoke.

   (a) *Neg$^+$ inference:* According to Frank's habits, he would not smoke.

Given the presence of HAB, the interpretation of (172) should be something like *it was not an initiated disposition of Frank's to smoke*. But note that this alone could just be because Frank lives somewhere where cigarettes simply do not exist. This is weaker than the preferred interpretation of (172), which comes with the counterfactual inference that were Frank to have been offered a cigarette, he would not have smoked it, at least by choice. With this reading, the inference seems to reflect the intuition that Frank does have a disposition, and that's to not smoke. Whatever his motivation, he has a fixed and negative view on smoking.

As we did with the Class I/II cases, we can use *until* to illustrate both the expected interpretation of (172) and this stronger reading.

(173) Frank didn't smoke until Julie did.

   (a) *Expected (weak) reading:* Frank did not have an initiated disposition to smoke until Julie had an initiated disposition to smoke.

   (b) *Strong reading:* Frank had an initiated disposition to wait until Julie started smoking before smoking himself.

The first is the expected reading given the entry for HAB we gave above: that Frank was not the experiencer of a disposition to smoke until Julie was the experiencer of a disposition to smoke. The second reading is the Neg$^+$ reading, which describes a habit to smoke only after Julie did.

Again, the stronger Neg$^+$ reading with these habitual sentences cannot be the result of classical Neg-raising: the verb *smoke*, even if it is dispositional, does not take propositional complements. That is, because there is no embedded clause, there is nowhere for the sentential negation to be interpreted but the matrix clause. Inferring from $\neg\alpha(x, p)$ to $\alpha(x, \neg p)$ is simply not applicable here.

We are now in a position to acknowledge that run-of-the-mill habituals, Class I and II predicates, and Neg-raising verbs all have extra, unexpectedly strong readings with negation; that is, they all have Neg$^+$ readings. We can also see that they don't all look like instances of Neg-raising. Nonetheless, to disregard the commonality among the cases, the presence of a reading that describes a negative eventuality, not just the absence of one, would seem to put us at risk of missing out on a theory with explanatory power. The rest of this chapter will argue that this commonality is the result of a single phenomena, which underlies all Neg$^+$ readings.

4.2   Diagnosing Neg$^+$

The previous section informally introduced Neg$^+$ predicates, which we characterized as those that lead to optional, unexpectedly strong readings when used in sentences with negation. However, these readings are not identical across all Neg$^+$ predicates, and in particular, they don't all have the form of Neg-raised readings. Moreover, sometimes the judgments on these readings are subtle. Even within the subclass of Neg-raisers, judgments are delicate enough that a couple of additional diagnostics for the presence of Neg-raised inferences have been proposed. In this section, we will see that the criteria

among these that hold up to closer scrutiny uniformly group together all the Neg$^+$ predicates, not just the Neg-raisers. We will look at two different sets of these diagnostics, investigated in the next two subsections.

4.2.1 Strict NPIs and Anti-Additivity

The first set of diagnostics we examine are those adopted by Gajewski (2007). We've already used NPIs to detect extra readings with negation, but Gajewski, picking up a line well-known in the Neg-raising literature since at least Lakoff (1969), cites the licensing of strict NPIs in embedded clauses as a categorical indicator of the presence of Neg-raised readings. We present his argument for the significance of these readings, which we will argue is flawed, but still useful, and then revisit NPI licensing among the range of Neg$^+$ predicates.

Gajewski presents pairs like the following:

(174)   *Neg-raisers*:

    (a) Bill doesn't think that Mary will leave until tomorrow.

    (b) Mary doesn't believe that Bill has left the country in years.

(175)   *Non-Neg-raisers*:

    (a) ??/* Bill doesn't claim that Mary will leave until tomorrow.

    (b) ??/* Mary doesn't say that Bill has left the country in years.

The terms *in years* and punctual *until* are strict NPIs, for which a downward entailing context is necessary for licensing, but not sufficient.

(176)   (a) * Alonso arrived until yesterday.

    (b) * Not every student arrived until yesterday.

    (c) Alonso didn't arrive until yesterday.

(177)　(a) * Alonso arrived in years.

　　　(b) * Not every student arrived in years.

　　　(c) Alonso hasn't arrived in years.

In the above examples, the (a) sentences indicate that these NPIs are not licensed outside downward entailing environments, but the (b) sentences show that downward entailing-ness is not enough. Gajewski claims that what distinguishes these (b) cases from those in (c) is anti-additivity. After Zwarts (1998), he takes the strengths of negation to be characterized as follows:

(178)　Strengths of Negation (Zwarts (1998)):

　　　(i) $f(X) \vee f(Y) \Rightarrow f(X \wedge Y)$

　　　(ii) $f(X \vee Y) \Rightarrow f(X) \wedge f(Y)$　　　　　*Downward Entailing (i-ii)*

　　　(iii) $f(X) \wedge f(Y) \Rightarrow f(X \vee Y)$　　　　　*Anti-Additive (i-iii)*

　　　(iv) $f(X \wedge Y) \Rightarrow f(X) \vee f(Y)$　　　　　*Antimorphic (i-iv)*

Sentential negation, as in the (c) examples above, is anti-additive (and in fact antimorphic, though this doesn't concern us here). The environment created by *not every*, as in the (b) examples, is only downward entailing. This is demonstrated in (179) and (180).

(179)　(i) Alonso didn't arrive or Alonso didn't turn off the light $\Rightarrow$

　　　Alonso didn't leave and turn off the light

　　　(ii) Alonso didn't leave or turn off the light $\Rightarrow$

　　　Alonso didn't leave and Alonso didn't turn off the light　　　　　*DE (i-ii)*

　　　(iii) Alonso didn't arrive and Alonso didn't turn off the light $\Rightarrow$

　　　Alonso didn't leave or turn off the light　　　　　*AA (i-iii)*

(180)　(i) Not every student likes tests or not every student likes cake $\Rightarrow$

　　　Not every student likes tests and cake

　　　(ii) Not every student likes tests or cake $\Rightarrow$

Not every student likes tests and not every student likes cake   *DE (i-ii)*

(iii) Not every student likes tests and not every student likes cake $\not\Rightarrow$

Not every student likes tests or cake   *Not AA (i-iii)*

The (i) and (ii) sentences show that both sentential negation and *not every* are downward entailing. But (179iii) and (180iii) show that while sentential negation is also anti-additive, *not every* is not. It can certainly be true that every student likes tests or cake without all uniformly liking one or the other.

For Gajewski then, strict NPIs are licensed by anti-additive environments, and these NPIs can be embedded in the objects of negated Neg-raising predicates, because negating them creates anti-additive contexts.

But while NPI licensing and formal notions of negative strength are exactly the kind of Neg-raising diagnostics we would hope for, there is a problem here. There are environments that license Neg-raising, but don't allow for strict NPIs. We've just seen that *not every* is not anti-additive and does not license strict NPIs (see (176b) and (177b). This is not affected by the use of a Neg-raising predicate:

(181)   * Not every student believes that Mary will leave until tomorrow.

Nonetheless, despite not licensing these NPIs, *not every* does license Neg-raising.

(182)   *(Homer (2012), ex.10)*

     (a) Not everyone wants to help me.

     (b) *Neg-raised reading:* There are some people who want not to help me.

So unfortunately, Neg-raising can sometimes occur when the licensing of strict NPIs does not. So strict NPI licensing can't be strictly required to indicate that Neg-raising has occurred. That said, strict NPI licensing is not irrelevant here: it appears to be a sufficient indicator of Neg-raising—whenever we find a strict NPI in the embedded object of a negated matrix Neg-raiser, the reading in which it is licensed is one in which the negation is interpreted down low, constituting an unexpectedly strong interpretation.

As a result, we'll assume that embedded strict NPI licensing is a sufficient but not necessary condition for Neg-raising. The strict NPI indicates that a reading with negation interpreted lower than expected is available, but sometimes, despite such a reading being available, the NPI is excluded (presumably for independent reasons).

With this established, we can ask whether strict NPI licensing can tell us anything more about the other putative members of the Neg$^+$ class. In Neg-raising, we've observed that when a strict NPI is licensed, the surface matrix negation is interpreted in the lower clause. As we saw in the previous section, while there are unexpected readings with the strict NPI *until*, these are not totally parallel with the Neg-raising cases—with run-of-the-mill habituals there is no lower clause, and with the Class I/II verbs, simply moving negation directly to the lower clause leads to the wrong interpretation. Nonetheless, the negation is interpreted somewhere lower than its surface matrix position, and we will see just where it goes for these predicates in the next section. For now though, we can use strict NPI licensing to tell us more about when, exactly, we get Neg$^+$ inferences. This will help us to begin to pinpoint the provenance of the Neg$^+$ readings.

We've already seen that matrix negation of Class I/II sentences can license NPIs in unexpected places; what we haven't pointed out is that this is only true with habitual, or stative Class I/II predicates. Recall that compatibility with the progressive indicates that a predicate is [+stages], which allows us to classify it as non-stative (and more specifically as an accomplishment or activity). Neither of the sentences in (183) is good:

(183)   *Eventive Class I/II cases*

    (a) * The teacher wasn't permitting the students to leave until the bell rang (when the alarm went off).

    (b) * The contractor wasn't promising to be finished until Monday (when the accident occurred).

In fact, it seems we don't get Neg$^+$ readings with eventive Class I/II sentences more

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generally:

(184) *Eventive Class I/II cases*

(a) The teacher wasn't permitting the students to leave (when the alarm went off).

(b) The contractor wasn't promising to be finished (when the accident occurred).

(184a) cannot be used to describe a situation where the teacher was forbidding the students to leave at the moment the alarm went off, nor does (184b) have a reading where the contractor was expressing an inability to promise something at the time of the accident.

Interestingly, this also corresponds to a novel (I think) observation about Neg-raising verbs. All Neg-raisers are stative, and in the rare case where an eventive counterpart of a Neg-raiser is available, this eventive counterpart does not lead to extra-strong readings with negation. Compare the cases with *think* below:

(185) *Stative* **think**

(a) The farmer didn't think the tree fell until late last night.

(b) The farmer didn't think rain would help the situation.

Can be interpreted as The farmer thought that rain wouldn't help the situation.

(186) *Eventive* **think**

(a) * The farmer wasn't thinking the tree fell until late last night when the barking dog startled him out of his reverie this morning.

(b) As they turned the corner, the farmer wasn't thinking rain would help the situation.

Cannot be interpreted as As they turned the corner, the farmer was thinking that rain wouldn't help the situation.

The strict NPI *until* is licensed with the stative *think* in (185a), but not with the eventive version of the verb in (186a). And as indicated with the (b) cases, we find that negation can be interpreted unexpectedly low with stative *think*, but not with eventive *think*..

We find the same situation with the Neg-raiser *want*.

(187)   *Stative* **want**

    (a) The farmer doesn't want the tree to fall until tomorrow.

    (b) The farmer doesn't want it to rain.

    Can be interpreted as The farmer wants it not to rain.

(188)   *Eventive* **want**

    (a) * The farmer wasn't wanting the tree to fall until tomorrow.

    (b) As they turned the corner, the farmer wasn't wanting it to rain.

    Cannot be interpreted as As they turned the corner, the farmer was wanting it to not rain.

So with both classical Neg-raisers and Class I/II verbs, we get Neg$^+$ readings and embedded strict NPI licensing when the predicates in question are stative, but not when they are eventive.

Turning to non-Class-I/II habituals (which are stative by definition), we've already seen that we get multiple readings with strict NPIs. Another case is given below:

(189)   *Habitual:*

    Michelle didn't cut her hair until she saw split ends.

    (a) *Expected reading:* Until she saw split ends for the first time, Michelle didn't have a habit of cutting her hair.

    (b) *Neg$^+$ reading:* Michelle had a habit of only cutting her hair once she saw split ends.

The (b) reading for (189) is clearly different from the (a) reading, and in particular, both the negation and strict NPI *until* are interpreted within the habit in (b), but outside the habit in (a). Again, we promise to return to where in the structure the negation is going in the next section, but point out here that an eventive version of this sentence will not have an extra reading with negation:

(190)   *Eventive:*

Michelle didn't cut her hair for the first time until January 6th, 2014.

(a) *Only reading:* Until January 6th, 2014, Michelle had not cut her hair.

As with the attitudes and the Class I/II predicates then, we only get Neg$^+$ readings and low NPI licensing when these verbs are in stative predicates.

We can say then that the Neg$^+$ category is populated by stative attitude verbs, the stative habitual versions of Class I/II verbs, and the stative habituals more generally. For all the verbs in all these Neg$^+$ categories, strict NPIs can be interpreted in sites that are unexpected given the location of negation on the surface. Though we haven't identified exactly where, the negation in these cases is also interpreted lower than its surface matrix position. As a result, the licensing of embedded strict NPIs groups together all the stative Neg$^+$ predicates, as those that lead to extra readings where negation is found in places not predicted by its surface position.

4.2.2   Wide Scope Existential Readings and Cyclicity

The next two characteristics of Neg-raising are also discussed by Gajewski, but it is Homer (2012), with a focus on distinguishing between Neg-raisers and positive polarity items, who promotes these characteristics to the level of diagnostics. The first of these is the existence of what he calls "wide scope existential readings" for sentences whose subject is a negative universal quantifier. We have already seen an instance of this in (182), but we consider some more examples here.

(191)   (a) Not everyone wants to help me. *(Homer (2012), ex.61)*

(b) *Paraphrasable as:* There is some x such that x wants not to help me.[3] *(Neg-Raised*

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[3]Homer contrasts this with PPIs, like *must*, which do not have readings in which the negation is interpreted down low:

(1)   Not everyone must jog. *(Homer (2012), ex.62)*

reading)

These readings are readily available with Class I/II predicates (192-193) and other habituals (194):

(192) (a) Not everyone permitted the students to use cell phones in class.

(b) *Paraphrasable as:* There is some x such that x forbade cell phone use in class. *(Neg$^+$ reading)*

(193) (a) Not everyone promised to be ready by 10 am.

(b) *Paraphrasable as:* There is some x such that x was not committed to being ready by 10 am. *(Neg$^+$ reading)*

(194) (a) Not everyone eats meat.

(b) *Paraphrasable as:* There is some x such that x has a habit of not eating meat. *(Neg$^+$ reading)*

Note that we don't get wide scope existential readings with eventive versions of attitudes and Class I/II verbs:

(195) (a) When the storm hit, not everyone was thinking that it needed to rain.

(b) *Not paraphrasable as:* When the storm hit, there was some x such that x was thinking that it didn't need to rain.

(196) (a) Not everyone was in the middle of permitting the students to use cell phones in class.

(b) *Not paraphrasable as:* There was some x such that x was in the middle of forbidding cell phone use in class.

Not paraphrasable as: There is some x such that x is required not to jog.

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(197) (a) Not everyone was promising to be ready by 10 am (at that moment).

(b) *Not paraphrasable as:* There was some x such that x was indicating a lack of commitment to being ready by 10 am (at that moment).

So this characteristic of allowing wide scope existential readings thus also groups all the Neg$^+$ predicates together, and distinguishes them from their eventive counterparts.

The next criterion is known as cyclicity, which we see when we get narrowest scope interpretations of surface matrix negation when a Neg-raising predicate is embedded under another Neg-raiser.

(198) (a) I don't think that John wants to help me. *(Homer (2012), ex.11)*

(b) *Paraphrasable as:* I think John wants not to help me. *(Cyclic Neg-raised reading)*

However, only some Neg-raisers lead to cyclic readings when they embed other Neg-raisers:

(199) (a) I don't want John to think that I'm angry. *(Homer (2012), ex.12)*

(b) *Not paraphrasable as:* I want John to think I'm not angry. *(No cyclic Neg-raised reading)*

We will come back to this property later, and discuss why only embedding by a subset of Neg-raisers allows for cyclic readings, but for now note that stative *think* is among these, as in (198).[4] This allows us to test the other Neg$^+$ predicates for cyclicity:

(200) *(Class I:)*

(a) I don't think Clara permitted her students to leave until after the bell.

(b) *Paraphrasable as:* I think Clara forbade her students to leave until after the bell. *(Cyclic Neg$^+$ reading)*

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[4]Obviously eventive *think* does not lead to cyclic Neg$^+$ readings when it embeds other Neg$^+$ predicates, as eventive *think* is never involved in Neg$^+$ readings.

(201)   *(Class II:)*

(a) I don't think the contractor promised to be done until Monday.

(b) *Paraphrasable as:* I think the contractor was not committed to being done until Monday. *(Cyclic Neg$^+$ reading)*

(202)   *(Habituals:)*

(a) I don't think Clara drinks until after lunch.

(b) *Paraphrasable as:* I think Clara has a habit of not drinking until after lunch. *(Cyclic Neg$^+$ reading)*

The examples in (200-202) show that when the Class I and II predicates and habituals are embedded under a cyclic Neg-raiser, a cyclic Neg$^+$ reading is available. As usual, eventive versions of the Class I/II predicates do not display this behavior:

(203)   *(Class I:)*

(i) * I don't think Clara was in the middle of permitting her students to leave until after the bell.

(ii-a) I don't think Clara was in the middle of permitting her students to leave.

(ii-b) *Not paraphrasable as:* I think Clara was in the middle of forbidding her students to leave.

(204)   *(Class II:)*

(i) * I don't think the contractor was in the middle of promising to be done until Monday.

(ii-a) I don't think the contractor was in the middle of promising to be done.

(ii-b) *Not paraphrasable as:* I think the contractor was in the middle of indicating a lack of commitment to being done until Monday.

In sum then, according to both Gajewski and Homer's sets of diagnostics for Neg-raising verbs, all the Neg$^+$ predicates group together, to the exclusion of their eventive

counterparts. So to the extent that the proposed criteria accurately indicate the presence of extra strong readings with negation, all Neg$^+$ predicates are subject to these interpretations.

4.3 Exploring the Source of Neg$^+$ Inferences

We have seen that on a naive level, Neg$^+$ readings don't all have the form associated with Neg-raised readings. However, all Neg$^+$ interpretations fall under the heading of extra strong readings with negation, and existing sets of diagnostics for Neg-raising group all our Neg$^+$ predicates together. In this section, we will look in more detail at existing accounts of Neg-raising, and discuss whether any of these could be adapted for the broader range of Neg$^+$ readings.

The first in-depth accounts of Neg-raising attributed the two readings in (205) below to two different underlying syntactic structures, with the converging surface forms resulting from the overt raising of the Neg operator.

(205)   George doesn't believe Shep is outside.

Non-Neg-raised reading: George does not hold the belief that Shep is outside.

Neg-raised reading: George believes Shep is not outside.

