Towards a Theory of Subjective Meaning

by

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Abstract

This dissertation develops a form of relativism in which propositions are treated as sets of world-time-individual triples, in contrast to standard views that treat them as sets of worlds or world-time pairs. This builds on existing proposals for predicates of personal taste such as *fun* and *tasty*, and has ties to approaches to *de se* attitudes involving centered worlds. I develop an accompanying pragmatic view in which the context set is similarly construed as a set of world-time-individual triples. The semantic and pragmatic systems together are used to account for the behavior of predicates of personal taste, epistemic modals, indicative conditionals, and a variety of attitude reports, including control constructions. I also explore ways that this account can help solve puzzles related to Moore's paradox.

To give one concrete example, I propose that the proposition expressed by the sentence *it might be raining* is the set of world-time-individual triples <w,t,x> such that it's compatible with x's knowledge in w at t that it's raining. On the pragmatic side, a speaker is justified in asserting this sentence in a conversation if it is compatible with the speaker's own knowledge that it's raining; by asserting it, though, the speaker is making the stronger proposal to make it common ground that it is compatible with the knowledge of the entire group of conversational participants that it's raining. If this proposal is accepted by the other participants, then the group will have established that their knowledge states are aligned in a particular way.

I introduce the core semantic and pragmatic proposals in Chapter 2, focusing on epistemic modals, predicates of personal taste, and belief reports. In Chapter 3, I extend the analysis to indicative conditionals, showing that this solves longstanding puzzles involving the relationship between conditionals and disjunction. In Chapter 4, I extend the approach to certain control constructions, with a special emphasis on capturing their *de se* interpretation. In Chapter 5, I look at two puzzles related to Moore's paradox, with special attention to the meaning of *imagine*.

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Chapter 1

Introduction

1. **<u>Preview</u>**

In this dissertation, I argue for a semantic and pragmatic system in which the truth of propositions is relativized to an individual "judge." In other words, propositions are sets of world-time-individual triples, as is the context set of a conversation. This builds on a proposal by Lasersohn (2005) for "predicates of personal taste" such as *fun* and *tasty*, and has obvious ties to approaches to *de se* attitudes (due to Lewis, 1979 and others), where the content of a propositional attitude is seen as a set of world-time-individual triples or "centered" worlds. I propose refinements to Lasersohn's semantic system, develop a view of the pragmatics of conversation to work alongside it and help to explain how these items are used in conversation, and extend the system to a broader domain including epistemic modals, conditionals, and certain attitude reports (including control constructions), in addition to Lasersohn's predicates of personal taste.

To give a brief concrete example of my view, I propose that the proposition expressed by the sentence *it might be raining* is the set of world-time-individual triples $<w,t,x>$ such that it's compatible with x's knowledge in w at t that it's raining. On the pragmatic side, a speaker is justified in asserting this sentence in a conversation if it is compatible with the speaker's own knowledge that it's raining; however, by asserting it, they are making the stronger proposal to make it common ground (roughly speaking) that it is

compatible with the knowledge of the entire group of conversational participants that it's raining. This proposal need not be accepted, but if it is, then the participants will have established that their knowledge states are aligned in a particular way.

The core proposal is presented in Chapter 2, through the two case studies of epistemic modals and predicates of personal taste. In Chapter 3, I extend the view to indicative conditionals, taking the view that they involve covert epistemic modals. A particular focus of Chapters 2 and 3 is to show that the mechanism of judge dependency, together with an appropriate view of the pragmatics, can provide solutions to longstanding puzzles about epistemic modals and conditionals. I also spend some time discussing the behavior of these "judge-dependent" items (epistemic modals, predicates of personal taste, and conditionals) in attitude reports, focusing on belief. Attitude reports then become the focus of Chapters 4 and 5. In Chapter 4, I look at the phenomenon of obligatory *de se* attitudes. I show that my proposed system is exactly what is needed to account for a well-defined subclass of *de se* constructions including control constructions as well as attitude reports that embed judge-dependent items. (I suggest that other *de se* expressions such as shifting indexicals, logophors, and optionally *de se* pronouns have different properties and should not be given the same account.) This has implications for a theory of control, which I touch on at the end of Chapter 4. In Chapter 5, I look at two puzzles related to Moore's paradox, with special attention to the meaning of *imagine*.

Finally, a brief note about the organization of Chapters 2–5: Chapter 2, which contains the core ideas of this work, is intended to be self-contained. Chapters 3–5 build on these ideas and thus crucially depend on material from Chapter 2; however, the sequence of Chapters 4–5 is essentially independent of Chapter 3 (although Chapter 5 does make some reference to material from Chapter 4).[1]

2. <u>Setting the Stage</u>

To give an idea of what I will be doing, let me start by highlighting a few key aspects of an approach to natural language semantics and pragmatics that I take to be standard.

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[1] More precisely, the self-contained portions of this dissertation include Ch.2, Ch.2⊕Ch.3, Ch.2⊕Ch.4, and Ch.2⊕Ch.4⊕Ch.5.

These are not necessarily universally accepted by semanticists and philosophers of language, but they do form my starting point. I will be proposing changes to some of these, but my underlying approach to semantics and pragmatics will be in line with the approach I describe. Then I will introduce two challenges to standard views that I will be dealing with here.

2.1. What We Learned in Semantics 1

The meaning (i.e., intension) of a sentence is standardly treated as a set of possible worlds, or similarly as a set of situations or world-time pairs. (Technically, this is usually defined as a function that characterizes such a set, and I will use the two descriptions interchangeably.) The denotation, or extension, of a sentence is a truth value: true if the actual world (situation, world-current-time pair) is in the relevant set. A proposition is normally taken by definition to be the kind of thing that can be the intension of a sentence – that is, a set of worlds, situations, or world-time pairs. Related to the view of propositions as sets of possible worlds is the notion of truth conditions. The truth conditions of a sentence are the conditions under which that sentence is true – that is, what a world (or situation, or world-time pair) has to be like for that proposition to be true in it.

To illustrate this view in a very mundane case, consider sentences (1)–(2).

(1)   Washington, D.C. is the capital of the United States.

(2)   San Francisco is the capital of the United States.

The intension of (1) is the set of worlds where the capital of the United States is Washington, D.C., and the extension of (1) at the actual world is, of course, the truth value 1 (true), since the actual world is a member of this set. On the other hand, the intension of the sentence in (2) is a different set – the set of worlds where San Francisco is the capital of the United States, and the extension of (2) is the truth value 0 (false) at the actual world.

2.2. What We Learned in Pragmatics 1

On the theory of conversation in the tradition of Stalnaker (1978, 2002), the exchange of information in conversation is modeled with the two related notions of a common ground and a context set. Formally, the context set is a set of worlds (and thus technically a proposition). Intuitively, it is the set of worlds that are compatible with every proposition p such that all the participants in the conversation believe that p, all the participants believe that all the participants believe that p, and so on ad infinitum. (For some purposes, this needs to be made more general by replacing "believe" with "accept for the purposes of conversation," but I will largely be unconcerned with this distinction.) The common ground is the set of these propositions, and when a proposition p is added to the common ground, we can say that p becomes common ground.

Just as propositions can alternatively be construed as sets of situations or sets of world-time pairs rather than sets of worlds, the context set can be construed in a parallel way as a set of situations or a set of world-time pairs. Typically the same formulation is used for both notions.

An important notion on this view is that of an assertion. According to the Stalnakerian view, a speaker asserts a proposition p by making a declarative utterance of a sentence expressing p. By asserting that p, they are making a proposal to restrict the context set by intersecting it with p; this has the effect of removing any worlds from the context set in which p is not true. Since there is a systematic correspondence between the set of worlds in the context set and the set of propositions in the common ground, an assertion can equivalently be described as a proposal to add p to the common ground.

A speaker who makes an assertion is proposing that the context set be restricted in a certain way, but that does not mean that the context set will automatically be restricted in that way. This depends on whether the other participants in the conversation accept the assertion or reject it. In English, hearers may indicate that they are accepting an assertion by saying things like *I agree*, *You're right*, *That's true*, *Oh*, *Uh-huh*, or by saying nothing; they may indicate that they reject an assertion by saying things like *Nuh-uh*, *Uh-uh*, *No!*, *You're wrong*, *That's not true*, etc. If the hearers all accept an assertion that p,

then the context set is intersected with p, giving a new context set; if any hearers reject the assertion, then the context set is not intersected with p. In any case, the common ground is always updated with the fact that the speaker made the assertion they made, and the fact that various hearers accepted or rejected the assertion by saying different things, but I will not be concerned with updates of those kind.

2.3. First Challenge: Matters of Opinion

There is one very obvious limitation to the standard view that most semanticists have probably thought about at some point, and which will be a major theme of Chapters 2 and 3. This limitation is tackled most recently by Lasersohn (2005, 2006) who introduces the problem like this:

> To many of us who teach introductory semantics courses, the following may be a familiar experience: Early in the course, when one introduces the idea of truth conditions, and of trying to formulate rules assigning truth conditions to sentences in a systematic way, students will frequently ask, "But what about sentences that aren't about matters of fact, but are really just matters of opinion?"

(Lasersohn, 2005: p. 643)

The worry is about sentences like (3) and (4).

(3)   This soup is tasty.

(4)   This party is fun.

These look and act like normal sentences, just like (1) or (2). Speakers can utter them declaratively, and hearers can agree or disagree with them. At the same time, there is an obvious sense in which it is a matter of opinion whether some particular soup is tasty or a particular party is fun, whereas it is not a matter of opinion whether Washington, D.C. is the capital of the United States. (It may be a matter of opinion whether it ought to be, and some people may falsely believe that it isn't, but this is not the same thing.) This may seem benign at first glance, but it wreaks havoc on our basic semantic and pragmatic assumptions. On the semantic side, if (3), for example, expresses a proposition, and a proposition is a set of worlds, then it becomes a matter of opinion which proposition it expresses – or worse, which worlds are members of a particular set. Accordingly, on the

pragmatic side, if an assertion of (3) constitutes a proposal to restrict the context set in a certain way, it becomes a matter of opinion what restriction is being proposed.

2.4. Second Challenge: *De Se* Attitudes

A second challenge to the standard approach to semantics, which is less obvious but perhaps better known, involves *de se* interpretations of attitude reports. (I will take on this challenge mainly in Chapter 4.) A *de se* attitude is one that crucially involves the self, rather than simply truth conditions about the world (Lewis, 1979; Perry, 1979; Chierchia, 1989). A classic example due to Perry (1977) involves an amnesiac named Lingens who is lost in the Stanford library and doesn't know who he is or where he is. Even if he reads a biography of himself, and learns from it that there is an amnesiac named Rudolf Lingens lost in the Stanford library, he may still not realize that he himself is Rudolf Lingens and is in the Stanford library. On the other hand, if he reads the biography and then suddenly regains his memory, he may well make this connection. In the first case, he would only be inclined to say, "Lingens is lost in the Stanford library" whereas in the second, he would be inclined to say, "I am lost in the Stanford library." The latter is a report of a *de se* belief. If propositions are seen as something like sets of worlds, there is no way to distinguish between the content of these two beliefs; both, for example, would be the set of worlds {w: Lingens is lost in the Stanford library in w}.

De se attitudes are an issue for natural language semantics because certain constructions are obligatorily interpreted *de se*, in particular attitude reports involving embedded infinitives and subject control (Morgan, 1970; Chierchia, 1989). For example, the Italian example in (5) is only true in a situation where Pavarotti would be inclined to say, "I am a genius." If he unknowingly listened to a recording of himself and thought, "That singer is a genius," (5) would not be true. Similarly, (6) would only be true if the amnesiac Lingens were inclined to say, "I want to get out of the Stanford library"; if he unknowingly read a biography of himself and thought, "I want this guy Lingens to get out of the Stanford library" (6) would not be true.

(5)　　　　**[Italian]**

Pavarotti crede　di　essere un genio.
Pavarotti believes COMP be　a　genius.

'Pavarotti believes that he's a genius.'
[Lit.: "Pavarotti believes to be a genius"]

　　　　　　　　　　　　　(Anand, 2006, no. 1a; based on Chierchia, 1989)

(6)　　　　Lingens wants to get out of the Stanford library.

Chapter 2

Epistemic Modals,
Predicates of Personal Taste,
and Attitude Reports

1. <u>Introduction</u>*

In this chapter, I present my core semantic and pragmatic proposals, using the case study of epistemic modals and predicates of personal taste. In particular, I look at the modals *might* and *must* and at predicates such as *tasty* and *fun*, which were discussed by Lasersohn (2005, 2006). These two classes of expressions share a similar analytical difficulty in determining whose taste or knowledge is being expressed. Accordingly, they have parallel behavior in attitude reports and in a certain kind of disagreement. On the other hand, they differ in how freely they can be linked to a contextually salient individual, with epistemic modals being much more restricted in this respect.

I propose a unified account of epistemic modals and predicates of personal taste that captures the similarities and differences between the two classes, as well as their interactions with certain attitude predicates. My semantic analysis builds on Lasersohn's (2005) analysis of predicates of personal taste using a "judge" parameter. I argue for certain modifications to Lasersohn's view, and extend the system to cover epistemic modals and a number of attitude predicates. I also sketch a pragmatic theory of conversation that goes with the semantic account and gives further explanatory power to the system.

Now let me start by introducing the basic puzzle shared by epistemic modals and predicates of personal taste. I will start with epistemic modals. It is widely assumed that (1a) has a reading (its epistemic reading) which can be expressed as something like (1b) (Kratzer, 1977).

(1) (a)   It might be raining.

     (b)   In some world compatible with <u>what is known</u> in the actual world, it's raining.

A troublesome question lurks in (1b). There is reference to the set of worlds "compatible with what is known," but the question is, known by *who*? If "what is known" is taken to mean "what is known by the speaker," the resulting meaning is too weak (see, e.g., MacFarlane, 2006). On the other hand, if "what is known" is taken to mean "what is known by anyone at all" or "what is known by people in general" the meaning becomes impossibly strong. The question of exactly whose knowledge is relevant for the interpretation of epistemic modals turns out to be difficult to answer, and a great deal of effort has gone into trying to either answer it or evade it (for example, by using descriptions like "what is known"), in both the linguistics and the philosophy literature.[1]

Lasersohn (2005) discusses a similar puzzle that arises with "predicates of personal taste" such as *tasty* and *fun*. He uses examples like (2).

(2)   This roller coaster is fun.

---

[1] In addition to Kratzer and MacFarlane's work, see, for example, Moore (1962), Hacking (1967), Stalnaker (1984), DeRose (1991), Egan, Hawthorne & Weatherson (2005), and von Fintel & Gillies (2005, 2007a).

Lasersohn shows that if *fun* in sentences like (2) is taken to mean "fun for the speaker" or "fun for someone," the meaning is too weak; on the other hand, if it's taken to mean "fun for everyone" or "fun for people in general" it becomes too strong. The question of whose taste or subjective experience is relevant to the interpretation of a predicate of personal taste thus turns out to also be difficult to answer, and the difficulty in this regard is very similar to the difficulty of specifying whose knowledge is expressed by an epistemic modal. I would like to suggest, then, that these two questions are difficult for the same reason; there is just one puzzle that applies to both epistemic modals and predicates of personal taste.[2]

The structure of the chapter is as follows. In Section 2, I give examples of the parallel behavior of epistemic modals and predicates of personal taste, and review the reasons why standard mechanisms of context dependence are not sufficient to account for the puzzling behavior of these items. In Section 3, I present Lasersohn's analysis of predicates of personal taste, and show how it can help to explain some of the puzzling behavior of predicates of personal taste discussed in Section 2. In Section 4, I extend this analysis to epistemic modals, first extending Lasersohn's system directly and then arguing for a modification to it. The revised version explains the puzzling behavior of both epistemic modals and predicates of personal taste, and also accounts for a difference between them. In Section 5, I bring up some contrasts between the predicates *think*, *find* (as in *find the cake tasty*), and *believe*, and offer an explanation based on requirements similar to those of evidentials. In Section 6, I show how the semantic system of judge dependency can be placed within a Stalnakerian theory of conversation and the common ground. In Sections 7–8, I compare my analysis to recent proposals by Egan, Hawthorne & Weatherson (2005) and MacFarlane (2006) for epistemic modals, and Lasersohn (2005) for predicates of personal taste, arguing that my proposal fares better in both domains, and I sum up the chapter in Section 9.

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[2] Egan, Hawthorne & Weatherson (2005) also connect their relativist view of epistemic modals with examples like *Rotting flesh tastes great* (uttered by a vulture), but they do not explore taste predicates in depth.

2. <u>Parallels between Epistemic Modals and Predicates of Personal Taste</u>

In this section, I will show that epistemic modals and predicates of personal taste have parallel behavior in attitude reports and in certain phenomena of contradiction and disagreement.[3]

2.1. Epistemic Modals in Attitude Reports

Much discussion about the semantics of epistemic modals has been devoted to the question of whose knowledge state is being expressed, or as it is sometimes put, what the relevant "community of knowers" is. For example, DeRose (1991) proposes that the community of knowers is fairly free, but that it's required to include the speaker. Egan, Hawthorne & Weatherson (2005) give counterexamples to this constraint. The main thing that seems to be generally agreed on is that it is not obvious how to figure out who the relevant "knowers" will be for any particular example. I would like to begin, though, by looking at a class of examples where this uncertainty disappears, namely those such as (3)–(4) where an epistemic modal is embedded under *think*. (I will be restricting my attention to modal verbs and auxiliaries, and leave it to future work to determine whether modal expressions of other syntactic categories, such as *probably* and *likely*, have parallel behavior.)

(3)   Sam thinks it might be raining.

(4)   Sam thinks it must be raining.

In (3)–(4), the embedded modal seems to express Sam's mental state.[4] For example, (3) is true iff Sam's beliefs do not exclude the possibility that it's raining, and (4) is true iff Sam's beliefs exclude the possibility that it isn't raining. This fact extends to cases where the grammatical subject of *think* is a quantifier, as in (5). (Indices are used just as a shorthand to indicate the intended reading and are not meant to have theoretical status.)

(5)   (a)   [Every boy]$_i$ thinks he$_i$ must be stupid.

---

[3] Moltmann (2005) independently makes similar observations about the parallels between predicates of personal taste and epistemic modals, and gives brief suggestions towards a parallel analysis.
[4] This observation about embedded epistemic modals is anticipated by Antinucci & Parisi (1971).

(b)   [Every contestant]$_i$ thinks they$_i$ might be the winner.[5]

The sentences in (5) have a reading where the "knowers" range along with the subject. On the relevant reading, (5a) says that for each boy x, x's beliefs entail that x is stupid, and (5b) says that for each contestant y, y's beliefs do not exclude the possibility that y is the winner. Of course, the bound pronoun need not be the subject of the embedded clause, as illustrated in (6). (Underlining indicates the "knower" for a particular modal.)

(6) (a)   [Every boy]$_i$ thinks that his$_i$ father <u>must</u> be the smartest person in the world.

     (b)   [Every contestant]$_i$ thinks that the judges <u>might</u> have liked them$_i$ the best.

In cases where one propositional attitude report is embedded under another, there is still no ambiguity as to whose mental state is being reported with an epistemic modal: the modal always reports the mental state of the immediate subject. This is illustrated in (7)–(8).

(7) (a)   Mary thinks that <u>Sam</u> thinks it <u>might</u> be raining.

     (b)   Mary thinks that <u>Sam</u> thinks it <u>must</u> be raining.

(8) (a)   <u>Mary</u> thinks that Sam <u>might</u> think it's raining.

     (b)   <u>Mary</u> thinks that Sam <u>must</u> think it's raining.

In (7a), for example, the content of Mary's belief is that Sam's beliefs don't exclude the possibility that it's raining. On the other hand, (8a) says that Mary's beliefs don't exclude the possibility that Sam thinks it's raining.

   The adverbial clause *as far as x knows* has the same effect as an attitude predicate, as illustrated in (9)–(10).

(9)   As far as <u>Sam</u> knows, it <u>might</u> be raining.

(10)   Mary thinks that as far as <u>Sam</u> knows, it <u>might</u> be raining.

---

[5] The examples in (5) are from Speas (2004), who argues that the modal base is linked to the bound variable but does not link the effect to attitude predicates. Similar examples are also used in von Fintel & Iatridou (2003) to show that quantifiers can bind pronouns across an epistemic modal.

Again, the modal in (9)–(10) is clearly reporting Sam's beliefs, not the beliefs of the speaker or anyone else.

2.2. Predicates of Personal Taste in Attitude Reports

Lasersohn (2005) looks at a different kind of item that turns out to have largely parallel behavior, namely what he calls "predicates of personal taste." Lasersohn gives *tasty* and *fun* as paradigm cases. As Lasersohn observes, it is difficult to draw a sharp distinction between predicates of personal taste and predicates expressing moral or aesthetic values, such as *beautiful* or *moral*. (Some borderline examples are *funny*, *annoying*, and *tasteful*.) Ultimately it would be desirable to give all of these classes a unified treatment, but (like Lasersohn) I will focus on the predicates *tasty* and *fun* (plus related expressions such as *taste good*), taking the relevant class of items to be those which pattern in roughly the same way.

Because predicates of personal taste such as *tasty* and *fun* relate to an internal state or experience, the question arises as to whose internal state or experience is being reported in any particular case, or in Lasersohn's terminology, who is the "judge." And as with the issue of who the "knower" is with epistemic modals, this turns out to be hard to answer. But also like epistemic modals, predicates of personal taste behave differently when embedded under a verb like *think*. For example, consider (11)–(12).

(11)   Sam thinks the dip is tasty.

(12)   Sam thinks that the roller coaster is fun.

These examples have a very salient reading where the predicate of personal taste is linked to the subject of *think*, that is, where the judge is clearly Sam. We will see that this is not the only possible reading, and that predicates of personal taste differ from epistemic modals in this respect. I'll return to this in Section 4.2.

Bearing this caveat in mind, we can see that the link remains when the subject of *think* is a quantifier that binds a pronoun in the embedded clause. For example, (13) has a reading where the judge co-varies with the boys. (Underlining indicates a link between a predicate and the judge.)

(13)   [Every boy]$_i$ thinks his$_i$ dinner is <u>tasty</u>.

As with epistemic modals, when one *think*-clause is embedded under another as in (14), the predicate is linked to the subject of the *think*-clause that most immediately embeds it, as illustrated in (14).

(14) (a)   Mary thinks that <u>Sam</u> thinks the dip is <u>tasty</u>.

(b)   Mary thinks that <u>Sam</u> thinks that the roller coaster is <u>fun</u>.

Also as with epistemic modals, the same effect can be achieved in some cases with certain adverbial phrases, as Lasersohn points out. Some of these are illustrated in (15).

(15) (a)   The roller coaster is <u>fun</u> for <u>Sam</u>.

(b)   As far as <u>Sam</u> is concerned, the roller coaster is <u>no fun</u>.

(c)   The cake <u>tastes good</u> to <u>me</u>.[6]

Thus one parallel between epistemic modals and predicates of personal taste is in their behavior when embedded under propositional attitude predicates such as *think*.

2.3. Contradictions and Disagreements

Another parallel between epistemic modals and predicates of personal taste is in the fact that both give rise to a peculiar kind of disagreement between speakers. I take the presence of expressions like *no* or *nuh-uh* to mark disagreement in English, as used, for example, in the dialogue in (16), which involves three people, Mary, Sam, and Sue.

(16)   Mary: Where's Bill?
            Sam: He's in his office.
            Sue: Nuh-uh, he's at home! He doesn't work on Fridays.
            [OR]   No, he isn't, he's at home! He doesn't work on Fridays.

---

[6] I assume that *tastes good* has the same meaning as *is tasty*, ignoring the fact that it's presumably built up from *taste* and *good*. The two expressions don't have exactly the same distribution, as seen for example in the fact that ?*tasty to me* is less acceptable than *tastes good to me*. But when convenient, I will substitute one for the other.

The disagreement in (16) is about a completely objective, factual matter. But disagreement is also possible if epistemic modals are used as in the dialogue in (17), which contains an epistemic modal.

(17)   Mary: Where's Bill?
                 Sam: I'm not sure. He might be in his office.
                 Sue: Nuh-uh, he can't be. He never works on Fridays.
                  [OR]   No, he can't be. He never works on Fridays.

The puzzling thing about discourses like (17) is this: Sam seems to be expressing his mental state, and Sue seems to seems to be disagreeing with him. But if this is the case, then Sue ought to be understood as saying that Sam is wrong about his own mental state. However, Sue does not seem to be doing that, but rather expressing her own mental state. In other words, two speakers can disagree about a statement containing an epistemic modal simply because they have different knowledge states. Compare this to (18), where Sam's statement explicitly refers to his own knowledge; here it seems odd for Sue to respond as if she is disagreeing.

(18)   Mary: Is Bill in his office?
                 Sam: Well, I'm not sure, but I don't know that he isn't.
                 Sue: # Nuh-uh, he's at home! He doesn't work on Fridays.
                  [OR]   # No, he isn't, he's at home! He doesn't work on Fridays.

Thus there are two facts to be explained: the fact that disagreement is possible in (17), and the contrast between (17) and (18) in this respect.

Once again, the behavior of predicates of personal taste is very similar. For example, in (19)–(20), Sam seems to be expressing his own taste or experience, and Sue seems to be expressing hers, and yet they are disagreeing.

(19)   Mary: How's the cake?
                 Sam: It's tasty.
                 Sue: Nuh-uh, it isn't tasty at all!
                  [OR]   No it isn't, it tastes terrible!

(20)   Mary: How was the party?
                 Sam: It was fun.
                 Sue: Nuh-uh, it wasn't fun at all!
                  [OR]   No it wasn't, it was no fun at all!

On the other hand, if Sam makes explicit that he is expressing his own taste, Sue's responses then become odd, as illustrated in (21)–(22).

(21)   Mary: How's the cake?
            Sam: It tastes good to me.
            Sue: # Nuh-uh, it doesn't taste good at all!
         [OR]   # No it doesn't, it tastes terrible!

(22)   Mary: How was the party?
            Sam: It was fun for me.
            Sue: # Nuh-uh, it wasn't fun at all!
         [OR]   # No it wasn't, it was no fun at all!

Another way to look at this contrast is in terms of possible interpretations of elided VPs. For example, compare (23) to (24).

(23)   Sam: The party was fun.
            Sue: No, it wasn't!

(24)   Sam: The party was fun for me.
            Sue: No, it wasn't!

In (23), Sue could be responding based on the fact that the party wasn't fun for her; however, in (24), Sue's response seems to mean "it wasn't fun for you (Sam)," and has to be based on a belief of Sue's that the party was not fun for Sam.

   Thus, as with epistemic modals, there are two facts about predicates of personal taste to be explained: why disagreement is possible in (19)–(20), and why these contrast with (21)–(22).[7]

   I should clarify that when I say that disagreement is possible in a certain dialogue, I mean very narrowly that expressions like *no* (*it isn't*) and *nuh-uh* are allowed. I don't mean that we merely have an intuition that the speakers disagree about something, which

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[7] A MITWPL reviewer pointed out that the same kind of disagreement is possible with vague scalar predicates as in dialogues like (i), in a situation where George's jacket is of a color intermediate between clearly red and clearly burgundy.
  (i)   Mary: What color is George's jacket?
        Sam: It's red.
        Sue: No it isn't, it's burgundy!
This suggests to me that it might be possible to extend the account I give to predicates of personal taste and epistemic modals to capture certain properties of vague scalar predicates, but I will not pursue that here.

may be a broader phenomenon.[8] I also don't mean that the disagreement is necessarily a rational or sensible one to engage in. The dialogues in (19) and (20) are just the kind of arguments that are often pointed out to be futile, given that people's tastes simply differ. That is not my concern. The only fact that matters for my purposes is that such dialogues can and do occur – often enough, in fact, to give us ample opportunity to perceive their futility.

2.4. Note about First-Person Belief Reports

I observed in Sections 2.1–2.2 that when an epistemic modal or predicate of personal taste is embedded in an attitude report, the attitude holder becomes the person whose knowledge or taste is relevant. Then in Section 2.3 I observed that when an epistemic modal or predicate of personal taste is explicitly linked to the speaker, it is not possible for a hearer to disagree using expressions such as *no it isn't* or *nuh-uh*. Putting these two observations together, we might expect that when an epistemic modal or predicate of personal taste is embedded in a first-person attitude report, disagreement would again become impossible. For example, we might expect (25)–(26) to be odd, and yet they are perfectly acceptable.

(25)   Mary: Where's Bill?
         Sam: I'm not sure. I think he might be in his office.
         Sue: No, he can't be. He never works on Fridays.

(26)   Mary: How's the cake?
         Sam: I think it's tasty.
         Sue: No it isn't, it tastes terrible!

Notice, though, that the form of Sue's response in these dialogues shows that her disagreement is targeting the embedded clause rather than the matrix clause. That is, in (25) Sue says *no, he can't be* (i.e., Bill can't be in his office); and similarly in (26) she says *no it isn't* (i.e., the cake isn't tasty). If Sue were disagreeing with the matrix clause, she would have to say, *No you don't*, meaning *you don't think that*. It is an interesting

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[8] For example, if Sam says, "I like this cake," and Mary says, "I don't like this cake," we may have a general intuition that there is something that Sam and Mary disagree about; however, this does not count as the type of disagreement that I am talking about because disagreement markers such as *no* or *nuh-uh* would not be licensed. (This was brought to my attention by Philippe Schlenker, p.c..)

question why speakers may disagree with propositions that are embedded within attitude reports, but one that is independent of the issues at hand. I will return to this issue in Section 6.5.

2.5. Why Not Context Dependence?

One might think that epistemic modals and predicates of personal taste are simply context-dependent items, so that, for example, *tasty* means "tastes good to x" and *might* means "compatible with x's knowledge," where x is some salient, contextually determined individual or group. In fact this approach is often taken with respect to epistemic modals (see, e.g., DeRose, 1991; von Fintel & Gillies, 2007a). However, standard mechanisms of context dependence are not enough to account for the behavior of these items. Lasersohn (2005) argues this in great detail for predicates of personal taste, and proponents of context relativism such as Egan, Hawthorne & Weatherson (2005) and MacFarlane (2006) do so for epistemic modals. Below I consider some obvious options for a context-dependent analysis, and review the reason why they fail.

First, note that in the dialogues (17) and (19)–(20) above, where Sam says that the cake is tasty or that Bill might be in his office, he seems, intuitively, to be expressing something about his own experience of taste or his own mental state. This suggests that a context-dependent account of these items ought to involve the speaker in some way. The most obvious possibility, then, is that predicates of personal taste and/or epistemic modals involve first-person indexicals, so that *tasty* means "tastes good to me (the speaker)" and *might* means "compatible with my (the speaker's) knowledge." But we have already seen that this cannot be right because of disagreements of the kind that occur in dialogues such as (17) and (19), repeated in (27)–(28).

(27)   Mary: Where's Bill?
             Sam: I'm not sure. He might be in his office.
             Sue: Nuh-uh, he can't be. He never works on Fridays.
           [OR]   No, he can't be. He never works on Fridays.

(28)   Mary: How's the cake?
             Sam: It's tasty.
             Sue: Nuh-uh, it isn't tasty at all!
           [OR]   No it isn't, it tastes terrible!

If *might* and *tasty* contained first-person indexicals, then these dialogues would be akin to that in (29), which is incoherent.

(29)   Mary: I'm a doctor.
                  Sam: # No, I'm not!

Even if a simple account using first-person indexicals is not right, we might think that the hidden argument should contain something like an inclusive *us*, that is, the speaker and the addressee. On this view, *tasty* would mean something like "tastes good to us" and *might* would mean something like "compatible with our knowledge." In this case, I will use different arguments for predicates of personal taste and for epistemic modals, so I will consider the two cases separately. In both cases, the arguments I will give below will apply equally to a view where the hidden argument consists of the speaker and addressee plus possibly other individuals.

The view that *tasty* means "tastes good to us" is initially plausible in light of dialogues like (28); there it is possible that Sue is denying that the cake tastes good to both her and Sam, on the grounds that it does not taste good to her. Assuming that the property of tasting good is distributive, this would be sufficient to make it false that the cake tastes good to both of them. However, now consider (30).

(30)   Mary: This cake is tasty.
                  Sam: No, it isn't, it tastes terrible!

In this case, Sam can say that the cake tastes terrible, even though he knows that the cake doesn't taste terrible to Mary, and therefore doesn't taste good to both of them.

Lasersohn makes a similar point with examples like (31).

(31)   Sam: This cake isn't tasty at all.
                  Mary: Yes it is! It tastes great!

                                     (based on Lasersohn, 2005, no. 17)

Here since Mary already knows that the cake does not taste good to Sam, she should not be able to assert that the cake tastes good to both of them.

Now let me turn to the case of epistemic modals. Here the proposal would be that *might* means something like "compatible with our (the speaker and addressee's) knowledge." It is not important for the argument whether this is understood as the speaker and addressee's combined knowledge or their shared knowledge. To see that this cannot be right, recall the behavior of epistemic modals in attitude reports such as (3), repeated in (32).

(32)   Sam thinks it might be raining.

If, for example, Bill utters (32) to Sue, the sentence means that it's compatible with Sam's knowledge or beliefs that it's raining. It clearly does not mean that it's compatible with Bill and Sue's knowledge that it's raining, which is what the proposal would predict. Thus, in general *might* cannot mean "compatible with our knowledge."

One solution that may come to mind here is to suggest that the component meaning *us* is not a normal indexical but a shifting indexical (see, e.g., Schlenker, 2003). The problem with this idea is that epistemic modals do not have the same behavior as shifting indexicals in this respect. The shifted interpretation of shifting indexicals is generally optional, whereas the shifting in (32) would be obligatory. Relatedly, in a case where one speech or attitude report is embedded under another, shifting indexicals can typically be linked to either the lower or higher attitude report. (I'll say more about this difference in Chapter 4, Section 2.4.)

A similar argument applies to a view where the relevant knowledge is just that of any particular, contextually relevant group (as argued by DeRose, 1991; von Fintel & Gillies, 2007a, and others). Again supposing that Bill uttered (32) to Sue, the sentence would clearly not mean that Sam thinks it's compatible with the knowledge of the <u>group relevant for Bill and Sue</u> that it's raining. Similarly, if Bill uttered (33) to Sue, it would not generally mean that Sam thinks the cake tastes good to the group of people who Sue takes to be relevant.

(33)   Sam thinks that the cake is tasty.

One final possibility that comes to mind is that *tasty*, for example, means something like "tastes good to people in general." I'll address that possibility in Section 4.6.

3. <u>Lasersohn's Analysis of Predicates of Personal Taste</u>

In this section I will summarize Lasersohn's (2005) analysis of predicates of personal taste, which uses an additional individual parameter called the "judge." On this view, the Kaplanian content of a sentence is a function from tuples $<w,t,j>$ to truth values, where w is a world, t is a time, and j is an individual (the judge). The judge is the person whose taste or experience is relevant for a predicate of personal taste. This is in contrast to the standard view which takes the content of a sentence to be a function from just worlds or world-time pairs to truth values. I will go through the analysis in more detail below. In Section 4, I will extend the same kind of view to epistemic modals.

3.1. Basic Assumptions

Lasersohn's starting point is the dual view of sentence meaning from Kaplan (1989). On this view, there are two senses of the "meaning" of an expression: the "character," which is constant for a single expression across utterances, and the "content," in which the reference of indexicals such as *I* and *now* has been fixed. For example, suppose that one speaker, A, utters the sentence *I am in Boston now* at time t_1, and another speaker, B, utters the same sentence at time t_2. The two utterances have the same character, but the content of A's utterance is the proposition that A is in Boston at time t_1, and the content of B's utterance is the proposition that B is in Boston at time t_2. In general, then, the content of an expression is a function from world-time pairs $<w,t>$ to extensions (i.e., its intension). The character of an expression is thus a function from contexts of utterance to contents. In particular, the content of a sentence (a proposition) is a function from world-time pairs to truth values, and the character of a sentence is a function from contexts of utterance to propositions. The elements of the context of utterance that determine content from character are called the "context" and the parameters of evaluation that determine truth value from content are called the "index."

Given that both the context of utterance and the world and time contribute to the extension of an expression, we can write the extension of an expression α as $[\![\alpha]\!]^{c;\,w,t}$, where c is the context of utterance (the context), w is the world of evaluation, and t is the time of evaluation (so <w,t> is the index). Assuming a system of semantic interpretation along the lines of Heim & Kratzer (1998), we can use the two rules of semantic interpretation in (34).[9],[10] (Note that worlds are type s and times are of type i.)

(34)   **Rules of semantic interpretation:**

Functional Application (FA): If α is a complex expression formed by combining two expressions β and γ, and $[\![\gamma]\!]^{c;\,w,t}$ is in the domain of $[\![\beta]\!]^{c;\,w,t}$, then $[\![\alpha]\!]^{c;\,w,t} = [\![\beta]\!]^{c;\,w,t}\,([\![\gamma]\!]^{c;\,w,t})$.

Intensional Functional Application (IFA): If α is a complex expression formed by combining two expressions β and γ, and $[\lambda w'_s\,.\,[\lambda t'_i\,.\,[\![\gamma]\!]^{c;\,w',t'}]\,]$ is in the domain of $[\![\beta]\!]^{c;\,w,t}$, then $[\![\alpha]\!]^{c;\,w,t} = [\![\beta]\!]^{c;\,w,t}\,(\,[\lambda w'_s\,.\,[\lambda t'_i\,.\,[\![\gamma]\!]^{c;\,w',t'}]\,]\,)$.

3.2. A New Parameter

To analyze predicates of personal taste, Lasersohn adds a "judge" to the index. In particular, the content of a sentence under this view is a function from world-time-individual triples <w,t,j> to truth values. Thus the extension of an expression α should now be written as $[\![\alpha]\!]^{c;\,w,t,j}$, where c is the context of utterance (the context), w is a world, t is a time, and j is the judge (so <w,t,j> is the index). It should be noted that since the judge is an individual, formally speaking Lasersohn's indices are in fact centered worlds, although he does not present the idea in those terms. I will not discuss other uses of centered worlds, but will make the connection implicitly by using the notion of doxastic alternatives.

Lasersohn's "judge" is the individual whose taste or experience is relevant for a predicate of personal taste. Thus *fun*, *tasty* (or *taste good*), and *taste terrible* have the meanings in (35).

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[9] Lasersohn presents his analysis in a somewhat different form, as a self-contained fragment, but the two versions are essentially notational equivalents.

[10] Additional rules of semantic interpretation would be needed if Kaplanian "monsters" are to be allowed (Kaplan, 1989; Schlenker, 2003); I will not address this question here, except for touching on it briefly in Chapter 4.

(35) $[\![\text{fun}]\!]^{c;\,w,t,j} = [\lambda x_e \,.\, x$ is fun for j in w at t]
$[\![\text{tasty}]\!]^{c;\,w,t,j} = [\![\text{taste good}]\!]^{c;\,w,t,j} = [\lambda x_e \,.\, x$ tastes good to j in w at t]
$[\![\text{taste terrible}]\!]^{c;\,w,t,j} = [\lambda x_e \,.\, x$ tastes terrible to j in w at t]

On the other hand, the extension of a normal, non-judge-dependent predicate such as [*be a*] *doctor* does not depend on the judge (which is to say that it is a constant function from the judge) as shown in (36).

(36) $[\![\text{be-a-doctor}]\!]^{c;\,w,t,j} = [\lambda x_e \,.\, x$ is a doctor in w at t]

All the meanings given so far are for expressions that don't depend on the context of utterance (and thus have the same content regardless of the context of utterance). Some expressions that do depend on the context of utterance are given in (37). (From now on I will include the context parameter only when it is relevant.)

(37) $[\![\text{I}]\!]^{c;\,w,t,j} =$ the speaker of c
$[\![\text{you}]\!]^{c;\,w,t,j} =$ the addressee of c

Adding a new parameter of evaluation requires us to revise the rules of interpretation from (34), replacing them with those in (38). Note that the judge parameter is an individual (type e).

(38)   **Rules of semantic interpretation [revised]:**

Functional Application (FA): If α is a complex expression formed by combining two expressions β and γ, and $[\![\gamma]\!]^{c;\,w,t,j}$ is in the domain of $[\![\beta]\!]^{c;\,w,t,j}$, then $[\![\alpha]\!]^{c;\,w,t,j} = [\![\beta]\!]^{c;\,w,t,j} ([\![\gamma]\!]^{c;\,w,t,j})$.

Intensional Functional Application (IFA): If α is a complex expression formed by combining two expressions β and γ, and $[\lambda w'_s \,.\, [\lambda t'_i \,.\, [\lambda j'_e \,.\, [\![\gamma]\!]^{c;\,w',t',j'}]\,]\,]$ is in the domain of $[\![\beta]\!]^{c;\,w,t,j}$, then $[\![\alpha]\!]^{c;\,w,t,j} = [\![\beta]\!]^{c;\,w,t,j} (\,[\lambda w'_s \,.\, [\lambda t'_i \,.\, [\lambda j'_e \,.\, [\![\gamma]\!]^{c;\,w',t',j'}]\,]\,]\,)$.

In the case of modified predicates of personal taste such as *fun for Sam*, Lasersohn treats the preposition as an intensional operator that shifts the judge parameter to the object of the preposition. This is equivalent to using the syncategorematic rule in (39).

(39) $[\![\text{P for y}]\!]^{w,t,j} = [\![\text{P}]\!]^{w,t,y}$
[where P is a predicate and y is a DP]

The *to* that is used in *tastes good to Sam* should work the same way. These are presumably different from *for* and *to* in their normal prepositional use, as in *a present for Sam* or *a letter to Sue*.

Of course, something more would need to be said to account for the fact that we say *fun for Sam* and *tastes good to Sam* in English, and not **fun to Sam* or **tastes good for Sam*. I will leave this aside for now, but return to it briefly in Section 8, when I compare Lasersohn's view with the revised view I will propose here.

On Lasersohn's view, attitude predicates such as *think* or *believe* take propositions as arguments, but in effect only operate on the world and time, not the judge. Roughly speaking, *think* would have a lexical entry along the lines of (40).[11]

(40) $[\![think]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} \,.\, [\lambda z_e \,.\, \forall <w',t'>$ compatible with z's beliefs in w at t, $p(w')(t')(j) = 1]\,]$

This says that "z thinks that p" is true at a world-time-judge triple $<w,t,j>$ iff in all the world-time pairs $<w',t'>$ compatible with z's beliefs in w at t, p is true in w' at t' as judged by j.

Lasersohn's final assumption is that speakers typically make assertions, and assess the assertions of others, from an "autocentric" perspective – taking themselves to be the judge. This is not always the case, though: in contexts where the perspective of another person is particularly salient, they may make and assess assertions from an "exocentric" perspective. One such context is that of an attitude report, since if a speaker is reporting the thoughts or experience of someone else, then it is natural to take them as the judge. I will have some criticisms of this view of perspective-taking, but will again save them until Section 8.

3.3. Consequences

Lasersohn's account can explain the "linked" reading of examples like (11), repeated in (41), where the judge of *tasty* is naturally understood to be Sam. Lasersohn's explanation

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[11] This is simplifying Lasersohn's view of propositional attitudes somewhat (see Lasersohn, 2005, Sec. 6.2).

is that in attitude reports, it is especially natural for the speaker to take an exocentric perspective using the subject as the judge. This view predicts that the link is not obligatory. As I mentioned in Section 2.2, this turns out to be correct for predicates of personal taste; I will return to this in Section 4.2.

(41)   Sam thinks the dip is tasty.

Lasersohn's account can also give at least the beginnings of an explanation for why predicates of personal taste give rise to disagreements in dialogues like (19), repeated in (42).

(42)   Mary: How's the cake?
             Sam: It's tasty.
             Sue: Nuh-uh, it isn't tasty at all!
             [OR]   No it isn't, it tastes terrible!

If we assume that what is crucial for the occurrence of expressions such as *nuh-uh* and *no it isn't* is the content of sentences (i.e., propositions), we can make some sense of (42). The content of the sentence uttered by Sam is a function from world-time-judge triples $<w,t,j>$ to truth values that yields the truth value 1 just in case the cake tastes good to j in w at t. The content of the sentence uttered by Sue is the negation of this, the function from triples $<w,t,j>$ that yields true just in case the cake does not taste good to j in w at t. Thus Sue utters a sentence that negates the content of Sam's sentence, and they disagree. On the other hand, if the judge is made explicit as in (21), repeated in (43), the sentence uttered by Sam has a different content: the function from triples $<w,t,j>$ that yields the truth value 1 just in case the cake tastes good to Sam in w at t. This is because *for me* operates on the judge parameter; the value of *me* is set to Sam by the context of utterance before the calculation of the content. The content of Sue's response is not the negation of this, so it sounds odd for her to signal that she is disagreeing.

(43)   Mary: How's the cake?
             Sam: It tastes good to me.
             Sue: # Nuh-uh, it doesn't taste good at all!
             [OR]   # No it doesn't, it tastes terrible!

This explanation for the contrast between (42) and (43) depends crucially on the assumption that speakers may take an autocentric perspective, thus in effect evaluating assertions using a different judge. In Lasersohn's system, this is technically no different from the situation that arises when two speakers believe they are in different worlds and thus disagree about whether a proposition is true in the actual world. Conceptually, though, there is a difference between the two situations, because there is always an objective fact of the matter as to what is the actual world and time, whereas there is no analogous "actual judge." I will develop a slightly different view of this in Section 6, where I discuss how this analysis can be put into a theory of conversation and common ground along the lines of Stalnaker (1978, 2002) and others. There I will try to make more sense of why disagreements would be expected to work in the particular puzzling way that they do for both predicates of personal taste and epistemic modals.

I call this only the beginnings of an explanation because it does not provide us with any insight into why disagreement would still involve the content in this way once the judge parameter is added into the system. Since the phenomenon of disagreement is specific to multi-speaker dialogues, we can only answer this question by looking at the pragmatics and rules of conversation, which is what I will do in Section 6.

4. <u>Extending the Analysis to Epistemic Modals</u>

In this section I show how Lasersohn's apparatus can be used to give a parallel analysis of epistemic modals and predicates of personal taste. In Section 4.1, I will give a preliminary proposal that extends Lasersohn's analysis very directly. In Section 4.2, I will bring up a contrast between epistemic modals and predicates of personal taste that poses a problem for that approach. In Sections 4.3–4.4, I will revise the analysis in a way that captures both the parallels and the differences between epistemic modals and predicates of personal taste. In Section 4.5, I address one apparent problem for the revised proposal.

4.1. First Attempt

The most direct way to extend Lasersohn's account to epistemic modals is to simply identify the person whose knowledge is relevant for an epistemic modal with the judge. On this view, the lexical entries for *might* and *must* would be those given in (44).[12] (I will modify these slightly in Section 4.3.)

(44) $[\![\text{might}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>}$. there is some world w′ compatible with j's knowledge in w at t such that p(w′)(t)(j) = 1]

$[\![\text{must}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>}$. every world w′ compatible with j's knowledge in w at t is such that p(w′)(t)(j) = 1]

This view will straightforwardly explain the parallel behavior of epistemic modals and predicates of personal taste discussed in Section 2. For example, the subject of *think* in examples like (3), *Sam thinks it might be raining*, can be linked to Sam because Sam's perspective is salient in a context where his mental state is being reported. Speakers can disagree in dialogues like (17) based on the fact that they have different knowledge because each of them may take an autocentric perspective, with themselves as the judge. As we will see, however, there is a problem with directly importing Lasersohn's analysis to epistemic modals.

4.2. A Contrast

A direct extension of Lasersohn's system neatly accounts for the similarities between epistemic modals and predicates of personal taste, but it turns out that there is also an important way that the two classes differ which this view cannot capture. Essentially the difference is that predicates of personal taste can generally be interpreted with respect to any salient enough referent, whereas epistemic modals cannot. The easiest way to see this is by looking at the case where they are embedded under *think*. Recall that in attitude reports involving either epistemic modals or predicates of personal taste, the judge of the embedded clause may be linked to the subject of the matrix attitude predicate. It turns

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[12] This is what I proposed in an earlier version of this work (Stephenson, 2005). Egan (2007) independently proposes a very similar view of epistemic modals. My view and Egan's differ from the accounts of MacFarlane (2006) and Egan, Hawthorne & Weatherson (2005) in not relativizing the time of knowledge along with the "knower" (although as time is not Egan's focus, it is not clear whether he intends this to be significant).

out, though, that while this link is optional with predicates of personal taste, it is obligatory with epistemic modals. To see that the link is optional with predicates of personal taste, compare example (45) with (46).

(45) Mary: Has anyone tried the cake?
     Sam: Sue has. She thinks it's tasty.

(46) Mary: How's that new brand of cat food you bought?
     Sam: I think it's tasty, because the cat has eaten a lot of it.

                      (Kai von Fintel, p.c.)

In (45), the judge of *tasty* is naturally understood to be Sue, whereas in (46) it's naturally understood to be the cat. The difference seems to come purely from the fact that in a context like (46), the cat's perspective towards the taste of the cat food is especially salient. Lasersohn notices examples like (46) and uses them as evidence for his view that speakers can freely choose between an autocentric or exocentric perspective.

  On the other hand, now compare (47) with (48).

(47) Mary: I heard it isn't very nice out.
     Sam: Yeah, Sue thinks it might be raining.

(48) Mary: Wow, the dog really likes the dog food you're feeding him.
     Sam: (#) Yeah, I think it might be table scraps.

In (47), the judge of *might* is naturally understood to be Sue, as expected. However, in (48), the judge of *might* cannot be understood to be the dog, even though the dog's perspective with regards to the taste of the dog food is salient (from Mary's statement), and even though the dog's attitude towards the dog food could be caused by his mental state (e.g., if he always likes food meant for people better than food meant for dogs). In other words, Sam's statement is only felicitous if Sam does not know what the dog food consists of, regardless of whether the dog knows. In a context where it's assumed that Sam knows what he is feeding to his dog, his response sounds odd.

  A related point can be made if a predicate of personal taste is embedded under an epistemic modal as in (49).

(49)   The cat food might be tasty.

(Danny Fox, p.c.)

In (49), *tasty* can mean "tastes good to the cat" (for example) or it can mean "tasty" in the judge-dependent way, but *might* can only have the judge-dependent interpretation. For example, imagine that Sam reads the ingredients on a can of cat food and reflects that there is nothing in it that he actually dislikes; then he might utter (49) to convey that we shouldn't assume that the cat food would taste terrible to us just because it's intended for cats. Now imagine that Sam is watching his cat eat the cat food, and he can't tell from her reaction whether she likes it; in this case he might utter (49) to convey that he isn't sure whether the cat food was a good choice. Finally, imagine that Sam is watching his cat sniff the cat food inquisitively, evidently trying to decide whether it's going to taste good. In this case, Sam cannot utter (49) to convey something about the cat's mental state. (And clearly the problem is not that a cat cannot have a mental state, since we have already attributed to her the process of deciding whether the cat food will taste good.)

On the simple extension of Lasersohn's view, we might expect that the choice between an autocentric or exocentric perspective would extend over the entire utterance. Thus it is surprising not only that the interpretation of *tasty* can vary in a way that the interpretation of *might* cannot, but that *tasty* can vary independently of *might* within a single sentence. This suggests that, if I am on the right track in treating epistemic modals as judge-dependent items in the first place, the ability of predicates of personal taste to vary should be captured in some way other than a generally available option of using an exocentric perspective.

4.3. Revised Analysis

The first change I will make to Lasersohn's system has to do with the source of judge dependency for predicates of personal taste. Instead of making them directly dependent on the judge, I take them to be simple two-place predicates, whose first argument is the

person whose taste or experience is relevant.[13] New lexical entries for *tasty* (or *taste good*), *taste terrible*, and *fun* are given in (50).

(50) $[\![tasty]\!]^{w,t,j} = [\![taste\ good]\!]^{w,t,j} = [\lambda x_e \, . \, [\lambda y_e \, . \, y \text{ tastes good to x in w at t}]\,]$

$[\![taste\ terrible]\!]^{w,t,j} = [\lambda x_e \, . \, [\lambda y_e \, . \, y \text{ tastes terrible to x in w at t}]\,]$

$[\![fun]\!]^{w,t,j} = [\lambda x_e \, . \, [\lambda y_e \, . \, y \text{ is fun for x in w at t}]\,]$

Note that the judge parameter is still present, but these items are no longer inherently judge-dependent. To bring judge dependency back into the system, I propose that there is a silent nominal item PRO$_J$ that refers to the judge. The lexical entry for PRO$_J$ is given in (51).

(51) $[\![PRO_J]\!]^{w,t,j} = j$

Note that PRO$_J$ is not an indexical since it takes its reference from the index rather than the context of utterance, and also differs from pronouns like *he* and *she* in not being able to be bound.[14] When a predicate of personal taste with the new kind of meaning as in (50) takes PRO$_J$ as its first argument, the result will be the same as the original judge-dependent meanings given earlier in (35) (as the reader can verify).

I assume that in expressions such as *fun for X*, the PP (*for X*) has the same extension as the DP (*X*). In other words, *for* denotes the identity function over individuals, as in (52). (This has the same effect as making prepositions semantically vacuous.)

(52) $[\![for]\!]^{w,t,j} = [\lambda y_e \, . \, y]$

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[13] Treating predicates like *tasty* and *fun* as two-place predicates is by no means new. For example, Epstein (1984) assumes that they have a syntactic argument place that can be filled by a null item. (I will discuss some observations of Epstein in Chapter 4.) My view of predicates of personal taste might also be considered to be broadly in the spirit of Mitchell's (1986) semantics for "perspectival" expressions, although his domain of inquiry and ultimate analysis are both different from mine.

[14] Though despite the differences between PRO$_J$ and typical pronouns, I will suggest in Chapter 4 that PRO$_J$ is subject to Principle B.

Then a predicate of personal taste can take a PP directly as an argument, instead of taking PRO$_J$. Crucially, I also assume that a predicate of personal taste can take a null referential pronoun referring to a contextually salient individual.[15]

Epistemic modals, on the other hand, keep their lexical entries from the preliminary analysis in (44) (to be revised slightly below). The difference between epistemic modals and predicates of personal taste, then, is that epistemic modals are inherently judge-dependent, whereas predicates of personal taste become judge-dependent only if they take PRO$_J$ as an argument.