In what follows, we are going to set aside the syntactic option. This is not because a structural account is prima facie implausible. Things are said to move around in structures all the time—why couldn't a Neg operator originate in an embedded clause, and then move up to its surface location? One (maybe not insurmountable) problem with this is why movement would be limited by the matrix predicate: why allow movement with *want* and *think*, but not *remember* or *manage*, or even the eventive version of *think*? However, even if there was something structurally singular and significant about Neg-raisers, something that allowed for exceptional movement, there would remain a bigger problem.

This problem is well-known in the literature (see, e.g. Homer (2012) or Gajewski (2007)), and has to do with something we've already seen: negative composed quantifiers. Take the example in (206) below.

(206)   No one thinks Jones is from Newfoundland.

This has a Neg$^+$ reading, which is given in (207):

(207)   *Neg$^+$ reading:* Everyone thinks Jones is not from Newfoundland.

    = $\forall$x. x thinks Jones isn't from Newfoundland

To get the Neg$^+$ reading on the syntactic story, the negation needs to originate in the embedded clause before moving to surface position. We could try to go about this by decomposing the subject quantifier *no one*, as is often done, into two parts: $\neg\ \exists x$. Then the negation could be interpreted down low, before surface movement, while the quantifier originates higher up.

(208) $\exists x$. x thinks Jones isn't from Newfoundland

Right? Wrong. As least wrong as an account of Neg$^+$ interpretations. First, the reading in (208) is not equivalent to (207), so it doesn't give us the Neg$^+$ reading associated with (206). Second, (208) is not even a possible interpretation for (206). So unless we start breaking down composed quantifiers in different, otherwise unmotivated ways, the syntactic story has no easy explanation for Neg$^+$ readings.

Now we turn to semantic and pragmatic approaches to Neg-raising. Both these lines stem from the work of Bartsch (1973), who characterizes Neg-raising as the result an excluded middle inference. Leaving aside all particulars, this is basically as follows:

(209)   Excluded Middle Inference (EMI$_{\mathrm{Bartsch}}$)

    For a Neg-raising predicate α, subject x, and propositional object p,

    α(x,p) or α(x,¬p)

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For example, the calculation of this inference with (210) below leads to the Neg-raised reading in (c):

(210)   Karl doesn't believe Katia is telling the truth.

    (a) Assertion: ¬believe (Karl, Katia is telling the truth)

    (b) $\text{EMI}_{Bartsch}$: believe (Karl, Katia is telling the truth) ∨ believe (Karl, Katia is not telling the truth)

    (c) Assertion + EMI: believe (Karl, Katia is not telling the truth)

As far as I know, every semantic or pragmatic account of Neg-raising since has incorporated some version of the excluded middle inference. Where each approach differs, however, is in implementation. The main issue of contention is whether the excluded middle inference should be calculated in the semantics, as a presupposition, or as a pragmatic implicature. We will return to this issue after we investigate how a variant of the EMI would have to look in order to be applicable to the broader class of Neg^+ predicates.

4.3.1   The EMI and Neg^+

So far, we have represented the excluded middle inference in a way that we know will fail to provide any insight for the non-Neg-raising cases of Neg^+, as the $\text{EMI}_{Bartsch}$ leads to the wrong interpretations for Class I/II cases, and does nothing for other habituals. But even without being aware of the fuller range of Neg^+ phenomena, several authors have characterized the excluded middle inference in a way that puts that range within reach. Gajewski (2007), in particular, explicitly shifts the talk from predicates to their modal bases, giving the following template for the lexical entries of Neg-raising predicates:

(211)   **Lexical Entry for Neg-Raising Predicate α, whose modal base is M**:

    $[\![\alpha]\!]$ (P)(x) (for any proposition P, and individual x):

    (i) presupposition: M(x) ⊆ P or M(x) ∩ P = ∅ (EMI)

    (ii) truth condition: M(x) ⊆ P

For now, we remain agnostic as to whether the EMI is actually a presupposition, but show how this kind of entry can derive the Neg$^+$ inferences associated with *believe*.

(212)   Karl doesn't believe Katia is telling the truth.

   (a) **Assertion**: $\forall w \in B_{karl}$: Katia is telling the truth in w

   (b) **EMI**: $\forall w \in B_{karl}$: Katia is telling the truth in w **or** $\forall w \in B_{karl}$: Katia is not telling the truth in w

   (c) **Assertion + EMI**: $\forall w \in B_{karl}$: Katia is not telling the truth in w

This formulation immediately suggests what may unite all the Neg$^+$ predicates (other than the fact that they are all stative): they all involve quantification over possible worlds— for habituals, over the worlds that conform to the habits of the speaker, and for Class I/II verbs, over the worlds that conform to the habits of the subject, over the worlds compatible with what has been indicated, and over the worlds that are compatible with the subject's standpoint.

In what follows, we will try to wrangle an account from this optimistic observation. In service of this end, it will help to recall our proposed lexical entries for the Neg$^+$ predicates. For *believe* and the other traditional attitudes, we took up Hacquard (2010)'s characterization of attitude verbs. The entry for *believe* is below:

(213)   *Modified from Hacquard (2010), ex. 41*

   $\llbracket$believe$\rrbracket$ = $\lambda p\lambda x\lambda e\lambda w$. Exp(e,x) & belief'(e,w) & $\forall w' \in \cap$CON(e,w): p(w')=1

Right away, we can see that we will have to change the letter, though not the spirit, of Gajewski's template. With an eventuality based entry for attitudes, we need to do more than just refer to modal bases. Instead, we want something that will derive the following:

(214)   Karl doesn't believe Katia is telling the truth.

   (a) **Assertion**: $\neg\exists e$. Exp(s, Karl) & belief'(e,w_0) & $\forall w \in \cap$CON(e,w_0): Katia-is-telling-the-truth(w)=1

   (b) **EMI'**: $\exists e$. Exp(e, Karl) & belief'(e,w_0) & $\forall w \in \cap$CON(e,w_0): Katia-is-telling-

the-truth(w)=1 **or** $\exists$e. Exp(e, Karl) & belief'(e,w_0) & $\forall$w $\in$ $\cap$CON(e,w_0): Katia-is-telling-the-truth(w)$\neq$1

(c) **Assertion + EMI'**: $\exists$e. Exp(e, Karl) & belief'(e,w_0) & $\forall$w $\in$ $\cap$CON(e,w_0): Katia-is-telling-the-truth(w)$\neq$1

In the rest of this section we will see a lot of this kind of example. It will be less unnecessarily overwhelming to deal with simplified versions of these assertions and inferences, as in (215a-c):

(215)   Karl doesn't believe Katia is telling the truth.

let p=Katia is telling the truth, and B=belief

(a) **Assertion**: $\neg\exists$B. $\square_B$p

(b) **EMI'**: $\exists$B. $\square_B$p **or** $\exists$B. $\square_B(\neg$p$)$

(c) **Assertion + EMI'**: $\exists$B. $\square_B(\neg$p$)$

We will employ this style of abbreviation where useful in the remainder of this chapter.

With this in hand, we can look at how this might work for the other Neg^+ predicates. To see what we need for habituals, recall our proposed entry for the HAB operator.

(216) $[\![$HAB$]\!]$ = λqλxλeλw. Exp(e,x) & disposition(e,w) & $\forall$w' $\in$ $\cap$CON(e,w): $\exists$E. q(x,E,w')

So for a sentence like *Tyrone eats meat*, we would have something like (217) below.

(217)   Tyrone eats meat.

(a) **Assertion**: $\exists$e. Exp(e,Tyrone) & disposition(e,w_0) & $\forall$w $\in$ $\cap$CON(e,w_0): $\exists$E. agent(E,Tyrone) & eats-meat(E,w)

The negation of this has two readings; one a straightforward denial of the existence of a habit, and the other an assertion of a disposition to not do something. The latter could be derived as follows:

(218)   Tyrone doesn't eat meat.

(a) **Assertion**: $\neg\exists$e. Exp(e,Tyrone) & disposition(e,w_0) & $\forall$w $\in$ $\cap$CON(e,w_0): $\exists$E.

agent(E,Tyrone) & eats-meat(E,w)

(b) **EMI′**: ∃e. Exp(e,Tyrone) & disposition(e,w_0) & ∀w ∈ ∩CON(e,w_0):

∃E. agent(E,Tyrone) & eats-meat(E,w) **or** ∃e. Exp(e,Tyrone) & disposition(e,w_0) &

∀w ∈ ∩CON(e,w_0): ¬∃E. agent(E,Tyrone) & eats-meat(E,w)

(c) **Assertion + EMI′**: ∃e. Exp(e,Tyrone) & disposition(e,w_0) & ∀w ∈ ∩CON(e,w_0):

¬∃E. agent(E,Tyrone) & eats-meat(E,w)

Or more succinctly:

(219) Tyrone doesn't eat meat.

let p=Tyrone eats meat, and D=disposition

(a) **Assertion**: ¬∃D. $\Box_D p$

(b) **EMI′**: ∃D. $\Box_D p$ **or** ∃D. $\Box_D(\neg p)$

(c) **Assertion + EMI′**: ∃D. $\Box_D(\neg p)$

With the negation applying within the content of the disposition, we have the interpretation that Tyrone has a disposition, and in all the worlds in which his dispositions remain constant and unconstrained, there are no events of him eating meat. That is, Tyrone has a disposition according to which he does not eat meat.

So what we have after looking at the attitudes and habituals is that to get the strengthened reading represented in (c), we need the excluded middle inference to establish that if one state doesn't exist, another state does, and this state is exactly the same, except that what holds in all the worlds compatible with the state's content is negated.

For the Class I and II predicates, things are a little less clear. Recall our Hacquard-inspired interpretations for the Class I and II verbs, for example, *permit* and *promise*, repeated below.

(220) ⟦permit⟧ = λpλxλeλw. Source(e,x) & publicly-indicate(e,w) & ∀w′ ∈ ∩CON(e,w):

∃w″: (w′ $R_{x,accept}$ w″) & p(w″)=1

(221) $[\![\text{promise}]\!]= \lambda p \lambda x \lambda e \lambda w.\ \text{Source}(e,x)\ \&\ \text{publicly-indicate}(e,w)\ \&\ \forall w' \in \cap\text{CON}(e,w)$:

$\forall w''$: $(w'\ R_{x,commit}\ w'') \rightarrow p(w'')=1$

Note that these are the basic, eventive versions of the Class I and II verbs, which do not have Neg$^+$ readings. To get their stative counterparts, we had to apply the dispositional operator, HAB. We had the concrete cases *Tyrone permitted Ming-Ming to borrow his suitcase*, and *Tyrone promised to meet Ming-Ming at the train station*:

(222) Tyrone permitted Ming-Ming to borrow his suitcase.

(a) **Assertion**: $\exists e.\ \text{Exp}(e,\text{Tyrone})\ \&\ \text{disposition}(e,w_0)\ \&\ \forall w \in \cap\text{CON}(e,w_0)$: $\exists E$. $\text{Source}(E,\text{Tyrone})\ \&\ \text{publicly-indicate}(E,w)\ \&\ \forall w' \in \cap\text{CON}(E,w)$: $\exists w''$: $(w'\ R_{Tyrone,accept}\ w'')\ \&\ \text{Ming-Ming-borrows-Tyrone's-suitcase}(w'')=1$

Or more simply:

let p=Ming-Ming borrows Tyrone's suitcase, I=indication, and D=disposition

(a) **Assertion**: $\exists D.\ \Box_D\ [\exists I.\ \Box_I(\Diamond p)]$

(223) Tyrone promised to meet Ming-Ming at the train station.

(a) **Assertion**: $\exists e.\ \text{Exp}(e,\text{Tyrone})\ \&\ \text{disposition}(e,w_0)\ \&\ \forall w \in \cap\text{CON}(e,w_0)$: $\exists E$. $\text{Source}(E,\text{Tyrone})\ \&\ \text{publicly-indicate}(E,w)\ \&\ \forall w' \in \cap\text{CON}(E,w)$: $\forall w''$: $(w'\ R_{Tyrone,commit}\ w'') \rightarrow \text{Tyrone-meets-Ming-Ming-at-the-train-station}(w'')=1$

Or more simply:

let p=Tyrone meets Ming-Ming at the train station, I=indication, and D=disposition

(a) **Assertion**: $\exists D.\ \Box_D\ [\exists I.\ \Box_I(\Box p)]$

Again, these have two readings when negated, one of which is the straightforward absence of a disposition. For the negation of (222), the second reading, the Neg$^+$ one, could be derived along the following lines.

(224) Tyrone didn't permit Ming-Ming to borrow his suitcase.

let p=Ming-Ming borrows Tyrone's suitcase, I=indication, and D=disposition

(a) **Assertion**: $\neg\exists$D. $\Box_D$ [$\exists$I. $\Box_I(\Diamond p)$]

(b) **EMI′**: $\exists$D. $\Box_D$ [$\exists$I. $\Box_I(\Diamond p)$] **or** $\exists$D. $\Box_D$ [$\exists$I. $\Box_I(\neg\Diamond p)$][5]

(c) **Assertion + EMI′**: $\exists$D. $\Box_D$ [$\exists$I. $\Box_I(\neg\Diamond p)$]

Notice that the (c) reading is not equivalent to *Tyrone permits Ming-Ming to not borrow his suitcase*. That is, as we have noted, the Neg$^+$ reading we seek to derive is not one where the negation is interpreted all the way down within the embedded proposition. Nor is the reading the same as *Tyrone promises/requires Ming-Ming to not borrow his suitcase*, as the accessibility relation is one of acceptance, not commitment or requirement.

We can lay out a similar proposal for the second, strengthened reading of (223):

(225)   Tyrone didn't promise to meet Ming-Ming at the train station.

let p=Ming-Ming borrows Tyrone's suitcase, I=indication, and D=disposition

(a) **Assertion**: $\neg\exists$D. $\Box_D$ [$\exists$I. $\Box_I(\Box p)$]

(b) **EMI′**: $\exists$D. $\Box_D$ [$\exists$I. $\Box_I(\Box p)$] **or** $\exists$D. $\Box_D$ [$\exists$I. $\Box_I(\neg\Box p)$]

(c) **Assertion + EMI′**: $\exists$D. $\Box_D$ [$\exists$I. $\Box_I(\neg\Box p)$]

Again, the reading in (c) is not *Tyrone promises to not meet Ming-Ming at the train station* (because the negation reverses what is said to hold of the worlds compatible with the

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[5]Instead of having the excluded middle inference be formulated this way, as a disjunction of claims of existence, we could, in principle, have characterized it as a claim of the existence of a disjunctive state, like any of the options below:

(1)   (224b′) **EMI″**: $\exists$D. [$\Box_D$ [$\exists$I. $\Box_I(\Diamond p)$] **or** $\Box_D$ [$\exists$I. $\Box_I(\neg\Diamond p)$)]]
      (224b″) **EMI‴**: $\exists$D. $\Box_D$ [$\exists$I. ($\Box_I(\Diamond p)$) **or** $\exists$I. ($\Box_I(\neg\Diamond p)$)]
      (224b‴) **EMI⁗**: $\exists$D. $\Box_D$ [$\exists$I. ($\Box_I(\Diamond p)$ **or** $\Box_I(\neg\Diamond p)$)]
      (224b⁗) **EMI⁗′**: $\exists$D. $\Box_D$ [$\exists$I. ($\Box_I(\Diamond p$ **or** $\neg\Diamond p)$)]
      (224b⁗′) **EMI⁗″**: $\exists$D. $\Box_D$ [$\exists$I. ($\Box_I(\Diamond(p$ **or** $\neg p)$)]]

The first option above would operate in the same way as our chosen formulation. However, none of the other four options could act as the excluded middle inference. The first two of these, put together with (224a) would give us that Tyrone had a disposition to publicly indicate either permission for Ming-Ming to borrow his suitcase or a prohibition of the same, but that he does not have a more specific disposition to indicate only permission for her to borrow the suitcase. These two statements do not lead to the attested Neg$^+$ reading in (224c). Similarly for the bottom two: the first describes the existence of a disposition to indicate that either borrowing is allowed or borrowing is forbidden, and the second a disposition with to indicate that either borrowing or not borrowing is allowed. Neither of these would join with (224a) to give us the attested Neg$^+$ inference.

content, and does not slip even deeper into the structure), or even *Tyrone permits himself to not meet Ming-Ming at the train station* (because the accessibility relation, here based on the subject's commitments, not permissions, is built directly into each Class I and II verb). This is desirable, as neither of these are attested readings for (223). That said, even with these assumptions, (i) that accessibility relations are built in, and (ii) that when negation is interpreted lower than its matrix position it reverses what is said to hold of all the worlds compatible with the content of an eventuality, the readings derived for these habitual readings of Class I and II verbs are not the only logically possible ones. In these cases, there are two eventualities with content—the habit, and the permission or promise.

With the as-yet undefended working formulation of the excluded middle inferences in the above examples, the (c) readings have negation active in the deepest content, the content of the most embedded state. To see that this properly reflects a real state of affairs, that negation can be interpreted in the deepest content, we can do a quick check using the strict NPIs we discussed above. As a baseline, we can look at what happens with strict NPI licensing in the cases of attitude verbs and non-Class I/II habituals. In (226), the NPI *in years* is interpreted in a negative belief:

(226)　a. Dev doesn't believe Siobhan has smoked in years.

　　　b. *Neg$^+$ interpretation:* According to Dev's beliefs, Siobhan hasn't smoked in years.

The following shows how we could arrive at this interpretation.

(227)　Dev doesn't believe Siobhan has smoked in years.

　　　let p=Siobhan smoked, and B=belief

　　　(a) **Assertion**: $\neg\exists B.\ \Box_B(p$ *in years*$)$

　　　(b) **EMI'**: $\exists B.\ \Box_B(p$ *in years*$)$ **or** $\exists B.\ \Box_B(\neg(p$ *in years*$))$

　　　(c) **Assertion + EMI'**: $\exists B.\ \Box_B(\neg(p$ *in years*$))$

For the habitual case, we can look at (228).

(228) a. Siobhan doesn't drink until after dinner.

b. *Neg$^+$ interpretation:* According to Siobhan's habits, she doesn't drink until after dinner.

Here we want (229c):

(229) Siobhan doesn't drink until after dinner.

let p=Siobhan drinks, and D=disposition

(a) **Assertion**: $\neg\exists D.\ \Box_D$(p *until after dinner*)

(b) **EMI′**: $\exists D.\ \Box_D$(p *until after dinner*) **or** $\exists D.\ \Box_D(\neg$(p *until after dinner*))

(c) **Assertion + EMI′**: $\exists D.\ \Box_D(\neg$(p *until after dinner*))

For the attitude and habitual cases, the NPI is interpreted within the content of the state (either the belief or the disposition), and our formulation of the excluded middle inference is designed to reflect this—the EMI′ gives the second disjunctive option as one that has the negation reversing the content of the state, where it licenses the pronunciation of the NPI.