Another way to formulate the account, which is empirically equivalent as far as I can tell, would be to also give epistemic modals meanings that take an individual "knower" argument, but require that it always be PRO$_J$.[16] (This could be treated as a syntactic selection requirement or as a semantic presupposition.) This would have the advantage of making the basic meanings of epistemic modals and predicates of personal taste more parallel, but at the cost of stipulating that epistemic modals must combine with PRO$_J$. If there turns out to be a good reason to adopt this kind of formulation over the one I have given, it should be possible to make the switch while keeping the rest of my proposal intact. Yet another option would be to treat predicates of personal taste as systematically ambiguous between a two-place-predicate meaning and a judge-dependent meaning, eliminating the need for PRO$_J$ at the cost of positing the appropriate kind of rule. (On this view, predicates of personal taste would still need to be able to take silent referential arguments.) On any of these variations, the crucial point would be that predicates of personal taste have the option of taking referential arguments while epistemic modals do not.

Returning to the analysis, I further assume that attitude predicates such as *think* obligatorily shift the judge parameter of the embedded clause to the matrix subject. (This option was proposed in an earlier version of Lasersohn's paper and later rejected.) I will

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[15] Once null referential pronouns are posited, the question arises as to whether these pronouns can be bound in the same way that overt pronouns can. I leave an exploration of their behavior in this respect to future work.

[16] This was the version I presented in Stephenson (2006).

implement this using the notion of doxastic alternatives (Lewis, 1979; Chierchia, 1989), defined in (53).[17]

(53)   Doxastic alternatives:

$Dox_{w,t,x} = \{<w',t',y>$: it is compatible with what x believes in w at t that he/she/it is y in w' at $t'\}$

The doxastic alternatives of an individual x in world w at time t are the set of world-time-individual triples $<w',t',y>$ such that it is compatible with x's beliefs in w at t that x (him/herself) is y in w' at t'. Intuitively, these represent properties that x self-ascribes. For example, if John self-ascribes the property of being an individual named John, then all of John's doxastic alternatives are triples $<w',t',y>$ such that y is named John in w' at t'. The lexical entry for *think* using doxastic alternatives is given in (54).

(54) $[\![think]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . [\lambda z_e . \forall <w',t',x> \in Dox_{w,t,z}: p(w')(t')(x) = 1]\,]$

Unlike the lexical entry in (40) (in Section 3.2 above), this meaning for *think* operates on the world, time, and judge parameters. It has the effect that a sentence of the form "x thinks that S" is equivalent to "x thinks that S is true as judged by x." In many cases this will be equivalent to "S is true as judged by x" because of what Lasersohn refers to as epistemic privilege. For example, if S is *the cake is tasty*, then given that people have privileged access to their own experiences of taste, a person will generally think that S tastes good to them just in case it does taste good to them. (The principle of epistemic privilege does not generally hold with respect to epistemic modals, since it would require individuals to have no false or unjustified beliefs that they take to be knowledge.)

Because people can forget what their own internal states have been in the past, epistemic privilege breaks down in examples like (55). This happens because the

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[17] I use doxastic alternatives in order to capture the fact that the shifted judge is always interpreted *de se* (Pranav Anand, p.c.). For example, (i) cannot be used in a context where Sam sees himself on T.V. and, not knowing that the man on T.V. is Sam himself, comes to believe that it's compatible with what is known by the man on T.V. that it's raining. This point will not be crucial here, but I will return to it in Chapter 4.

(i) Sam thinks it might be raining.   (Pranav Anand, p.c.)

proposition believed is understood generically, so that the time of thinking is different from the time(s) of the taste experience.[18]

(55)   Sue thinks sea urchin tastes good to her, but whenever she eats it, she realizes that she can't stand the stuff.

(Robert Stalnaker, p.c.)

In the interest of consistency, I will recast the meanings of epistemic modals using a notion of "epistemic alternatives" (in analogy to doxastic alternatives), which I define in (56).

(56)   Epistemic Alternatives:

$\text{Epist}_{w,t,x} = \{<w',t',y>$: it is compatible with what x knows in w at t that he/she/it is y in w' at t'$\}$

The key difference between doxastic alternatives and epistemic alternatives is that a person's knowledge cannot rule out the actual individual that they are in the actual world and time at which they are located, and so $\text{Epist}_{w,t,x}$ must always include $<w,t,x>$ itself. Presumably knowledge also carries extra requirements for justification, so that if x rules out a triple $<w',t',y>$ without sufficient justification, then $<w',t',y>$ will still be among x's epistemic alternatives. New lexical entries for *might* and *must* using this notion are given in (57).

(57) $[\![\text{might}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . \exists <w',t',x> \in \text{Epist}_{w,t,j}: p(w')(t')(x) = 1]$

$[\![\text{must}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . \forall <w',t',x>: \text{Epist}_{w,t,j}: p(w')(t')(x) = 1]$

Note that my lexical entries for epistemic modals can be thought of as a simplification of a fuller theory of modality where modals take restrictor arguments, which come in various types (deontic, epistemic and so on) and determine the modal base and/or ordering source. On a more complete view of this kind, my claim would be that the only kind of epistemic restrictor is one that makes reference to the knowledge of the judge.

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[18] (55) becomes much less natural without the overt PP *to her* in the embedded clause, which is to say that the argument of *tastes good* in this case cannot (easily) be a silent referential pronoun referring to Sue. This may be related to the puzzle I will discuss in Section 4.7.

I have one final change to make to Lasersohn's analysis. I assume that what Lasersohn calls an autocentric perspective is obligatory: speakers always make assertions, and accept or reject the assertions of others, using themselves as the judge. Cases involving predicates of personal taste where it appears that speakers are taking an exocentric view will be treated as instead containing a null referential pronoun referring to the individual whose perspective is apparently being taken. In Section 8.2, I will show that this view makes better predictions than Lasersohn's, under which speakers freely choose between an auto- and exocentric perspective.

4.4. Examples

To see how the revised proposal works, let's first look at a case of a matrix epistemic modal as in (58a). I assume that the structure of (58a) is (58b). The meaning is computed in (58c).

(58)   (a)   It might be raining.

       (b)   [might] [it be raining]

       (c) $[\![(b)]\!]^{w,t,j} = [\![might]\!]^{w,t,j} ([\lambda w'' . [\lambda t'' . [\lambda j'' . [\![it\ be\ raining]\!]^{w'',t'',j''}]]])$

                $= 1$ iff $\exists <w',t',x> \in Epist_{w,t,j}$: it's raining in w' at t'

Thus (58a) is true at a world-time-judge triple $<w,t,j>$ iff at least one of j's epistemic alternatives is such that it's raining.

Now let's see what happens when (58a) is embedded under *think*, with its new meaning from (54), which operates on the judge parameter. An example is given in (59a), with the structure in (59b) and meaning in (59c).

(59)   (a)   Sue thinks it might be raining.

       (b)   [Sue [$_{VP}$ thinks [$_S$ [might] [it be raining]]]]

       (c) $[\![(b)]\!]^{w,t,j} = [\![thinks]\!]^{w,t,j}$
                $([\lambda w'' . [\lambda t'' . [\lambda j'' . [\![it\ might\ be\ raining]\!]^{w'',t'',j''}]]]) ([\![Sue]\!]^{w,t,j})$

                $= 1$ iff $\forall <w',t',x> \in Dox_{w,t,Sue}$: $[\![it\ might\ be\ raining]\!]^{w',t',x} = 1$

$= 1$ iff $\forall<w',t',x>\in Dox_{w,t,Sue}$: $\exists<w'',t'',y>\in Epist_{w',t',x}$: it's raining in w'' at t''

This says that (59a) is true at a world-time-judge triple $<w,t,j>$ iff every one of Sue's doxastic alternatives has an epistemic alternative where it's raining. This can be simplified if we make certain assumptions about the relationship between belief and knowledge. Specifically, I assume that to believe something is to believe that one knows it, which means that the epistemic alternatives of a person's doxastic alternatives are the same as the person's doxastic alternatives. Under this assumption, (59c) becomes equivalent to (60).[19]

(60) $= 1$ iff $\exists<w',t',x>\in Dox_{w,t,Sue}$: it's raining in w' at t'

This is the same as the matrix case (58c) except that "j" is replaced by "Sue" and the epistemic alternatives are replaced with doxastic alternatives.

When we turn to predicates of personal taste, there are now two possibilities for the matrix case. Consider (61).

(61)   This cake is tasty.

One option is for the argument of *tasty* to be PRO$_J$. In this case, the structure of (61) is (62a), giving the meaning in (62b). (I'm ignoring tense and the contribution of the copula.)

(62) (a)   [This cake] [is tasty PRO$_J$]

      (b) $[\![(a)]\!]^{w,t,j} = [\![tasty]\!]^{w,t,j} ([\![PRO_J]\!]^{w,t,j}) ([\![this\ cake]\!]^{w,t,j})$

                 $= [\lambda x_e . [\lambda y_e . y$ tastes good to x in w at $t]] (j) ($ the cake $)$

                 $= 1$ iff the cake tastes good to j in w at t

This sentence says that the cake tastes good to the judge, and is the same as the meaning given for the sentence under the preliminary analysis from Section 4.1. However, on the revised analysis, it is also possible for *tasty* to take a null referential argument, for

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[19] At the end of Chapter 3 I go through the assumptions that are needed to allow this simplification, and provide a proof.

example one referring to Sam. In that case the structure of (61) is the one given in (63a), with the meaning in (63b). (I will use "pro$_x$" to indicate a null referential pronoun referring to an individual x.)

(63) (a)   [This cake] [is tasty pro$_{Sam}$]

(b) $[\![(a)]\!]^{w,t,j} = [\![tasty]\!]^{w,t,j}$ ($[\![pro_{Sam}]\!]^{w,t,j}$) ($[\![this\ cake]\!]^{w,t,j}$)

$= [\lambda x_e . [\lambda y_e . y$ tastes good to x in w at t]] (Sam) (the cake)

$= 1$ iff the cake tastes good to Sam in w at t

On this reading, the sentence says that the cake tastes good to Sam, making it non-judge-dependent. Again, what allows *tasty* to simply be linked to a salient referent (in this case, Sam) is that it can take a silent referential argument. Note that since silent referential arguments are not allowed for epistemic modals, my view predicts that an epistemic modal in a matrix context cannot simply be linked to a salient referent. I will discuss this prediction in Section 4.5.

For predicates of personal taste that can take overt PP arguments, the situation is exactly the same. For example, the sentence in (64a) is completely parallel to (63), with the structure in (64b) and the meaning in (64c).

(64) (a)   The roller coaster is fun for Sam.

(b)   [The roller coaster] [is fun [for Sam]].

(c) $[\![(b)]\!]^{w,t,j} = [\![fun]\!]^{w,t,j}$ ($[\![for\ Sam]\!]^{w,t,j}$) ($[\![the\ roller\ coaster]\!]^{w,t,j}$)

$= [\lambda x_e . [\lambda y_e . y$ is fun for x in w at t]] (Sam) (the roller coaster)

$= 1$ iff the roller coaster is fun for Sam in w at t

I will ignore the possibility of overt PPs in the discussion of attitude predicates below, since these have the same effect as null referential arguments.

There are still the same two possibilities when (61) is embedded under *think*, giving (65).

(65)   Sue thinks this cake is tasty.

If PRO$_J$ is used as the argument of *tasty* in (65), then the structure of (65) is (66a), with the meaning in (66b).

(66) (a) [Sue [thinks [[this cake] [is tasty PRO$_J$]]]]

(b) $[\![(a)]\!]^{w,t,j} = [\![\text{thinks}]\!]^{w,t,j}$
([λw″ . [λt″ . [λj″ . $[\![\text{this cake is tasty PRO}_J]\!]^{w″,t″,j″}$]]]) ($[\![\text{Sue}]\!]^{w,t,j}$)

= 1 iff $\forall <w′,t′,x> \in \text{Dox}_{w,t,Sue}$: $[\![\text{this cake is tasty PRO}_J]\!]^{w′,t′,x} = 1$

= 1 iff $\forall <w′,t′,x> \in \text{Dox}_{w,t,Sue}$: the cake tastes good to x in w′ at t′

This says that (66a) is true iff (roughly speaking) the cake tastes good to all of Sue's doxastic alternatives. Assuming that Sue has privileged access to her own experiences of taste, this becomes equivalent to (67).

(67) = 1 iff the cake tastes good to Sue in w at t

On the other hand, if a null referential pronoun – say, one referring to Sam, as in (63) – is used as the argument of *tasty* in (65), then the structure of (65) is (68a), with the meaning in (68b).

(68) (a) [Sue [thinks [[this cake] [is tasty pro$_{Sam}$]]]]

(b) $[\![(a)]\!]^{w,t,j} = [\![\text{thinks}]\!]^{w,t,j}$
([λw″ . [λt″ . [λj″ . $[\![\text{this cake is tasty pro}_{Sam}]\!]^{w″,t″,j″}$]]]) ($[\![\text{Sue}]\!]^{w,t,j}$)

= 1 iff $\forall <w′,t′,x> \in \text{Dox}_{w,t,Sue}$: $[\![\text{this cake is tasty pro}_{Sam}]\!]^{w′,t′,x} = 1$

= 1 iff $\forall <w′,t′,x> \in \text{Dox}_{w,t,Sue}$: the cake tastes good to Sam in w′ at t′

This sentence simply describes a factual belief of Sue's, namely that the cake tastes good to Sam. It's important to note that *think* still operates on the judge parameter, but since in this case *tasty* has taken a referential argument rather than PRO$_J$, the embedded clause is non-judge-dependent, so shifting the judge parameter has no effect on the meaning of the sentence.

Similarly, there are two possibilities when a predicate of personal taste is embedded under an epistemic modal as in (49), repeated in (69).

(69)   The cat food might be tasty.

If PRO$_J$ is the argument of *tasty* in (69), then the structure of (69) is (70a), with the meaning in (70b).

(70) (a)   [might [the cat food be tasty PRO$_J$]]

(b) $[\![(a)]\!]^{w,t,j} = [\![might]\!]^{w,t,j}$ ([λw″ . [λt″ . [λj″ . $[\![$the cat food is tasty PRO$_J]\!]^{w'',t'',j''}$]]])

= 1 iff ∃<w′,t′,x>∈Epist$_{w,t,j}$: $[\![$the cat food is tasty PRO$_J]\!]^{w',t',x}$ = 1

= 1 iff ∃<w′,t′,x>∈Epist$_{w,t,j}$: the cat food tastes good to x in w′ at t′

In this case, (69) is true at a world-time-judge triple <w,t,j> iff j has at least one epistemic alternative where the cat food is tasty – roughly speaking, if it's compatible with j's knowledge that the cat food tastes good to j themselves. This is the meaning needed for the situation where the speaker checks the ingredients of the cat food and realizes that there is nothing in it that he knows he dislikes.

On the other hand, if *tasty* takes a null referential pronoun referring to the cat (for example), then (69) has the structure in (71a) and the meaning in (71b).

(71) (a)   [might [this cat food be tasty pro$_{the\text{-}cat}$]]

(b) $[\![(a)]\!]^{w,t,j} = [\![might]\!]^{w,t,j}$ ([λw″ . [λt″ . [λj″ . $[\![$the cat food is tasty pro$_{the\text{-}cat}]\!]^{w'',t'',j''}$]]])

= 1 iff ∃<w′,t′,x>∈Epist$_{w,t,j}$: $[\![$the cat food is tasty pro$_{the\text{-}cat}]\!]^{w',t',x}$ = 1

= 1 iff ∃<w′,t′,x>∈Epist$_{w,t,j}$: the cat food tastes good to the cat in w′ at t′

In this case, (69) is true at a world-time-judge triple <w,t,j> iff j has at least one epistemic alternative where the cat food tastes good to the cat. This is the meaning needed for the situation where the speaker isn't sure whether the cat likes the cat food.

4.5. Apparent Counterexamples

On my proposal, epistemic modals are directly judge-dependent, so that the relevant knowledge can never simply be that of a salient individual or group. I used examples

such as (48) and (49) as evidence that this is correct; however, there are also examples in the literature that seem to suggest the opposite. First consider (72a–b), based closely on examples by DeRose (1991).

(72)   [Context: John has some symptoms of cancer, and his doctor has run a test. If the results are positive, John may (or may not) have cancer; if they are negative, then John definitely does not have cancer. John's doctor has received the test results. John's wife, Jane, knows that the doctor has received the results, but does not know yet what they are. Jane says:]

(a)   John might have cancer.
                    (based on DeRose, 1991: pp. 582, "Cancer Test Case 581A")

(b)   I don't know whether John might have cancer.
                    (based on DeRose, 1991: pp. 584–585, "Cancer Test Case 581B")

In (72b), but not (72a), the group whose knowledge is relevant for the interpretation of *might* seems to include the doctor, which I predict to be impossible. DeRose concludes from this that the interpretation of epistemic modals is somewhat flexible and context-dependent in this respect.

   I suggest that the difference between (72a) and (72b) is not in who the relevant "knowers" are but rather in what sort of modality is being used. Specifically, I suggest that *might* in (72b) does not actually express epistemic modality, but rather something like "metaphysical" modality of the kind that appears in examples involving the future such as (73)–(74) (see, e.g., Thomason, 1970; Abusch, 1985; Copley, 1996).

(73)   It might rain tomorrow.

(74)   It won't rain tomorrow.

I assume that *might* in (73) and *won't* in (74) express, respectively, compatibility and incompatibility with facts about the current state of the clouds, winds, and so forth; which is to say that they involve a circumstantial modal base (Kratzer, 1991a). Hence a person could utter (75) if they were unaware of what these facts were.

(75)   I don't know if it might rain tomorrow.

Similarly, in (72b) what Jane doesn't know is whether it's compatible with certain facts about John's physical state that he has cancer, where the relevant facts are whatever the

test is screening for. For example, suppose that the test screened for a certain protein in the blood, which would definitely be present in the case of cancer but might also be present for other reasons. What Jane doesn't know (but the doctor does know) is whether this protein is present in John's blood, and therefore whether it is compatible with the state of John's blood that he has cancer.

Another kind of apparent counterexample comes from Egan, Hawthorne & Weatherson (2005), who discuss (76).

(76) [Context: Ann is planning a surprise party for Bill. Unfortunately, Chris has discovered the surprise and told Bill all about it. Now Bill and Chris are having fun watching Ann try to set up the party without being discovered. Currently Ann is walking past Chris's apartment carrying a large supply of party hats. She sees a bus on which Bill frequently rides home, so she jumps into some nearby bushes to avoid being spotted. Bill, watching from Chris's window, is quite amused, but Chris is puzzled and asks Bill why Ann is hiding in the bushes. Bill says:]

I might be on that bus.

(Egan, Hawthorne & Weatherson, 2005, no. 16)

Egan, Hawthorne & Weatherson report that (76) is acceptable on a reading where *might* expresses Ann's mental state, which I predict to be impossible.

I suggest that on the relevant reading, there is more to (76) than meets the eye – specifically, that there is ellipsis as shown in (77).[20]

(77) [Context: Same as (76).]

Ann is hiding in the bushes because I might be on that bus.

I believe it's plausible that ellipsis is involved given that Bill's statement in (76) is supposed to be the answer to a question. That is, according to Egan, Hawthorne & Weatherson's original context, (76) is really part of a dialogue along the lines of (78).

(78) [Context: Same as (76).]

Chris: Why is Ann hiding in the bushes?
Bill: I might be on that bus.

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[20] I assume that elided material is present in the syntactic structure and interpreted at LF; however, a different view of ellipsis would be compatible with my view provided it gave (76) the same meaning.

Intuitively, Bill's response, on the relevant reading, is understood as an answer to Chris's question. I assume that the meaning of a question is the set of propositions that are possible answers to the question (see, e.g., Hamblin, 1973; Karttunen, 1977; and related ideas of Groenendijk & Stokhof, 1984). In the case of Chris's question in (78), this is, roughly speaking, the set of propositions of the form "Ann is hiding in the bushes because p" where p is any proposition. Thus for Bill's response to be an answer, it must be understood as expressing a proposition of this form, and the only obvious way to do this is to let "I might be on that bus" stand in for p.

If we assume that (76) has the structure in (77), then the occurrence of *might* is no longer in a matrix clause, but embedded inside the *because*-clause. I suggest that in *because*-clauses that express a person's conscious reasoning or rationale, the judge parameter is shifted to the person whose reasoning is involved – in the case of (76), Ann.[21,22] One way to achieve this is to give *because* the lexical entry in (79).

(79) $[\![because]\!]^{w,t,j} = [\lambda z_e . [\lambda q_{<s,<i,et>>} . [\lambda p_{<s,<i,et>>} .$ the reason that $p(w)(t)(j) = 1$ is that $\forall <w',t',x> \in Epist_{w,t,z}: q(w')(t')(x) = 1]\,]\,]$

According to (79), *because* takes two propositional arguments, p and q, and an individual argument z, and "p because q" is true at a world-time-judge triple <w,t,j> iff the reason that p is true at <w,t,j> is that all of z's epistemic alternatives in w at t are such that q is true. This has the effect of evaluating the matrix clause with respect to the matrix judge, while evaluating the embedded clause with the person whose reasoning is involved as judge. Roughly speaking, "p because q" is equivalent to "p is true because z knows that q is true as judged by z," where z is the person whose reasoning is involved. Note that since

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[21] The person whose reasoning or rationale is involved is not always the grammatical subject of the higher clause (as I previously suggested in Stephenson, 2006). For example, in (i) (due to an anonymous *L&P* reviewer), it seems that *might* can be linked to John's epistemic state at least as easily as it can be linked to Ann's in (76). Thanks to this reviewer and *L&P* editor Polly Jacobson for very helpful discussion of the meaning of *because*.
(i)   Airplanes frighten John because they might crash.
[22] It's difficult to give independent evidence for this analysis of *because* since the kinds of examples that seem to support it may also be explained by binding of a null referential pronoun. (See note 15.) For example, (i) has a reading equivalent to "each boy x is smiling because the food tastes good to x," which could be explained if the argument of *tasty* is PRO_J and *because* shifts the judge parameter, but could also be explained if the argument is a null referential pronoun bound by *each boy*.
(i)   Each boy is smiling because his food is tasty.

z's knowledge is involved, rather than simply z's beliefs, q must actually be true as judged by z (but need not be true as judged by j). I assume that the individual argument is always silent.

I will leave open the question of what happens when a *because*-clause does not involve anyone's conscious reasoning or rationale. One possibility is that *because* has a different meaning that does not take an individual argument and does not involve epistemic alternatives; another possibility is that it still has the meaning in (79) but takes either PRO_J or a contextually salient argument such as the speaker.

Now, in the pre-ellipsis sentence in (77), for example, *because* takes Ann as its silent individual argument, and the two sentences *I might be on that bus* and *Ann is hiding in the bushes* as its propositional arguments, giving it the meaning in (80b-c). The syntactic structure is shown in (80a), where pro_{Ann} is used to represent the silent argument referring to Ann, and c* indicates the context of (77), where Bill is the speaker.

(80) (a)   [Ann is hiding in the bushes] [because pro_{Ann} [I might be on that bus]]

(b) $[\![(77)]\!]^{c*;\, w,t,j} = [\![because]\!]^{c*;\, w,t,j} \, (\, [\![pro_{Ann}]\!]^{c*;\, w,t,j} \,)$
        $(\, [\lambda w' \,.\, [\lambda t' \,.\, [\lambda j' \,.\, [\![I \text{ might be on that bus}]\!]^{c*;\, w',t',j'} \,] \,] \,] \,)$
        $(\, [\lambda w'' \,.\, [\lambda t'' \,.\, [\lambda j'' \,.\, [\![Ann \text{ is hiding in the bushes}]\!]^{c*;\, w'',t'',j''} \,] \,] \,] \,)$

= 1 iff the reason that $[\![Ann \text{ is hiding in the bushes}]\!]^{c*;\, w,t,j} = 1$ is that
$\forall <w',t',x> \in Epist_{w,t,Ann}$: $[\![I \text{ might be on that bus}]\!]^{c*;\, w',t',x} = 1$

= 1 iff the reason that Ann is hiding in the bushes in w at t is that
$\forall <w',t',x> \in Epist_{w,t,Ann}$: $\exists <w'',t'',y> \in Epist_{w',t',x}$: Bill is on the bus in w″ at t″

(c)   = 1 iff the reason that Ann is hiding in the bushes in w at t is that
        $\exists <w',t',x> \in Epist_{w,t,Ann}$: Bill is on the bus in w′ at t′

Thus the sentence in (77) says that the reason Ann is hiding in the bushes is because it's compatible with Ann's knowledge that Bill is on the bus. (Note that the two layers of knowledge shown in the last line of (80b) can be collapsed into one as in (80c).) Provided I'm justified in positing ellipsis here, this is possible without letting *might* take a referential argument, and the example in (76) no longer poses a problem for my revised analysis.

Notice that in (81a), where the *might*-statement is embedded under *I think*, it is not possible to understand *might* as linked to Ann's knowledge. This is completely expected under my view, provided that the ellipsis in (81b) is not possible (corresponding to the ellipsis I posited for (76)).

(81)   [Context: Same as (76).]

    (a)   # I think I might be on that bus.

    (b)   I think ~~Ann is hiding in the bushes because~~ I might be on that bus.

Without going into the theory of ellipsis in any detail, we can see that this kind of ellipsis is not generally allowed. For example, consider (82).

(82)   Ann just jumped into the bushes, and Bill and Chris can't agree on why she did that. Bill thinks she's hiding because Chris is there, and Chris thinks she's hiding because Bill is there.

If the second occurrence of *she's hiding because* were elided, the result would be (83a), with the ellipsis shown in (83b).

(83) (a)   Ann just jumped into the bushes, and Bill and Chris can't agree on why she did that. # Bill thinks she's hiding because Chris is there, and Chris thinks Bill is there.

    (b)   Ann just jumped into the bushes, and Bill and Chris can't agree on why she did that. Bill thinks she's hiding because Chris is there, and Chris thinks ~~she's hiding because~~ Bill is there.

But (83a) does not have a meaning equivalent to (82), where Bill's presence is the reason Chris attributes to Ann hiding – rather, it can only mean that Chris himself thinks Bill is there, which is an odd thing to say in the context given that Bill and Chris are having a conversation and thus are obviously aware of each other's presence. Compare this to the gapping case in (84), which is acceptable and means the same thing as (82).

(84)   Ann just jumped into the bushes, and Bill and Chris can't agree on why she did that. Bill thinks she's hiding because Chris is there, and Chris, because Bill is there.

Given that the ellipsis in (83b) is impossible, then, it seems reasonable to assume that the same kind of ellipsis in (81b) is also impossible.

Note that not all speakers I have consulted accept (76). This variation could be taken to either be variation in whether the ellipsis in (77) is allowed, or perhaps variation in whether *because* can shift the judge parameter. I'll leave this question open.

4.6. Note about Generic Readings

One question that comes up is whether judge-dependent items allow interpretations that involve generic quantification over potential judges – for example, whether it is possible for *tasty* to mean something like "tasty to people in general." Lasersohn (2005) gives conclusive evidence that a generic reading is not the only reading possible for predicates of personal taste, but this leaves open the possibility of it being an additional reading.

First let me briefly review Lasersohn's evidence that predicates of personal taste are not always interpreted generically.[23] (The following argument is based on Lasersohn, 2005: pp. 653–654.) First, there is the simple fact that a speaker always seems to be justified in asserting a sentence with a predicate of personal taste provided that it is true as judged by them, even if they know that most people would disagree. Lasersohn gives the example of an office supplies aficionado enthusiastically cataloguing his collection of the latest models of paperclips. This guy may have odd taste in pastimes, but he still has a firm grasp on reality and is aware that most people would not enjoy cataloguing paperclips. Nevertheless, as long as he is having a good time doing it, he can permissibly utter (85).

(85)   This is fun!

(Lasersohn, 2005, no. 22a)

Second, Lasersohn points out that if predicates of personal taste were always interpreted generically, then sentences like (86) should be contradictory.

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[23] Lasersohn (2005) cites Bhatt & Izvorski (1995) for suggesting a generic view of predicates of personal taste.

(86)   This is fun, but most people would hate it.

(Lasersohn, 2005, no. 23)

However (86) is perfectly coherent (and the kind of thing our realistically minded paperclip collector might say). Note that if *most people* is replaced with some other plausible candidate for generic quantification, as in (87a–b), the sentence remains acceptable.

(87) (a)   This is fun, but almost everyone would hate it.

      (b)   This is fun, but the average person would hate it.

It is clear, then, that a generic interpretation is not the only possible interpretation for predicates of personal taste.[24] But is a generic reading possible at all? Lasersohn does not explicitly address this question, but some of his data seems to suggest that generic readings are not possible. For example, he claims that it would be odd for our paperclip collector to utter (88).

(88)   # This is not fun at all, although I'm having fun doing it.

(Lasersohn, 2005, no. 22b)

While I share Lasersohn's judgment, some speakers I have consulted do accept sentences like (88) in the context described. Moreover, there are examples that clearly seem to need a generic interpretation. Consider the sentences in (89), for example.

(89) (a)   If a game isn't fun, don't play it!

      (b)   If a dish isn't tasty, don't eat it!

A person giving advice along the lines of (89a) clearly isn't suggesting that the listener conduct an opinion poll before deciding which games to play – rather, the advice seems to be, "if you don't find a game fun, don't play it." (Presumably the quantificational indefinite *a game* helps to bring out the generic reading.) I conclude, then, that generic

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[24] Larry Horn (p.c.) has suggested that a purely generic view of predicates of personal taste might be tenable if genericity itself were taken to be a relativist or judge-dependent phenomenon – for example, if the domain of quantification for a generic operator always included the judge. I will not pursue this possibility; but in any case such a view (if tenable) would really be a more complex version of my view rather than an alternative to it.

readings of predicates of personal taste are generally available, in addition to the normal, judge-dependent reading, as well as readings involving an implicit, salient referent. Of course, this means that there must be some other explanation for why some speakers do not accept (88); I will leave that open.

It is not difficult to allow for the possibility of generic readings for predicates of personal taste on my view, since I allow them to take silent pronouns as arguments. For example, we could assume that the silent pronoun can be bound by a generic operator (see note 15). Alternatively, we could assume that the silent pronouns can also be "generic pronouns," whatever that might mean. How exactly to capture the generic readings of predicates of personal taste depends, of course, on having an account of genericity. Since I don't want to complicate matters by going into the semantics of generic quantification, I will largely avoid discussing generic readings. The important point is just that generic readings, on my view, would be seen as a more complicated version of "exocentric" readings involving a silent referential argument. [25]

Note that since epistemic modals do not take an individual argument on my view, (and therefore cannot take a silent referential pronoun), this predicts that epistemic modals do not allow generic interpretations. This seems to be right. For example, suppose that the administrators of a small liberal arts college in New Mexico, let's call it Hidalgo College, are planning to launch an advertising and recruiting campaign to increase the visibility of the institution on the national level. They start by hiring a polling agency to conduct a nationwide survey to try to determine how many people have heard of Hidalgo College and how much they know about it. They are encouraged to find that a large percentage of respondents have heard of the school, but very few people know that it is located in New Mexico. A lot of respondents thought that it was in Arizona, and many more others only knew that it was in the Southwest. If the polling results are reliable, then, it is compatible with the knowledge of Americans in general that Hidalgo College is in Arizona. In this situation it would be very odd for the pollster to report back to the

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[25] Lasersohn could allow for the possibility of generic interpretations by giving speakers and hearers the additional option of taking a "generic" perspective, in addition to an autocentric or exocentric one.

college administration using any of the sentences in (90), whereas they could use those in (91).

(90) (a) (#) Our survey shows that Hidalgo College might be in Arizona.

(b) (#) We have concluded that Hidalgo College might be in Arizona.

(91) (a) Our survey shows that as far as most Americans know, Hidalgo College might be in Arizona.

(b) We have concluded that to the best of most Americans' knowledge, Hidalgo College might be in Arizona.

4.7. A Puzzle about Silent Pronouns

I have assumed that predicates of personal taste can take silent pronouns as arguments, which act just like overt pronouns. However, it seems that these silent pronouns do not behave in all ways like their overt counterparts. For example, consider (92)–(93), which involve ellipsis of a VP that contains *tasty* or *tastes good*.

(92) Sam thinks that the tuna is tasty, and Mary does, too.

(93) Sam thinks that the tuna tastes good to him, and Mary does, too.

Sentence (93) allows an interpretation on which both Sam and Mary think that the tuna tastes good to Sam, but (92) does not allow this reading.

This seems to have some connection with the presence or absence of epistemic privilege. In (93), the first conjunct seems to require that Sam not be sure of his own taste (for example because he has forgotten); accordingly, the second conjunct can then either mean that Mary shares Sam's uncertain belief about his taste, or that she has the same kind of uncertain belief about her own taste. In other words, if a predicate of personal taste has an overt argument that refers to the attitude holder, it seems that the situation described has to be one where epistemic privilege does not hold.[26] On the other hand, the first conjunct of (92) tends to evoke a scenario where Sam is certain about his own taste,

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[26] Note that the question of whether epistemic privilege holds is distinct from that of whether the argument of the predicate of personal taste allows a *de se* interpretation. Sam can believe (*de se*) that he himself is a person who the tuna tastes good to, without actually knowing or remembering how the tuna tastes. I will return to issues of *de se* interpretation in Chapter 4, but will not have anything more to say about the puzzle at hand.

that is, where epistemic privilege holds. However, it seems to me that the sentence is also compatible with scenarios where epistemic privilege does not hold, as in (94).

(94)   Sam thinks that the tuna is tasty, but he doesn't remember for sure.[27]

Even when this kind of scenario is brought out, the ellipsis facts remain the same. For example, (95) still does not allow an interpretation on which both Sam and Mary think that the tuna tastes good to Sam (but can't remember).

(95)   Sam thinks that the tuna is tasty but doesn't remember for sure, and Mary does, too.

In sum, then, there seems to be a prohibition against a predicate of personal taste taking a silent argument that refers to the attitude holder, even though an overt argument referring to the attitude holder is perfectly acceptable. I leave this as an open puzzle.

5. <u>More Attitude Predicates: *Find* and *Believe*</u>

In this section I look at two additional attitude predicates, *find* and *believe*. I argue that their meanings, while generally similar to *think*, also have important differences from *think* and from each other.

5.1. *Find* vs. *Think*

Consider (96) and (97).

(96)   Sam thinks the cake is tasty.

(97)   Sam finds the cake tasty.

Both sentences are naturally interpreted to mean that the cake tastes good to Sam. The two sentences have somewhat different syntax in that only *think* takes a finite clause as complement. Apart from that, they seem at first glance to be very similar. However, there is an important difference between *find* and *think* in English: as Mitchell (1986) observes, *find* does not seem to allow the embedded predicate to be interpreted with respect to a

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[27] Keir Moulton (p.c.) reports, in contrast, that examples very much like (94) are not acceptable (see Chapter 4, footnote 31).

salient referent (in Lasersohn's terms, an "exocentric" reading).[28] We can see this by comparing (98) with (99).

(98)   Sam thinks the cat food is tasty.

(99)   Sam finds the cat food tasty.

The sentence in (98) can be used to mean that Sam thinks the cat food tastes good to the cat, as discussed in Section 4.2. This reading can be brought out by the continuation *…because the cat has eaten a lot of it*. In contrast, (99) can only mean that the cat food tastes good to Sam, odd as it might sound for Sam to have tried cat food.

There is another difference as well, which I will not be addressing but should mention: it is not clear whether epistemic modals can be embedded under *find*. For the case of *might* and *must*, there are independent reasons for this in English, since *might* and *must* lack non-finite forms. This should in principle be testable in other languages where the equivalent of *find* takes a regular tensed clause, as with German *finden* (Irene Heim, p.c.), but it is not clear if the constructions are truly equivalent given that there is a contrast in English between the *find* construction as in (96) and the *find to be* construction (Mitchell, 1986, Ch. 1). *Find* can embed *probable* as in (100), but it not clear to me that *probable* is truly interpreted epistemically in this case.

(100)   I find it probable that it's raining.

                                                                                (Kai von Fintel, p.c.)

I will leave this issue aside and focus on the behavior of *find* in sentences like (96) with predicates of personal taste.

On the face of it, the contrast between (98) and (99) seems to suggest that predicates of personal taste cannot in general take silent referential arguments, which would be a problem for my account. The behavior of *find* could be captured if predicates of personal taste were obligatorily judge-dependent, but then the behavior of *think* could not be captured. However, I suggest that this contrast does not have anything to do with the argument structure of predicates of personal taste, but rather with the fine-grained lexical

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[28] This fact has also been pointed out to me by a number of people, including Rick Nouwen (p.c.).

semantics of *find*. In particular, I suggest that to "find" a proposition p (in the sense that *find* is used in the examples above) means to believe it due to having a direct experience of it. Thus *find* has a component to its meaning that is essentially an evidential of direct evidence.[29] A lexical entry for *find* along these lines is given in (101). This is different from the meaning of *think* only in the extra requirement of direct experience.[30] (For simplicity, this requirement is encoded as an entailment.)

(101) $\llbracket \text{find} \rrbracket^{w,t,j} = [\lambda p_{<s,<i,et>>} . [\lambda z_e . \forall <w',t',y> \in \text{Dox}_{w,t,z}: p(w')(t')(y) = 1,$
          and this is caused by z having a direct experience of p in w]]

The reason that (99) cannot be understood to mean that Sam thinks the cat food tastes good to the cat, I suggest, is because the proposition that the cat food tastes good to the cat is simply not the kind of proposition that Sam can have direct experience of. Of course this notion of direct experience is a bit vague, but for present purposes the idea is this: whether something tastes good to someone depends on the internal psychological state of that individual, and the only way to have direct experience of an individual's internal psychological state is to be that individual. Thus if Sam tastes a cake and discovers that it tastes good to him, he has direct experience of the cake tasting good (and of the cake tasting good to him); on the other hand, if Sam sees his cat devouring cat food with gusto and licking her chops, he can infer from this, perhaps even with a high degree of certainty, that the cat is having a similar experience of taste, but he cannot have direct experience of this, and so *find* cannot be used in this case, as in (99). Since *think* does not carry this extra requirement, though, *think* can be used in this case, as in (98).

This predicts that the contrast between *find* and *think* has nothing to do with whether the embedded predicate is judge-dependent, but only with whether the embedded proposition is something that the subject can have direct experience of. We can see that

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[29] Kai von Fintel (p.c.) suggested the connection with evidentiality, as well as the related point that the lack of direct experience does not always entail lack of certainty. The distinction between direct experience and certainty is discussed at some length by von Fintel & Gillies (2007b) in connection with epistemic *must*.

[30] In the past tense in English, *find* seems to be telic and have an inchoative interpretation, something like 'come to believe (through direct sensory experience),' as in (i). This kind of predicate is telic, however, and so should not be possible in the English simple present. Thus I will assume that *find* is stative, but this issue calls for further investigation.

    (i)   John found the apple tasty.

this prediction is correct from considering what happens when predicates of personal taste take explicit arguments. If the argument of a predicate of personal taste is made explicit with a prepositional phrase as in (102a–b) (thus rendering it non-judge-dependent according to my view), the resulting sentences are simply unacceptable. (This can be tested with *tasty* only to the extent that *tasty* allows *to*-phrases.)

(102) (a) */# Sam finds the hamster wheel fun for the hamster.

    (b) */# Sam finds the cat food tasty to the cat.

I conclude, then, that the difference between *find* and *think* is merely telling us something about a difference in the lexical semantics of the two attitude predicates, and not about predicates of personal taste or judge dependency.

5.2. *Believe* vs. *Think*

In most of my examples of attitude reports so far, I have used the attitude predicate *think*. The meaning I have given to it is based on meanings proposed by others for *believe*, and so one might assume that *think* and *believe* have identical behavior. However, there turns out to be a contrast between them: while *think* is very natural with both epistemic modals and predicates of personal taste, *believe* is less natural with predicates of personal taste in certain contexts. To see this, first consider (103) and (104), with an epistemic modal.

(103)   Sam thinks that it might be raining.

(104)   Sam believes that it might be raining.

These two sentences are essentially synonymous, and seem to mean that it's compatible with Sam's beliefs that it's raining.

   Now consider (105) and (106), which contain a predicate of personal taste embedded under *think* or *believe*.

(105)   Sam thinks that the cake is tasty.

(106)   Sam believes that the cake is tasty.

Although both sentences are acceptable, (106) seems to suggest that Sam isn't sure of his opinion of the cake, possibly because he hasn't actually tasted it. For example, (106) would be odd in a context where Sam has just tasted the cake and expressed his enjoyment of it, whereas (105) would be fine in such a context, as illustrated in (107).

(107)   [Context: Mary and Sue have made a cake for Sam. They are not very good at baking, whereas Sam is famous as a cook, so they are worried it won't be up to his standards. Of course, they know that Sam would be too polite to say so, so they decide to spy on him as he tastes the cake. Sam takes a bite, smiles, and says, "Mmm, yum!" Mary says to Sue:]

    (a)   Oh good, Sam thinks the cake is tasty.

    (b)   # Oh good, Sam believes the cake is tasty.

(107a) is much more natural in this context than (107b).[31]

    I suggest, again, that this difference is due to a fine-grained difference in semantics between the two attitude predicates. Specifically, I suggest that to "believe" a proposition p in the sense that the English word *believe* requires, the belief must not come from a direct experience of p. (This is the opposite of what *find* required, and is akin to an evidential of indirect evidence.) Typically, this will suggest some level of uncertainty. Normally one might assume that any suggestion of uncertainty from using *believe* comes from an implicature based on the fact that the speaker did not use *know* or *be certain*, but I'm proposing that this actually comes from the semantics. A lexical entry is given in (108).

(108) $[\![\text{believe}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . [\lambda z_e . \forall <w',t',y> \in Dox_{w,t,z}: p(w')(t')(y) = 1$, and this is NOT caused by z having a direct experience of p in w]]

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[31] Keir Moulton (p.c.) has suggested that the reverse fact holds as well: *think* is not acceptable with predicates of personal taste when there is a lack of certainty. He claims, for example, that (i) is odd.
  (i)   I've never had licorice, the smell turns me off. # But I think that it's tasty.
I'm not sure that I agree that *think* is unacceptable in (i), although *believe* might be slightly more natural. In any case, sentences like (i) become much better if the embedded clause is not in the present tense, as in (ii)–(iii).
  (ii) I don't remember for sure whether the cake was tasty, but I think it was.
  (iii) I think the cake will be tasty, but I can't be sure since I've never tried this recipe before.
I leave it to future work to investigate what difference, if any, there is between the acceptability of *think* and *believe* in contexts where a person is not sure of their own opinion.

Thus the reason *believe* cannot be used in examples like (107b) is because Sam's belief comes from direct experience of tasting the cake. Since *think* is neutral between whether the belief comes a direct experience or not, *think* is fine in (107a).

Of course, this notion of direct experience is just as vague here as it was above in the discussion of *find*. However, there is at least some evidence that the same notion is involved for both *find* and *believe*. In exactly those cases where *believe* is natural with predicates of personal taste, meaning that direct experience is not involved, *find* becomes unacceptable. For example, (109) is perfectly natural, and (110) is unacceptable.

(109)   I've never actually tried licorice, but I believe it's tasty.

(110)   */# I've never actually tried licorice, but I find it tasty.[32]

Also, when we consider readings of predicates of personal taste with referential arguments (either silent or overt), then *believe* becomes natural. For example, (111) and (112) seem equally natural when *tasty* is interpreted to mean "tastes good to the cat."

(111)   I think the cat food is tasty, because the cat has eaten a lot of it.

(112)   I believe the cat food is tasty, because the cat has eaten a lot of it.

The situation is the same when the argument of a predicate of personal taste is made explicit. For example, (113) and (114) are equally acceptable.

(113)   I think the cat food tastes good to the cat.

(114)   I believe the cat food tastes good to the cat.

Again, since these were exactly the kinds of cases where *find* was impossible, it seems reasonable that the same notion of direct experience is needed for both.

5.3. Remarks

I have suggested here that there is a three way distinction between *think*, *find* (as in *find the cake tasty*), and *believe*. Of these three, *think* has the simplest, most general meaning, simply saying something about the attitude holder's doxastic alternatives. *Find* has an

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[32] (110) is similar to Keir Moulton's example from note (31) except that (110) uses *find* instead of *think*.

additional requirement that the belief come from direct experience, whereas *believe*
requires the exact opposite – that the belief not come from direct experience. (I assume,
then, that the way the world *believe* is used in many contexts of linguistic and
philosophical analysis, including in this paper, is not true to its meaning in English.)

One might ask why I treated the extra requirements of *find* and *believe* as part of the
entailments of these predicates rather than as presuppositions. For example, we might
observe that (115) cannot be used to describe a situation where Sam thinks that the cake
is tasty because of a direct experience, and (116) cannot be used to describe a situation
where Sam believes the cake is tasty but hasn't tried it.

(115)   Sam doesn't believe that the cake is tasty.

(116)   Sam doesn't find the cake tasty.

However, I think this comes from the fact that both *believe* and *find* are neg-raisers. (This
is standardly observed for *believe*; I don't know if this has been claimed for *find* before,
but it seems to be true.) In other words, (115) normally means that Sam believes the cake
isn't tasty, and (116) normally means that Sam finds the cake un-tasty (so to speak). As
long as we adopt an account of neg-raising that predicts that "x doesn't believe p" is
equivalent to "x believes that not p" (and similarly for *find*), this will capture the behavior
of (115) and (116). (Gajewski, 2005 is one possibility.) Of course, if there were some
reason to make the extra requirement separate presuppositions, that could also be done.

6. <u>Pragmatics and Judge Dependency</u>

In this section, I will discuss how a system using a judge parameter can be embedded in a
theory of conversation. In particular, I will propose extended notions of assertion and the
common ground that can help make sense of the behavior of judge-dependent items.

6.1. Common Ground and Assertion

In the theory of conversation and common ground developed in large part by Stalnaker
(see, e.g., Stalnaker, 1978, 2002), it is assumed that the purpose of conversation is to
establish and update a context set, which is the set of worlds consistent with what the

participants in the conversation all believe, believe that they all believe, and so on ad infinitum. (Sometimes what is taken to be relevant is not actual beliefs, but rather the propositions taken to be true for the purposes of the conversation, but this is not important for my purposes.) The common ground is the set of such propositions. The context set is thus essentially a proposition, expressed as a set. When a speaker makes an assertion, they are proposing to remove from this set any worlds in which the asserted proposition is not true. The hearers can then accept or challenge this proposal with their own speech acts.

I would like to follow this view of conversation as closely as possible. The simple view of a context set as a set of worlds is based on the assumption that a proposition is a set of worlds. On the view I have adopted, a proposition is a set of world-time-individual triples. To extend the Stalnakerian view of conversation to the semantic system I have adopted, then, the first step is to treat the context set as a set of world-time-individual triples instead of worlds or world-time pairs. In particular, I propose that for all the triples in the context set for a conversation, the judge element represents the plurality of the group of participants in the conversation.[33] As we will see below, this is not going to mean that *might* (for example) is equivalent to something like "compatible with our knowledge." What it does mean is that I have in effect introduced a notion of an actual judge, which is just the group of participants in a particular conversation. Moreover, in the typical case there will be no interesting disagreement in a conversation about who the actual judge is, unlike with worlds and possibly times.

The other important piece of my pragmatic proposal is the norm of assertion. I suggest that it is what Lasersohn would call autocentric. Specifically, I propose that in order for a speaker A to assert a sentence S, it must be the case that for all of A's doxastic alternatives $\langle w',t',x \rangle$, S is true at the index $\langle w',t',x \rangle$. As I discussed when I introduced the meaning for *think* in (54) (Section 4.3), this means that A must believe that S is true as judged by A. Crucially, then, A does not need to believe that S is true as judged by the

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[33] Egan (2007) independently develops a different view of a relativist pragmatics, where for indices $\langle w,t,x \rangle$ in the context set, x varies among the atomic individuals participating in the conversation. I leave it to future work to make a thorough comparison of the two pragmatic systems.

whole group of conversational participants. Thus the norm of assertion is crucially weak in a certain sense. In order for A to assert that S, A only needs to believe that S is true as judged by A, but if A's assertion is accepted by the other speakers and added to the common ground, it has the same effect as adding the proposition that S is true as judged by the group of conversational participants.[34]

On my view, then, there are two differences between the judge parameter and the other elements of the index (world and time): first, it is generally known in a conversation who the "actual" judge is, namely, the group of conversational participants; and second, the judge involved in the norm of assertion varies according to who the speaker is.

6.2. Consequences

With these new assumptions in place, we can now make some sense of the special kind of disagreement that occurs with epistemic modals and predicates of personal taste, as discussed in Section 2.3. Consider (117), for example.

(117)   Mary: How's the cake?
           Sam: It's tasty.
           Sue: No it isn't, it tastes terrible!

In this dialogue, Sam's assertion serves as a proposal to add to the common ground the proposition that the cake is tasty, which, if successful, will have the same effect on the common ground as adding the proposition that the cake tastes good to the entire group of conversational participants. To make this assertion, though, he only needs to believe that the cake tastes good to him. Sue objects to the proposal by asserting that the cake is not tasty (*No it isn't!*), which serves as a counterproposal to restrict the context set to triples $<w,t,j>$ such that the cake does not taste good to j in w at t.[35] She then goes on to assert that the cake tastes terrible; crucially, in order to do that, she only needs to believe that

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[34] The norm of assertion is also weak in a different way, given that it only involves belief. We could make it stronger in this sense by replacing doxastic alternatives with epistemic alternatives, without affecting my main points. I will suggest in Chapter 3 that this stronger requirement is needed for certain other purposes.

[35] I assume that in the case of distributive predicates, including predicates of personal taste, the plural judge carries a homogeneity requirement – that is, "the cake does not taste good to j" means that for each atomic part of j, the cake does not taste good to j (see, e.g., Schwarzschild, 1994). (This does not apply to epistemic modals, which I assume involve a collective interpretation of knowledge). Thanks to Barry Schein (p.c.) for bringing up this issue.

the cake tastes terrible to her. This shows that the relevant judge for the purposes of the norm of assertion is just the speaker, and not the entire group of conversational participants, because in this case Sue clearly knows that the cake does not taste terrible to Sam. This same point can also be seen by examples like (118), as Lasersohn (2005) observes.

(118)   Sue: This cake isn't tasty.
           Sam: Yes it is!

(based on Lasersohn, 2005, no. 17)

In this case, again, Sam can assert that the cake is tasty even knowing that it does not taste good to Sue.

The situation is completely parallel if the disagreement involves an epistemic modal as in (17), repeated below in (119).

(119)   Mary: Where's Bill?
           Sam: I'm not sure. He might be in his office.
           Sue: Nuh-uh, he can't be. He never works on Fridays.
           [OR]   No, he can't be. He never works on Fridays.

Here Sam's assertion serves as a proposal to add to the common ground the proposition that Bill might be in his office. If successful, this will have the same effect as adding the proposition that the combined knowledge of the group of conversational participants is consistent with Bill being in his office. Sue challenges this assertion because she believes that her knowledge is inconsistent with Bill being in his office.

Essentially I have proposed that what a group does in a conversation is analogous to what an individual does in developing and revising a set of beliefs: an individual is trying to place him or herself in the space of possible individuals (as reflected in the notion of doxastic alternatives), and similarly a group of people in conversation are on a joint venture to place themselves, as a group, in the space of possible plural individuals. In other words, they are trying to align their world views, not only with regard to factual beliefs such as whether Bill works on Fridays, but also with regard to subjective matters such as what is tasty and which epistemic possibilities are still open. The rules of conversation are set up to let this happen particularly efficiently, by letting a speaker just

propose something like "let's establish that we're in a world where Bill doesn't work on Fridays" or "let's establish that we're a group of people for whom this cake is tasty" or "let's establish that our epistemic state leaves it open whether Bill is in his office" without knowing whether their interlocutors will accept the proposal. The others are free to object, and if they do, then some argument may ensue, but if they don't, little time needs to be wasted on the issue.

One might still ask why speakers should be able to make proposals that they know will be unsuccessful, as Sue does in (117), where she knows that Sam will not accept the proposition that the cake tastes terrible. I will follow Stalnaker and assume that in making a conversational move, a speaker does not need to intend or even expect the move to succeed. This is analogous to the fact that, as Stalnaker puts it, "Congress may make a law knowing it will be vetoed, a labor negotiator may make a proposal knowing it will be met by a counterproposal, or a poker player may place a bet knowing it will cause all the other players to fold" (Stalnaker, 1978: p. 153). Perhaps a more appropriate analogy would be the following: suppose that a widely used hiking path runs along the edge of a privately owned ranch. The rancher believes that the path is actually on her property, and thus that the hikers are trespassing, but the hikers believe that the path runs along the route of a colonial wagon road, and is therefore a public right-of-way. The rancher puts "No Trespassing" signs along the path, thereby proposing that the path be treated as part of her property. In turn, the hikers (in addition to continuing to use the path) put up improvised road signs along it saying things like "1 mile to Acoakset," thereby proposing that it be treated as a public way. The hikers know that the rancher will not accept this proposal, but by doing this they are making it clear to her that her proposal to treat the path as private property has not been accepted either. Similarly, in the case of a disagreement as in (117), the main purpose of Sue's assertion that the cake tastes terrible is to make it clear that she does not accept the proposal to add to the common ground the proposition that it's tasty. I suggest that the ability of speakers to allowably make doomed proposals (sometimes resulting in futile arguments) is an inevitable byproduct of an otherwise useful and efficient system.

6.3. A Special Case

Note that in my discussion of the purpose of conversation and the norm of assertion I have been talking about normal, information-sharing conversation. Some types of conversation are different. For example, an anonymous *Linguistics and Philosophy* reviewer brings up an example along the lines of (120). (Similar examples appear in von Fintel & Gillies, 2007a.)

(120)   [Context: Sam is playing a game with his young daughter. He is hiding a prize in one of his hands and she has to guess which hand it is in. Sam says:]

It might be in my right hand. It might be in my left hand. You have to guess.