Now we move to the future-oriented Class I and II verbs, where a strict NPI like *until* can help us determine where the surface matrix negation is actually interpreted in Neg$^+$ readings.

(230) a. The rules didn't permit the students to leave until they'd handed in their work.

b. *Neg$^+$ interpretation:* According to the rules, the students were not allowed to leave until they'd handed in their work.

(231) The rules didn't permit the students to leave until they'd handed in their work.

let p=the students leave, I=indication, and D=disposition

(a) **Assertion**: $\neg\exists D.\ \Box_D\ [\exists I.\ \Box_I(\Diamond$(p *until they hand in their work*))]

(b) **EMI′**: $\exists D.\ \Box_D\ [\exists I.\ \Box_I(\Diamond$(p *until they hand in their work*))] **or** $\exists D.\ \Box_D\ [\exists I.\ \Box_I(\neg\Diamond$(p *until they hand in their work*))]

(c) **Assertion + EMI′**: $\exists D.\ \Box_D\ [\exists I.\ \Box_I(\neg\Diamond$(p *until they hand in their work*))

In this case, an excluded middle inference could, in principal, have worked in such a way that the negation and NPI would be interpreted as in the habitual case of (229), in the content of the subject's habits. This would look something like this:

(232)   The rules didn't permit the students to leave until they'd handed in their work.

let p=the students leave, I=indication, and D=disposition

(a) **Assertion**: $\neg\exists D.\ \square_D$ [$\exists I$ *until they hand in their work.* $\square_I(\lozenge p)$]

(b) **EMI'**: $\exists D.\ \square_D$ [$\exists I$ *until they hand in their work.* $\square_I(\lozenge p)$] **or** $\exists D.\ \square_D$ [$\neg\exists I$ *until they hand in their work.* $\square_I(\lozenge p)$]

(c) **Assertion + EMI'**: $\exists D.\ \square_D$ [$\neg\exists I$ *until they hand in their work.* $\square_I(\lozenge p)$]

This would have given us an interpretation closer to *the rules were disposed in such a way that until the students handed in their work, the rules wouldn't be the source of a public indication of permission for the students to leave*, which is not a readily available interpretation (as it would be an odd thing to attribute to a inanimate set of rules).

Similar examples can be produced with Class II predicates.

(233)   a. Marc didn't promise to be there until next Tuesday.

b. *Neg$^+$ interpretation:* According to Marc's promises, he doesn't have to be there until next Tuesday.

(234)   Marc didn't promise to be there until next Tuesday.

let p=Marc is there, I=indication, and D=disposition

(a) **Assertion**: $\neg\exists D.\ \square_D$ [$\exists I.\ \square_I(\square(p$ *until next Tuesday*$))$]

(b) **EMI'**: $\exists D.\ \square_D$ [$\exists I.\ \square_I(\square(p$ *until next Tuesday*$))$] **or** $\exists D.\ \square_D$ [$\exists I.\ \square_I(\neg\square(p$ *until next Tuesday*$))$]

(c) **Assertion + EMI'**: $\exists D.\ \square_D$ [$\exists I.\ \square_I(\neg\square(p$ *until next Tuesday*$))$]

As above, we could theoretically have had a different excluded middle inference, where the negation and NPI are interpreted in the content of the habit:

(235) Marc didn't promise to be there until next Tuesday.

let p=Marc is there, I=indication, and D=disposition

(a) **Assertion**: $\neg\exists$D. $\Box_D$ [$\exists$I *until next Tuesday.* $\Box_I(\Box p)$]

(b) **EMI′**: $\exists$D. $\Box_D$ [$\exists$I *until next Tuesday.* $\Box_I(\Box p)$] **or** $\exists$D. $\Box_D$ [$\neg\exists$I *until next Tuesday.* $\Box_I(\Box p)$]

(c) **Assertion + EMI′**: $\exists$D. $\Box_D$ [$\neg\exists$I *until next Tuesday.* $\Box_I(\Box p)$]

This would be paraphrasable as *Marc had a habit of not promising until next Tuesday that he will be there*, clearly not an available, or even coherent, reading for (234).

But finding examples in which the extra strong reading has negation interpreted as low as possible doesn't prove that this is always the case. And indeed, we find examples where the negation is interpreted in the habit, i.e. not as low as possible. Just take (232), but switch out *the rules* for an animate subject, as in *The geography teacher didn't permit the students to leave until they'd handed in their work*. This could have the NPI-attaching-low interpretation as in (232c), but it could also be interpreted as *the geography teacher had a habit of waiting until his students had handed in their work, and only then publicly indicating permission for them to leave*. This reading does, in fact, have the negation applying to the content of the habit.

(236) The geography teacher didn't permit the students to leave until they'd handed in their work.

let p=the students leave, I=indication, and D=disposition

(a) **Assertion**: $\neg\exists$D. $\Box_D$ [$\exists$I *until they hand in their work.* $\Box_I(\Diamond p)$]

(b) **EMI′**: $\exists$D. $\Box_D$ [$\exists$I *until they hand in their work.* $\Box_I(\Diamond p)$] **or** $\exists$D. $\Box_D$ [$\neg\exists$I *until they hand in their work.* $\Box_I(\Diamond p)$]

(c) **Assertion + EMI′**: $\exists$D. $\Box_D$ [$\neg\exists$I *until they hand in their work.* $\Box_I(\Diamond p)$]

We can also find Class II examples which are interpreted with the NPI (and negation) active in the content of the habit, not the deepest content:

(237) Marc didn't promise to be truthful until the fourth date.

let p=Marc is truthful, I=indication, and D=disposition

(a) **Assertion**: $\neg\exists D.\ \square_D$ [$\exists I$ *until the fourth date.* $\square_I(\square p)$]

(b) **EMI'**: $\exists D.\ \square_D$ [$\exists I$ *until the fourth date.* $\square_I(\square p)$] **or** $\exists D.\ \square_D$ [$\neg\exists I$ *until the fourth date.* $\square_I(\square p)$]

(c) **Assertion + EMI'**: $\exists D.\ \square_D$ [$\neg\exists I$ *until the fourth date.* $\square_I(\square p)$]

If we imagine Marc to be a serial dater with very strict and somewhat peculiar rules about commitment and openness, we can imagine that Marc had a habit of waiting until the fourth date, and then indicating his commitment to be truthful.

So we come to a generalization: in Neg$^+$ readings, matrix negation can be interpreted as negating what is said to hold in all the worlds compatible with the content of the most embedded state (what I have been calling the standpoint or the view). We see examples of this in (230) and (233). But we also find Neg$^+$ readings in which the negation is interpreted within the content of an intermediate state, one above the view, but below the matrix state. Examples of this are in (236) and (237).

As a result, though every instance of Neg$^+$ appears to be related to some form of excluded middle inference, to make use of something like the EMI', we would need to characterize it in a way that reflects both of these possibilities. One idea to deal with this would be to allow the inference to contain a disjunct for each place the negation could go. Take (236). Assuming a structure where the NPI is interpreted in the content of the habit, we would have the following EMI'.

(238) The geography teacher didn't permit the students to leave until they'd handed in their work.

let p=the students leave, I=indication, and D=disposition

(a) **Assertion**: $\neg\exists D.\ \square_D$ [$\exists I$ *until the students hand in their work.* $\square_I(\lozenge p)$]

(b) **EMI'**: $\exists D.\ \square_D$ [$\exists I$ *until the students hand in their work.* $\square_I(\lozenge p)$] **or** $\exists D.\ \square_D$ [$\neg\exists I$

until the students hand in their work. $\square_I(\Diamond p)]$ **or** $\exists D.\ \square_D$ $[\exists I$ *until the students hand in their work.* $\square_I(\neg\Diamond p)]$

(c) **Assertion + EMI′**: $\exists D.\ \square_D$ $[\neg\exists I$ *until the students hand in their work.* $\square_I(\Diamond p)]$ **or** $\exists D.\ \square_D$ $[\exists I$ *until the students hand in their work.* $\square_I(\neg\Diamond p)]$

But then the problem is (c): the combination of the negated assertion and the three-way disjunctive EMI′ leaves will leave us with a two-way disjunction. How do we get from here to the attested non-disjunctive Neg$^+$ inference? Whether this EMI′ were semantic or pragmatic, we would need some secondary inference to get the Neg$^+$ readings.[6]

An alternative way of dealing with this would be to keep the traditional shape of the EMI′, and just let context determine which second disjunct we get in a given situation. That is, we get an EMI′ with negation in the lower content when what is relevant is when the students are allowed to leave, according to the teacher. We would get the EMI′ and Neg$^+$ reading in (236) when the relevant topic was when the teacher would regularly let the kids know they could leave.

In what follows, we look at two current competing theories of Neg-raising, one semantic, and one pragmatic. For each, their purveyors have shown that it can deal with a number of important characteristics of Neg-raising. We update these properties with the non-Neg-raising Neg$^+$ data, and together with the observation just reported about the nature of the EMI′ for Class I/II predicates, we use them to compare the two theories. In the end, we will show that the pragmatic theory is much better equipped to deal with all the data, including the EMI′ situation for Class I and II.

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[6]The last disjunct in (238c) would correspond to something unpronounceable (there is a strict NPI in a non-DE context), but this won't do to eliminate the extra disjunct generally, as not all Class I/II examples contain NPIs.

4.4 EMI/EMI': Presupposition or Implicature

In this section, we consider the nature of the mechanism behind Neg$^+$ inferences. We compare two recent theories, one that takes the EMI/EMI'[7] to be a semantic presupposition, and another that takes it to be a scalar implicature, which we get by parsing the sentence with an exhaustivity operator in the syntax. We begin the chapter by briefly outlining the background to the presuppositional account of Gajewski (2007). Then we walk through how this strategy handles two important characteristics of Neg$^+$ inferences, which we update by looking at what happens with non-Neg-raising Neg$^+$ predicates. Then we show the challenges that the presuppositional approach would face with respect to our above observation that Class I/II Neg$^+$ inferences would require some refinement of the EMI/EMI'. At that point, we turn to Romoli (2013)'s scalar theory. We run through how this theory can more easily handle the updated characteristics of Neg$^+$ inferences, and show how it already contains the means to capture how something like an excluded middle inference could work for Class I/II sentences.

4.4.1 Presuppositional EMI/EMI'

Bartsch, who first formulated the EMI for Neg-raisers, took the inference to be a "pragmatic" presupposition, so-called because it was easily cancelable, as in (239):

(239)   Rose didn't believe Tesla was awesome, as she had never heard of the man.

However, characterizing the EMI as pragmatic left this hypothesis at a loss to explain why only some predicates are associated with Neg-raising, as there appears to be no rhyme or reason as to which verbs qualify as Neg-raisers and which do not. For example, why

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[7]In this section I will use both the term EMI (when talking about previously existing theories that are concerned only with Neg-raising, and not the broader range of Neg$^+$ phenomena), and EMI' (when I am using the working formulation of the excluded middle inference used in the previous section, or discussing non-Neg-raising Neg$^+$ predicates).

would *want* be a Neg-raiser if *desire* and *wish* are not?

On a more conventional semantic story of presuppositions, where these are taken to be definedness conditions on the use of certain terms, we get the seemingly arbitrary restriction to certain predicates for free. However, the EMI appears to lack several key characteristics of this kind of presupposition. In particular, the EMI does pretty poorly on the standard projections tests for presuppositions. If it were a presupposition, we would expect that if a Neg-raising predicate were embedded in the antecedent of a conditional, or in a question, we would find the same inference as we find under negation.

(240) *(Neg-raising verb)*:

    (a) Rose didn't think that Tesla was awesome.

    (b) If Rose thinks that Tesla was awesome, she'll buy his biography.

    (c) Did Rose think that Tesla was awesome?

(241) *(Non-Neg-raising verb)*:

    (a) Rose didn't say that Tesla was awesome.

    (b) If Rose says that Tesla was awesome, she'll buy his biography.

    (c) Did Rose say that Tesla was awesome?

With (240a) (in contrast to (241a)), we have an inference that Rosa is opinionated. But among the (b) and (c) examples, we don't find the same distinction—neither those in (240) nor (241) allow us to infer that Rose thinks anything about Tesla.

Nevertheless, presuppositional accounts have been enjoying a vogue in recent years. Chief among these is Gajewski (2007), who proposes that we categorize the EMI as a particular kind of presupposition. Some presuppositions are known to be cancelled more easily than others (Chierchia & McConnell-Ginet (1990), Simons (2001), *inter alia*). Abusch (2005) classifies triggers that often fail to lead to presuppositions as "soft triggers", and those with more irrepressible presuppositions as "hard triggers". This distinction corresponds to categorical semantic differences—for Abusch (who follows Heim (1983)), it is

the hard triggers that are definedness conditions on context change potentials, whereas soft triggers are not, and instead lead to inferences by conventionally invoking lexically encoded alternatives. The details of her account do not concern us here, but what is significant is that Gajewski groups excluded middle inferences with the soft-triggered presuppositions, whose amenability to cancellation purportedly explains the lack of opinionatedness in (240b) and (240c).

On top of addressing the problems with projection tests that plagued earlier presuppositional theories, Gajewski (2007) presents two additional characteristics of the EMI that would be easily explained if it were a presupposition, apart from its apparently arbitrary association with certain verbs. We have seen both these properties in passing: how the EMI projects with negative quantifiers, and how it projects with Neg-raising predicates embedded within other Neg-raising predicates. We walk through these in turn, updating the relevant data with non-Neg-raising Neg$^+$ cases.

4.4.2 Presuppositional EMI/EMI′ and Projection with Negative Quantifiers

Here we are interested in sentences with subjects like those in (242) and (243):

(242)   No one believes Katia is telling the truth.

   Non-Neg-raised reading: $\neg \exists$x. believe (x, Katia is telling the truth)

(243)   Not everyone believes Katia is telling the truth.

   Non-Neg-raised reading: $\neg \forall$x. believe (x, Katia is telling the truth)

These have the Neg-raised readings in (244) and (245).

(244)   No one believes Katia is telling the truth.

   Neg-raised reading: $\forall$x. believe (x, $\neg$ (Katia is telling the truth))

(245) Not everyone believes Katia is telling the truth.

     Neg-raised reading: $\exists x.$ believe $(x, \neg$ (Katia is telling the truth))

To get these readings, whether the EMI/EMI′ is pragmatic or presuppositional, we need the inference to be universal. That is, we need the universal operator in (246b) below to get (244) from (242):

(246) No one believes Katia is telling the truth.

     let p=Katia is telling the truth, and B_x=belief of x

     (a) **Assertion**: $\neg\exists x \, [\exists B_x. \, \Box_{Bx}p]$

     (b) **EMI′**: $\forall x \, [\exists B_x. \, \Box_{Bx}p$ **or** $\exists B_x. \, \Box_{Bx}(\neg p)]$

     (c) **Assertion + EMI′**: $\forall x \, [\exists B_x. \, \Box_{Bx}(\neg p)]$

We need the EMI′ in (246b) to be universal; if it weren't, (246c) would not follow. We can see that the same situation holds for the derivation of the Neg-raised reading of (243):

(247) Not everyone believes Katia is telling the truth.

     let p=Katia is telling the truth, and B_x=belief of x

     (a) **Assertion**: $\neg\forall x \, [\exists B_x. \, \Box_{Bx}p]$

     (b) **EMI′**: $\forall x \, [\exists B_x. \, \Box_{Bx}p$ **or** $\exists B_x. \, \Box_{Bx}(\neg p)]$

     (c) **Assertion + EMI′**: $\exists x \, [\exists B_x. \, \Box_{Bx}(\neg p)]$

This universal projection of the EMI′ is not just explained, but expected if the EMI′ is a presupposition. Gajewski, following Heim (1983), points out that with quantified expressions, presuppositions project universally. For example, take (248) below.

(248) Every boy called his sister.

This sentence has the presupposition that every boy had a sister at the relevant time, not that only a subset of them did. The EMI′ has exactly this behavior, and this would follow if the inference is a presupposition.

For the subject *not everyone*, we have already seen that the non-Neg-raising Neg$^+$ predicates have the same behavior as the Neg-raisers: we get wide scope existential readings of (249) and (250) below.

(249) Not everyone promised to be here on time.

let p=x is here on time, I=indication, and D$_x$=disposition of x

(a) **Assertion**: $\neg\forall x\ [\exists D_x.\ \Box_{Dx}\ [\exists I.\ \Box_I(\Box p)]]$

(b) **EMI'**: $\forall x\ [\exists D_x.\ \Box_{Dx}\ [\exists I.\ \Box_I(\Box p)]\ \textbf{or}\ \exists D_x.\ \Box_{Dx}\ [\exists I.\ \Box_I(\neg\Box p)]]$

(c) **Assertion + EMI'**: $\exists x\ [\exists D_x.\ \Box_{Dx}\ [\exists I.\ \Box_I(\neg\Box p)]]$

(250) Not everyone eats meat.

let p=x eats meat, and D$_x$=disposition of x

(a) **Assertion**: $\neg\forall x\ [\exists D_x.\ \Box_{Dx}p]$

(b) **EMI'**: $\forall x\ [\exists D_x.\ \Box_{Dx}p\ \textbf{or}\ \exists D_x.\ \Box_{Dx}(\neg p)]$

(c) **Assertion + EMI'**: $\exists x\ [\exists D_x.\ \Box_{Dx}(\neg p)]$

Again, we need the excluded middle inference to be project universally. Before moving on, we verify that the same holds true with the subject *no one*:

(251) No one promised to be here on time.

let p=x is here on time, I=indication, and D$_x$=disposition of x

(a) **Assertion**: $\neg\exists x\ [\exists D_x.\ \Box_{Dx}\ [\exists I.\ \Box_I(\Box p)]]$

(b) **EMI'**: $\forall x\ [\exists D_x.\ \Box_{Dx}\ [\exists I.\ \Box_I(\Box p)]\ \textbf{or}\ \exists D_x.\ \Box_{Dx}\ [\exists I.\ \Box_I(\neg\Box p)]]$

(c) **Assertion + EMI'**: $\forall x\ [\exists D_x.\ \Box_{Dx}\ [\exists I.\ \Box_I(\neg\Box p)]]$

(252) No one eats meat.

let p=x eats meat, and D$_x$=disposition of x

(a) **Assertion**: $\neg\exists x\ [\exists D_x.\ \Box_{Dx}p]$

(b) **EMI'**: $\forall x\ [\exists D_x.\ \Box_{Dx}p\ \textbf{or}\ \exists D_x.\ \Box_{Dx}(\neg p)]$

(c) **Assertion + EMI'**: $\forall x\ [\exists D_x.\ \Box_{Dx}(\neg p)]$

The readings derived with the universal versions of the excluded middle inference in (251) and (252) are indeed attested Neg$^+$ readings of these sentences. So even looking at the full range of Neg$^+$ predicates reported here, the excluded middle inference EMI′ projects universally with negative quantified subjects, a behavior predicted by a presuppositional characterization of the excluded middle inference.