Of course Sam knows which hand the prize is in – let's suppose it's in his left hand. Then it seems surprising on my view that he can assert that it might be in his right hand, since it's not compatible with his beliefs that it's in his right hand.

I suggest that the norm of assertion in a guessing game is different than it is in normal, information-sharing conversation, and that this is related directly to the purpose of the conversation and the roles of the participants. In normal conversation, a speaker making an assertion is trying to get the others to share their beliefs. The speaker must believe the proposition they are asserting because it would be counterproductive to get the other participants to accept a proposition that they themselves do not believe (unless, of course, the speaker is lying, but in that case they are presenting themselves falsely as being engaged in information-sharing conversation). In a guessing game, on the other hand, the clue-giver is not supposed to eliminate the right answer as a possibility, but is also not supposed to give it away. The proposition that the prize might be in the clue-giver's right hand happens to have the special property that even though the clue-giver doesn't believe it, adding it to the common ground does not go against the purpose of the guessing game.

Note that allowing the epistemic modal in (120) to refer directly to the daughter's knowledge does not seem to be the answer here in any case. On such a view, (120) would be expected to express roughly the same thing as (121).

(121)   [Context: Same as (120). Sam says:]

>   # You don't know if the prize is in my right hand or my left hand. You have
>   to guess.

However, (121) sounds odd in this context. In particular, it seems as if Sam is simply stating the obvious (that his daughter doesn't know where the prize is), whereas in (120) he seems to be setting the parameters of the guessing game and inviting his daughter to play. This suggests that (120) does not mean the same thing as (121).

6.4. Questions and Answers

Another area where thinking about the pragmatics can be informative is in questions and answers. Consider an exchange like that in (122).

(122)   Mary: Is the cake tasty?
            Sam: Yes, it is.

On the most natural interpretation of Mary's question in (122), she is asking Sam to report his own experience, that is, whether the cake tastes good to him. Thus at first glance, the judge of a predicate of personal taste seems to shift to the addressee in questions.[36] However, this is something of an illusion. In fact *tasty* in Mary's question in (122) does not literally mean "tasty to you." If it did, then Sam's response would have to literally mean either "the cake tastes good to me" (if *you* were interpreted as singular) or "the cake tastes good to us" (if *you* were interpreted as plural). On the singular interpretation, the prediction would be that in a dialogue like (122), a third person could not disagree, saying that the cake isn't tasty, based purely on the fact that it doesn't taste good to them. But a third person can do this as usual, as we can see from the continuation (123).

(123)   Mary: Is the cake tasty?
            Sam: Yes, it is.
            Sue: No, it isn't!

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[36] McCready (2006) makes this observation, both for predicates of personal taste and for Japanese experiential predicates.

Of course, if *you* were interpreted as plural, the dialogue in (123) would be expected to be possible since the cake doesn't taste good to Sue, and therefore doesn't taste good to both Sam and Sue. However, this would then predict that the dialogue in (124) should be impossible, contrary to fact.

(124) Mary: Is the cake tasty?
       Sam: No, not at all.
       Sue: Yes, it is!

We can make sense of the behavior of predicates of personal taste in questions under simple assumptions about the semantics and pragmatics of questions. First, I assume that the denotation of a question is the set of propositions that constitute answers to that question (following Hamblin, 1973; Karttunen, 1977; see also Groenendijk & Stokhof, 1984). Second, I assume that in asking a question, the asker is inviting the addressee to assert one of this set of propositions, with the presumption that the asker will accept whichever assertion the addressee makes. To see how this works with a more mundane example, consider (125).

(125) Mary: Is it raining?
       Sam: Yes, it is.

In this exchange, Mary is inviting Sam to assert either that it's raining or that it isn't raining, with the presumption that she will accept whichever one he asserts (for example because she does not know whether it's raining, thinks that he knows, and thinks that he will truthfully tell her).

Now, in (122), Mary is asking Sam to assert either that the cake is tasty or that it isn't tasty, again with the presumption that she will accept whichever assertion he makes. Her reasons for being willing to accept his assertion would be different than in (125) – for example, she may assume that the two of them have similar taste, wish to defer to his taste for the purpose of the conversation, or simply consider it irrelevant whether the cake tastes good to her – but what she is doing in both cases is the same. Sue's disagreement in (123) is possible because Sam's answer is a normal assertion subject to the normal kinds

of objections. (Although Mary has indicated by asking the question that she will accept his answer, Sue is under no such obligation.)

6.5. First-Person Belief Reports

As I noted in Section 2.4, in some cases epistemic modals and predicates of personal taste that are embedded in attitude reports seem to behave the same way that they do in the matrix clause, and disagreement is possible. This was illustrated in (25)–(26), repeated in (126)–(127).

(126)   Mary: Where's Bill?
                 Sam: I'm not sure. I think he might be in his office.
                 Sue: No, he can't be. He never works on Fridays.

(127)   Mary: How's the cake?
                 Sam: I think it's tasty.
                 Sue: No it isn't, it tastes terrible!

On the face of it, these cases seem to present a challenge to my view of attitude predicates shifting the judge parameter, which predicts that *might* and *tasty* in (126)–(127) are interpreted with Sam as the judge, and thus that Sue should not be able to respond based on her own knowledge or taste. As I noted before, though, we can tell from the form of *No, he can't be!* and *No, it isn't!* (rather than *No, you don't!*) that Sue's disagreement targets the embedded clause rather than the main clause.

This is part of a more general phenomenon and is not specific to judge-dependent items. Simons (2005b) observes (also citing Urmson, 1952; Hooper, 1975 and others) that assertions of the form "x thinks that p" can be used in such a way that the "main point" of the utterance is p, and not the entire attitude report. (This is especially easy with, but not restricted to, first-person reports.) For example, consider the dialogue in (128).

(128)   Mary: How's the weather outside?
                 Sam: I think it's raining.
                 Sue: No it isn't, it's sunny!

As in (126)–(127), Sue's response in (128) is acceptable, and we can tell from the form *no it isn't* (not *no you don't*) that the disagreement is with the embedded clause.

I suggest (as hinted at by Simons) that when a belief report is used as evidence for the proposition being believed – i.e., if the fact that x thinks that p is used as evidence for p – then the utterance acts as if it is asserting both the main clause and the embedded clause. (This happens especially with first-person belief reports, since people generally treat their own beliefs as reliable.) Sam's utterance in (126), for example, serves as a proposal to (among other things) add to the common ground the proposition that Bill might be in his office. Since this proposition is judge-dependent, Sue can disagree based on her own epistemic state.

One might be concerned that since attitude verbs such as *think* shift the judge parameter, the embedded clause will have a different meaning than it does in a matrix position – that is, that the proposition asserted by the embedded clause in Sam's utterance in (126), *he might be in his office*, in this context means that Bill might be in his office according to Sam's knowledge. If this were true, then the assertion associated with the embedded clause would be essentially equivalent to the one associated with the main clause, and Sue's response would again be predicted to be deviant. But this would be a misunderstanding of what it means to shift the judge parameter in the relevant sense. Recall that the meaning I have given to *think* is (129).

(129) $\qquad$ $[\![\text{think}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . [\lambda z_e . \forall <w',t',x> \in \text{Dox}_{w,t,z}: p(w')(t')(x) = 1]]$

The first argument of this function is a proposition, i.e., a function from world-time-judge triples to truth values – let's call it p. The second argument is an individual, z. Then the meaning of *think* says something about what happens when the proposition p is applied to each of a particular set of triples, namely the doxastic alternatives of z in w at t. In no sense does this change p – p is still the same function from world-time-judge triples to truth values. Thus if p ends up also being asserted, it will behave in the same way as it would if it were in a matrix context.

7. <u>Predictions of the Analysis for Epistemic Modals</u>

In this section and the next I will compare my proposal to existing analyses of epistemic modals and predicates of personal taste, considering the two cases separately. In this

section I will look at epistemic modals, focusing on the context-relativist approaches of Egan, Hawthorne & Weatherson (2005) and MacFarlane (2006). After summarizing their approach in Section 7.1, I will discuss specific differences in predictions between their approach and mine in Sections 7.2–7.4, plus one similar feature in Section 7.5, then summarize in Section 7.6.

7.1. The Context-Relativist View of Epistemic Modals

Egan, Hawthorne & Weatherson (2005) and MacFarlane (2006) propose that the truth of an utterance depends not only on the context of utterance (which gives the values for indexicals such as *I* and *now*) and the index (a world and time), but also on a "context of assessment."[37] Under this view, a particular utterance may be true as assessed in one context but false as assessed in another. When a speaker makes an assertion that contains an assessment-sensitive item, they can be challenged and forced to withdraw the assertion if it is found to be false even with respect to a different context of assessment. For epistemic modals in particular, MacFarlane and Egan, Hawthorne & Weatherson propose that the person whose knowledge is relevant is the person assessing the sentence. That is, a sentence of the form "might S" is true at a context of assessment A just in case the proposition expressed by S (at the time of utterance) is compatible with the knowledge of the person assessing the sentence, at the time that they are assessing it. This amounts to giving epistemic *might* and *must* the lexical entries in (130), where A is a context of assessment, and w(A), t(A), and a(A) are the world, time, and assessor of A.

(130)   Context-Relativist lexical entries for *might* and *must*:

$$[\![\text{might}]\!]^{w,t; A} = [\lambda p_{<s,it>} . \exists <w',t',x> \in \text{Epist}_{w(A),t(A),a(A)}: p(w')(t') = 1]$$

$$[\![\text{must}]\!]^{w,t; A} = [\lambda p_{<s,it>} . \forall <w',t',x>: \text{Epist}_{w(A),t(A),a(A)}: p(w')(t') = 1]$$

My judge-dependent lexical entries for *might* and *must* are repeated in (131).

(131)   Judge-dependent entries for *might* and *must*:

$$[\![\text{might}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . \exists <w',t',x> \in \text{Epist}_{w,t,j}: p(w')(t')(x) = 1]$$

$$[\![\text{must}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . \forall <w',t',x>: \text{Epist}_{w,t,j}: p(w')(t')(x) = 1]$$

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[37] Egan, Hawthorne & Weatherson call it a "context of evaluation."

I will refer to accounts along the lines of (130) as the context-relativist approach, and accounts along the lines of (131) as the judge-dependent approach. (Both are forms of relativism.) Notice that both approaches add some kind of extra parameter of interpretation beyond what is standardly assumed, and this extra parameter gives the person whose knowledge is relevant for epistemic modals. (By "parameter of interpretation" I mean any element used for the semantic interpretation of an utterance, in the context, index, or elsewhere.)

The crucial difference between the two approaches is in the size, so to speak, of the extra parameter of interpretation. On the context-relativist approach, the context of assessment comprises an entire situation where an utterance is assessed. This includes at least the person assessing the sentence and the world and time of assessment, and presumably also the place. On the judge-dependent approach, the judge is simply an individual.

7.2. Scope Ambiguities

On the context-relativist approach, the context of assessment comprises an entire situation where a person assesses a sentence. In particular, this includes the time when the sentence is assessed. I will use "time of assessment" to mean the time provided by the context of assessment, and "time of evaluation" to mean the matrix time, that is, the time provided by the index. On the judge-dependent approach, the judge is only an individual. This means that on the judge-dependent view, the relevant knowledge is that of the judge <u>at the time of evaluation</u>. On the context-relativist view, on the other hand, the relevant knowledge is that of the assessor (roughly analogous to the judge) <u>at the time of assessment</u>, meaning that the time of evaluation is only relevant for the interpretation of the sentence under *might*. As pointed out by von Fintel & Gillies (2007a), this property of the context-relativist view leads to a problem with sentences like (132).[38]

(132)   The keys might have been in the drawer.

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[38] Von Fintel & Gillies actually use (132) to make a more general point, and use a different example to illustrate scope ambiguity, but in their discussion the connection is obvious.

The most salient reading of (132) in isolation is a counterfactual one; however *might* can also be understood in this example as epistemic, and moreover, it can take scope either over or under the past tense. The following dialogue from von Fintel & Gillies exemplifies the reading of (132) where *might* scopes under the past tense (making the necessary assumptions about ellipsis).

(133)   [Context: Billy is looking for her keys. Alex is trying to help.]

      Alex: The keys might be in the drawer.
      Billy: [Looks in the drawer, agitated] They're not. Why did you say that?
      Alex: Look, I didn't say they were in the drawer. I said they might be there – and <u>they might have been</u>. Sheesh.

                         (von Fintel & Gillies, 2007a, no. 10, emphasis added)

The underlined sentence in Alex's second utterance says that it was compatible with what he knew before Billy looked in the drawer that the keys were there. In this context it obviously isn't compatible with what Alex knows after Billy looked in the drawer that the keys were there before, so it isn't a matter of present knowledge.

On the other hand, (132) also has a reading where *might* scopes over the past tense. This can be brought out in a context like (134).

(134)   [Context: Billy is looking for her keys. Alex is trying to help her retrace her steps.]

      Alex: Where were they when you went to bed last night?
      Billy: Hmm, I remember that I checked a bunch of places and I did see them, but now I forget where. <u>They might have been in the drawer</u>. On the other hand, they might have been on the coffee table. I just don't remember.

In (134), the underlined part of Billy's utterance means that it's compatible with what she knows now that the keys were in the drawer last night. Crucially, since this is a case of forgetting, she presumably knew last night whether the keys were in the drawer, so it isn't a matter of past knowledge.

As von Fintel & Gillies observe, the context-relativist view has no way to capture the ambiguity of sentences like (132) because, by assumption, the relevant knowledge does not depend on the time of evaluation, but only on the time of assessment. This means that

whichever way the items actually took scope, the relevant knowledge would be expected to be that of the assessor at the time of assessment. The judge-dependent view, however, can easily capture this ambiguity since the relevant knowledge is taken to be that of the judge at the time of evaluation – or, more precisely, at the time at which the judge takes themselves to be located at the time of evaluation.[39] Let's assume that the two schematic structures shown in (135) are the ones available for a sentence of the form "might have S," such as (132).

(135) (a)   PAST [might [S]]

    (b)   might [PAST [S]]

On one standard view, past tense shifts the evaluation time. Without going into details about the semantics of tense, it's clear that if the past tense scopes over *might* as in (135a), the evaluation time will be shifted for both *might* and the embedded sentence; whereas if *might* scopes over the past tense as in (135b), the evaluation time will only be shifted for the embedded sentence. (135a) corresponds to the reading of (132) brought out in (133), and (135b) corresponds to the reading brought out in (134).

7.3. Time Lag

There is a second apparent problem for the context-relativist view related to time that von Fintel & Gillies (2007a) bring up, the problem of "time lag." The problem is that the number of facts that are known by any given person or group tends to grow over time, so that in general, it should get easier and easier as time goes by to contradict a statement containing epistemic *might*. However, they observe, it actually seems to get increasingly difficult to contradict a *might*-statement as time passes. They illustrate this with (136) and several other examples like it.[40]

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[39] In general, von Fintel & Gillies lump the judge-dependent view together with context relativism, but they do observe (fn. 9) that it does not run into the same problems related to time as the context-relativist view.
[40] Elsewhere they give example (i), the relevant fact being that later on in the investigation, when some of the preliminary possibilities have been eliminated, no one would try to retract or disagree with the original statement.

  (i) [Context: We are starting to investigate a crime.]
     There are many people who might be the culprit.   (von Fintel & Gillies, 2007a, no. 30)

(136)   [Context: A randomly chosen card is being put in an envelope. Person A catches a glimpse of the card and knows that it is a black face card. When the envelope is opened ten years later, they find that it is actually the Jack of Clubs.]

A: [now] It might be the King of Spades.
B: ?? [ten years later] Wrong! / What you said is false!

<div align="right">(von Fintel & Gillies, 2007a, no. 19)</div>

In this context, it's compatible with both A and B's knowledge at the earlier time that the card is the King of Spades, and at the later time, after the envelope is opened and the card shown, it is compatible with neither person's knowledge that the card is the King of Spades. This means that any difference has to come from the time of the knowledge, not from the holder of it. On the context-relativist view, it's expected that different times of assessment can lead to disagreement, and so the oddness of B's utterance in (136) is surprising. On the other hand, the judge-dependent view does not make room for a time of assessment, so it does not face the same problem.

I think we need to be cautious here, though. Recall from Section 6.1 my assumption that in order to assert that p, a speaker only needs to believe that p is true as judged by them, but that the assertion acts as a proposal to add p to the common ground. And if p is added to the common ground, it becomes equivalent for all intents and purposes to the proposition that p is true as judged by the entire group of conversational participants. This means that hearers have a motivation for contradicting others' assertions of judge-dependent propositions: even if the asserter did not violate the norm of assertion, the hearer may be unwilling to add the proposition to the common ground, and therefore feel obliged to challenge it. But this motivation only lasts as long as the conversation. A conversation, I assume, is a real event that happens in the world, which has spatial and temporal boundaries (although these may be vague in some cases). Moreover, speech communities have conventions about what sorts of conversations may occur. Typically they are spatially and temporally continuous, for example. There are exceptions to this, of course, such as telephone calls (which are spatially discontinuous) and correspondences conducted by slow-moving mail (which are temporally and usually also spatially

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They use (i) in their discussion of *might* in disjunctions (which I will discuss in Section 7.5), but I think it is also an example of the "time lag" sort, and suffers from the same objection I will make about those.

discontinuous). These sorts of special cases are themselves conventionalized. Roughly speaking, I take a conversation to be a communicative interaction that people enter into knowingly (if not always willingly), where the purpose is to exchange information between a finite group of people during a finite period of time.[41] During this finite period of time with this finite group of people, among other things a context set is established and updated. But when the conversation ends, the updating also ends, and if the participants want to continue exchanging information on another occasion, they have to start a new conversation.

I suggest, then, that there are limits to how a conversation can proceed. It cannot, for example, start with some people putting a card into an envelope, and then adjourn and reconvene ten years later when they open the envelope. Similarly, a conversation cannot start in a courtroom, and then continue, after many of the original participants are dead, when a detective starts going over the transcripts (the setup for another of von Fintel & Gillies's examples). These just aren't conversations. It's not that a conversation cannot adjourn and reconvene – that is presumably exactly what happens when someone is talking on the telephone and says, "hold on a second, I need to turn off the stove" – but something really extraordinary would have to happen for a conversation to reconvene after ten years. Normally after that long the participants will assume it's over.

If this is true, then examples like (136) are not really conversations – or, more precisely, the utterances made by A and B in these examples are not part of the same conversation. And if there are two different conversations, then there are also two different common grounds. So A's assertion still acts as a proposal to add a proposition to the common ground (in this case, the proposition that the card might be the King of Spades), but the common ground to be updated this way is the one connected to the first conversation, not the second. By the time B's utterance occurs, the first conversation is over, and A's proposal was either successful or unsuccessful, and now a new conversation has started with a new common ground. In this new conversation, there is

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[41] Note that I'm using 'conversation' for these purposes in a much broader way than the English word *conversation* would normally be understood. For example, written correspondences, one-sided lectures, and even arguments are commonly not considered to be real conversations, but would count as conversations in my sense.

no assertion for B to challenge. This, I suggest, could be the real reason why B's utterance in (136) sounds odd: because it has no purpose in the (current) conversation.

It might be possible, then, for the proponents of the context-relativist approach to escape the time lag problem by adopting assumptions about conversation similar to the ones I have adopted. However, the fact that relevant knowledge seems to be linked to the evaluation time, as we can see from the potential scope ambiguity between *might* and past tense, remains a problem for the context-relativist approach that does not apply to the judge-dependent approach.

7.4. Retraction

Recall that it's possible for speakers to disagree about a statement containing an epistemic modal simply because they have different knowledge states. One example of this kind was (17), which is repeated in (137).

(137) Mary: Where's Bill?
       Sam: I'm not sure. He might be in his office.
       Sue: Nuh-uh, he can't be. He never works on Fridays.
       [OR]   No, he can't be. He never works on Fridays.

As we have already seen, this kind of disagreement is expected on the judge-dependent approach, since the judge is part the of the Kaplanian "index" rather than the "context," and thus the sentence asserted by one speaker has the same content as the one negated by the other. This kind of disagreement is also expected on the context-relativist approach for a similar reason, given that when two different people assess the same utterance, the context of assessment will be different since the assessors are different. On this point, then, the two approaches seem to be equivalent.

Nevertheless, there is another fact that seems to favor the context-relativist approach – on the face of it at least. This is the fact that, as observed by MacFarlane (2006), when a speaker makes a statement containing an epistemic modal, and another speaker disagrees

with it, the original speaker sometimes apparently retracts their previous statement, saying that they were wrong. An example of this is given in (138), due to MacFarlane.[42]

(138)   Sally: Joe might be in Chicago.
                       George: He can't be in Chicago. I saw him in the hall five minutes ago.
                       Sally: Oh, then I guess I was wrong.

This kind of example can be explained straightforwardly on the context-relativist approach, since Sally's knowledge state changes between her first and second utterances, and thus at the time of her second utterance, she may assess her previous utterance as false. But of course, this is the very same property of the context-relativist approach that leads to the time-related problems pointed out by von Fintel & Gillies (2007a) and discussed in Sections 7.2 and 7.3 above.

Notice that the same phenomenon does not seem to occur with predicates of personal taste. For example, it seems odd and pathologically meek for Sam to respond to Sue's challenge as in (139).

(139)   Mary: How's the cake?
                       Sam: It's tasty.
                       Sue: No it isn't, it tastes terrible!
                       Sam: # Oh, then I guess I was wrong.

Given this contrast between epistemic modals and predicates of personal taste, there are two directions we could go. One would be to say that epistemic modals and predicates of personal taste are actually completely different and should not be analyzed using the same mechanism, despite apparent parallels. But even if we put predicates of personal taste aside, the problem remains of how to allow retractions for epistemic modals as in (138) without running into the problems that arise from allowing a separate time of assessment. The other direction we could go is to retain the parallel analysis of epistemic modals and predicates of personal taste and look for a solution in the more fine-grained differences between the items rather than in the basic mechanism of judge dependency or context relativism. I will advocate a solution of that kind.

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[42] Examples (138) and (146) come from an earlier version of MacFarlane's (2006) paper.

I suggest that when a speaker says "Oh, I guess I was wrong" in reference to a previous assertion, they are not necessarily saying that the previous assertion was false or unjustified, but are simply saying something about their belief state at the time of making it, namely that they had relevant false beliefs. Look again at dialogue (138), repeated in (140).

(140)   Sally: Joe might be in Chicago.
           George: He can't be in Chicago. I saw him in the hall five minutes ago.
           Sally: Oh, then I guess I was wrong.

My claim is that what Sally is "wrong" about is some relevant belief that she had when she said that Joe might be in Chicago. For example, she might have believed that Joe had plans to fly to Chicago that day, but upon finding out that he was in the hallway five minutes ago concludes that she was mistaken about his plans. To the extent that her previous assertion was based on that false belief, her admission of being wrong may serve as a retraction of her statement.

At this point, one might ask how it would even be possible for a *might*-statement to be based on a false belief, if "might p" simply entails the lack of knowledge that p is false. There are two ways to answer this question. One is to assume that pragmatic factors typically require there to be some reason for bringing up a particular epistemic possibility, for example if there is reason to believe that it's fairly likely. Another answer to this question comes from Kratzer (1981, 1991a), who argues that the semantics of modals involves not only a modal base but also an ordering source. An ordering source is a set of propositions that creates a partial ordering among worlds in the modal base with respect to various properties. Thus (under certain simplifying assumptions that Kratzer herself does not make) we can talk not only about accessible worlds but about "best" accessible worlds – and, by extension, "best" epistemic alternatives. In the case of an epistemic modal like *might*, then, we are still dealing with the judge's epistemic alternatives, but these are ordered in terms of which ones more closely match the typical

course of events (a "stereotypical" ordering source). Thus the lexical entries for epistemic modals should actually be roughly as in (141).[43]

(141) $\llbracket\text{might}\rrbracket^{w,t,j} = [\lambda p_{<s,<i,et>>}$. there is **some stereotypically best** triple $<w',t',x>$ in $\text{Epist}_{w,t,j}$ such that $p(w')(t')(x) = 1]$

    $\llbracket\text{must}\rrbracket^{w,t,j} = [\lambda p_{<s,<i,et>>}$. **every stereotypically best** triple $<w',t',x>$ in $\text{Epist}_{w,t,j}$ is such that $p(w')(t')(x) = 1]$

In pictures, the simplified meanings for *might* and *must* I assumed previously are represented in (142), and the new ones are represented in (143). For example, suppose the proposition under the modal is the proposition that it's raining. In (142), a relation is enforced between the set of indices where it's raining and the set of all of the judge's epistemic alternatives (containment for *must* and overlap for *might*). In (143), on the other hand, the relation is between the set of indices where it's raining and the set of the judge's best epistemic alternatives.

(142) Modal semantics without ordering sources
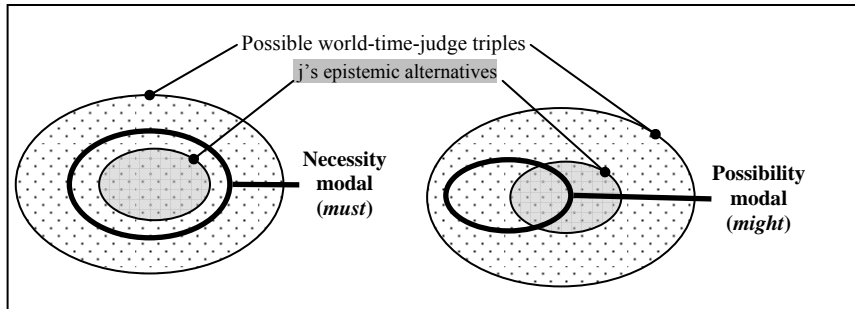
(143) Modal semantics with ordering sources

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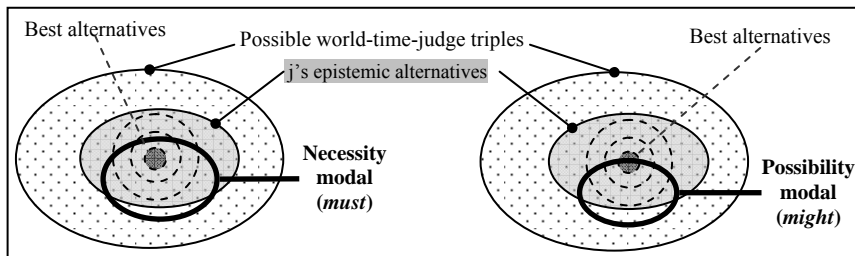
[43] These lexical entries are based loosely on Kratzer's definitions 6 and 8 for "necessity" and "possibility" (Kratzer, 1991a: p. 664), modified to use the notion of epistemic alternatives. This is only a rough approximation of Kratzer's (1981, 1991a) proposals.

Given this more complicated semantics, we can now make sense of how Sally's assertion in (140) could be based on a false belief. Let's assume that the stereotypical ordering source includes the proposition that people with travel plans follow them, and people without travel plans stay in their general area. So in all the best alternatives (those in the smallest circles in (143)), everybody follows their travel plans and everybody without travel plans stays in their general area. This means that when Sally utters the sentence "Joe might be in Chicago" in (140), she doesn't just mean that she hasn't eliminated all the alternatives where Joe is in Chicago, but that in fact there is at least one alternative where people follow their travel plans and Joe is in Chicago. So this probably means that Sally thinks Joe has travel plans. So if it turns out that Joe doesn't have travel plans, then her assertion was based on a false belief. That is, if Sally and George made more of their reasoning explicit, the dialogue might go like this:

(144)   Sally: Joe might be in Chicago.
         George: He can't be. I saw him in the hall five minutes ago. Why did you think he might be in Chicago?
         Sally: He was going to go there sometime this week.
         George: Oh, no, he's going next week.
         Sally: Oh, then I guess I was wrong.

In (144) it's fairly clear that what Sally is wrong about is her belief about Joe's travel plans, and my claim is that this is also the case in (140).

There is another possibility, of course, which is that Joe *did* have travel plans, but he cancelled them at the last moment, in which case it's much harder to see what Sally might be wrong about. But in this kind of situation, I think it's a bit odd for Sally to say that she was wrong. Consider the dialogue in (145), for example.

(145)   Sally: Joe might be in Chicago.
         George: He can't be. I saw him in the hall five minutes ago.
         Sally: I thought he was going there to visit his relatives sometime this week!
         George: Oh yeah, he was, but he changed his plans at the last minute.
         Sally: # Oh, then I guess I was wrong.

It seems strange in this case for Sally to say that she was wrong. On the context-relativist approach this is surprising, since given the new knowledge that Joe changed his travel

plans, it would no longer be compatible with Sally's knowledge that Joe was in Chicago, and so she ought to assess her previous assertion, in her new context of assessment, as false. Under the view I have proposed, Sally's original sentence is always evaluated with respect to the judge's knowledge *at the time of evaluation* (in this case the time of utterance since the sentence is in the present tense), and thus should not "become false" in the face of additional knowledge. When the possibility of mistaken belief is factored out, as in (145), this does indeed seem to be the way epistemic modals behave, and so my analysis makes the right prediction.

Recall that predicates of personal taste do not give rise to the same phenomenon of retraction. This makes sense given that assertions involving predicates of personal taste are normally based only on the speaker's own experience, which they are unlikely to be mistaken about.

A related phenomenon is the case of eavesdropping examples such as (146), due to MacFarlane.[44]

(146)   [Context: Jane, a stranger, is hiding in the bushes.]

Sally: Joe might be in Chicago.
George: Oh, really? I didn't know that.
Jane (*sotto voce*): Sally is wrong. I saw Joe just a few minutes ago.

Again, I think that there is a contrast between epistemic modals and predicates of personal taste in this respect. For example, Jane's whispered response in (147) seems odd compared to that in (146).[45]

(147)   [Context: Jane, a stranger, is hiding in the bushes.]

Sally: Wow, this cake is really tasty!
George: Oh, really? Let me try.
Jane (*sotto voce*): ?# Sally is wrong. I tried the cake, and it tastes terrible.

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[44] See note 42.

[45] Some speakers (including an anonymous *L&P* reviewer) accept (147). It's possible that "X is wrong" can also be used by these speakers to mean "Don't accept X's assertion!" The retraction cases with predicates of personal taste as in (139) would still be ruled out, since (for example) Sam would presumably stand by his assertion that the cake is tasty.

The fact in (146), and the contrast between (146) and (147), can be explained the same way as the apparent retraction cases. In (146), Sally's assertion may reveal the fact that Sally believes that Joe has travel plans. If Jane knows that Joe doesn't have travel plans, then she may conclude that Sally has a false belief and is justified in saying that she is wrong. On the other hand, Sally's assertion in (147) is only based on her own experience, which she would not typically have false beliefs about.

The moral of this, I believe, is that researchers have been too quick to assume that "x is wrong" means "x made a false assertion" or "x made an improper unjustified move" rather than "x has a false belief." It's important to keep a clear distinction between situations where two participants in a conversation can have a disagreement, and situations where one participant can be called "wrong" by themselves or someone else. For a disagreement, typically one person has made a proposal to add p to the common ground, and the other objects to that proposal because they don't accept p. For a person to be called wrong, it isn't necessary for any proposal to have been made about the common ground, but they must have (or be believed to have) a false belief.

7.5. *Might* in Disjunctions

I will close by discussing one problem brought up by von Fintel & Gillies that the judge-dependent approach apparently shares with the context-relativist approach. This has to do with the puzzling behavior of *might* in disjunctions. It is well known that assertions of the form "might p or might q" seem to have the same effect as two separate assertions "might p" and "might q."[46] As von Fintel & Gillies point out, then, the expectation is that a hearer ought to be able to challenge an assertion of this form if they know that one of p and q is true and the other, false. For example, then, (148) (based on von Fintel & Gillies, 2007a, no. 27) ought to be an acceptable discourse.

(148)   Sally: Joe might be in Boston or he might be in New York.
              George: # Nuh-uh, he's in New York.
             [OR]   # No, he's in New York.

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[46] See, e.g., Kamp (1974), Zimmermann (2001), Simons (2005a), and Geurts (2005).

But George's response in (148) sounds odd. This is surprising under the context-relativist view because if George knows that Joe is in New York, then in his context of assessment it's false that Joe might be in Boston, and therefore he should be able to disagree with that part of Sally's assertion. It's also surprising under the judge-dependent view for a similar reason: if George knows that Joe is in New York, then it is not compatible with his knowledge that Joe is in Boston, so again he should object to this part of Sally's assertion. On the other hand, if the relevant knowledge is determined contextually, as has been assumed implicitly or explicitly in most previous work, Sally's utterance in (148) can always be understood as merely referring to her own knowledge, and on that interpretation George's response would be odd. Thus von Fintel & Gillies take (148) to be evidence for a contextual account.

This reasoning relies crucially on the assumption that the puzzling behavior of *might*-disjunctions is due to an entailment, as opposed to some other kind of inference such as a conversational implicature. But the evidence for this is mixed. Another, even better known fact is that assertions with deontic modals of the form "x can (P or Q)" (where P and Q are properties expressed as VPs) similarly have the effect of two separate assertions "x can P" and "x can Q." (Note that there are two differences here: the modality is deontic instead of epistemic, and there is one modal that scopes over both VPs instead of two modals.) A number of authors have argued that, at least in this case, the effect is due to an implicature rather than an entailment.[47]

Conversational implicatures do not behave the same way as assertions with regards to disagreement, as we can see from (149).

(149)   Sally: Some of the girls came to the party.
               George: # Nuh-uh, all of them did.
               [OR]   # No, all of them did.

Sally's assertion in (149) is standardly assumed to carry a conversational implicature that not all of the girls came to the party. George's response, which seems to register

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[47] See, e.g., Kratzer & Shimoyama (2002), Alonso-Ovalle (2005, 2006), Schulz (2004, 2005), and Fox (2006). For opposing views, see, e.g., Zimmermann (2001), Aloni (2003), Geurts (2005), and Simons (2005a).

disagreement with the implicated proposition, is not acceptable. It seems, then, that conversational implicatures cannot generally trigger disagreements in the same way as assertions. Thus if the inference from "might p and might q" to "might p" and "might q" is due to a conversational implicature, then disagreements as in (148) are not expected, and there is no problem for the context-relativist or judge-dependent view of epistemic modals.

One piece of evidence for treating this inference as an implicature is that both (148) and (149) can be improved by replacing the disagreement marker (*nuh-uh* or *no*) with *actually*, as in (150)–(151).[48]

(150)   Sally: Some of the girls came to the party.
                George: Actually, all of them did.

(151)   Sally: Joe might be in Boston or he might be in New York.
                George: Actually, I know that he's in New York.

This shows that disagreements are allowed, in a sense, but that it must be signaled (by the use of *actually*, for example) that the disagreement turns on an implicature rather than an entailment of the first speaker's assertion.

On the other hand, one reason for thinking that the inference is an entailment (or at least not an implicature) is the suspendability test. It has been observed that the continuation *in fact, all of them did* in (152) is felicitous, and serves to remove the implicature that not all of the girls came to the party. However, the parallel continuations in (153) sound odd (Kai von Fintel, p.c.).

(152)   Some of the girls came to the party – in fact, all of them did.

(153) (a)   Joe might be in Boston or he might be in New York – # in fact, he's in New York.

     (b)   Joe might be in Boston or he might be in New York – # in fact, he must be in New York.

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[48] For some reason, in (151) *actually* is not sufficient by itself, but needs to be accompanied by *I know* or some other material that indicates the speaker's certainty. I have no explanation for this.

Then again, there is another reason to believe that the inference is not an entailment, which comes from one of von Fintel & Gillies's own examples. They observe that (154) is felicitous in a context where Sally knows that Joe is in Boston or New York, and also knows that George thinks he knows where Joe is (but may not agree with him).

(154)   Sally: Look, I know you think you know where Joe is. But we can agree on this much: <u>Joe might be in Boston or he might be in New York.</u> So, if he isn't in New York, he must be in Boston.

                              (von Fintel & Gillies, 2007a, no. 32)

It seems reasonable to assume that entailments are preserved under agreement: that is, if p entails q, and two people agree that p, then they also agree that q, provided they are aware of the entailment. For example, if we agree that Fido is a spaniel, and recognize that being a spaniel entails being a dog, then we agree that Fido is a dog. Now suppose that *Joe might be in Boston or he might be in New York* entails *Joe might be in Boston*, as von Fintel & Gillies claim, and that speakers are generally aware of this entailment. Then if Sally and George agree that Joe might be in Boston or he might be in New York, they should also agree that Joe might be in Boston. But this is not the case. If George definitely believes that Joe is in New York, then they do not agree that he might be in Boston, and (155) is unacceptable in this context.

(155)   Sally: # Look, I know you think you know where Joe is. But we can agree on this much: <u>Joe might be in Boston.</u> So if he isn't in New York, we should look for him in Boston.

Note that the implicature of *some* behaves like (154): if Sally thinks that some but not all of the girls came to the party, and George thinks that all of them did, (156) is also felicitous.

(156)   Sally: Look, I know you think that all of the girls came to the party. But we can agree on this much: Some of them came.

But things are even worse. Some speakers I have consulted do not accept (154) in the first place, given that if George has definite beliefs about where Joe is, he cannot agree that he might be in one place and that he might be in another. For example, if George believes that Joe is definitely in New York, then he doesn't agree that he might be in

Boston or he might be in New York. This suggests that the inference is an entailment after all.

It is not clear, then, whether the inference from "might p or might q" to "might p" and "might q" is an entailment or an implicature. Either view leaves us with unanswered questions: if the inference is an entailment, we need to explain why it is not preserved under agreement, as seen in (154)–(155) (assuming (154) is acceptable to some speakers); if it's an implicature, we need to explain why it fails the suspendability test, as seen in (153). Then again, it's also possible that the inference is neither an entailment nor a conversational implicature, but something else altogether. In any case, I think the evidence is murky enough that an argument based on one assumption or the other should not weigh too heavily in choosing between various accounts of epistemic modals at this stage.

7.6. Summary

In this section I have discussed differences in empirical predictions between the judge-dependent approach to epistemic modals that I am proposing and the context-relativist approach proposed by others in previous work. The key point is that the extra parameter of interpretation includes a time on the context-relativist approach but not on the judge-dependent approach. Thus the relevant knowledge for interpreting an epistemic modal is that held at the time of assessment on the context-relativist view, but is that held at the time of evaluation on the judge-dependent view. This leads to two problems for the context-relativist approach pointed out by von Fintel & Gillies (2007a). The first is the existence of scope ambiguities that would be predicted to be impossible on the context-relativist approach, and the second is the problem of time lag, i.e., the prediction that it should get easier and easier to contradict a *might*-statement the more time has elapsed since it was uttered. I showed that the judge-dependent approach is safe from both of these problems, although I suggested that some caution is in order with regards to the time lag problem. The third difference between the approaches has to do with apparent retractions by speakers of their previous *might*-statements. On the surface, this phenomenon seems to favor the context-relativist approach, but I argued that this

phenomenon has been misanalyzed, and that when it is characterized properly it actually lends support to the judge-dependent approach. Finally, I discussed one apparent problem for the context-relativist approach that does seem to carry over to the judge-dependent approach, but argued that it could be explained in another way.

8. <u>Predictions of the Analysis for Predicates of Personal Taste</u>

In this section I will look again at Lasersohn's account of predicates of personal taste, and show that the changes I have proposed lead to better predictions specifically in that domain, apart from the question of extending the analysis to epistemic modals. Recall that the crucial difference between the two accounts has to do with which items encode a dependency on the judge. On Lasersohn's view, judge dependency is built directly into the meanings of predicates of personal taste, so that *fun*, for example, means "fun for the judge." On my view, on the other hand, judge dependency is encoded in the silent nominal PRO$_J$, which refers to the judge; a predicate of personal taste is simply a two-place predicate whose object may be silent. When a predicate of personal taste takes PRO$_J$ as its object, this results in the meaning "fun for the judge." In Sections 8.1–8.2 below, I discuss two specific differences between the accounts.

8.1. PP Arguments

We have seen that predicates of personal taste can sometimes appear with PPs that seem to explicitly express the person whose taste or experience is relevant. The main example given so far is *fun for X*, where X is the person whose experience is relevant. Lasersohn analyzes this particular kind of example by giving a meaning to *for* that operates on the judge parameter; specifically, on his view *fun for X* (evaluated with respect to any judge) is equivalent to *fun* evaluated with respect to the judge X. This is equivalent to giving *for* the lexical entry in (157).

(157) $[\![\text{for}]\!]^{w,t,j} = [\lambda y_e \,.\, [\lambda P_{<s,<i,<e,et>>>} \,.\, P(w)(t)(y)\,]\,]$

Thus the role of *for* on Lasersohn's view is similar to the role I give to attitude predicates such as *think* (based on an earlier proposal by Lasersohn), the difference being only that *for X* operates on predicates whereas *think* operates on propositions.

On my view, in contrast, predicates of personal taste are simply two-place predicates that may take a silent argument, including PRO$_J$. In principle, though, there is nothing to stop them from taking overt arguments, and I assume that this is what happens in expressions such as *fun for X*. Thus I give *for* the lexical entry in (52), repeated in (158), which is just the identity function on individuals.

(158) $[\![\text{for}]\!]^{w,t,j} = [\lambda y_e \,.\, y]$

In other words, I assume that in expressions such as *fun for X*, the preposition makes no semantic contribution, but is required for some syntactic reason (perhaps to assign case to the object). This is a common assumption to make for relational nouns; for example, in the DP *father of Mary*, *Mary* may be taken to be the object of the relational noun *father*, where *of* has no semantic contribution.[49] Other prepositions besides *of* are possible with certain relational nouns, such as *to* in *contribution to the charity*. If we accept this view for relational nouns, then it becomes natural on my view to look at predicates of personal taste as relational adjectives, treating their PP arguments in a way similar to those of relational nouns.[50] The difference between Lasersohn's view and mine, then, is that in *fun for X* (for example), Lasersohn treats *for X* as a modifier of *fun* while I treat it as an argument.[51,52] These make different predictions. If the PP is a modifier, then we would expect the same PP to be able to combine with essentially any predicate of personal taste, restricted only by general aspects of meaning (in the same way that a modifier like *for two days* may be restricted to imperfective or atelic predicates but not to specific verbs). If the PP is an argument, on the other hand, we might expect predicates of personal taste to select more idiosyncratically for a PP headed by a particular preposition. This is in fact what we find when we consider a wider variety of predicates of personal taste. Some

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[49] See, e.g., Heim & Kratzer (1998: pp. 61–62).

[50] The parallel between relational nouns and predicates of personal taste is not complete, however, since relational nouns cannot have the meaning that would result from combining with PRO$_J$. For example, if Sue is the daughter of A and the mother of C, the dialogue in (i) is absurd.

(i)   A: Sue is a daughter.   /   Sue is the daughter.
      C: # No, she isn't, she's a mother! /   # No she isn't, she's the mother!

[51] Thanks to an anonymous *L&P* reviewer for discussion of this point.

[52] Conceivably it could be the other way around; for example, *for* could have the lexical entry in (i).

(i) $[\![\text{for}_2]\!]^{w,t,j} = [\lambda x_e \,.\, [P_{<s,<i,<e,<e,et>>>>} \,.\, [P(w)(t)(j)(x)]\,]\,]$

But it is clearly more straightforward on my view to treat these PPs as arguments of the predicates of personal taste.

examples are given in (159). (The judgments given in (159) are my own, and the exact judgments are less important than the variation among predicates.)

(159)   fun for Sue   * fun to Sue

           boring for Sue   ?? boring to Sue

           tedious for Sue   ?? tedious to Sue

           pleasurable for Sue   ?? pleasurable to Sue

        ?? pleasing for Sue   pleasing to Sue

        ?? tasty for Sue   ?? tasty to Sue

        ?? delicious for Sue   * delicious to Sue

         * tastes good for Sue   tastes good to Sue

        ?? tasteless for Sue   ? tasteless to Sue

        ?? funny for Sue   funny to Sue

           exciting for Sue   exciting to Sue

Some predicates in (159) can appear with *for*, some can appear with *to*, and some cannot appear with either. (I have not yet found any predicates of personal taste that appear with other prepositions.) There are some semi-regularities, for example, predicates expressing enjoyment or lack of enjoyment tend to appear with *for*. However, the choice of preposition is largely idiosyncratic, with similar predicates sometimes showing different behavior. For example, in my judgment *exciting to Sue* sounds much better than *boring to Sue*, while *fun to Sue* is completely impossible; similarly, *tasty to Sue*, while somewhat odd, is still much better than *delicious to Sue*. *Pleasing* and *pleasurable* seem to be at least somewhat related in meaning, and yet *pleasing* takes *to* and *pleasurable* takes *for*. This suggests that *for*- and *to*-phrases are arguments rather than modifiers of predicates of personal taste, giving my view the advantage over Lasersohn's.

8.2. Autocentric and Exocentric Perspectives

Recall that Lasersohn assumes that while speakers and hearers typically take an "autocentric" perspective, making and assessing assertions with themselves as judge, they may sometimes take an "exocentric" perspective instead, making and assessing assertions with some other salient individual as the judge. I assumed, in contrast, that speakers and hearers always take an autocentric perspective in his sense, but that what looks like an exocentric reading can arise if a predicate of personal taste takes a silent referential argument instead of PRO$_J$.

On the face of it, these two views seem to make similar predictions. On either view, asserting that the cake is tasty will normally require that the cake taste good to the speaker, but if some individual X is particularly salient, it might mean that the cake tastes good to X. Both views also allow for disagreements as in (160), as we have seen.

(160)   Sam: This cake is tasty.
            Sue: Nuh-uh, it isn't tasty at all!
            [OR]   No it isn't, it tastes terrible!

However, there is actually an important difference between the two analyses that has empirical consequences. This difference has to do with what the content of a sentence is, and thus with when people can disagree. On Lasersohn's view, a sentence with a predicate of personal taste always has the same content regardless of whether the speaker is taking an autocentric or exocentric perspective. For example, the content of (161) (expressed as a set) is the set of world-time-judge triples <w,t,j> such that the cake tastes good to j in w at t.

(161)   This cake is tasty.

On my view, on the other hand, (161) has more than one possible content. One is the same as Lasersohn's; this is the content if *tasty* takes PRO$_J$ as its argument, corresponding to an autocentric perspective on Lasersohn's view. But if a particular individual is salient, for example Mary, then *tasty* can take as its argument a null pronoun referring to Mary, in which case its content is the set of world-time-judge triples <w,t,j>

such that the cake tastes good to Mary in w at t. This corresponds to an exocentric perspective on Lasersohn's view.

Lasersohn and I both assume that two speakers disagree only if the content of the sentence asserted by one is the negation of the one asserted by the other. On Lasersohn's view, a sentence has the same content regardless of the perspective taken by the speaker, which predicts that it should be possible for two speakers to disagree even when one takes an autocentric perspective and the other takes an exocentric perspective. To test this, consider the dialogue in (162).

(162) Sam: The tuna is tasty.
       Sue: (#) No, it's isn't! It's not tasty at all!

Suppose that Sam and Sue are feeding tuna to their cat. If Sam intends his statement in (162) to mean that the tuna tastes good to the cat, and Sue understands that he means it this way, then Sue's response is only felicitous if she also means that the tuna does not taste good to the cat. In this case she cannot respond as in (162) based on the fact that the tuna does not taste good to her. On the other hand, now suppose that Sam and Sue are the ones eating tuna. If Sam's statement is intended in the autocentric way, based on the fact that the tuna tastes good to him, and Sue understands that he means it this way, then her response is only felicitous if it is also autocentric, based on the fact that the tuna does not taste good to her. In other words, for disagreement to be possible in an example like (162), it must be the case (in Lasersohn's terms) either that both speakers are taking an autocentric perspective or that both are taking an exocentric perspective linked to the same third party. My view predicts this, since the difference between an autocentric and an exocentric perspective comes from whether PRO$_J$ or a silent referential pronoun is present, which changes the content of Sam's statement. By assumption, disagreement can only occur with contradictory contents, and thus Sue's statement can only indicate disagreement with Sam's if *tasty* has the same argument in both. Lasersohn does not predict this, however, at least not without further stipulation. On his view, nothing prevents this sort of disagreement from occurring, because the content of *the tuna is tasty*

is the same in Sam's and Sue's utterances regardless of what perspectives the speakers take. This supports my view over Lasersohn's.

8.3. Summary

In this section I have discussed differences between Lasersohn's account of predicates of personal taste and my proposed modification of it. The crucial change I made to Lasersohn's account in my proposal was to relocate judge dependency from the predicates themselves to a silent item PRO$_J$, which allowed me to enforce a strict requirement of autocentricity. I have shown that besides being simpler in a certain sense, my account makes better predictions than Lasersohn's relating to the possibility of disagreements between speakers – a domain that Lasersohn himself stresses. These advantages over Lasersohn's account hold whether or not the account is extended to epistemic modals.

9. Conclusions

In this chapter I have developed an account of both epistemic modals and predicates of personal taste using Lasersohn's (2005) framework of judge dependency. At this point, I will summarize the changes to Lasersohn's account that I have proposed, my way of extending it to cover epistemic modals, and my efforts to address certain theoretical and conceptual issues that arise from this general framework.

The essential innovation of Lasersohn (2005), which I have adopted, is to add an individual "judge" parameter to the Kaplanian index, so that the content (or intension) of any expression is a function from world-time-judge triples to its extension. On Lasersohn's account, the meaning of a predicate of personal taste such as *tasty* is directly dependent on the value of the judge: for example, for any world-time-judge triple <w,t,j>, *tasty* denotes the set of things x such that x tastes good to j in w at t. My account achieves a similar effect in a somewhat different way. I treat predicates of personal taste as two-place predicates, and introduce a silent nominal item PRO$_J$ that refers to the judge. Thus, on my view, for any world-time-judge triple <w,t,j>, *tasty* denotes the set of pairs <x,y> such that x tastes good to y, and *tasty PRO$_J$* has the meaning that Lasersohn gives to

tasty. I also assume that predicates of personal taste may take null referential arguments, in which case judge dependency disappears.

Two more differences between Lasersohn's account and mine involve the perspective(s) that may be taken by speakers and hearers in conversation and, relatedly, the semantics of attitude predicates such as *think*. Lasersohn assumes that speakers and hearers normally take themselves to the be the judge when making and assessing assertions (an autocentric perspective), but that they can take the perspective of someone else when that individual is particularly salient (an exocentric perspective). Accordingly, on his view attitude predicates such as *think* don't shift the judge parameter, but it would be expected that attitude reports would generally be contexts where an exocentric perspective is natural. I propose instead that an autocentric perspective is obligatory, and that apparent exocentric cases arise only when a predicate of personal taste has taken a null referential argument rather than PRO$_J$. This allows me to retain a semantics for attitude predicates on which they shift the judge parameter to the attitude holder, as proposed by Lasersohn in an earlier version of his work.

I extend judge dependency to epistemic modals by making the judge the person whose knowledge is relevant. Unlike with predicates of personal taste, I build the judge dependency directly into the meaning of the modals so that, for example, given a world-time-judge triple <w,t,j>, *might p* is true iff p is compatible with what j knows in w at t. That is, I give epistemic modals roughly the kind of meaning that Lasersohn gives to predicates of personal taste, but with differences in the surrounding assumptions that predict the somewhat different behavior of these items.

As it stands, my view must simply stipulate that predicates of personal taste can take silent individual arguments while epistemic modals cannot, at least in English. We might expect, then, to find a language where predicates of personal taste cannot take referential arguments or epistemic modals can.[53] I don't know what the relevant cross-linguistic facts are, and this is an important question for future work. However, it seems likely that predicates of personal taste or items similar to them might have different argument-taking

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[53] Thanks to *L&P* editor Polly Jacobson for bringing up this point.

behavior across languages. Japanese experiential predicates could be an example of this (see, e.g., Tenny, 2006; McCready, 2006), but again this would need to be investigated. Turning to epistemic modals, as I mentioned in Section 4.3, the required judge dependency of epistemic modals actually ought to reside in the restrictor argument rather than the modals themselves, but the question remains of why the modal restrictor could not make reference to the epistemic alternatives of a contextually salient individual. This issue becomes more pointed when we consider the meaning I gave for *because* in Section 4.5, which does make reference to the epistemic alternatives of a contextually salient individual, namely the individual whose reasoning or rationale is involved. If *because* can do this, we might ask, why can't *might* and *must*? Once again, I cannot answer this question here, but I suggest that it ought to be investigated as part of a general project looking at cross-linguistic patterns and restrictions on modality. The Kratzerian tradition has emphasized the freedom of modals to take a variety of restrictors depending largely on context. The facts about epistemic modals discussed here and elsewhere suggest that epistemic modality is more restricted than this view would predict, and it is possible that other kinds of modality have unexpected restrictions as well.

In proposing an additional parameter of interpretation, it is important to explain how it is involved in the pragmatic rules governing conversation. I have proposed that a conversation is always linked to a particular judge, namely the group of participants in the conversation. This is parallel to the link a conversation has with the particular world and time in which it occurs. This means that at the level of entire conversations, there is no conceptual difference between the judge and the other parameters of the index: for any conversation, there is a completely objective fact of the matter about what world-time-judge triple it belongs to. The conceptual difference between the judge and the other parts of the index, I have proposed, only matters within a conversation. Within a conversation, participants are governed by principles which make a distinction between the world and time on the one hand and the judge on the other. While all participants are held responsible, so to speak, to the same world and time (whichever one happens to be the actual one), each one is held responsible to a different judge – namely themselves. This is reflected in the norm of assertion that I have proposed, which says in effect that in order

to assert a sentence S, a speaker only has to believe (justifiably) that S is true with themselves as the judge, although if their assertion is accepted and added to the common ground, it becomes linked to the entire group of conversational participants. At the level of individual conversational moves such as assertions, then, the judge-dependent view makes a conceptual departure from standard assumptions, but this effect goes away as soon as any particular conversation is over and its common ground established.