4.4.3 Presuppositional EMI/EMI′ and Partial Cyclicity

The second characteristic Gajewski takes to follow from a presuppositional account of Neg-raising are the cyclicity patterns that we saw when one Neg-raising predicate was embedded under another. Compare (253) to (254) and (255) below.

(253)   Alice doesn't think Pierrot wants Sasha to leave until tomorrow.

        Cyclic Neg-raised reading: Alice thinks Pierrot wants Sasha to not leave until tomorrow.

(254)   * Alice doesn't want Pierrot to think Sasha left until yesterday.

(255)   Alice doesn't want Pierrot to think Sasha left.

        No Cyclic Neg-raised reading: # Alice wants Pierrot to think Sasha didn't leave.

As pointed out in Fillmore (1963), the existence of the Neg-raised reading in (253) indicates that Neg-raising can act in a cyclic fashion, with negation cycling from its surface position in the top clause all the way through to the most embedded clause. However, Horn (1971) points out that examples like those in (254-255) show that this is not always the case: despite a sequence of Neg-raising predicates, negation cannot always be interpreted in the lowest clause.

Gajewski argues that this, too, would follow if the EMI was a presupposition, because the kind of presupposition projected by each Neg-raising predicate can vary. With doxastic predicates like *believe* and *think*, the presuppositions of their complements are

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presupposed to be believed by their subjects. Perhaps surprisingly, the presuppositions of desire predicates, like *want*, are shown by Gajewski (following Heim (1992) and Karttunen (1974)) to be the same: just like with the doxastics, *want* takes the presuppositions of its complement, and presupposes that its subject believes them to be true.

(256)   *Gajewski (2007), ex. 100*

Bill will sell his cello.

Presupposition: Bill has a cello.

(257)   *Gajewski (2007), ex. 101*

Bill thinks he will sell his cello.

Presupposition: Bill thinks he has a cello.

(258)   *Gajewski (2007), ex. 102*

Bill wants to sell his cello.

Presupposition: Bill thinks he has a cello. (*Not:* Bill wants to have a cello)

With this in mind, let's go back to (253-255).

(259)   (253) [Alice doesn't think [Pierrot wants Sasha to leave until tomorrow$_\beta$]$_\alpha$].

Knowing the nature of the presuppositions that project for the predicates involved, we can work through (following Homer (2012)'s lucid presentation, but adapting the argument for our working formulation of EMI') how the cyclic-Neg-raised reading will be accounted for.

(260)   *let p=Sasha leaves until tomorrow, B$_x$=belief of x, W$_x$=want of x, a=Alice, r=Pierrot*

(a) **Assertion of α:** $\neg\exists B_a. \Box_{Ba}[\exists W_r. \Box_{Wr}p]$

(b) **EMI' for α:** $\exists B_a. \Box_{Ba}[\exists W_r. \Box_{Wr}p]$ **or** $\exists B_a. \Box_{Ba}[\neg\exists W_r. \Box_{Wr}p]$

(c) **EMI' for β:** $\exists W_r. \Box_{Wr}p$ **or** $\exists W_r. \Box_{Wr}(\neg p)$

(d) **Projection of EMI' for β:** $\exists B_a. \Box_{Ba}[\exists W_r. \Box_{Wr}p$ **or** $\exists W_r. \Box_{Wr}(\neg p)]$

Putting (260a) together with (260b), we have that (e): $\exists B_a. \square_{Ba}[\neg \exists W_r. \square_{Wr}p]$ (*Alice thinks Pierrot doesn't want Sasha to leave until tomorrow*). Now, if we assume that Alice is consistent doxastically, and so does not hold thoughts that are inconsistent with one another, (e) and (260d) give us that (f): $\exists B_a. \square_{Ba}[\exists W_r. \square_{Wr}(\neg p)]$ (*Alice thinks Pierrot wants Sasha to not leave until tomorrow*). So because both *think* and *want* funnel up their objects' presuppositions to their subjects' beliefs, the cyclic Neg-raised reading goes through.

Turning to (255), repeated in (261), we have the following:

(261)   (255) [Alice doesn't want [Pierrot to think Sasha left$_\beta$]$_\alpha$].

(262)   *let p=Sasha leaves, B_x=belief of x, W_x=want of x, a=Alice, r=Pierrot*

      (a) **Assertion of** α: $\neg \exists W_a. \square_{Wa}[\exists B_r. \square_{Br}p]$

      (b) **EMI' for** α: $\exists W_a. \square_{Wa}[\exists B_r. \square_{Br}p]$ **or** $\exists W_a. \square_{Wa}[\neg \exists B_r. \square_{Br}p]$

      (c) **EMI' for** β: $\exists B_r. \square_{Br}p$ **or** $\exists B_r. \square_{Br}(\neg p)$

      (d) **Projection of EMI' for** β: $\exists B_a. \square_{Ba}[\exists B_r. \square_{Br}p$ **or** $\exists B_r. \square_{Br}(\neg p)]$

In this case, (262a) and (262b) give us (e): $\exists W_a. \square_{Wa}[\neg \exists B_r. \square_{Br}p]$ (*Alice wants Pierrot to not think that Sasha left*). But here (e) and (262d) do not lead us to the second inference, that Alice wants Pierrot to think that Sasha didn't leave, because it is completely possible for Alice to want Pierrot to not think that Sasha left (e), believe that Pierrot either thinks that Sasha left or thinks that Sasha didn't leave (d), and yet not herself want Pierrot to think that Sasha didn't leave. She could, for instance, want him to be ambivalent. So we don't get the cyclic Neg-raised reading here, because the way the excluded middle presuppositions project does not allow them to combine with the assertion to create the right entailment. This same argument predicts the impossibility of a fully embedded strict NPI in such a configuration, which is the result we saw in (254), repeated below.

(263)   (254) * Alice doesn't want Pierrot to think Sasha left until yesterday.

Because of how different predicates project presuppositions, Gajewski's hypothesis nicely captures why we get cyclic Neg-raised readings when doxastic verbs are embedded

under belief verbs, but not when the verb positions are reversed.

However, this story runs into problems when we start playing around with different combinations of Neg-raising verbs. Consider the following examples:

(264)   I don't want Amy to want her brother to die until she does.[8]

(265)   Amy shouldn't want her brother to die until after she does.

With the double desire case in (264), there is a cyclic Neg-raised reading (as signaled by the presence of the embedded strict NPI). This is not predicted by Gajewski's account:

(266)   [I don't want [Amy to want her brother to die until she does$_\beta$]$_\alpha$].

let p=Amy's brother dies until she does, B_x=belief of x, W_x=want of x, s=Speaker, a=Amy

(a) **Assertion of** α: $\neg\exists W_s. \Box_{Ws}[\exists W_a. \Box_{Wa}p]$

(b) **EMI′ for** α: $\exists W_s. \Box_{Ws}[\exists W_a. \Box_{Wa}p]$ **or** $\exists W_s. \Box_{Ws}[\neg\exists W_a. \Box_{Wa}p]$

(c) **EMI′ for** β: $\exists W_a. \Box_{Wa}p$ **or** $\exists W_a. \Box_{Wa}(\neg p)$

(d) **Projection of EMI′ for** β: $\exists B_s. \Box_{Bs}[\exists W_a. \Box_{Wa}p$ **or** $\exists W_a. \Box_{Wa}(\neg p)]$

(266a-b) give us (e) $\exists W_s. \Box_{Ws}[\neg\exists W_a. \Box_{Wa}p]$ (*the speaker wants Amy to not want her brother to die until she does*). However, the speaker can want this while believing that Amy either wants her brother to die before she does or wants her brother to not die before she does (d), and still not want Amy to want her brother to not die before she does. A reasonable instance of this would be if the speaker does not want Amy to have thought about anyone's death at all. So on Gajewski's proposal, we don't get a second entailment, and we shouldn't find a cyclic Neg-raised reading in (264), let alone a fully embedded strict NPI.

The same problem is found with (265). As Gajewski points out, *should* is deontic/ bouletic, not doxastic, and the presuppositions of its complement are presupposed to be

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[8]I apologize for the morbidity; because it's not reasonable to expect a person to be doing any wanting after his or her death, these particular examples avoid an irrelevant ambiguity in attachment site for the *until* phrase.

beliefs of the speaker. As a result, Gajewski does not predict the available cyclic Neg-raised reading.

Moreover, it's not clear that even the patterns established above are robust. Many people have no problem with a cyclic reading of the doxastic under desire case in (267):

(267)   No one wants to believe they got together until after his divorce.

In fact, though he doesn't address them, Gajewski himself acknowledges the existence of examples like these, citing Fillmore's original example:

(268)   *Fillmore (1963), p.220*

I don't believe that he wants me to think that he did it.

It looks like the cyclicity situation may be trickier than originally thought, and in particular, we find a range of cyclic readings that are not predicted by a presuppositional account. It is true that sometimes we get cyclic readings and the licensing of embedded strict NPIs, and sometimes we do not, but this part-time cyclicity does not reliably depend on the configuration of doxastic vs. desire predicates.

With the non-Neg-raising Neg$^+$ predicates, we find the same situation. We saw in a previous section that we get cyclic readings when we embed habituals and Class I/II verbs under doxastic predicates like *believe*. So we could have followed Gajewski, and argued that these predicates also project their presuppositions into the beliefs of the speaker. However, we also find cyclic Neg$^+$ readings when the embedder is a desire verb, which wouldn't be predicted by this extension of Gajewski's account:

(269)   [I don't want [Amy to permit her brother to die until she does$_\beta$]$_\alpha$].

let p=Amy's brother dies until she does, B$_x$=belief of x, W$_x$=want of x, D$_x$=disposition of x, s=Speaker, a=Amy

(a) **Assertion of** α: $\neg\exists W_s. \square_{Ws}[\exists D_a. \square_{Da} [\exists I. \square_I(\lozenge p)]]$

(b) **EMI' for** α: $\exists W_s. \square_{Ws}[\exists D_a. \square_{Da} [\exists I. \square_I(\lozenge p)]]$ **or** $\exists W_s. \square_{Ws}[\neg\exists D_a. \square_{Da} [\exists I. \square_I(\lozenge p)]]$

(c) **EMI′ for β:** $\exists D_a. \square_{Da} [\exists I. \square_I(\lozenge p)]$ **or** $\exists D_a. \square_{Da} [\exists I. \square_I(\neg\lozenge p)]$

(d) **Projection of EMI′ for β:** $\exists B_s. \square_{Bs}[\exists D_a. \square_{Da} [\exists I. \square_I(\lozenge p)]$ **or** $\exists D_a. \square_{Da} [\exists I. \square_I(\neg\lozenge p)]]$

As above, though (269a-b) give us that $\exists W_s. \square_{Ws}[\neg\exists D_a. \square_{Da} [\exists I. \square_I(\lozenge p)]]$ (*the speaker wants Amy to not be in a state that disposes her to permit her brother to die before she does*), this doesn't team up with (269d) to give us that speaker wants Amy to forbid her brother to die until she does—the speaker could want her to be neutral. This same argument can show that despite the fact that Class II verbs embedded under desire predicates lead to cyclic Neg$^+$ readings, Gajewski's presuppositional account does not predict this.

Finally, (270) below shows that Gajewski's hypothesis runs into the same difficulty when we embed a habitual under *want*.

(270)   [I don't want [Amy to drink until dinner$_\beta$]$_\alpha$].

let p=Amy drinks until the dinner, B_x=belief of x, W_x=want of x, D_x=disposition of x, s=Speaker, a=Amy

(a) **Assertion of α:** $\neg\exists W_s. \square_{Ws}[\exists D_a. \square_{Da}p]$

(b) **EMI′ for α:** $\exists W_s. \square_{Ws}[\exists D_a. \square_{Da}p]$ **or** $\exists W_s. \square_{Ws}[\neg\exists D_a. \square_{Da}p]$

(c) **EMI′ for β:** $\exists D_a. \square_{Da}p$ **or** $\exists D_a. \square_{Da}(\neg p)$

(d) **Projection of EMI′ for β:** $\exists B_s. \square_{Bs}[\exists D_a. \square_{Da}p$ **or** $\exists D_a. \square_{Da}(\neg p)]$

We get that the speaker wants Amy to not have a habit of drinking before dinner from (270a-b), $\exists W_s. \square_{Ws}[\neg\exists D_a. \square_{Da}p]$. However, just having this and (d), that the speaker thinks Amy has a habit one way or another, does not lead to the attested inference, that $\exists W_s. \square_{Ws}[\exists D_a. \square_{Da}\neg p]$. So our extension to Gajewski's story doesn't get the cyclic Neg$^+$ reading, or the licensing of the strict NPI.

In the end then, we actually find a much wider spectrum of cyclic readings than is predicted by a presuppositional account. So while the presuppositional story does easily account for why excluded middle inferences are associated with some predicates and

not others, and it accounts for the universal projection behavior of the EMI/EMI′ with quantified subjects, it hasn't dealt with cyclicity in a completely satisfactory way. Before comparing this story with an implicature-based one, we outline one more point of struggle for the presuppositional strategy: Class I/II verbs and the EMI′.

4.4.4 Presuppositional EMI/EMI′ and Class I/II

We saw in the previous section that any formulation of the EMI′ would need to deal with the fact that negated Class I/II sentences have two possible Neg$^+$ readings, one with the negation interpreted in the habit, and the other in which the negation is interpreted in the standpoint. Recall that the problem is that we would either need an EMI′ with more than two disjuncts (as below in (271), which would correspond to a Class I case), or some way to contextually determine the second disjunct.

(271) $\exists$D. $\Box_D$ [$\exists$I *until the students hand in their work.* $\Box_I(\Diamond p)$] **or** $\exists$D. $\Box_D$ [$\neg\exists$I *until the students hand in their work.* $\Box_I(\Diamond p)$] **or** $\exists$D. $\Box_D$ [$\exists$I *until the students hand in their work.* $\Box_I(\neg\Diamond p)$]

Notice that the second tactic is not available here: if excluded middle inferences are presuppositions, the disjuncts are lexically specified, not selected based on context. On the other strategy, in which the excluded middle inferences include more than two disjuncts, we noted that such an EMI′ would result in a disjunctive Neg$^+$ reading, something we never find. This means that we would need some extra inference to narrow things down to the non-disjunctive Neg$^+$ reading. It's not clear what this extra inference could be. If it were based on context, we would need to be able to account for why it is absolutely necessary (as we never get a disjunctive Neg$^+$ reading). Perhaps this line isn't wrong, in the end, but it does entail that the Neg$^+$ readings are hybrid entities—partly presuppositional, partly pragmatic. This makes things considerably more complex. The next account of Neg$^+$ readings does not have this pitfall.

4.4.5   Pragmatic EMI/EMI′

The other main line on the EMI′ is the pragmatic one. As a response to Bartsch's peculiar "pragmatic presupposition", Horn & Bayer (1984) suggested that the EMI is an implicature that has come to be conventionally associated with some lexical items and not others. As an implicature, the inference would be defeasible, accounting for the cancellability demonstrated in (239), but the conventional connection to certain predicates would account for the unsystematic availability. Horn and Bayer called these "short-circuited implicatures": those that have been wired into the grammar. As presuppositional accounts became more nuanced and compelling, this general strategy was largely abandoned in the last few decades (though the basic idea that the inference could be an implicature remained a live possibility for at least Homer (2012)). Recently however, Romoli (2013) has argued that by taking a grammatical approach to implicatures, à la Fox (2006), we can account for at least as many properties of Neg-raising as with a presuppositional theory. After we outline Romoli's hypothesis, we will show how it deals with the same properties Gajewski took as evidence for a presuppositional story, and then demonstrate that the pragmatic approach can easily handle the Class I/II EMI′ situation.

Whereas Abusch and Gajewski dealt with the non-presuppositional-like qualities of Neg-raising inferences, as in (240) and (241), by making the EMI a soft presupposition, Romoli (2013) takes these data to suggest that the EMI is not a presupposition at all, and that Neg-raising is actually a pragmatic phenomena. His implementation of this idea makes use of the grammatical approach to implicatures introduced in Chapter 1, which had an operator, EXH, exhaustifying sentences by negating innocently excludable alternatives.

Recall that to get rid of an undesired ignorance inference, we parsed a disjunctive Class I/II sentence with one or more EXH operators between the "indicate" and $\diamond$ nodes. This gave us the distribution inferences we had observed. For Romoli, the Neg-raising in-

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ferences (and on the extension to his account we outline below, Neg$^+$ inferences more gen-
erally) can be thought to result from the same mechanism—the presence of EXH above
the clause with the Neg-raising predicate. For the alternatives, Romoli notes that atti-
tude verbs are often thought of as universal operators (as seen in Chapter 1), and as such,
would traditionally have their existential counterparts as alternatives. This seems to be
right for the non-Neg-raising attitude verbs, but Romoli proposes that the distinct be-
havior found when we negate a sentence with a Neg-raiser is actually the result of a
different set of alternatives associated with the predicate. For example, the alternatives of
the non-Neg-raising *is certain* and the Neg-raising *think*, would be as in (272) and (273),
respectively:

(272)   *Alt*(**be certain**(p)(x))

     = {**be certain**(p)(x), **be possible for**(p)(x)}

     = {$\Box_x p$, $\Diamond_x p$}

(273)   *Alt*(**think**(p)(x))

     = {**think**(p)(x), **have an opinion as to whether**(p)(x)}

     = {$\Box_x p$, ($\Box_x p \vee \Box_x \neg p$)}

So the alternative for the non-Neg-raiser *is certain* would just be its existential counterpart,
but the alternative for the Neg-raiser would be something quite different—it would be,
in effect, an excluded middle claim.

     To see how these alternatives lead to the attested readings with negation, we start
by observing that for neither of the lexical entries proposed in (272) and (273) would
exhaustification have any effect in the positive unembedded case. This is because both of
the alternatives in (c) are entailed by (b) in the examples below:

(274)   (a) Thea is certain that the café will be open.

     (b) **be certain**$_t$(p) = $\Box_t p$

(c) *Alt*(**be certain**(*p*)(*t*))

= {$\Box_t p, \Diamond_t p$}

(275) (a) Thea thinks that the café will be open.

(b) **think**$_t(p) = \Box_t p$

(c) *Alt*(**think**(*p*)(*t*))

= {$\Box_t p, (\Box_t p \vee \Box_t \neg p)$}

Because all the alternatives are entailed by the assertion, we would not be able to exclude any in an exhaustification, and EXH(274) will be the same as (274), EXH(275) the same as (275).

But when we throw in negation, the alternatives are no longer uniformly entailed. (276a) below does not entail that Thea doesn't think it possible that the café will be open, nor does (277a) entail that Thea fails to think anything at all about whether the café will be open.