Chapter 3

Conditionals

1. <u>Introduction</u>*

In this chapter I extend the judge-dependent approach to indicative conditionals. First, in Section 2, I give an analysis of indicative conditionals involving judge dependency. Essentially, I adopt the view of Kratzer (1991b) that *if*-clauses restrict modals, and that indicative conditionals contain silent epistemic modals, and put this together with a judge-dependent analysis of epistemic modals. In Section 3, I address some puzzles that have been used to argue for a non-truth-conditional view of conditionals, and show that the account I propose solves longstanding puzzles about conditionals. Section 4 is an appendix with a semantic proof involving the relationship between belief and knowledge.

2. <u>A Judge-Dependent Account of Indicative Conditionals</u>

2.1. Starting Point

I will start by restricting my attention to so-called indicative conditionals where, additionally, the antecedent contains a stative predicate with no future orientation and the consequent is in the present tense, as in (1).

(1)   If the butler isn't the murderer, the cook is.

For the time being, I will not be considering counterfactual (or "subjunctive") conditionals such as (2), nor conditionals such as (3) where the antecedent has a future orientation and the consequent contains future morphology. My main reason for disregarding examples like (3) is that I am going to advocate the Kratzerian view of *if*-clauses as restricting modals, and it is conceivable that *will* itself is a modal.

(2)   If the butler hadn't murdered the victim, the cook would have.

(3)   If the butler accuses the cook of the murder, the cook will accuse the butler.

Like epistemic modals, conditionals such as (1) give rise to situations where one person may justifiably utter "if p then q" while another person justifiably utters "if p then not q," apparently with neither person being in error, an observation that goes back at least to Gibbard (1981). In particular, just as dialogues like (4) with epistemic modals are possible, so are dialogues like (5) involving conditionals.

(4)   [Context: A murder investigation. Sam has narrowed the suspects down to the cook and the butler, and Mary has narrowed them down to the butler and the maid.]

    Sam: The cook might be the murderer.
    Mary: (No! / Nuh-uh!) The cook can't be the murderer.

(5)   [Same context as (4).]

    Sam: If the butler isn't the murderer, the cook is.
    Mary: (No! / Nuh-uh!) If the butler isn't the murderer, the maid is.

In (5), it is crucial that the cook and the maid cannot both be the murderer, so that the consequent of Mary's statement *the maid is (the murderer)* entails that the cook is not the murderer (the negation of the consequent of Sam's statement).

This is not the form in which Gibbard made the observation, and the way it tends to be made especially in philosophy, although it makes the same point. The more standard form of the observation is that in the context described in (5), Sam could – sincerely and without error – utter his assertion to a third person, and Mary could separately utter her assertion to the same person (again sincerely and without error). The third person

(assuming they are sufficiently rational), would then not be inclined to utter either conditional themselves, but instead conclude that the butler is the murderer.

From a certain perspective, the parallel between (4) and (5) is expected. Kratzer (1991b) proposes that *if*-clauses always act as restrictors to modals, and that when no overt modal is present as in (5), there is a silent epistemic necessity modal. If the *might*-statements in (4) and the conditionals in (5) are both statements involving epistemic modals (albeit a possibility modal in one case and a necessity modal in the other), it is not surprising that they might behave the same way. The parallel in fact lends support to an epistemic view of conditionals – provided, that is, that we have a view of epistemic modals that accounts for their behavior in (4). As we have seen, a context-dependent account of epistemic modals (where the "knower" is an individual supplied from the context) cannot account for this behavior; however, I will show that my proposed judge-dependent view does. Thus, following suggestions of Weatherson (2005) and Kai von Fintel (p.c.), I will try to give new life to an epistemic account of conditionals using my new account of epistemic modals.

Examples like (5) have been used to argue that indicative conditionals have no truth conditions, but instead act as non-assertive speech acts (see, e.g., Bennett, 2003). Advocates of this view rightly point out that standard epistemic accounts cannot account for (5) (unsurprisingly, given that they can't account for (4)). I'll leave this aside for the moment, until after I have presented a judge-dependent account of conditionals.

2.2. The Account

Recall the meanings for epistemic *might* and *must* from Chapter 2 (Section 4.3), repeated in (6). Only the meaning for *must* will be involved in conditionals, but since I will propose minor changes in its meaning, I will make the same changes in parallel for *might*.

(6) (a) $[\![\text{might}_{\text{EPISTEMIC}}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . \exists <w',t',x> \in \text{Epist}_{w,t,j}: p(w')(t')(x) = 1]$

(b) $[\![\text{must}_{\text{EPISTEMIC}}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . \forall <w',t',x> \in \text{Epist}_{w,t,j}: p(w')(t')(x) = 1]$

With these meanings, a sentence of the form "must ϕ," for example, is true at a world-time-judge triple $<w,t,j>$ iff for all of j's doxastic alternatives in w at t, ϕ is true. At this

point I'd like to bring attention to one simplification I have been making in my account of epistemic modals, and move towards a more adequate account. I have been assuming that the epistemic "flavor" of epistemic modals is written right into their lexical entries. (I have added a subscript "-EPIST" to *might* and *must* in (6) to reflect this.) There are good reasons, going back to Kratzer (1977), to believe that this is not right, but rather that the type of modal interpretation (epistemic, deontic, etc.) comes from a silent, contextually supplied argument (giving the modal base and/or ordering source). There are still lexical restrictions on what type of restrictor argument a particular modal can take, but we will put that aside for now. To place my analysis of epistemic modals in this more general view, we first need to give more general lexical entries for necessity and possibility modals as in (7). (These do not take into account any lexical restrictions on the type of restrictor argument *might* and *must* can take, for example the fact that *might* cannot be deontic.)

(7)　(a)　$[\![\text{might}]\!]^{w,t,j} = [\lambda r_{<s,<i,et>>} . [\lambda p_{<s,<i,et>>} . \exists <w',t',x>: r(w')(t')(x) = 1 \ \& \ p(w')(t')(x) = 1 \ ] \ ]$

(b)　$[\![\text{must}]\!]^{w,t,j} = [\lambda r_{<s,<i,et>>} . [\lambda p_{<s,<i,et>>} . \forall <w',t',x>: r(w')(t')(x) = 1 \supset p(w')(t')(x) = 1 \ ] \ ]$

These get an epistemic interpretation by combining with a restrictor argument expressing epistemic accessibility. On my view, this would have the meaning in (8).

(8)　$[\![\text{EPISTEMIC}]\!]^{w,t,j} = [\lambda w'_s . [\lambda t'_i . [\lambda x_e . <w',t',x> \in \text{Epist}_{w,t,j}] \ ] \ ]$

This is just the function that characterizes the set of epistemic alternatives of the judge of evaluation at the world and time of evaluation. When the meanings in (7) take (8) as their first argument, the result is the same as the meanings in (6), as the reader can verify.

　　Following Kratzer (1991b) and others, I assume that *if*-clauses act as restrictors of modals, and that conditionals with no overt modal contain a silent epistemic modal. Specifically, I assume that a conditional such as (1), repeated in (9a), has the structure in

(9b).[1] I use "MUST" in small caps for the silent modal. The gray font and strikethrough on "~~the murderer~~" indicates ellipsis.

(9)   (a)   If the butler isn't the murderer, the cook is.

      (b)

The cook is ~~the murderer~~

MUST

EPISTEMIC   if the butler isn't the murderer
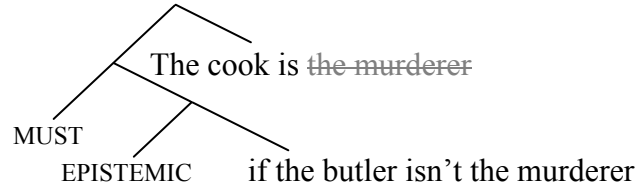
I assume that *if* simply denotes the identity function on propositions, as shown in (10).

(10) $[\![\text{if}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} \cdot p]$

(In the system I am using, this is not technically the same as making *if* semantically vacuous, because its presence triggers intensional functional application.)

I also assume that the modal restrictor and the if-clause combine using a version of predicate modification, given in (11).[2]

(11)   Rule of Propositional Predicate Modification:

If α is a complex expression made up of β and γ, which are both of type $<s,<i,et>>$, then $[\![\alpha]\!]^{c;\,w,t,j} = [\lambda w' \cdot [\lambda t' \cdot [\lambda x \cdot [\![\beta]\!]^{c;\,w,t,j} (w')(t')(x)$
$= [\![\gamma]\!]^{c;\,w,t,j} (w')(t')(x) = 1]]\,]$

Given these assumptions, we now predict that the complex restrictor of the modal in (9) (consisting of EPISTEMIC and the *if*-clause) has the meaning in (12a), and the whole conditional has the meaning in (12b).

(12)   (a) $[\![$ [EPISTEMIC] [if the butler isn't the murderer] $]\!]^{w,t,j}$

$= [\lambda w'' \cdot [\lambda t'' \cdot [\lambda y \cdot [\![\text{EPISTEMIC}]\!]^{w,t,j} (w'')(t'')(y) =$
$[\![\text{the butler isn't the murderer}]\!]^{w,t,j} (w'')(t'')(y) = 1]]\,]$

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[1] For discussion of how the structure of conditionals is derived, and what relationship there is between the syntax and the compositional semantics, see, e.g., von Fintel (1994, Ch. 3).

[2] One might worry that the rule in (11) would allow any two sentences to combine without a conjunction; technically, however, I have set things up so that the rule only applies if the two sentential expressions have basic type $<s,<i,et>>$, whereas normal sentences have type t. As long as there is no rule of "Intensional Propositional Predicate Modification," we avoid this overgeneralization.

$= [\lambda w'' \, . \, [\lambda t'' \, . \, [\lambda y \, . \, <w'',t'',y>\in \text{Epist}_{w,t,j} \text{ and the butler isn't the murderer}$
in w'' at $t'']$]]

     (b) $[\![\text{if the butler isn't the murderer, the cook is }\sout{\text{the murderer}}]\!]^{w,t,j}$

$= [\![\text{MUST}]\!]^{w,t,j} \, (\, [\![(12a)]\!]^{w,t,j} \,)$
$(\, [\lambda w'' \, . \, [\lambda t'' \, . \, [\lambda y \, . \, [\![\text{the cook is the murderer}]\!]^{w'',t'',y} \,] \,] \,] \,)$

$= [\lambda r_{<s,<i,et>>} \, . \, [\lambda p_{<s,<i,et>>} \, . \, \forall <w',t',x>: r(w')(t')(x) = 1 \supset p(w')(t')(x) = 1 \,] \,]$
$(\, [\lambda w'' \, . \, [\lambda t'' \, . \, [\lambda y \, . \, <w'',t'',y>\in\text{Epist}_{w,t,j} \text{ and the butler isn't the murderer in}$
w'' at $t'']$]]) $(\, [\lambda w'' \, . \, [\lambda t'' \, . \, [\lambda y \, . \, [\![\text{the cook is the murderer}]\!]^{w'',t'',y} \,] \,] \,)$

$= 1$ iff $\forall <w',t',x>:$
$<w',t',x>\in\text{Epist}_{w,t,j}$ and the butler isn't the murderer in w' at $t' \supset$ the cook
is the murderer in w' at t'

This says that (9a) is true at a world-time-judge triple $<w,t,j>$ iff for all triples $<w',t',x>$
that are both epistemic alternatives of j in w at t and are indices at which the butler isn't
the murderer, the cook is the murderer. Equivalently, (9a) is true at $<w,t,j>$ iff for all of
j's epistemic alternatives (in w at t) where the butler isn't the murderer, the cook is the
murderer.

    With this analysis in place, we can now account for the behavior of conditionals in
examples such as (5), repeated in (13).

(13)   Sam: (a) If the butler isn't the murderer, the cook is.
              Mary: (No! / Nuh-uh!) (b) If the butler isn't the murderer, the maid
                              is.

Sam's assertion in (13a) is a proposal to restrict the context set to triples $<w,t,j>$ such that
for all of j's doxastic alternatives in w at t where the butler isn't the murderer, the cook is
the murderer. As with the earlier cases of epistemic modals, Mary objects to this proposal
by making the opposite proposal – to restrict the context set to triples $<w,t,j>$ such that
for all of j's doxastic alternatives in w at t where the butler isn't the murderer, the maid is
the murderer.

2.3. Attitude Reports
This account predicts that, like epistemic modals, conditionals should also shift under
attitude predicates such as *think*. This seems correct. For example, consider (14).

(14)   Sam thinks that if the butler isn't the murderer, the cook is.

The meaning I proposed for *think* is repeated in (15). Combining this with the semantics for conditionals above, (14) is predicted to have the meaning computed in (16).

(15) $[\![\text{think}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . [\lambda z_e . \forall <w',t',x> \in Dox_{w,t,z}: p(w')(t')(x) = 1]]$

(16) $[\![(14)]\!]^{w,t,j} = [\![\text{think}]\!]^{w,t,j} ([\lambda w'' . [\lambda t'' . [\lambda y . [\![\text{if the butler isn't the}$
             murderer, the cook is$]\!]^{w'',t'',y}]]]) ([\![\text{Sam}]\!]^{w,t,j})$

$= [\lambda p_{<s,<i,et>>} . [\lambda z_e . \forall <w',t',x> \in Dox_{w,t,z}: p(w')(t')(x) = 1]]$
$([\lambda w'' . [\lambda t'' . [\lambda y . \forall <w_3,t_3,x_3>:$
$<w_3,t_3,x_3> \in Epist_{w'',t'',y}$ and the butler isn't the murderer in w_3 at t_3
$\supset$ the cook is the murderer in w_3 at $t_3]]]) (Sam)$

(a) $= 1$ iff $\forall <w',t',x> \in Dox_{w,t,Sam}: \forall <w_3,t_3,x_3>:$
        $<w_3,t_3,x_3> \in Epist_{w',t',x}$ and the butler isn't the murderer in w_3 at t_3
        $\supset$ the cook is the murderer in w_3 at t_3

(b) $= 1$ iff $\forall <w',t',x>: <w',t',x> \in Dox_{w,t,Sam}$ and the butler isn't the murderer
        in w' at $t' \supset$ the cook is the murderer in w' at t'

According to (16a), (14) is true at a world-time-judge triple $<w,t,j>$ iff all of Sam's doxastic alternatives $<w',t',x>$ are such that all of x's epistemic alternatives where the butler isn't the murderer, the cook is the murderer. This simplifies to (16b), according to which (14) is true at a world-time-judge triple $<w,t,j>$ iff for all of Sam's doxastic alternatives where the butler isn't the murderer, the cook is the murderer. This is intuitively correct. (I discussed the simplification from (16a) to (16b) in Chapter 2, and I have included a proof in Section 4, as an appendix to this chapter).

3. **Defense of (Judge-Dependent) Truth Conditions**

In this section, I will look at two arguments (discussed mainly in the philosophical literature) that have been leveled against treating indicative conditionals as having any truth conditions at all. The two arguments I focus on are discussed by Bennett (2003, at the end of Chapter 7). I will start by discussing Gibbard's examples in a form closer to their original one, and show that the judge-dependent account I have proposed captures the puzzling and apparently paradoxical facts about these examples. Then I will address a

supposed direct argument for a non-truth-conditional view, and conclude with some remarks about the implications of adopting a relativist semantics for conditionals.

3.1. Gibbardian Standoffs

In standard Gibbard examples, there are two people, A and B, and sentences ϕ and ψ, such that A justifiably utters the conditional "if ϕ then ψ" and B justifiably utters the conditional "if ϕ then not ψ." In some examples, each of these speakers separately asserts their respective conditionals to a third person, C, who concludes that ϕ is false. The dialogue in (5) is an example of this, except for being presented as a dialogue. Recast in a more standard form, (5) would become something like (17).

(17) [Sam and Mary have been separately collecting evidence about a murder. Sam is reporting to Chris on his findings.]

Sam (to Chris): If the butler isn't the murderer, the cook is.

[Sam leaves, and then Mary comes in.]

Mary (to Chris): If the butler isn't the murderer, the maid is.

[Mary leaves. Chris ponders what he's heard.]

Chris (to himself): Aha! The butler must be the murderer!

There are three crucial observations: first, that the two conditionals uttered by Sam and Mary seem to contradict each other (as seen more directly from the dialogue in (5)); second, that it is possible that neither Sam nor Mary is mistaken; and third, that Chris seems to be correct to come to the conclusion that he does (under the assumption that Sam and Mary are not mistaken). I'll consider these one at a time.

First take the observation that the two conditionals are – or at least seem to be – contradictory (on the assumption that the cook and the maid can't both be the murderer). On the account of conditionals proposed above, the proposition expressed by Sam's conditional is the set of world-time-judge triples <w,t,j> such that in all of j's epistemic alternatives in w at t where the butler is not the murderer, the cook is. The proposition expressed by Mary's conditional is the set of world-time-judge triples <w,t,j> such that in

all of j's epistemic alternatives in w at t where the butler is not the murderer, the maid is. These are written in (18).

(18) (a) If the butler isn't the murderer, the cook is:

$\{<w,t,j>: \forall<w',t',x>: <w',t',x> \in \text{Epist}_{w,t,j}$ & the butler is not the murderer in w′ at t′ $\supset$ the cook is the murderer in w′ at t′$\}$

(b) If the butler isn't the murderer, the maid is:

$\{<w,t,j>: \forall<w',t',x>: <w',t',x> \in \text{Epist}_{w,t,j}$ & the butler is not the murderer in w′ at t′ $\supset$ the maid is the murderer in w′ at t′$\}$

Strictly speaking, these are not disjoint sets: their intersection is the set of world-time-judge triples <w,t,j> such that there are no triples <w′,t′,x> that are epistemic alternatives of j in w at t where the butler is not the murderer in w′ at t′ – i.e., the set of triples <w,t,j> such that the butler is the murderer in all of j's epistemic alternatives. In this case, both universal statements are vacuously satisfied. However, I assume that, like other universal statements in natural language, epistemic modals (and therefore indicative conditionals) carry a presupposition that they are not satisfied vacuously – in this case, that j has epistemic alternatives where the butler is not the murderer. Provided that this presupposition is satisfied, the two propositions expressed are disjoint sets and the two conditionals are contradictory. In fact, if we adopt von Fintel's (1999) notion of Strawson-entailment, we can say that the two propositions are "Strawson-contradictory" (where p and q are Strawson-contradictory iff p Strawson-entails "not q"). This accounts for the first observation.

Next consider the observation that it is possible for neither Sam nor Mary to be mistaken in making their utterances. As a first step, recall the norm of assertion that I proposed: a speaker A is allowed to assert ϕ if ϕ is true for all of A's doxastic alternatives, that is, if for all <w′,t′,x> that are doxastic alternatives of j at the speech world and time, $[\![\phi]\!]^{w',t',x} = 1$. (Recall that a person's doxastic alternatives are those triples <w′,t′,x> such that it's compatible with their beliefs that they are x in w′ at t′.) This means that in (17), Sam is allowed to make his assertion provided that for all of his doxastic alternatives where the butler is not the murderer, the cook is; and Mary is

allowed to make her assertion provided that for all of her doxastic alternatives where the butler is not the murderer, the maid is. This is consistent with the fact that both Sam and Mary seem to make acceptable assertions. But this doesn't fully capture the intuition about a speaker not being *mistaken* in making an utterance. For example, if Sam misinterpreted some of his available evidence as ruling out the maid being the murderer, when actually it left that possibility open, he would still satisfy the norm of assertion but there is an obvious sense in which he would be mistaken. We need to impose a stricter requirement in this case to rule out this kind of situation. We can get the notion we need by replacing doxastic alternatives with epistemic alternatives. Recall that a person's epistemic alternatives are those triples <w,t,x> such that it is compatible with what they know that are x in w at t. The main difference between doxastic alternatives and epistemic alternatives is that, since false or unjustified beliefs do not constitute knowledge, some triples may be eliminated from a person's doxastic alternatives without being eliminated from their epistemic alternatives. In other words, a person's doxastic alternatives are generally a subset of their epistemic alternatives. Using epistemic alternatives, we can formulate a stricter requirement for "non-erroneous assertion" as in (19).

(19)   <u>Requirement for non-erroneous assertion</u>:

            For speaker A to assert sentence ϕ in w at t (in context c) <u>without error</u>, it must be the case that $\forall <w',t',x> \in \text{Epist}_{w,t,A}: [\![\phi]\!]^{w',t',x} = 1$

This requirement is stricter because it contains universal quantification over a broader domain (the speaker's epistemic alternatives rather than doxastic alternatives). Using this stricter requirement, we can now rule out the kind of case I brought up where a speaker was mistaken. For example, if Sam mistakenly eliminated all of his doxastic alternatives where the maid was the murderer, those indices would remain among his epistemic alternatives (even though he would not be aware of this fact), and his assertion would not satisfy the requirement in (19).

    With the stricter requirement in place, we can account for the observation that it is possible in Gibbard examples for neither of the two speakers to be mistaken, even though

they utter apparently contradictory statements. In (17), for example, Sam is not in error in making his assertion provided that for all of his epistemic alternatives where the butler is not the murderer, the cook is; and Mary is not in error provided that for all of her epistemic alternatives where the butler is not the murderer, the maid is. (The requirement for non-erroneous assertion actually yields two layers of knowledge, but they can be collapsed into one). Essentially, a speaker is not in error provided that they are right about their own (relevant) knowledge. In (17), Sam and Mary are both right about their own knowledge about who the murderer is, but both have incomplete knowledge, and it is incomplete in different ways. There is nothing contradictory about this. Note that both Sam and Mary have epistemic alternatives where the butler is not the murderer, so the presupposition is satisfied in both cases as well.

Finally, consider the observation that Chris, after hearing Sam and Mary's assertions in (17), can validly conclude that the butler must be the murderer. Chris's reasoning can be seen as an argument with two premises as in (20). Note that it is immaterial whether Chris accepts either Sam or Mary's assertion during his conversations with them, that is, allows them to be added to the common ground; all that is needed is for Chris to assume that Sam and Mary were not mistaken in making their assertions, that is, that they meet the requirement in (19).

(20)   Reasoning from contradictory conditionals:

Premise 1: Sam was justified and not in error in asserting, "If the butler isn't the murderer, the cook is."

Premise 2: Mary was justified and not in error in asserting, "If the butler isn't the murderer, the maid is."

⇒   Conclusion: The butler is the murderer.

To see that the argument in (20) is valid, first note that an individual A's epistemic alternatives at a world w and time t must include the triple $<w,t,A>$, that is, the triple that consists of the world, time, and individual that A actually is or is located at. This is the crucial way that knowledge differs from belief. Now consider the first premise. Given the requirement from (19), this entails that all of Sam's epistemic alternatives at the actual

world and time are triples <w′,t′,x> such that either the butler is the murderer in w′ at t′ or the cook is the murderer in w′ at t′. Similarly, the second premise entails that all of Mary's epistemic alternatives at the actual world and time are triples <w′,t′,y> such that either the butler is the murderer in w′ at t′ or the cook is the murderer in w′ at t′. Let w* and t* stand for the actual world and time. Then we also know that the triple <w*,t*,Sam> must be among Sam's epistemic alternatives and that the triple <w*,t*,Mary> must be among Mary's epistemic alternatives. This means that w* must be a world where, on the one hand, either the butler or the cook is the murderer, and on the other, either the butler or the maid is the murderer. From this it follows that w* is a world where the butler is the murderer, and so the conclusion follows from the premises.

3.2. The Direct Argument for the Non-Truth-Conditional View

Edgington (1986, 1995) presents what purports to be a direct argument for a non-truth-conditional view of conditionals. The way the argument works is to start with the hypothesis that "if ϕ then ψ" is a proposition and derive a contradiction. This works by showing that, on the one hand, the sentence "not ϕ or ψ" (i.e., the material implication ϕ⊃ψ) must entail "if ϕ then ψ," and that, on the other hand, this entailment must not hold. This is a contradiction, and so the conclusion is that the hypothesis must be false, and "if ϕ then ψ" cannot be a proposition.

The direct argument is based on a standard view where propositions are sets of possible worlds. What I will be doing below is showing that if the standard notion of a proposition is replaced with the notion I am using (i.e., a proposition is a set of world-time-individual triples), the argument no longer goes through. In other words, I will show that it is possible to give truth conditions to conditionals if we change the kind of truth conditions we are working with.

Before I go on, I should mention that this argument is sometimes presented as being about a hypothetical conditional connector "→" (where "ϕ→ψ" represents "if ϕ then ψ"). The hypothesis is that there is a binary connector →, and the contradiction derived is that the material implication connector ⊃ must be both stronger than and not stronger than →,

leading to the conclusion that no such connector exists. Kratzer (1991b) points out that on the view where *if*-clauses restrict modals, no binary conditional operator is assumed to exist in the first place, and so this conclusion is not troubling. I think this is dismissing the issue too quickly, however, since this objection does not apply to the argument in its more general form. If it is shown that a sentence α must express a proposition that is both entailed and not entailed by the proposition expressed by another sentence β, then we have a problem regardless of the internal composition of α and β.

Now let's look at the argument. The first premise is this: suppose an individual, let's call them A, believes (with certainty) "not ϕ or ψ." Suppose also that A is not certain that not ϕ. (Here I will be a little bit sloppy in using "ϕ" and "ψ" to stand for both sentences and the propositions they express.) In this case, if A is rational, A must also believe (with certainty) "if ϕ then ψ." From this (so the argument goes) it follows that "not ϕ or ψ" entails "if ϕ then ψ." This can be recast equivalently using "ϕ or ψ" and "if not ϕ then ψ" (with the conclusion that the first entails the second), which makes it easier to give an example. Edgington (1995: p. 242) gives an example of the murder-mystery kind: suppose a detective has narrowed down the suspects to just the gardener and the butler, meaning that she is certain that either the gardener did it or the butler did it. In that case she must then be certain that if the gardener didn't do it, the butler did.

The second premise is that it is possible for a rational individual, let's call them B, to believe that not ϕ and also believe that it's not the case that if ϕ then ψ. From this (according to the argument) it follows that "not ϕ or ψ" does not entail "if ϕ then ψ." As an example, Edgington (1995: p. 243) asks us to imagine that she thinks her husband isn't home yet; the claim is that it is perfectly rational for her to also think that if he is home, he will be worried about where she is.

Notice that each premise is used to draw an intermediate conclusion: the intermediate conclusion from the first premise is that "not ϕ or ψ" entails "if ϕ then ψ," and the intermediate conclusion from the second premise is that this is not the case. It is these intermediate conclusions that create the contradiction. My method of attack, then, will be to show that, in my system, one of these intermediate conclusions does not follow from

its premise – specifically, that it does not follow from the first premise that "not ϕ or ψ" entails "if ϕ then ψ." The problem in a nutshell is that the inference is implicitly based on the principle that entailments are preserved under belief – so that, for example, if believing ϕ is sufficient for believing ψ, then ϕ entails ψ. This principle is not valid in my system because of the way that the judge parameter interacts with belief predicates. To show this, I will start by showing that in my system "not ϕ or ψ" does not entail "if ϕ then ψ," and then show that nevertheless "A believes that not ϕ or ψ" does entail "A believes that if ϕ then ψ" (for any individual A).

Recall that on my view, propositions are defined as (functions that characterize) sets of world-time-judge triples. On the standard view, these are sets of worlds or world-time pairs. I will write p_S to mean the set characterized by proposition p, on whichever view is under consideration. Entailment on the standard view is the subset relation: a proposition p entails another proposition q iff $p_S \subseteq q_S$, and p asymmetrically entails q (or is stronger than 1) iff $p_S \subset q_S$. If we adopt the definition of propositions that I am using, the obvious way to extend the notion of entailment on my view is also as a subset relation.