(276) (a) Thea isn't certain that the café will be open.

(b) $\neg$**be certain**$_t(p) = \neg\Box_t p$

(c) *Alt*($\neg$**be certain**(*p*)(*t*))

= {$\neg\Box_t p, \neg\Diamond_t p$}

(277) (a) Thea doesn't think that the café will be open.

(b) $\neg$**think**$_t(p) = \neg\Box_t p$

(c) *Alt*($\neg$**think**(*p*)(*t*))

= {$\neg\Box_t p, \neg(\Box_t p \vee \Box_t \neg p)$}

Recall that when we exhaustify, we negate all the innocently excludable alternatives, that is, those that are in all of the maximal sets that can be negated while the sentence itself remains true. For (276), the maximal set is just one alternative, $\neg\Diamond_t p$, so this is innocently excludable, and we get the following exhaustified meaning.

(278) (a) EXH(Thea isn't certain that the café will be open)

(b) $= \neg\Box_t p \ \& \ \neg\neg\Diamond_t p$

(c) $= \neg\Box_t p \ \& \ \Diamond_t p$

So the exhaustified meaning for *Thea isn't certain that the café will be open* includes the inference that she thinks it possible that the café will be open.

With the Neg-raising case in (277), we find that the maximal set of alternatives that can be negated while the sentence is true is again just the one alternative. Here, however, we are negating the negation of an excluded middle claim:

(279) (a) EXH(Thea doesn't think that the café will be open)

(b) $= \neg\Box_t p \ \& \ \neg\neg(\Box_t p \lor \Box_t\neg p)$

(c) $= \neg\Box_t p \ \& \ (\Box_t p \lor \Box_t\neg p)$

(d) $= \Box_t\neg p$

So exhaustification in a Neg-raising case gives us the excluded middle inference in (c), which leads to the Neg-raising interpretation in (d).

Now, Romoli argues that all universal operators (whether quantifiers over individuals, times, worlds, or what have you) have one of the two forms of alternatives seen above for *is certain* and *think*, and which set of alternatives a predicate has (something arbitrarily given by the lexicon) is what determines its behavior under negation. When we turn to the non-Neg-raising Neg$^+$ predicates however, we see that we need a somewhat different account of the nature of alternatives. What Romoli outlines will do just fine for Neg-raisers like *think*, but the Class I/II verbs are more complicated creatures. Using the abbreviation style we introduced earlier in this chapter, we can see how the alternatives for Class I/II verbs would need to look. First, as a comparison, take a regular attitude case in this style.

(280) (a) Thea doesn't believe the employees will leave at 10pm.

(b) $\neg\textbf{believe}_t(p) = \neg\exists B_t. \ \Box_{Bt} p$

(c) *Alt*(¬**believe**(*p*)(*t*))

= {¬∃B$_t$. □$_{Bt}$p, ¬(∃B$_t$. □$_{Bt}$p ∨ ∃B$_t$. □$_{Bt}$(¬p))}

For Class I/II verbs like *permit* and *promise*, we would need something like the following:

(281) (a) Thea doesn't permit the employees to stay past midnight.

(b) ¬**permit**$_t$(*p*) = ¬∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(◇p)]

(c) *Alt*(¬**permit**(*p*)(*t*))

= {¬∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(◇p)], ¬(∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(◇p)] ∨ ∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(¬◇p)])}

(282) (a) Thea doesn't promise that the café will be open.

(b) ¬**promise**$_t$(*p*) = ¬∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(□p)]

(c) *Alt*(¬**promise**(*p*)(*t*))

= {¬∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(□p)], ¬(∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(□p)] ∨

∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(¬□p)])}

Finally, for a non-Class I/II-habitual case we'd be looking for something like the alternatives in (283):

(283) (a) Thea doesn't stay past midnight.

(b) ¬**stay**$_t$(*p*) = ¬∃D$_t$. □$_{Dt}$p

(c) *Alt*(¬**stay**(*p*)(*t*))

= {¬∃D$_t$. □$_{Dt}$p, ¬(∃D$_t$. □$_{Dt}$p ∨ ∃D$_t$. □$_{Dt}$(¬p))}

We need these alternatives so that when we exhaustify, we negate the second alternative in the set given in (c), and this then combines with the basic assertion to get the attested inference. This is demonstrated below for (281).

(284) (a) EXH(Thea doesn't permit the employees to stay past midnight)

(b) = ¬∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(◇p)] & ¬¬(∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(◇p)] ∨ ∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(¬◇p)])

(c) = ¬∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(◇p)] & (∃D$_t$. □$_{Dt}$ [∃I$_t$. □$_{It}$(◇p)] ∨

$\exists D_t . \square_{Dt} [\exists I_t . \square_{It}(\neg \Diamond p)])$

(d) = $\exists D_t . \square_{Dt} [\exists I_t . \square_{It}(\neg \Diamond p)]$

The alternatives outlined in (281-283) aren't so different from the alternatives Romoli proposed for the Neg-raising verbs: they are excluded middle claims, which have a negation in the second disjunct. However, because the lexical entries we give to the Neg$^+$ predicates are more complex, we're not dealing so straightforwardly with simple universal operators. In an effort to describe the alternatives we get and which predicates have them, I would like to suggest the following principle: for any given stative predicate that reports the mental position of the subject it combines with (e.g. the subject's belief, or desire, or disposition), the predicate will come with an "excluded middle" alternative, and this alternative is a disjunction of the predicate, and one exactly the same but for a negation applying to what is said to hold in all of the worlds compatible with one of the described contents. This could be the content of an attitude, like a belief, or the content of a habit, or the content of an indication. In our shorthand, all the contentful eventualities correspond to the boxes that are indexed with a letter representing that eventuality (e.g. *B*, or *D*, or *I*). So for (280), we have only one available content, the belief of the subject, and so the excluded middle alternative is that either in all the worlds compatible with the subject's beliefs, *p* holds, or in all the worlds compatible with the subject's beliefs, $\neg p$ holds. For the habitual case in (283), the only content we have corresponds to the habit, so the excluded middle alternative is that either *p* is true in all the worlds compatible with the subject's habits, or $\neg p$ is true in all the worlds compatible with the subject's habits. For the Class I/II cases, there are two contents; the examples laid out above depict cases where the excluded middle alternative has its second disjunct's negation in the content of the indication. (We return to the other case in 4.4.8, when we discuss how Romoli's account deals with Class I/II sentences.) Note though that the view, the modal proposition that is said to hold in the worlds compatible with the indication in Class I/II sentences, does

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not itself contain a contentful eventuality. The view is something like a typical sentence with a modal verb, such as *the employees can stay past midnight*. Now, *the employees stay past midnight* does involve an eventuality, as the predicate *stay past midnight* would come with an eventuality argument. However, this is not an eventuality that has propositional content. When we add in the modal, we add quantification over possible worlds, but we don't add in another eventuality argument.[9] As a result, we never find excluded middle alternatives of the following form:

(285) $\exists D_x. \square_{Dx} [\exists I_x. \square_{Ix}(\Diamond p)] \vee \exists D_x. \square_{Dx} [\exists I_x. \square_{Ix}(\Diamond(\neg p))]$

The contentful eventualities here are the disposition and the indication; the $\Diamond$ does not indicate an eventuality, and so this kind of excluded middle alternative is not predicted based on the proposed principle.

Taking a step back, we can ask if this principle isn't much too broad: what about cases like *know*, or *realize*, or even *is certain*? These are things that describe mental positions, but they don't have Neg$^+$ readings. We can separate these apparent counterexamples into two classes. The first is what we could call "attitudes with presuppositions". Both of the sentences in (286) presuppose (287):

(286)   (a) Thea knows that it is raining.

(b) Thea realizes that it is raining.

(287)   It is raining.

So the verbs given in (286) do not just describe opinions—they impose conditions on the world in ways that non-presuppositional attitudes and habits do not. As a result, these are more than pure mental position or mental-position-reporting verbs, and as such, they will not have the same kinds of available alternatives as the Neg$^+$ verbs.

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[9]This does mean that the account of Neg+ presented here is ill-equipped to deal with what some people think is Neg-raising in modal statements like "John should not go to the beach". I'm not convinced this needs to be thought of as the same phenomenon, and I set aside a thorough discussion of this issue for the present.

Now for *is certain*, this appears to belong to a class of syntactically complex predicates like *is confident*, *is convinced*, and so on. None of these predicates lead to the kind of Neg$^+$ reading that we find with *believe* or *think*. Very tentatively, I would like to suggest that perhaps it is the syntactic presence of the copula that actually gives us a contentful eventuality with these predicates. Then, as in the Class I/II cases, we will have a second modal within the content that encodes the certainty or convinced-ness associated with the individual verbs. For example:

(288)   (a) Thea isn't certain that the café will be open.

(b) $\neg$**be certain**$_t(p) = \neg\Box_t(\Box p)$

(c) $Alt(\neg$**be certain**$(p)(t))$

$= \{\neg\Box_t(\Box p), \neg(\Box_t(\Box p) \vee \Box_t(\neg\Box p))\}^{10}$

On the unexhaustified reading of (288a), given in (288b), we have a simple denial that Thea is in some kind of state from which it follows that the café is necessarily open. But when we calculate the exhaustified reading, we get the following:

(289)   (a) EXH(Thea isn't certain that the café will be open)

(b) $= \neg\Box_t(\Box p) \ \& \ \neg\neg(\Box_t(\Box p) \vee \Box_t(\neg\Box p))$

(c) $= \neg\Box_t(\Box p) \ \& \ (\Box_t(\Box p) \vee \Box_t(\neg\Box p))$

(d) $= \Box_t(\neg\Box p)$

On this explanation, the exhaustified reading of (288a) would be that Thea is the experiencer of some kind of state or position, but it is not true that all of the worlds compatible with it feature the café being open. This story would explain the lack of apparent Neg-raising inferences, but it is difficult to argue for convincingly, as it hard to find truth conditional differences between the unexhaustified reading in (288a) and the exhaustified

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[10]There does appear to be a perplexing asymmetry with respect to these cases. While there are existential counterparts to *is certain* and *is convinced* in the realm of non-propositional complements, such as *is open to*, or *is receptive to*, there do not appear to be any with propositional complements. I leave this lacuna as an unresolved curiosity.

reading in (289d).

If this suggestion for *is certain* and its kin can be defended though, it would be somewhat at odds with just about every existing account of Neg-raising, which at some point tries to contrast this "non-Neg-raising" verb with the Neg-raiser *think*. On the story here, both verbs lead to Neg$^+$ readings, and both verbs have alternatives determined by the same principle, which delivers an excluded middle inference in which the second disjunct has negation applying to all the worlds compatible with content of one of the eventualities described by the predicate. The reason the behaviors of *think* and *is certain* diverge is that the lexical entries have different semantic structure, which is reflected in the overt syntactic structure.

Now, this principled account of excluded middle alternatives may need tweaking (for the *is certain* cases, or otherwise), or even jettisoning in the end, but it does give us for the first time the ability to predict which verbs will have Neg$^+$ readings, and what these readings will be. In our final chapter, we will look at several other verbs that this principle predicts to have Neg$^+$ readings, and outline the nature of their excluded middle alternatives.[11]

For now though, we can summarize Romoli's account and our modifications to it. From Romoli: when we negate predicates with excluded middle alternatives (for him the Neg-raisers, for us the Neg$^+$ predicates), we can parse the sentence with an EXH operator, which will lead to the negation of the negation of the excluded middle claim, or the excluded middle claim, which will combine with the assertion to give us the stronger, exhaustified reading. The excluded middle alternatives are lexically associated with certain predicates. On Romoli's account, all verbs that correspond to universal quantifiers

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[11]One thing we will not address here is the interaction between the lexical entries for Class I/II verbs, their alternatives, and Fox & Katzir (2011)'s algorithm for calculating alternatives for complex structures. In particular, habitual Class I/II cases contain multiple modals, and according to the algorithm, each of these should contribute to the number of alternatives, which we haven't considered here. It may be relevant that none of the modals in habitual Class I/II predicates are pronounced, but I leave the explicit working out of this issue to future research.

will have alternatives, but some of these will be the verbs' more traditional existential counterparts, and others will be excluded middle claims. On the present hypothesis, all stative predicates that describe mental positions will have alternatives, and these will be disjunctions between the predicate and something exactly similar except for a negation applying to what is said to hold in all the worlds compatible with (one of) the described contents.

We can now walk through how this proposal deals with all the observed characteristics of Neg$^+$ readings.

4.4.6   Pragmatic EMI/EMI' and Projection with Negative Quantifiers

In the previous section, we showed how the presuppositional account was able to get the Neg$^+$ inferences found in sentences that had negatively quantified subjects, like (247), (249), and (252), repeated below.

(290)   Not everyone believes Katia is telling the truth.

Neg$^+$ inference: Someone believes Katia is not telling the truth.

(291)   No one eats meat.

Neg$^+$ inference: Everyone has a habit of not eating meat.

(292)   Not everyone promised to be here on time.

Neg$^+$ inference: Someone was explicitly not committed to being here on time.

Romoli can also easily account for these inferences, by assuming that the quantifiers *no* and *not every* are really $\neg\exists$ and $\neg\forall$, and that these are alternatives of one another (an assumption grounded in previous work, such as Horn (1972), and Sauerland (2004), among others). These then allow us to get the right exhaustified meanings.

(293)   (a) Not everyone believes Katia is telling the truth.

let p=Katia is telling the truth, and B$_x$=belief of x

(b) $\neg\forall x \textbf{ believe}_x(p) = \neg\forall x \ [\exists B_x . \ \Box_{Bx}p]$

(c) $Alt(\neg\forall x \textbf{ believe}(p)(x))$

$= \{\neg\forall x \ [\exists B_x . \ \Box_{Bx}p],$

$\neg\forall x \ [\exists B_x . \ \Box_{Bx}p \lor \exists B_x . \ \Box_{Bx}(\neg p)],$

$\neg\exists x \ [\exists B_x . \ \Box_{Bx}p],$

$\neg\exists x \ [\exists B_x . \ \Box_{Bx}p \lor \exists B_x . \ \Box_{Bx}(\neg p)]\}$

From the alternatives, we find that all of the last three can be negated together while the assertion is true. This is because it can be true that not everyone has the express belief that Katia is telling the truth, while everyone is opinionated and someone does in fact believe that Katia telling the truth. So when we exhaustify we get the following:

(294) (a) EXH(Not everyone believes Katia is telling the truth)

(b) $= \neg\forall x \ [\exists B_x . \ \Box_{Bx}p] \ \& \ \neg\neg\forall x \ [\exists B_x . \ \Box_{Bx}p \lor \exists B_x . \ \Box_{Bx}(\neg p)] \ \& \ \neg\neg\exists x \ [\exists B_x . \ \Box_{Bx}p] \ \&$
$\neg\neg\exists x \ [\exists B_x . \ \Box_{Bx}p \lor \exists B_x . \ \Box_{Bx}(\neg p)]$

(c) $= \neg\forall x \ [\exists B_x . \ \Box_{Bx}p] \ \& \ \forall x \ [\exists B_x . \ \Box_{Bx}p \lor \exists B_x . \ \Box_{Bx}(\neg p)] \ \& \ \exists x \ [\exists B_x . \ \Box_{Bx}p] \ \& \ \exists x$
$[\exists B_x . \ \Box_{Bx}p \lor \exists B_x . \ \Box_{Bx}(\neg p)]$

(d) $= \neg\forall x \ [\exists B_x . \ \Box_{Bx}p] \ \& \ \forall x \ [\exists B_x . \ \Box_{Bx}p \lor \exists B_x . \ \Box_{Bx}(\neg p)] \ \& \ \exists x \ [\exists B_x . \ \Box_{Bx}p]$

(e) $= \forall x \ [\exists B_x . \ \Box_{Bx}p \lor \exists B_x . \ \Box_{Bx}(\neg p)] \ \& \ \exists x \ [\exists B_x . \ \Box_{Bx}(\neg p)] \ \& \ \exists x \ [\exists B_x . \ \Box_{Bx}p]$

In the end then, the exhaustification gives us the inference reported in (290), that someone believes Katia is not telling the truth, or $\exists x \ [\exists B_x . \ \Box_{Bx}(\neg p)]$. The same process brings us the inferences for the Class I/II and regular habitual cases, as we work out below.

(295) No one eats meat.

let p=x eats meat, and D_x=disposition of x

(b) $\neg\exists x \ [\exists D_x . \ \Box_{Dx}p]$

(c) $Alt(\neg\exists x \ [\exists D_x . \ \Box_{Dx}p])$

$= \{\neg\exists x \ [\exists D_x . \ \Box_{Dx}p],$

$\neg\exists x \ [\exists D_x . \ \Box_{Dx}p \lor \exists D_x . \ \Box_{Dx}(\neg p)],$

$\neg\forall x \, [\exists D_x. \, \Box_{Dx}p]$,

$\neg\forall x \, [\exists D_x. \, \Box_{Dx}p \lor \exists D_x. \, \Box_{Dx}(\neg p)]\}$

In this case, only the second and fourth alternatives can be false when the sentence is true, and so we get the following exhaustification:

(296) EXH(No one eats meat)

(a) $= \neg\exists x \, [\exists D_x. \, \Box_{Dx}p] \, \& \, \neg\neg\exists x \, [\exists D_x. \, \Box_{Dx}p \lor \exists D_x. \, \Box_{Dx}(\neg p)] \, \& \, \neg\neg\forall x \, [\exists D_x. \, \Box_{Dx}p$

$\lor \exists D_x. \, \Box_{Dx}(\neg p)]$

(b) $= \neg\exists x \, [\exists D_x. \, \Box_{Dx}p] \, \& \, \exists x \, [\exists D_x. \, \Box_{Dx}p \lor \exists D_x. \, \Box_{Dx}(\neg p)] \, \& \, \forall x \, [\exists D_x. \, \Box_{Dx}p \lor \exists D_x.$

$\Box_{Dx}(\neg p)]$

(c) $= \neg\exists x \, [\exists D_x. \, \Box_{Dx}p] \, \& \, \forall x \, [\exists D_x. \, \Box_{Dx}p \lor \exists D_x. \, \Box_{Dx}(\neg p)]$

(d) $= \forall x \, [\exists D_x. \, \Box_{Dx}(\neg p)]$

This gives us exactly the Neg$^+$ inference described in (291).

For the Class I/II case, we had the following example:

(297) Not everyone promised to be here on time.

let p=x is here on time, D_x=disposition of x, and I_x=indication by x

(b) $\neg\forall x \, \mathbf{promise}_x(p) = \neg\forall x \, [\exists D_x. \, \Box_{Dx}[\exists I_x. \, \Box_{Ix}(\Box p)]]$

(c) *Alt*($\neg\forall x \, \mathbf{promise}_x(p)$)

$= \{\neg\forall x \, [\exists D_x. \, \Box_{Dx}[\exists I_x. \, \Box_{Ix}(\Box p)]]$,

$\neg\forall x \, [\exists D_x. \, \Box_{Dx}[\exists I_x. \, \Box_{Ix}(\Box p)] \lor \exists D_x. \, \Box_{Dx}[\exists I_x. \, \Box_{Ix}(\neg\Box p)]]$,

$\neg\exists x \, [\exists D_x. \, \Box_{Dx}[\exists I_x. \, \Box_{Ix}(\Box p)]]$,

$\neg\exists x \, [\exists D_x. \, \Box_{Dx}[\exists I_x. \, \Box_{Ix}(\Box p)] \lor \exists D_x. \, \Box_{Dx}[\exists I_x. \, \Box_{Ix}(\neg\Box p)]]\}$

Just as for (293), we can consistently negate all the last three alternatives together while the assertion is true. Then when we parse the sentence with EXH, we are led to the observed existential inference.

(298) EXH(Not everyone promised to be here on time)

(a) $= \neg\forall x \, [\exists D_x. \, \Box_{Dx}[\exists I_x. \, \Box_{Ix}(\Box p)]] \, \& \, \neg\neg\forall x \, [\exists D_x. \, \Box_{Dx}[\exists I_x. \, \Box_{Ix}(\Box p)] \lor$

$\exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\neg\Box p)]]$ & $\neg\neg\exists x [\exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\Box p)]]$ &

$\neg\neg\exists x [\exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\Box p)] \lor \exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\neg\Box p)]]$

(c) = $\neg\forall x [\exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\Box p)]]$ & $\forall x [\exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\Box p)] \lor \exists D_x. \Box_{Dx}[\exists I_x.$

$\Box_{Ix}(\neg\Box p)]]$ & $\exists x [\exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\Box p)]]$ & $\exists x [\exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\Box p)] \lor \exists D_x.$

$\Box_{Dx}[\exists I_x. \Box_{Ix}(\neg\Box p)]]$

(d) = $\forall x [\exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\Box p)] \lor \exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\neg\Box p)]]$ & $\exists x [\exists D_x. \Box_{Dx}[\exists I_x.$

$\Box_{Ix}(\Box p)]]$ & $\exists x [\exists D_x. \Box_{Dx}[\exists I_x. \Box_{Ix}(\neg\Box p)]]$

So in the end then, by assuming that the negative quantifiers *no* and *not every* are alternatives to one another (an idea motivated elsewhere), Romoli, on our extension to his theory, gets all the inferences found when a Neg$^+$ predicate has one or the other of these terms in its subject.

4.4.7 Pragmatic EMI/EMI′ and Partial Cyclicity

The second major characteristic discussed by Gajewski was the inconstant existence of cyclic readings when Neg-raisers were embedded under other Neg-raisers. Romoli (2013) discusses a solution for why we might get these interpretations for some, but not all, configurations of Neg-raising verbs, in which he introduces a condition on when EXH can apply. I do not have a direct criticism of this stipulation, but I believe Romoli has more intuitive means at his disposal to account for partial cyclicity—relevance. Other than intuitive appeal, we will also see appealing to relevance allows us to deal with the somewhat messier set of cyclicity data presented above, which the presuppositional account had a hard time handling.

Neg-raising (and Neg$^+$) implicatures are context-dependent, as we've mentioned above for (239). As Romoli points out, this is expected if these inferences are calculated in the same way as scalar implicatures, which are also sensitive to context. For both kinds of inference, this can be captured by assuming that only alternatives that are relevant to

the question under discussion will factor into the exhaustification.

Romoli's story, which we sketch below, begins by assuming (along with Roberts (2004) and others) that an assertion can be thought of as a response to a (often unspoken) question under discussion, and that this question can modeled as a partition of the common ground (as in Groenendijk & Stokhof (1984)). This allows for Heim (2011)'s definition of relevance:

(299) **Relevance**: A proposition p is relevant to a question Q iff p is (contextually equivalent with) the union of some subset of Q.

We can imagine a situation where the question under discussion is as in (300):

(300) (a) Has the student finished writing yet?

(b) Q = {the student has finished writing, the student has not finished writing}

Then of the following responses, only (b) is the union of a subset of Q (it is equivalent to the second cell of the partition in (300b)), and therefore only (b) is relevant:

(301) (a) There is a bar in that rooftop pool.

(b) The student is still writing.

Turning back to Neg$^+$, Romoli's proposal that only the relevant alternatives are employed in exhaustification thus means that we only care about alternatives that are equivalent to the union of some subset of the question under discussion.

Beginning with a simple case, imagine a context in which the participants are interested in whether Desiree has the belief that Wyatt went to the store. Then the question under discussion is in (302).

(302) (a) Does Desiree believe Wyatt went to the store?

(b) Q = {Desiree believes Wyatt went to the store, Desiree does not believe Wyatt went to the store}

(c) = {$\exists B_d. \Box_{Bd} p, \neg \exists B_d. \Box_{Bd} p$}

Now take the statement *Desiree doesn't believe Wyatt went to the store*. As we saw above, this has the following alternatives.

(303)   Desiree doesn't believe Wyatt went to the store.

(a) $\neg \exists B_d. \Box_{Bd}p$

(b) $Alt(\neg \exists B_d. \Box_{Bd}p)$

$= \{\neg \exists B_d. \Box_{Bd}p, \neg [\exists B_d. \Box_{Bd}p \vee \exists B_d. \Box_{Bd}(\neg p)]\}$

Here only the first alternative (the assertion itself) is relevant, as it is the same as the second cell in (302c), the partition given by the question under discussion. The second alternative doesn't correspond to any cell or union of cells. As a result, when we exhaustify *Desiree doesn't believe Wyatt went to the store*, there are no relevant innocently excludable alternatives, and so we have no distinct Neg$^+$ reading.

But now imagine a situation in which we want to know what Desiree thinks about whether Wyatt went to the store. Then we have the following question under discussion:

(304)   (a) What does Desiree believe about whether Wyatt went to the store?

(b) Q = {Desiree believes Wyatt went to the store, Desiree believes Wyatt didn't go to the store, Desiree doesn't have an applicable belief}

(c) = $\{\exists B_d. \Box_{Bd}p, \exists B_d. \Box_{Bd}(\neg p), \neg [\exists B_d. \Box_{Bd}p \vee \exists B_d. \Box_{Bd}(\neg p)]\}$

Here we have a different partition of worlds to be used to determine whether the alternatives of (303) are relevant. In this case, the second alternative in (303b) is clearly relevant, as it is equal to the third cell in the partition in (304c). The first alternative is also relevant (in the technical sense), because it is the union of the second and third cells in (304c). In this context, exhaustifying will allow us to exclude the second alternative, the excluded middle, and this is what gives us the Neg$^+$ reading.

So whether or not we get a distinct Neg$^+$ reading will be influenced by the context, in a way that Romoli models using the notions of relevance and question under discussion.

I propose that we can explain the rather complicated cyclicity data in the same way.

Let's begin with a case of a desire predicate embedded under a doxastic one.

(305) (a) Ahmed doesn't believe Sam wants to go to Los Angeles.

(b) *Cyclic Neg$^+$ reading:* Ahmed believes Sam wants to not go to Los Angeles.

On the pragmatic explanation for Neg$^+$ inferences, for the cyclic reading in (305) to go through, we need the following excluded middle alternative to be relevant for the exhaustification calculation:[12]

(306) *Letting p=Sam goes to Los Angeles, and W=want*

$\neg[\exists B_a . \Box_{Ba}[\exists W_s . \Box_{Ws} p] \vee \exists B_a . \Box_{Ba}[\exists W_s . \Box_{Ws}(\neg p)]]$

First note that this excluded middle alternative is possible on the principle outlined: under the top negation we have a disjunction between our basic sentence, *Ahmed believes Sam wants to go to LA*, and one with negation applying to what is said to hold in a content of an eventuality, in this case, the desire of Sam. Of course, like the Class I/II cases, here we have two places the negation could go—it could also apply to the content of the belief of Ahmed. For expository purposes, we ignore this second option, assume that we can get the simple two-way disjunction in (306), and issue a promissory note to account for this in the next section. The skeptical reader can skip ahead to that discussion.

For now though, note that the excluded middle alternative in (306) would be relevant on the question under discussion in (307):

(307) (a) What does Ahmed believe that Sam wants with respect to going to Los Angeles?

(b) = {Ahmed believes Sam wants to go to Los Angeles, Ahmed believes Sam wants not to go to Los Angeles, Ahmed believes Sam doesn't have an explicit desire about going to Los Angeles, Ahmed doesn't have an explicit belief about

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[12]Note that we won't get the cyclic reading by putting an EXH in both the embedded and matrix clauses: the embedded clause, *Sam wants to go to Los Angeles*, is positive, and so exhaustifying it will have no effect, and so we would only get a non-cyclic Neg$^+$ reading, not (305b).

Sam's desires to go to Los Angeles}

(c) = {$\exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}p]$, $\exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}(\neg p)]$, $\exists B_a. \Box_{Ba}[\neg(\exists W_s. \Box_{Ws}p \lor \exists W_s. \Box_{Ws}(\neg p))]$, $\neg[\exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}p] \lor \exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}(\neg p)] \lor \exists B_a. \Box_{Ba}[\neg(\exists W_s. \Box_{Ws}p \lor \exists W_s. \Box_{Ws}(\neg p))]]$}

As (306) is equivalent to the union of the last two cells of the partition in (307b), the alternative is relevant, and exhaustification will lead to the attested Neg$^+$ reading. Note that the question in (307a) is a very plausible one: Ahmed could be trying to visit Los Angeles, but needs Sam to go along for that to happen. Then whether Sam wants to go, wants not to go, or is not decided (and thus maybe persuadable) would all be significant to Ahmed.

Next we look at a desire-over-doxastic case.

(308)   (a) Ahmed doesn't want Sarah to believe he is in Los Angeles.

(b) *Cyclic Neg$^+$ reading:* Ahmed wants Sarah to believe that he is not in Los Angeles.

To get (b), the alternative that we need to be relevant is in (309):

(309)   *Letting p=Sam goes to Los Angeles, and W=want*

$\neg[\exists W_a. \Box_{Wa}[\exists B_s. \Box_{Bs}p] \lor \exists W_a. \Box_{Wa}[\exists B_s. \Box_{Bs}(\neg p)]]$

In this case, the context would need to provide the following question under discussion:

(310)   (a) What does Ahmed want Sarah to believe with respect to his presence in Los Angeles?

(b) = {Ahmed wants Sarah to believe he is in Los Angeles, Ahmed wants Sarah to believe he is not in Los Angeles, Ahmed wants Sarah to not have an explicit opinion about his being Los Angeles, Ahmed doesn't have an explicit desire about Sam's belief about his presence in Los Angeles}

Now, this could work in the same way as the doxastic-over-desire case, but there is a

difference between the questions under discussion required. As alluded to, it is easy to think of scenarios where knowing whether someone actively doesn't want something or is just undecided about it could be important. But though it seems reasonable at first glance, it is actually very difficult to come up with a case where there is a significant difference between desiring for someone to specifically believe the negative of something and just desiring that they not believing the positive. Instead, the more likely question under discussion would be along the lines of the one below.

(311) (a) What does Ahmed want with respect to whether Sarah believes he is in Los Angeles?

(b) = {Ahmed wants Sarah to believe he is in Los Angeles, Ahmed wants Sarah to not believe he is in Los Angeles, Ahmed doesn't have an explicit desire about Sam's belief about his presence in Los Angeles}

With this question, the excluded middle alternative is not relevant (it is not the union of a subset of the cells in (311b)), so there is no Neg^+ reading.

That said, difficult is not the same as impossible, of course, so sometimes the usually unlikely form of question under discussion is actually feasible, which is why we sometimes do find cyclic desire-over-doxastic readings. We repeat (267) here.

(312) No one wants to believe they got together until after his divorce.

Because in this case believing the negative (believing they did not get together until after the divorce) could lead to a positive moral judgment, there is some rationale for wanting negative belief and not just ambivalence.

In short, I am proposing that the reason we do not often get certain cyclic readings is because they rely on the provision of a very unlikely question under discussion. Then, on a more likely question under discussion, the excluded middle alternative associated with Neg^+ predicates will not be relevant, and we will not find a distinct Neg^+ reading. In the cases where the unlikely question is actually reasonable, we do get cyclic readings.

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We can also see what this will mean for the desire-under-desire cases reported earlier, as well as what happens with Class I/II.

(313) (a) I don't want Amy to want her brother to die until she does.

(b) *Cyclic Neg$^+$ reading:* I want Amy to want her brother to not die until she does.

To the extent that this is an acceptable sentence, the current proposal takes this to be the result of the feasibility of the following question under discussion:

(314) (a) What does the speaker want Amy to want with respect to when her brother dies (vs. when she does)?

(b) = {the speaker wants Amy to want her brother to die before she does, the speaker wants Amy to want her brother to not die until she does, the speaker wants Amy to not have an explicit opinion about when her brother dies, the speaker doesn't have an explicit desire about Amy's opinions on when her brother dies}[13]

This question does, in fact, seem practically different than *What does the speaker want with respect to whether Amy wants her brother to die before she does?* This is because it makes sense to want Amy to not just not want her brother to die before her, but to want her to want him to die after. Only the latter allows us to make the most positive moral judgment.

We can discuss similar cases of habituals or Class I/II under doxastic or desire predicates. Here are a select few:

(315) *(Class I/II under doxastic:)*

(a) He doesn't think she permits the students to wear hats.

(b) *Cyclic Neg$^+$ reading:* He thinks she forbids the students to wear hats.

This Neg$^+$ inference goes through because the critical alternative, in (316), is equivalent to the last two cells in the partition in (317b), making it relevant with the reasonable question

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[13]I am really regretting this example.

under discussion laid out in (317a):

(316) *Letting p=the students wear hats, B=belief, h=him, s=her*

$\neg[\exists B_h. \Box_{Bh}(\exists D_s. \Box_{Ds}[\exists I_s. \Box_{Is}(\Diamond p)]) \vee \exists B_h. \Box_{Bh}(\exists D_s. \Box_{Ds}[\exists I_s. \Box_{Is}(\neg \Diamond p)])]$

(317) (a) What does he think her stance is on the possibility of the students wearing hats?

(b) {he thinks she permits the students to wear hats, he thinks she forbids the students to wear hats, he thinks she doesn't have an explicit stance on the students wearing hats, he doesn't have a belief as to her stance on the possibility of the students wearing hats}

In a similar way, we get the Neg$^+$ inference for an embedded habitual case:

(318) *(Habitual under desire:)*

(a) I don't want Amy to eat meat.

(b) *Cyclic Neg$^+$ reading:* I want Amy to have a habit of not eating meat.

This has the following excluded middle alternative:

(319) *Letting p=Amy eats meat, W=want, a=Amy, s=Speaker*

$\neg[\exists W_s. \Box_{Ws}(\exists D_a. \Box_{Da}p) \vee \exists W_s. \Box_{Ws}(\exists D_a. \Box_{Da}(\neg p))]$

(320) (a) What kind of habit does the speaker want Amy to have in terms of eating meat?

(b) {the speaker wants Amy to have a habit of eating meat, the speaker wants Amy to have a habit of not eating meat, the speaker wants Amy to not have a specific habit with respect to eating meat, the speaker doesn't have an explicit opinion with respect to Amy having a habit of eating meat}

In some cases, this question is probably not usually taken up over its simpler counterpart, *What does the speaker want with respect to Amy having a habit of eating meat?* However, in cases where Amy's having a habit of not eating meat is materially different than Amy

simply not having a habit of eating meat (say where the speaker only associates with conscientious vegans), the more specific question could be under discussion, and so its partitioning of worlds in (318a) would render the excluded middle alternative in (319) relevant. So in this kind of context, a Neg$^+$ reading would be available.

There is one kind of configuration of Neg$^+$ predicates that we have ignored so far: Class I/II verbs over other Neg$^+$-ers.

(321)   Joaquin doesn't permit his children to believe that the neighbor is a Republican.

There are no cyclic readings of the following form:

(322)   *Not attested*:

Joaquin permits his children to believe that the neighbor isn't a Republican.

Of course, we don't even have a non-cyclic Neg$^+$ reading where the negation has just jumped down in the pronounced structure:

(323)   *Not attested*:

Joaquin permits his children to not believe that the neighbor is a Republican.

We do have a non-cyclic Neg$^+$ reading, of course, but this looks like (324):

(324)   *Attested*:

Joaquin forbids his children to believe that the neighbor is a Republican.

This is because when negation is interpreted lower than pronounced with Class I/II verbs, the negation doesn't negate an entire predicate; it only negates the standpoint. But this doesn't completely explain why that negation can't keep "cycling" down. We have a reading of (321) which corresponds to the following excluded middle alternative:

(325) $\neg[\exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\Diamond(\exists B_{ch}. \Box_{Bch}p)]) \vee \exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\neg\Diamond(\exists B_{ch}. \Box_{Bch}p)])]$

So why can't we have a reading that corresponds to the excluded middle alternative in (326)?

(326) $\neg[\exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\Diamond(\exists B_{ch}. \Box_{Bch}p)]) \lor \exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\Diamond(\exists B_{ch}. \Box_{Bch}(\neg p))])]$

This would require a question under discussion along the lines of (327):

(327) What does Joaquin permit his kids to believe with respect to the neighbor being a Republican?

={Joaquin permits his kids to believe the neighbor is a Republican, Joaquin permits his kids to believe the neighbor is not a Republican, Joaquin permits his kids to have no explicit belief with respect to the neighbor being a Republican}

Examples which have a subject permitting or promising or what-have-you-ing a cognitive attitude like belief or desire are fairly difficult to get an intuitive grasp of. However, whether we get a negation going below a Class I/II predicate doesn't seem to be context sensitive in the same way as the examples we saw above; negating a permission never results in an inference that permission for the opposite holds.

The problem here seems to be that the excluded middle inference in (326) is not of the same breed as the ones we dealt with above. Imagine it were possible as an excluded middle alternative. Then, assuming there are contexts where the question under discussion is (327), we could have the following calculation of inferences:

(328) (a) EXH Joaquin doesn't permit his children to believe that the neighbor is a Republican

(b) $= \neg\exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\Diamond(\exists B_{ch}. \Box_{Bch}p)]) \land \neg\neg[\exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\Diamond(\exists B_{ch}. \Box_{Bch}p)])$
$\lor \exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\Diamond(\exists B_{ch}. \Box_{Bch}(\neg p))])]$

(c) $\neg\exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\Diamond(\exists B_{ch}. \Box_{Bch}p)]) \land [\exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\Diamond(\exists B_{ch}. \Box_{Bch}p)]) \lor$
$\exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\Diamond(\exists B_{ch}. \Box_{Bch}(\neg p))])]$

(d) $\exists D_j. \Box_{Dj}(\exists I_j. \Box_{Ij}[\Diamond(\exists B_{ch}. \Box_{Bch}(\neg p))])$

The reading derived in (328d), that Joaquin permits his children to believe that the neighbor is not a Republican, is different from the Neg$^+$ readings we've discussed. We've used the term "extra strong" throughout, and we can now make it precise: a reading α is prop-

erly stronger than a reading β if, assuming that subjects are consistent (mentally, and in terms of how they represent their mental positions), α entails β, and has some added inference to boot. So when we say that (328d) is not an extra strong reading of the original sentence (321), we mean that (328d) doesn't entail the original sentence, which is a feature of every Neg$^+$ reading we've seen.

So I'd like to suggest that the reason we don't get cyclic readings with Class I verbs on top is because, due to the nature of the actions described by these verbs, they lead to different entailment patterns than those found with the other Neg$^+$-ers. In particular, for consistent subjects, believing $\neg p$ entails not believing p, but permitting $\neg p$ doesn't entail not permitting p. It is totally normal to permit someone to have coffee while also permitting them to not have coffee. It is not possible for one person, however, to believe $\neg p$ and believe p simultaneously, if they are in full charge of their faculties.[14]

In sum then, the sometimes cyclicity of Neg$^+$ readings can be accounted on our extension of Romoli's account if we allow context, via a particular notion of relevance, to determine which excluded middle alternatives are applicable for exhaustification.

4.4.8 Pragmatic EMI/EMI' and Class I/II

We finish off this argument for an extension of Romoli's pragmatic story by demonstrating how it captures the Class I/II situation (and, as we mentioned in the previous section, any case where there are multiple contents that could house the negation in the second disjunct of the excluded middle inference). Recall that an example like (329) has two different Neg$^+$ readings, as indicated in (a) and (b):

(329) The geography teacher didn't permit the students to leave until they'd handed in their work.

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[14]I admit that more needs to be added to this explanation for it to cover Class II verbs embedding other Neg$^+$ predicates. I hope to address this in future work.

(a) The geography teacher was disposed to wait until the students handed in their work before letting them know they could leave.

(b) The geography teacher was disposed to tell the students that they could only leave once they'd handed in their work.

The problem was in how to implement the excluded middle inference in a way that would allow us to extract both readings. We mentioned two possible strategies—one in which the EMI' could have more than two disjuncts, and another in which something allowed us to choose which second disjunct would be used in the calculation of the exhaustified meaning. We now have at hand one way to restrict the alternatives that are employed in an exhaustification: relevance. This can be shown to directly account for how we get two different readings in the Class I/II and other double content cases. Take (329) with a structure in which the NPI is attached in habit, and not the opinion. Imagine this is uttered when the question under discussion is as in (330).

(330)   (a) When was the geography teacher disposed to make his indication that the students were allowed to leave—before or after they finished their work?
(b) {the teacher was disposed to make his indication before the students finished their work, the teacher was disposed to make his indication after the students finished their work, the teacher did not have a disposition to indicate that was specified based on when they finished their work}

Now we can outline a version of the second strategy mentioned for dealing with these cases. As we laid out in our principle for which predicates get excluded middle alternatives and what these would look like, we said that an alternative will be a disjunction of the predicate and an identical one except for having a negation in what is said to hold in all of the worlds compatible with one of the described contents. We can keep this principle and say that (329) actually has two excluded middle alternatives, one with the negation in habit, and one with the negation in the opinion.

(331) *(Excluded middle alternatives for (329) with NPI in habit):*

Letting p=the students leave, t=geography teacher

(a) $\neg[\exists D_t. \Box_{Dt}(\exists I_t$ before the students finish their work. $\Box_{It}(\Diamond p)) \vee \exists D_t. \Box_{Dt}(\neg\exists I_t$ before the students finish their work. $\Box_{It}(\Diamond p))]$

(b) $\neg[\exists D_t. \Box_{Dt}(\exists I_t$ before the students finish their work. $\Box_{It}(\Diamond p)) \vee \exists D_t. \Box_{Dt}(\exists I_t$ before the students finish their work. $\Box_{It}(\neg\Diamond p))]$

However, while (a) is relevant according to the question under discussion in (330), because it is equal to the last cell in the partition, (b) is not equivalent to any union of subsets of cells, and so is not relevant. As a result, only (a) is used in the exhaustification, and so we get the Neg$^+$ reading in (329a).

Now let's take the same sentence with the NPI attaching in the standpoint. This could be uttered with the question under discussion in (332) below.

(332) (a) When were the students allowed to leave according to what the teacher was disposed to indicate—before or after they finished their work?

(b) {the teacher's disposition was to indicate that the students could leave before they finished their work, the teacher's disposition was to indicate that the students could leave after they finished their work, the teacher did not have a disposition to indicate that the students were allowed to leave based on whether they had finished their work yet}

Now for this structure, the possible excluded middle alternatives are as below:

(333) *(Excluded middle alternatives for (329) with NPI in opinion):*

Letting p=the students leave, t=geography teacher

(a) $\neg[\exists D_t. \Box_{Dt}(\exists I_t. \Box_{It}(\Diamond(p$ before the students finish their work))) $\vee$

$\exists D_t. \Box_{Dt}(\neg\exists I_t. \Box_{It}(\Diamond(p$ before the students finish their work)))]$

(b) $\neg[\exists D_t. \Box_{Dt}(\exists I_t. \Box_{It}(\Diamond(p$ before the students finish their work))) $\vee \exists D_t. \Box_{Dt}(\exists I_t.$

$\Box_{It}(\neg\Diamond(p$ before the students finish their work)))]$

In this context, (b) is relevant, because it is equivalent to the third cell in (332b). The other alternative in (a) is not: it is not equivalent to the union of a subset of cells of (332b). As a result, (a) will feature in the calculation of the exhaustified reading of the sentence, giving us the Neg$^+$ interpretation in (329b).

So using the notion of relevance, our extension of Romoli's scalar story of Neg$^+$ readings allows us to deal with the tricky Class I/II cases, where we have two contents the negation in an excluded middle alternative could be found in. This is also why, in the cases where we have one Neg$^+$ predicate embedded under another, we sometimes get negation being interpreted all the way down in the lower content (this is the cyclic reading). Recall the case in (334).

(334)   (a) Ahmed doesn't believe Sam wants to go to Los Angeles.

(b) *Cyclic Neg$^+$ reading:* Ahmed believes Sam wants to not go to Los Angeles.

We can now see that this will be associated with two excluded middle alternatives, given below.

(335)   *Letting p=Sam goes to Los Angeles, and W=want*

(a) $\neg[\exists B_a. \square_{Ba}[\exists W_s. \square_{Ws}p] \vee \exists B_a. \square_{Ba}[\neg\exists W_s. \square_{Ws}p]]$

(b) $\neg[\exists B_a. \square_{Ba}[\exists W_s. \square_{Ws}p] \vee \exists B_a. \square_{Ba}[\exists W_s. \square_{Ws}(\neg p)]]$

The second one is the one we used to get the cyclic reading, by noting that this alternative would be relevant given a question under discussion like the one repeated in (336), because it would be equivalent to the union of the last two cells:

(336)   (a) What does Ahmed believe that Sam wants with respect to going to Los Angeles?

(b) = {Ahmed believes Sam wants to go to Los Angeles, Ahmed believes Sam wants not to go to Los Angeles, Ahmed believes Sam doesn't have an explicit desire about going to Los Angeles, Ahmed doesn't have an explicit belief about Sam's desires to go to Los Angeles}

What about the alternative in (a) though? We can see that it would be used to calculate the non-cyclic Neg$^+$ reading in (337).

(337) (a) Ahmed doesn't believe Sam wants to go to Los Angeles.

(b) *Non-cyclic Neg$^+$ reading:* Ahmed believes Sam doesn't want to go to Los Angeles.

This is the only Neg$^+$ reading we get with the following question under discussion:

(338) (a) What does Ahmed believe with respect to whether Sam wants to go to Los Angeles?

(b) {Ahmed believes Sam wants to go to Los Angeles, Ahmed believes Sam doesn't want to go to Los Angeles, Ahmed doesn't have a specific belief as to whether Sam wants to go to Los Angeles}

With this question, (335a) is relevant, as it is the same as the third cell in the partition in (338b). (335b) does not match up to any union of cells, so it is not relevant. As a result, (335a) is the (only) excluded middle alternative used in the exhaustification, and so we get the non-cyclic Neg$^+$ reading in (337b).

But go back to the first question under discussion we mentioned for the sentence in (334a), (336). We said that the alternative in (335b) was relevant, and that this is responsible for the cyclic Neg$^+$ reading. But the alternative in (335a) is also relevant—it it equivalent to the last cell in (336b). There seem to me to be two options for understanding this situation. The first is that (334), and all questions under discussion that make a more specific alternative relevant (leading to either a cyclic reading or a Class I/II case with the negation interpreted in the opinion), should really be presuppositional. That is, these questions should take as a given that the matrix state holds, whether it is a belief or a habit or what have you, and then partition the resulting set of worlds. For instance, on this suggestion, (336) should really be (339):

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(339)   (a) Given that Ahmed has a belief about what Sam wants with respect to going to Los Angeles, what is that belief?

(b) = {Ahmed believes Sam wants to go to Los Angeles, Ahmed believes Sam wants not to go to Los Angeles, Ahmed believes Sam doesn't have an explicit desire about going to Los Angeles}

If this were the question under discussion, only the alternative in (335b) would be relevant, as (335a) does not correspond to any cell in (339b).

Another strategy would to just let the two alternatives be relevant. In this case they would both be innocently excludable, and the exhaustified reading of (334a) would be in (340):

(340)   (a) EXH(Ahmed doesn't believe Sam wants to go to Los Angeles)

(b) = $\neg \exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}p]$ & $\neg\neg[\exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}p] \lor \exists B_a. \Box_{Ba}[\neg \exists W_s.$ $\Box_{Ws}p]]$ & $\neg\neg[\exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}p] \lor \exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}(\neg p)]]$

(c) = $\neg \exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}p]$ & $[\exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}p] \lor \exists B_a. \Box_{Ba}[\neg \exists W_s. \Box_{Ws}p]]$ & $[\exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}p] \lor \exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}(\neg p)]]$

(d) = $\exists B_a. \Box_{Ba}[\neg \exists W_s. \Box_{Ws}p]$ & $\exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}(\neg p)]$

(e) = $\exists B_a. \Box_{Ba}[\exists W_s. \Box_{Ws}(\neg p)]$

But (e) is just our cyclic Neg$^+$ reading, so keeping both alternatives at play for the exhaustification makes no difference. It could be that sometimes we have presuppositional questions like in (339), and sometimes there are multiple excluded middle alternatives in our exhaustifications. I leave further examination of these options to future work.

In the end, the availability of multiple contents leading to multiple excluded middle alternatives for complex Neg$^+$ predicates does not seem to be a problem; with the help of relevance, we are able to ensure that we are calculating the right inference for the context. This is true for both the complex Class I and II cases, as well as cyclic and non-cyclic Neg$^+$ readings. We have shown then that our extension to Romoli's pragmatic approach

can neatly capture all the characteristics of Neg$^+$ discussed by Gajewski, and that it has no problem dealing with the full spectrum of Neg$^+$ inferences investigated in this work.

Chapter 5

In Conclusion: Performativity, Competitors, Predictions, and Future Directions

5.1 Summary and Performativity

In the last four chapters, we've broken down several key behaviors of the Class I/II verbs, and set out an analysis that can account for each of them. The basic strategy was to structurally decompose the verbs into an eventive indication portion and a modal part that represents the subject's standpoint. The presence of a modal proposition that was accessible to the EXH operator allowed us to easily explain the presence of free choice effects. That the verbs could be classified as accomplishments accounted for the weak readings found with negation, which were interpreted as denials of the existence of particular events. At the same time, these verbs sometimes appear in predicates that looks like attitudes, and we accounted for this by appealing to the dispositional operator, which we took to be a variant of HAB.

In our attempts to understand the other kind of reading we observed when negating Class I/II predicates, we noticed that we only get such Neg$^+$ readings when the predicates were stative (so in the case of Class I/II, only when a dispositional operator was present). This restriction was also true for attitudes (e.g. eventive *think* never has Neg$^+$ readings), and garden-variety verbs (e.g. only when HAB is present does *Wim didn't smoke*

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get a Neg$^+$ reading). All kinds of Neg$^+$ readings shared a set of critical properties, and so we accounted for all of them using a single mechanism: a pragmatically governed parsing of sentences with an exhaustivity operator. We claimed that because all stative Neg$^+$ predicates describe eventualities with content, they are associated with "excluded middle" alternatives, which are innocuous in positive contexts, but deliver something like an excluded middle inference in exhaustified negative sentences. That this phenomenon is at least partially pragmatic is important: not only do we not always get Neg$^+$ inferences, but we also needed a way to account for the complicated partial cyclicity situation, and how it is we manage to get the right Neg$^+$ reading in Class I/II sentences, which contain two eventualities with content, and so could be thought to be associated with two different excluded middle alternatives.

This story also gave us a way to explain the similarities and differences found when we compare the Class I/II verbs to speech reporters like *announce* and *remark*. All these verbs are used to describe indications of propositional information, but the felicitous use of a dispositional Class I/II sentence after a single indication set our verbs apart. Inspired by cases with inanimate subjects, we suggested that this was because a disposition can be established by the connection of a set of propositions to the subject, and with the Class I/II predicates, there is a necessary connection between the subject and his or her standpoint. Specifically, use of a Class I/II verb establishes the existence of the standpoint the subject is representing himself or herself to hold. Speech reporting verbs like *announce* do not involve this necessary connection between the subject and a set of propositions, and as a result, a single indication will not suffice to establish a disposition.

As a kind of coda can now return to a property mentioned in the introduction: performativity. The members of Class I/II are performative, as reported (for a selection of the verbs) by Austin (1961), Bach (1975), and Searle (1989), among others. In the words of Bach, "uttering a performative sentence is to do what one is stating one is doing; indeed, that is what makes the sentence true." (Bach (1975), p.229). Sentences with the Class I/II

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verbs have this property, as the following examples show:

(341) (a) I permit you guys to stay up until midnight.

(b) I suggest you wake up to see the sunrise.

(c) I promise to be on time tomorrow.

(d) I insist you bring chocolate.

Uttering any one of these sentences is to do what it is describing, or in other words, an utterance of any of these sentences would make the same sentence true. Now, with our semantics for Class I/II laid out, we can explain this effect. Take the case with *guarantee* below.

(342) I guarantee that the house will be clean by tomorrow night.

According to the template for Class II lexical entries, we would get something like the following for the truth conditions of (342):

(343) (342) is true in w_0 iff:

$\exists e.$ Exp(e,speaker) & Disp(e,w_0) & $\forall w \in \cap$CON(e,w_0): $\exists E.$ Source(E,speaker) & publicly-indicate(E,w) & $\forall w' \in \cap$CON(E,w): $\forall w''$: (w' R$_{speaker,commit}$ w'') $\rightarrow$ the-house-will-be-clean-by-tomorrow-night(w'')=1

Above we observed that a dispositional Class I/II statement seems to be made true by a single indication. So (342) can be true even if there has been only one act of indication of the speaker's propositional commitments. But an utterance of (342) is just such an indication—it contains reference to the speaker's standpoint, in this case, his or her commitments. So an utterance of (342) serves to establish the disposition it describes. That is, what is described by this simple present Class II sentence is true in virtue of the sentence's utterance, and this performativity follows from the complex lexical entry of the verb itself. This same property holds for the other members of Class I and II.

When we look at other performative verbs though, we find something different. Consider *christen*. This might mean something like *give a name to*, or *use for the first time*.

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Crucially though, the meaning of *christen* does not appear to refer to the speaker's opinion, or some set of propositions. As a result, when we use *christen* in a simple present first person sentence, like *I christen this ship "Godot"*, it is not the case that there is a disposition that is initiated as a consequence of the establishment of a set of propositions. In this way then, we see that the performativity of non-Class I/II performatives must be the result of something other than the possession of a lexical entry that is compatible with the templates given in (128) and (129).

So the fact that Class I and II verbs are performative is argued here to follow from their lexical entries, which contain reference to propositional standpoints that can serve as the initiating basis for dispositions. This is why a dispositional Class I/II statement is true after a single eventive indication of the subject's standpoint. With the other performatives, we don't have this set of propositions to act as reference for the initiation of a disposition, and as a result, for a sentence like *Beckett christens this ship "Godot"* to be used felicitously, the habit must be initiated in a more conventional way—maybe with actual habitual acts of christening or some verbal indication of the inclination. This is why statements like *Beckett christens this ship "Godot"* can only be feliciously uttered if Beckett is a drunk or otherwise unreasonable individual who repeatedly says (or claims to repeatedly say) *I christen this ship "Godot"*.

But then how do we account for what happens with the first person simple present? Why does an utterance of *I christen this ship "Godot"* seem to have an acceptable non-dispositional reading? I take this to be one of the central questions surrounding performative verbs. Perhaps these are singular in allowing for another way to instantaneously establish dispositions. However, the current project is not an investigation of this kind of performativity, and so we leave the investigation of its source to others.

5.2   Considering the Competition

At this point, especially looking at our complex lexical entries and the revisions required to our understanding of Neg-raising, it makes sense to ask if there are alternatives to the approach presented here. One option would be to simply say that for every Class I/II verb, there are really two lexical entries; one built like a stative attitude, and another built like an accomplishment verb. This would give us simpler entries, and it would naturally account for the range of negative readings detected. Nonethless, this kind of systematic ambiguity is unappealing and unexplanatory. A much more viable strategy would be to build on the simple story we floated in Chapter 1, where we took the attitude-like manifestations of the Class I and II verbs to represent their basic stative nature. Class I verbs would be existential quantifiers over possible worlds, and the members of Class II would be their universal counterparts. But where ambiguity just posits a second class of accomplishment predicates, here we would propose that these are the result of the presence of some kind of operator (let's call it EVENT for fun), which would take a predicate built with a Class I/II attitude and output its eventive counterpart.

On this hypothesis, the distribution effects would be taken care of, as EXH could be inserted above the node corresponding to the modal verb. And which reading we get with negation would depend on whether we are negating the bare modal version (as in (344) below), or the assertion of an event (as in (345)).

(344)   Sergio doesn't permit his kids to wear hats or scarves inside.

True iff $\neg \exists w \in$ Accepted(Sergio,w_0): his-kids-wear-hats-or-scarves-inside(w)=1

(letting w_0 be the actual world)

(345)   Sergio wasn't permitting his kids to take an apple or a banana.

True iff $\neg \exists e.$ Agent(e,Sergio) & Indication(e,w_0) & CON(e):

($\exists w \in$ Accepted(Sergio,w_0): his-kids-take-an-apple-or-a-banana(w)=1)

The negation in (344) is what we called "strong"—here negation gives us that Sergio forbids his kids to wear hats or scarves inside. The negation in (345) does not allow us to conclude any such thing—we simply have the denial that a particular event occurred, and are given no indication of Sergio's feelings on whether his kids can take apples or bananas. This corresponds to the "weak" reading we identified in Chapter 1.

Turning to the difference we observed between the members of Class I and II and other speech reporters, recall that the Class I/II verbs could be used felicitously in dispositional sentences with sentient subjects without repetitive action, a property not found with the other speech reporters. On the new story, we could say this is because the seemingly dispositional cases are really just bare attitude versions of the Class I/II verbs, not dispositionals at all.

(346)   (a) George recommends that we arrive before noon. *attitude*

(b) George observes that tomatoes are not vegetables. *habitual only*

However, there are significant issues that crop up with this second strategy. First is that there is a restriction on canonical attitude verbs that is not found with the members of Class I and II. Standard attitude verbs require a sentient subject:

(347)   (a) * The book believes that Murphy is guilty.

(b) * The rules think Murphy should be more careful.

Class I and II verbs, on the other hand, are perfectly comfortable with non-sentient subjects, so long as they somehow contain or represent propositional material.

(348)   (a) The instructions recommend that you take one pill with every meal.

(b) The rules permit you to go swimming after eight am.

(c) The cereal box offers a free gift with purchase.

(d) That article insists that Montreal is the perfect city.

(e) The invitation promises that there will be champagne.

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Anand & Hacquard (2008) address the distinction between attitudes that take inanimate subjects and those that do not, though they are looking at a somewhat different partition of verbs. They compare what they call the "doxastic attitudes", like *believe* and *think*, with the "proffering attitudes", which include verbs that are similar to the Class II verbs, like *assert* and *claim* (see the next section), but also others that are not best described as being indicators of opinion, like *demonstrate* and *convince*. Discussing the data in (349) below, Anand and Hacquard's claim is that while doxastic attitudes describe cognitive states, the proffering attitudes are really "reporters of discourse moves".

(349)   *(Anand & Hacquard (2008), ex.21)*

(a) # The book believes, thinks, knows that the Earth might be flat.

(b) The book argues, claims, implies that the Earth might be flat.

The alternative strategy we're describing here is somewhat aligned with this idea, characterizing the predicates built with the Class I/II verbs and the EVENT operator as reporters of attitudes. However, the exact strategy fails to do enough: as the examples in (348) show, we find non-sentient subjects even with non-habitual simple present, which this strategy associates with the basic stative attitudes. Moreover, any Class I/II sentence built with EVENT still has the subject holding the basic attitude in the predicate with which EVENT combines.

Apart from this, we have problems even when we stick to sentient subjects. Attitude verbs can felicitously be used to describe a state when there has been no external indication of the existence of that state. The sentences in (350) below can be truthfully uttered if Mzilikazi has indicated nothing at all about Murphy.

(350)   (a) Mzilikazi believes that Murphy is guilty.

(b) Mzilikazi thinks Murphy should be more careful.

On the other hand, for the sentences in (351) below to be felicitous, there must have been some observable eventuality in the real world that establishes the existence of the offer

and the demand, respectively.

(351)   (a) Mzilikazi offers to buy the property as is.

     (b) Mzilikazi demands that Murphy be more careful.

Mzilikazi cannot just be willing to buy the property as is; she must have somehow indicated as much. Similarly, demands, as in (b), have to be signaled; they cannot be constituted by thoughts alone.

The proposal we have chosen easily accounts for these two properties. First, traditional attitudes describe cognitive states, which necessarily require a sentient subject. On the other hand, on the current proposal, Class I/II verbs describe indications, and as we've discussed above, a disposition to be the source of an indication can be said to hold of an inanimate subject in virtue of its inscription with propositional information. Second, while attitudes are cognitive states that hold without external indication, the way we've characterized Class I/II sentences has them describing either events (external indications), or dispositions, which have to be initiated some way. For a sentient subject, that initiation needs to be some kind of indication of the subject's opinion.

I don't, however, take either of these issues to provide knock-down arguments against the hastily sketched alternative strategy. It could, in theory, be possible to build into the modal background of a basic attitude these sentience restrictions and indication requirements, though this does strike me as being somewhat inelegant and redundant—an eventive Class I/II sentence like *McCay is promising to take good care of his new dog* would come out as something like *McCay is indicating that in all the worlds compatible with what he has indicated, McCay takes good care of his new dog*. I leave further examination of this possibility to future work.

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5.3 Other Predictions

In the last chapter, we introduced a principle used to determined which verbs are associated with one or more excluded middle alternatives and what these alternatives look like. This claimed that any stative predicate that expressed a mental position would have one or more excluded middle alternatives in which the first disjunct is the predicate itself, and the second disjunct is the same but with negation applying in one of the contents described. This covered the attitude cases as well as the habituals, whether these were versions of regular non-stative verbs, or the more complex members of Class I and II. But there are other verbs that describe stative positions, like *hate*, *love*, and *like*. First we check to see what kinds of readings these get with negation.

(352)   (a) Elan doesn't hate that the team has no captain.

      (b) Elan doesn't like that the team has no captain.

These sentences do have interpretations in which Elan simply does not possess a particular opinion regarding the fact that the team has no captain (namely hatred and liking, respectively). But they also have "stronger" readings; for (a), one in which Elan feels a positive, or at least neutral, feeling toward the lack of a team captain, and for (b), one in which Elan has a negative opinion of the team's captainlessness. This would be expected if this kind of verb is analyzed as describing a state in which a gradable thing holds. For instance, let *like* have the following lexical entry:

(353) $[\![\text{like}]\!] = \lambda p \lambda x \lambda e \lambda w.$ Exp(e,x) & feeling(e,w) & CON(e,w): p(w)=1 is a good thing

We can go back to our negative examples using this kind of lexical entry:

(354)   Elan doesn't like that the team has no captain.

    True in w_0 iff: $\neg \exists e.$ Exp(e,Elan) & feeling(e,w_0) & CON(e,w_0): it is not the case that the team having no captain in w_0 is a good thing

On our principle, this would be associated with the excluded middle alternative in (355), which would be relevant on the question under discussion in (356), as it is equivalent to the last cell in the partition.

(355)   ¬[∃e. Exp(e,Elan) & feeling(e,w_0) & CON(e,w_0): the team having no captain in w_0 is a good thing **or** ∃e. Exp(e,Elan) & feeling(e,w_0) & CON(e,w_0): it is not the case that the team having no captain in w_0 is a good thing]

(356)   What is Elan's feeling about the fact that the team has no captain?
= {Elan feels positively about the team having no captain, Elan feels negatively about the team having no captain, Elan has no specific feeling about the team having no captain}

In this case, when we exhaustify (354), we get the following:

(357)   (a) EXH (Elan doesn't like that the team has no captain)
(b) ¬∃e. Exp(e,Elan) & feeling(e,w_0) & CON(e,w_0): the team having no captain in w_0 is a good thing & ¬¬[∃e. Exp(e,Elan) & feeling(e,w_0) & CON(s,w_0): the team having no captain in w_0 is a good thing **or** ∃e. Exp(e,Elan) & feeling(e,w_0) & CON(e,w_0): it is not the case that the team having no captain in w_0 is a good thing]
(c) ¬∃e. Exp(e,Elan) & feeling(e,w_0) & CON(e,w_0): the team having no captain in w_0 is a good thing & [∃e. Exp(e,Elan) & feeling(e,w_0) & CON(e,w_0): the team having no captain in w_0 is a good thing **or** ∃e. Exp(e,Elan) & feeling(e,w_0) & CON(e,w_0): it is not the case that the team having no captain in w_0 is a good thing]
(d) ∃e. Exp(e,Elan) & feeling(e,w_0) & CON(e,w_0): it is not the case that the team having no captain in w_0 is a good thing

So we can apply our principle to opinion verbs like *like* and *hate*, even though they don't contain the same kind of future orientation as the other Neg$^+$ predicates we've discussed.

Instead, what our principal crucially relies on is whether or not the eventuality a predicate describes is a mental position that has propositional content, in which we can put the negation for the excluded middle alternative.

Before moving on, note that these verbs are presuppositional. Both of the examples in (352) presuppose that the team has no captain. This seems to be at odds with a previous observation, that other presuppositional verbs, like *know*, lack Neg^+ readings. This makes sense once we set out a rough lexical entry for the assertive part of *know*:

(358) $[\![\text{know}]\!]_{assertion} = \lambda p\lambda x\lambda e\lambda w.\ \text{Exp}(e,x)\ \&\ \text{knowledge}(e,w)\ \&\ \text{CON}(e,w):\ p(w)=1$

Using our principle, the only Neg^+ reading we could get with *know* would have the negation applying to the content of the knowledge eventuality, so a Neg^+ reading of (359a) could only look like (359b):

(359) (a) Servane doesn't know that it's raining outside.

(b) $\exists e.\ \text{Exp}(e,\text{Servane})\ \&\ \text{knowledge}(e,w_0)\ \&\ \text{CON}(e,w_0):$

$\neg\text{it's-raining-outside}(w)=1$

But then the Neg^+ interpretation would contradict the presupposition, that it is raining outside. We didn't have this contradiction with the cases we just discussed—because the contents of the eventualities in these cases were more complex, applying the negation to what is said to hold in the content negated an opinion about the object proposition, not the proposition itself, and the presupposition is not touched.

Next we take a look at another (non-gradable) set of mental position verbs. All of *deem*, *consider*, and *feel*, intuitively seem to describe opinions, and they do not seem to necessarily involve external action. In this sense they would be like *believe* and the other traditional attitudes, so we can imagine that they share with these verbs the same basic semantic structure. For instance, we could assign *consider* the following lexical entry:

(360) $[\![\text{consider}]\!] = \lambda p\lambda x\lambda e\lambda w.\ \text{Exp}(e,x)\ \&\ \text{reckoning}(e,w)\ \&\ \forall w' \in \cap\text{CON}(e,w):\ p(w')=1$

If this is roughly the right way to characterize these verbs, then from our principle we would expect to find Neg$^+$ readings with the same basic form as we find with *believe*.

(361) (a) Vince doesn't deem the team to be ready.

Neg$^+$ reading: Vince deems the team to be not ready.

(b) Vince doesn't consider the team to be ready.

Neg$^+$ reading: Vince considers the team to be not ready.

(c) Vince doesn't feel that the team is ready.

Neg$^+$ reading: Vince feels that the team is not ready.

For each of these verbs, we do find these attitude-like Neg$^+$ readings, where the negation is interpreted in embedded clause. Using our principle, this is what we expect given an attitude-style analysis like in (360)—the negation is interpreted in the content of the only eventuality described by the predicate.

We also find mental standpoint verbs that are similar, but intuitively convey a little extra: words like *maintain*, *claim*, and *avow* all seem to describe views, and specifically convictions that something is true, but they also carry an external requirement. None of the following are felicitous without at least one relevant external pronouncement on the part of Vince:

(362) (a) Vince maintains that the team is ready.

(b) Vince claims that the team is ready.

(c) Vince avows that the team is ready.

This makes these verbs look more like Class I/II verbs, and so we can ascribe them lexical entries along the lines of (363):

(363) ⟦claim⟧ = λpλxλeλw. Source(e,x) & publicly-indicate(e,w) & $\forall w' \in \cap$CON(e,w): $\forall w''$: (w' $R_{x,judgment}$ w'') $\rightarrow$ p(w'')=1

With this kind of complex lexical entry, we will need to apply the habitual operator to get a stative predicate. Then our principle predicts that we would not get *believe*-like Neg$^+$

readings, but Class II-like ones. This is indeed what we find:

(364) (a) Vince doesn't maintain that the team is ready.

Not attested Neg$^+$ reading: Vince maintains that the team is not ready.

Attested Neg$^+$ reading: Vince is explicitly not committed to the team being ready.

(b) Vince doesn't claim that the team is ready.

Not attested Neg$^+$ reading: Vince claims that the team is not ready.

Attested Neg$^+$ reading: Vince is explicitly not committed to the team being ready.

(c) Vince doesn't avow that the team is ready.

Not attested Neg$^+$ reading: Vince avows that the team is not ready.

Attested Neg$^+$ reading: Vince is explicitly not committed to the team being ready.

Overall, the principle we introduced does a good job of predicting the kinds of Neg$^+$ readings we'll get with mental position verbs that involve contentful eventualities. I can point to one exception: *hold*. *Hold* appears to have a meaning like *believe* or *consider*, and it's not clear to me that it requires an external indication to be used felicitously. Nonetheless, we don't get attitude-like Neg$^+$ readings with *hold*:

(365) Vince doesn't hold that the team is ready.

(Not attested Neg$^+$ reading:) Vince holds that the team is not ready.

I don't have a proper argument for why we don't get this reading, though I would like to point out that *hold* is not quite the same as *believe*, or *consider*, or *think*.

(366) (a) Vince holds the belief/opinion/view that the team is ready.

(b) # Vince believes the belief/opinion/view that the team is ready.

(c) # Vince considers the belief/opinion/view that the team is ready.

(d) # Vince thinks the belief/opinion/view that the team is ready.

It seems that one can hold a state, but one can't believe or consider or think a state. Hopefully future work will discuss this disparity, and how it interacts with Neg$^+$ inferences.

There are surely other mental state verbs that describe contentful eventualities. We can't treat all of these here, but hope that this section can be used as a guide to see what kinds of excluded middle alternatives they are predicted to come with, if any.

5.4 Future Direction: DP Objects

This last section addresses the instances of Class I/II verbs that have non-propositional complements. In particular, we'll be looking at DP objects. We've ignored these uses of the verbs so far for two reasons: first, it seems that even the DP objects are propositional at some level (which we will demonstrate below in 5.4.1), so it doesn't seem obviously misleading to assume that at heart, the basic form of the verbs take propositional objects. Second, the actual interpretations we get with predicates that have DP objects are somewhat mysterious. We will show what we mean by this in 5.4.2.

5.4.1 DP Objects with Class I/II Verbs are Propositional

The first indication we have that the DP complements of Class I and II verbs are propositional at some level, comes from the interpretations we find when we attach future-time adverbs to present tense sentences.

(367) (a) The diet permits sugar after tonight.

(b) The store offers free consultations next week.

(c) Chiara promises brownies tomorrow.

(d) The producer demands coffee next time.

All of these examples have the adverb grouping with the object DP, not, crucially, the matrix clause. Roughly, the interpretations of these examples are as follows:

(368) (a) The diet (currently) permits its followers to start eating sugar after tonight.

(b) The store (currently) offers to give free consultations next week.

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(c) Chiara (currently) promises to bring brownies tomorrow.

(d) The producer (currently) demands that there be coffee next time.

That is, in order to make sense of the temporal adverbs in these sentences, we have to acknowledge that the object contains more information than just the DP. In particular, DP objects seem to stand in, in some way, for propositional material.

A second piece of evidence comes from the interpretations we get when we modify a DP object with *the same ... as ...* For example, each of the following sentences has two interpretations:

(369)   (a) The rules permit the same strategy as your opponent.

Possible reading: The rules permit you to use the same strategy as your opponent uses.

Possible reading: The rules permit the same strategy as your opponent permits.

(b) The stylist suggests the same haircut as Abby.

Possible reading: The stylist suggests that you have the same haircut as Abby has.

Possible reading: The stylist suggests the same haircut as Abby suggests.

(c) Chiara insists on the same treatment as Aziz.

Possible reading: Chiara insists on getting the same treatment as Aziz gets.

Possible reading: Chiara insists on the same treatment as Aziz insists on.

(d) The producer guarantees the same champagne as the director.

Possible reading: The producer guarantees you will get the same champagne as the director gets.

Possible reading: The producer guarantees the same champagne as the director guarantees.

We can compare this to other verbs that take DP objects:

(370)   (a) The neighbor kicked the same ball as Sophia.

Only reading: The neighbor kicked the same ball as Sophia kicked.

(b) We talked to the same man as Abby.

Only reading: We talked to the same man as Abby talked to.

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In the examples in (370), we see that the unpronounced but understood verb is identical to the pronounced matrix verb. This is true for the second of each pair of possible interpretations given in (369) as well. For the first members of each pair, if we assume that the mechanism involved here, whether ellipsis or otherwise, requires this kind of identity to get the right meaning for the unpronounced verb, we need the DP object in each of (369a-d) to represent something like a full clause, which would furnish a verb for the purposes of the identity-governed verb recovery.

So with the two pieces of evidence presented, it looks as if the DP objects of Class I and II verbs really contain, at some level, propositional material.

5.4.2 The Interpretations of Class I/II Predicates with DP Objects are Unpredictable

So DP objects found with Class I/II verbs come out as more substantial than they appear, in that they include unpronounced propositional information. However, it's not clear how we get this material. Compare the following pair of sentences:

(371) (a) Gina promises to throw out the candy.

(b) Gina promises candy.

Imagine a context in which we are explicitly discussing what Gina says she'll throw out. The example in (371a) is obviously on topic, but it's not so clear that (371b) is. That is, even in a context that provides other propositional material, the DP is (371b) seems to necessarily be interpreted as something like *Gina promises to bring candy*. Similarly for (372) below: even in a context where what is being discussed is what Gina wants Bill to denounce, it is extremely hard, if not impossible, to interpret (372b) as anything other than *Gina demands that she receive coffee*.

(372) (a) Gina demands that Bill denounce coffee.

(b) Gina demands coffee.

We see a related effect with the *recommend* case in (373):

(373)   (a) The waitress recommends that Bill have coffee and the waitress recommends that Bill have tea.

(b) The waitress recommends coffee and the waitress recommends tea.

In a context where Bill can only drink one thing, and where we are interested in what the waitress thinks is good, (373a) seems to be describing a situation in which the waitress is being unreasonable: she is recommending that Bill drink two things, something he is not able to do. On the other hand, the waitress isn't necessarily being unreasonable as described by (b). In this case, she can be merely pointing out that both beverages are generally desirable (i.e. not just good for Bill specifically).

The upshot of this is that when the Class I/II verbs take DP complements, these are at least optionally associated with a default set of propositional material. However, this material isn't the same for every one of the verbs. For *promise*, as in (371b), the default seems to be that the subject procure the DP object; for *demand*, as in (372), it seems to be that the subject receive the DP object; for *recommend*, as in (373), it seems to be that some general subject (maybe *one*) have/experience the DP object in the most conventional way of having/experiencing that object.

Because the default propositional material varies with the predicate, an explanation of how these non-contextually determined interpretations get their meaning will have to account for the way defaults are associated with individual verbs. We look forward to coming back to this challenge in future work.

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