On my account, the proposition expressed by "not ϕ or ψ" characterizes the set in (21), and the proposition expressed by "if ϕ then ψ" characterizes the set in (22). (I am ignoring the role of context.)

(21)   <u>not ϕ or ψ:</u>
          $\{<w,t,j>: [\![\phi]\!]^{w,t,j} = 0 \text{ or } [\![\psi]\!]^{w,t,j} = 1\}$

(22)   <u>if ϕ then ψ:</u>
          $\{<w,t,j>: \forall <w',t',x> \in \text{Epist}_{w,t,j}: [\![\phi]\!]^{w',t',x} = 1 \supset [\![\psi]\!]^{w',t',x} = 1\}$
          $= \{<w,t,j>: \forall <w',t',x> \in \text{Epist}_{w,t,j}: [\![\phi]\!]^{w',t',x} = 0 \text{ or } [\![\psi]\!]^{w',t',x} = 1\}$

(21) is the set of world-time-judge triples $<w,t,j>$ such that either ϕ is false or ψ is true, and (22) is the set of world-time-judge triples $<w,t,j>$ such that in all of j's epistemic alternatives in w at t, either ϕ is false or ψ is true. (21) is not a subset of (22). The easiest way to see this is with an example of a multi-world model. For simplicity, I will collapse worlds and times into world-time pairs. Consider a model with four world-time pairs s_1–s_4 and one individual, A, with the facts for each world-time pair stated in (23). Assume

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that ϕ and ψ are non-judge-dependent propositions, so their truth only depends on the world and time.

(23) s_1: ϕ is true, ψ is true;
A's epistemic alternatives are $\{<s_1,A>, <s_4,A>\}$

s_2: ϕ is true, ψ is false;
A's epistemic alternatives are $\{<s_1,A>, <s_2,A>, <s_3,A>, <s_4,A>\}$

s_3: ϕ is false, ψ is true;
A's epistemic alternatives are $\{<s_1,A>, <s_2,A>, <s_3,A>, <s_4,A>\}$

s_4: ϕ is false, ψ is false;
A's epistemic alternatives are $\{<s_1,A>, <s_4,A>\}$

Intuitively, s_1–s_4 could be thought of as world-time pairs where A believes that ϕ and ψ have to either be both true or both false. A is right about this in s_1 and s_4 , and justified enough that this belief constitutes knowledge, whereas A is wrong about this in s_2 and s_3, and thus the belief does not constitute knowledge. In this model, the propositions expressed by the two statements are given in (24)–(25) (written as sets).

(24) "not ϕ or ψ": $\{<s_1, A>, <s_3,A>, <s_4,A>\}$

(25) "if ϕ then ψ": $\{<s_1,A>, <s_4,A>\}$

The index $<s_3,A>$ is a member of (24) but not (25), since ψ is true in s_3 but A's knowledge does not rule out the possibility that ϕ is true and ψ is false. Thus (24) is not a subset of (25), so "not ϕ or ψ" does not entail "if ϕ then ψ." (Note that the presupposition is satisfied at all of these indices.)

At this point I have shown that "not ϕ or ψ" does not entail "if ϕ then ψ." Nevertheless, "A believes that not ϕ or ψ" does entail "A believes that if ϕ then ψ," as I will now show. The propositions expressed by the two belief statements are given in (26)–(27) (expressed as sets).

(26) A believes that not ϕ or ψ:
$\{<w,t,j>: \forall <w',t',x> \in \text{Dox}_{w,t,A}: [\![\phi]\!]^{w',t',x} = 0 \text{ or } [\![\psi]\!]^{w',t',x} = 1\}$

(27)   A believes that if ϕ then ψ:
$\{<w,t,j>: \forall<w'',t'',y>\in Dox_{w,t,A}: \forall<w',t',x>\in Epist_{w'',t'',y}:$
$[\![\phi]\!]^{w',t',x} = 1 \supset [\![\psi]\!]^{w',t',x} = 1\}$

(a) $= \{<w,t,j>: \forall<w'',t'',y>\in Dox_{w,t,A}: \forall<w',t',x>\in Epist_{w'',t'',y}:$
$[\![\phi]\!]^{w',t',x} = 0 \text{ or } [\![\psi]\!]^{w',t',x} = 1\}$

(b) $= \{<w,t,j>: \forall<w',t',x>\in Dox_{w,t,A}: [\![\phi]\!]^{w',t',x} = 0 \text{ or } [\![\psi]\!]^{w',t',x} = 1\}$

(26) says that "A believes that not ϕ or ψ" is true at a world-time-judge triple $<w,t,j>$ iff all of A's doxastic alternatives in w at t are such that either ϕ is false or ψ is true. (27a) says that "A believes that if ϕ then ψ" is true at a world-time-judge triple $<w,t,j>$ iff for all of A's doxastic alternatives $<w'',t'',y>$, all of y's epistemic alternatives are such that ϕ is false or ψ is true. As discussed in Chapter 2, principles about the relationship between belief and knowledge allow this to be reduced to (27b), which is the same as (26), thus the two sentences are equivalent. In particular, this means that "A believes that not ϕ or ψ" entails "A believes that if ϕ then ψ."

At this point I have refuted the direct argument for a non-truth-conditional view of conditionals, by showing that "not ϕ or ψ" does not entail "if ϕ then ψ" in my system, but that "A believes that not ϕ or ψ" nevertheless entails "A believes that if ϕ then ψ." To understand this result more clearly, though, we need to have a fuller picture of what's going on. A key part of this picture has to do with the entailment relation between "not ϕ or ψ" and "if ϕ then ψ." I showed that the first does not entail the second by constructing a multi-world model where the two propositions were those represented as in (24)–(25), repeated in (28)–(29).

(28)   "not ϕ or ψ": $\{<s_1, A>, <s_3,A>, <s_4,A>\}$

(29)   "if ϕ then ψ": $\{<s_1,A>, <s_4,A>\}$

Since (28) is not a subset of (29), "not ϕ or ψ" does not entail "if ϕ then ψ." But you may have noticed that (29) is a subset of (28), which raises the question of whether the reverse entailment holds, that is, whether "if ϕ then ψ" entails "not ϕ or ψ." In fact it does. Recall

that in the general case, the two propositions characterize the sets in (21)–(22), repeated in (30)–(31).

(30) $\quad$ <u>not ϕ or ψ</u>:
$\quad\quad\quad$ $\{<w,t,j>: [\![\phi]\!]^{w,t,j} = 0 \text{ or } [\![\psi]\!]^{w,t,j} = 1\}$

(31) $\quad$ <u>if ϕ then ψ</u>:
$\quad\quad\quad$ $\{<w,t,j>: \forall<w',t',x>\in Epist_{w,t,j}: [\![\phi]\!]^{w',t',x} = 1 \supset [\![\psi]\!]^{w',t',x} = 1\}$
$\quad\quad\quad$ $= \{<w,t,j>: \forall<w',t',x>\in Epist_{w,t,j}: [\![\phi]\!]^{w',t',x} = 0 \text{ or } [\![\psi]\!]^{w',t',x} = 1\}$

The crucial point, which I observed in Chapter 2 (Section 4.3), is that given an individual j, world w, and time t, the epistemic alternatives of j in w at t must include the triple $<w,t,j>$ (since j's knowledge cannot rule out the world and time that j is actually located at or the individual that j actually is, so beliefs that rule these out cannot constitute knowledge). Given this principle, which I will refer to as the factivity principle, there is a simple direct proof: suppose that a triple $<w,t,j>$ is a member of the set in (31). This means that all of j's epistemic alternatives in w at t are such that either ϕ is false or ψ is true. The factivity principle tells us that $<w,t,j>$ itself must be one of j's epistemic alternatives in w at t, so this means that it must be the case that either ϕ is false or ψ is true at $<w,t,j>$. But this means that $<w,t,j>$ is also a member of the set in (30). Thus every member of (31) must be a member of (30), so (31) is a subset of (30), therefore "if ϕ then ψ" entails "not ϕ or ψ." This entailment relation is really just a more complicated case of the fact that in epistemic logic "must ϕ" entails ϕ. This holds in my system because of what I called the factivity principle. The companion result, that ϕ entails "might ϕ" holds for the same reason. (Proof: suppose that ϕ is true at $<w,t,j>$. Then j's epistemic alternatives in w at t must include $<w,t,j>$, and so one of j's epistemic alternatives in w at t, namely $<w,t,j>$, is such that ϕ is true.)

In sum, then, the situation is that the conditional "if ϕ then ψ" asymmetrically entails the disjunction "not ϕ or ψ" (on the obvious notion of entailment to adopt in my system), but the two become equivalent when they are embedded under a belief predicate. This is because when judge dependency is involved, belief predicates manipulate the judge parameter in such a way that information about relative strength may be lost. Thus even

though "A believes that not ϕ or ψ" entails "A believes that if ϕ then ψ," it is not the case that "not ϕ or ψ" entails "if ϕ then ψ."[3] In other words, it is not valid in my system to conclude that a proposition p entails another proposition q from the fact that believing p is sufficient for believing q, and so the intermediate conclusion about entailment cannot be drawn from the first premise of the argument, and the argument does not go through.

3.3. A Note about Entailments

At this point I would like to comment on a property of the judge-dependent system that has not come out clearly so far. We saw in Section 3.2 that on the account I have proposed the judge-dependent proposition "if ϕ then ψ" entails the non-judge-dependent proposition "not ϕ or ψ." This entailment is related to the factivity of knowledge, brought in by the silent epistemic modal in indicative conditionals, and is thus fairly special. In the more general case, a judge-dependent proposition would not be expected to have a relation of entailment with a non-judge-dependent proposition, even if they are clearly related. To see this, compare the case of a predicate of personal taste. Consider the examples with *tasty* and *taste good* in (32)–(33). The propositions expressed by these sentences are given below them (written as sets).

(32)   The cake is tasty.
         {<w,t,j>: the cake tastes good to j in w at t}

(33)   The cake tastes good to Sam.
         {<w,t,j>: the cake tastes good to Sam in w at t}

Neither one of these sentences entails the other in my system. Again, the easiest way to see this is with an example of a multi-world model. Consider a model with four world-time pairs s_1–s_4 and two individuals Sam and Mary, plus the plurality Sam⊕Mary, with the facts for each world-time pair stated in (34).

(34) s_1: The cake tastes good to both Sam and Mary (and thus Sam⊕Mary).
         s_2: The cake tastes good to just Sam.
         s_3: The cake tastes good to just Mary.
         s_4: The cake does not taste good to either Sam or Mary.

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[3] Edgington (1986: p. 127) mentions this as a fact about conditionals, stating that "no non-truth-functional truth conditions can accommodate this fact." My point, then, is that relativist truth conditions can.

CHAPTER 3

In this model, the set characterized by the proposition that the cake is tasty is given in (35), and the set characterized by the proposition that the cake tastes good to Sam is given in (36).

(35)   The cake is tasty:
         $\{<s_1, \text{Sam}>, <s_1, \text{Mary}>, <s_1, \text{Sam}\oplus\text{Mary}>, <s_2, \text{Sam}>, <s_3, \text{Mary}>\}$

(36)   The cake tastes good to Sam:
         $\{<s_1,\text{Sam}>, <s_1,\text{Mary}>, <s_1,\text{Sam}\oplus\text{Mary}>, <s_2,\text{Sam}>, <s_2,\text{Mary}>,$
         $<s_2,\text{Sam}\oplus\text{Mary}>\}$

These are not in a subset-superset relation. For example, the pair $<s_3, \text{Mary}>$ is in the first set because the cake tastes good to Mary in s_3 (that is, the cake is tasty in s_3 as judged by Mary) but it isn't in the second set because the cake doesn't taste good to Sam in s_3. On the other hand, $<s_2, \text{Mary}>$ is in the second set because the cake tastes good to Sam in s_2, but it isn't in the first set because the cake doesn't taste good to Mary in s_2. In other words, since *the cake is tasty* expresses a relationship between the world, time, and judge, while *the cake tastes good to Sam* only expresses information about the world and time, the two propositions are independent. The parallel argument can be made replacing Sam with Mary, so similarly there is no entailment relation between *The cake is tasty* and *The cake tastes good to Mary*.

I should distinguish this property of my system from a stronger property that it could conceivably have but doesn't. Zoltan Szabo (p.c.) objected to my view, claiming that it predicts that the proposition that the cake is tasty (for example) does not even entail the proposition that there is some individual x such that the cake tastes good to x. On some level, this seems absurd. After all, a cake can only be tasty by virtue of causing a particular experience of taste, and no experience of taste can occur without a sentient being experiencing it. I'm not so sure that we should give any weight to this common-sense claim, but I will not evaluate it because in fact on my system this weaker, existential entailment does hold. To see this, note that the propositions expressed by the two sentences characterize the sets in (37)–(38).

(37)   The cake is tasty:
         $\{<w,t,j>:$ the cake tastes good to j in w at t$\}$

(38)   The cake tastes good to someone:
            {<w,t,j>: ∃x: the cake tastes good to x in w at t}

Recall that on my view the judge is always an individual. Now, suppose a triple <w,t,j> is a member of (37). This means that there is an individual (namely j) such that the cake tastes good to that individual, which means that <w,t,j> is also a member of (38). Therefore, *The cake is tasty* entails *The cake tastes good to someone* (if *someone* is evaluated with respect to the widest possible domain). The same argument can be made for any other predicate of personal taste.

What is probably more important here is that any time someone could properly assert that the cake is tasty, there would in fact have to be someone who the cake tastes good to, since the norm of assertion requires that the speaker be such an individual.

3.4. Remarks

In this section, I have shown that my view of conditionals allows us to reconcile the apparent contradictions that arise in Gibbard examples and in inference patterns between conditionals and disjunction. My goal, of course, has been to argue for a particular view of conditionals that is based on a particular view of epistemic modals, using a particular relativist semantics, but I think there are important lessons we can take out of the discussion here even if this particular view is ultimately not right.

The first lesson is that we need to take seriously the difference between truth and assertability. In Gibbard examples, we derive a contradiction based on the fact that one person can acceptably assert one sentence while another can acceptably assert a seemingly contradictory sentence. On my view, there is no contradiction here because of the way the norm of assertion works. More generally, Gibbard examples have been taken to tell us something puzzling about conditionals, but perhaps they ought to be taken to tell us something puzzling about assertion, namely the fact that we can assert things in some sense from our own perspective. I have proposed one way of capturing this fact, building on Lasersohn's assumptions, but there could be entirely different ways of doing so.

The second lesson has to do with the assumption that entailments are preserved under belief. It is implicitly assumed in the direct argument for a non-truth-conditional view of

conditionals that if believing p is sufficient for believing q, then p entails q. I have suggested that this is not a valid inference. On my view, this is because predicates like *believe* manipulate semantic parameters in certain ways, but there could be other views of belief and other reasons why the inference is not valid. Thus the argument could be recast differently, as testing the hypothesis that entailments are preserved under belief. Applied to conditionals, this derives a contradiction, and so the hypothesis is false. In other words, we might see this as teaching us something about belief, and hence about attitudes more generally, rather than about conditionals.

If we accept the result that entailments are not preserved under belief, this has serious implications for how we argue for semantic theories. Essentially, we can no longer trust our intuitions about logical entailments. We can have the intuition that if A can assert ϕ, then A can also assert ψ, or that if A believes ϕ then A must believe ψ, but these don't automatically translate to logical entailment in the sense of a subset relation between sets of indices.

In conclusion, I hope that I have not merely given some arguments against a non-truth-conditional view of conditionals, but also brought up issues that are relevant for semantics and logic more generally. Of course, in some sense I have not been arguing against the a non-truth-conditional view at all – one might say that I have actually gone some way towards vindicating it. On my view, there is an obvious sense in which indicative conditionals do not have truth conditions: they do not have truth conditions that depend only on external, objective facts (i.e., the world and time of evaluation). The same can be said for any other sentence that I treat as judge-dependent, such as those containing epistemic modals or predicates of personal taste. There could be some philosophical reason to distinguish the judge-dependent type of truth conditions from the standard, non-judge-dependent type, in which case we might call the former "truth-and-judgment conditions" or some such thing. If we looked at things that way, then in fact my view of conditionals would be a non-truth-conditional view.

We might also cut traditional logicians some slack for insisting that natural language conditionals are equivalent to the corresponding material conditionals. If my account is

right, the two do become equivalent under belief – that is, believing one is the same as believing the other – and it is initially plausible (though ultimately not valid, I claim) to conclude from this that they are the same.

4. **Appendix: Relationship between Belief and Knowledge**

In Chapter 2, I assumed that to believe something is to believe that one knows it. I claimed that from this assumption it follows that the epistemic alternatives of a person's doxastic alternatives are always the same as their doxastic alternatives. This is not immediately obvious, and in fact requires an additional assumption (which I have also introduced). At this point I will show which assumptions are needed, and prove that this relationship does in fact hold.

For convenience, I will use the italic letters i, j, k etc. as variables over world-time-individual triples. I will ignore the distinction between a triple $\langle w,t,x \rangle$ (written in angle brackets) and a sequence "w,t,x"; thus for example, if $i=\langle w,t,x \rangle$, then $Dox_i = Dox_{w,t,x}$.

Note that for any i, the epistemic alternatives of i's doxastic alternatives can be defined as $\cup\{Epist_k: k \in Dox_i\}$, that is, the set consisting of all world-time-individual triples j such that there is some k such that $j \in Epist_k$ and $k \in Dox_i$.

What we need to show is that $\cup\{Epist_k: k \in Dox_i\} = Dox_i$. There are two assumptions I need to make. The first is the one I started with (that if you believe something, then you believe that you know it). This is written in (39). Note that only the one-way conditional is required, from belief to belief of knowledge.

(39) **Assumption:** If you believe that p, then you believe that you know that p:
<u>For any i</u>
If $Dox_i \subseteq S$, then $\cup\{Epist_k: k \in Dox_i\} \subseteq S$.

Intuitively, I'm using "S" for the set characterized by the proposition p. What (39) says is that if all of a person's doxastic alternatives are such that p is true, then all of the epistemic alternatives of their doxastic alternatives are also such that p is true.

Next we need the factivity principle, that is, the fact that a person z's epistemic alternatives in world w at time t always have to include the triple $<w,t,z>$ itself. This is repeated in (40).

(40) **Factivity Principle:** For any i, $i \in \text{Epist}_i$

Now we need to show that for any i, $\cup\{\text{Epist}_k: k \in \text{Dox}_i\} = \text{Dox}_i$. The proof is in (41).

(41) **Proof that for any i, $\cup\{\text{Epist}_k: k \in \text{Dox}_i\} = \text{Dox}_i$:**

(a) <u>Part 1</u>: Show that $\text{Dox}_i \subseteq \{\text{Epist}_k: k \in \text{Dox}_i\}$

Suppose that $j \in \text{Dox}_i$
Note that $j \in \text{Epist}_j$ [Factivity Principle (40)]
Then there is a k such that $k \in \text{Dox}_i$ and $j \in \text{Epist}_k$, [specifically, $k = j$]

So $j \in \cup\{\text{Epist}_k: k \in \text{Dox}_i\}$

$\therefore \text{Dox}_i \subseteq \{\text{Epist}_k: k \in \text{Dox}_i\}$

(b) <u>Part 2</u>: Show that that $\{\text{Epist}_k: k \in \text{Dox}_i\} \subseteq \text{Dox}_i$

From (39): If $\text{Dox}_i \subseteq S$, then $\cup\{\text{Epist}_k: k \in \text{Dox}_i\} \subseteq S$
Note that $\text{Dox}_i \subseteq \text{Dox}_i$
$\therefore \cup\{\text{Epist}_k: k \in \text{Dox}_i\} \subseteq \text{Dox}_i$

(c) <u>Conclusion</u>:
From (a): $\text{Dox}_i \subseteq \cup\{\text{Epist}_k: k \in \text{Dox}_i\}$
From (b): $\cup\{\text{Epist}_k: k \in \text{Dox}_i\} \subseteq \text{Dox}_i$

$\therefore \cup\{\text{Epist}_k: k \in \text{Dox}_i\} = \text{Dox}_i$
QED.

Chapter 4

De Se Attitudes and Control Structures

1. <u>Introduction</u>

In this chapter I look at applications of the judge-dependent semantic system to the semantics of certain kinds of embedded clauses, particularly non-finite complements in control constructions. I show that making use of the judge parameter provides a straightforward way to capture a number of properties of the relevant constructions, including the fact that they are obligatorily interpreted *de se*.

The chapter is organized as follows: in Section 2, I introduce the problem of *de se* interpretation and show a parallel between judge-dependent items and controlled PRO. In Section 3, I develop a judge-dependent account of one particular type of *de se* construction. Specifically, I propose that subject PRO in attitude reports is actually PRO$_J$, the judge-referring nominal I posited in Chapter 2. In Section 4, I explore the implications of this view for a wider range of control constructions. In Section 5, I bring up an apparent puzzle involving a restriction on multiple occurrences of PRO$_J$ in a clause, and suggest that it can be explained as an instance of a familiar restriction on binding and pronominal coreference.

2. <u>Doxastic Alternatives and *De Se* Interpretation</u>

2.1. *De Se* Attitudes

The problem of so-called *de se* attitudes and essential indexicals goes back at least to Lewis (1979) and Perry (1979).[1] These are attitudes that are crucially about the attitude holder's self, and which thus cannot be captured using sets of worlds. A classic example (due to Perry, 1977) is the story of the amnesiac Rudolf Lingens, who is lost in the Stanford library and does not know who he is or where he is. Even if he reads a biography of himself, and learns from it that there is an amnesiac named Rudolf Lingens lost in the Stanford library, he may still not realize that he himself is Rudolf Lingens and is in the Stanford library.

If propositions are viewed as sets of worlds or world-time pairs, there is no way to distinguish between the belief Lingens would acquire by reading a biography of himself and the belief he would acquire if (after reading the biography) he suddenly regained his memory. In the first case, he would only be in a position to say, "Lingens is lost in the Stanford library," whereas in the second he would be in a position to say, "I am lost in the Stanford library." In either case, though, a standard view would have to represent the proposition believed as the set of worlds in (1a) or the set of world-time pairs in (1b).

(1)   Content of Lingens's belief (sets of worlds / world-time pairs):

    (a) $\{w:$ Lingens is lost in the Stanford library in $w\}$

    (b) $\{<w,t>:$ Lingens is lost in the Stanford library in w at $t\}$

If, however, we use a richer notion than the standard proposition, such as a set of world-individual pairs or world-time-individual triples, we can then distinguish between the two beliefs. This is essentially the idea proposed by Lewis (1979) and elaborated on by Chierchia (1989) and others. The content of a belief is expressed using the notion of doxastic alternatives.[2] A person's set of doxastic alternatives is the set of world-

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[1] Castañeda (1966, 1968, and other work) is cited for discussing similar issues in the context of artificial languages. Geach (1957) gives preliminary thoughts on expressions like *he himself* from a logical perspective.

[2] Actually, the term "doxastic alternatives" was originally used in the context of a standard possible-worlds view of propositional attitudes. Cresswell & von Stechow (1982) attribute the notion of "doxastic

individual pairs such that it is compatible with what they believe that they themselves are that individual in that world, as defined in (2a). On a more complex formulation, a person's set of doxastic alternatives is the set of world-time-individual triples such that it is compatible with what they believe that they are that individual in that world at that time, as defined in (2b).

(2)   Doxastic Alternatives:

    (a) $Dox_{w,x} = \{<w',y>:$ it is compatible with what x believes in w that he/she/it is y in $w'\}$

    (b) $Dox_{w,t,x} = \{<w',t',y>:$ it is compatible with what x believes in w at t that he/she/it is y in w' at $t'\}$

I should note that the motivation for adding times into the definition of a proposition and/or into the notion of doxastic alternatives also has to do with *de se* phenomena. One example of the type discussed in the literature is given in (3) (see, e.g., Cresswell & von Stechow, 1982, no. 4).

(3)   Sam believes that today is June 1, 2007.

Sam's belief in (3) is not a belief about what kind of world he is in, but rather a belief about what time he is located at. That is, in this case all of Sam's doxastic alternatives are triples <w,t,x> such that t is during June 1, 2007. (In this case, neither the world nor the individual parameters are relevant.) In other words, it is a belief that is crucially about the attitude holder's "now," and thus is often referred to as *de nunc*. Although I will not be concerned with temporal *de se*/*de nunc* readings, from now on I will use the version of doxastic alternatives using world-time-individual triples in the interest of consistency.

Once we make the move to using doxastic alternatives in the sense of (2), we can distinguish between the two cases of Lingens's beliefs. In the case where Lingens only reads a biography of himself, the content of his belief is represented as the set of world-time-individual triples in (4a), and in the case where he regains his memory, the content of his belief is represented as the (distinct) set in (4b).

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alternativeness," construed as a modal accessibility relation, to Hintikka (1962). However, I will only talk about "doxastic alternatives" as the kind encoding self-locating beliefs using an individual or center.

(4)   Content of Lingens's belief (sets of world-time-individual triples):

    (a)   [Reading biography] {<w,t,x>: Lingens is lost in the Stanford library in w at t}

    (b)   [Regained memory] {<w,t,x>: x is lost in the Stanford library in w at t}

The first case is simply a set of world-time pairs repackaged as a set of world-time-individual triples, since the "x" variable does not appear in the condition for membership of the set in (4a). In the second case, however, the machinery of doxastic alternatives is crucial, since the individual is involved in the description of the set.

2.2. Obligatory *De Se*

The problem of *de se* attitudes would be mainly a concern for philosophy – and perhaps an issue for the lexical semantics of certain attitude predicates – if it only arose for sentences like (5).

(5)   Lingens thinks that he's lost in the Stanford library.

Given an appropriate context, (5) allows either a *de se* construal or a non-*de-se* construal of the pronoun *he*.[3] This raises the possibility that the two interpretations are not separate readings at all, but simply different situations that make the proposition expressed by (5) true. Thus examples like (5) on their own do not give evidence that *de se* interpretations are something for linguistic semantics to reckon with. This point was made by Chierchia (1989). Chierchia went on to observe, though, that some attitude reports are in fact sensitive to this distinction. He gives examples like (6), a belief report in Italian using *credere*, 'believe' with an infinitive complement.

(6)   **[Italian]**
           Pavarotti crede   di   essere un genio.
           Pavarotti believes COMP be   a   genius.
           'Pavarotti believes that he's a genius.'
           [Lit.: "Pavarotti believes to be a genius"]
                                                    (Anand, 2006, no. 1a; based on Chierchia, 1989)

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[3] In many such cases the *de se* interpretation is strongly preferred. Anand (2006) discusses this issue in some detail and gives evidence that non-*de-se* interpretations of pronouns that co-refer with the attitude holder are generally available given the appropriate context.

For (6) to be true, Chierchia reports, Pavarotti must know that the person he believes to be a genius is himself – that is, Pavarotti must be inclined to say, "I'm a genius." If he were to listen to a recording of a singer and come to believe that the singer was a genius, unaware that the singer was in fact him, then (6) would not be true. In contrast, (7), where the embedded clause contains the pronoun *gli*, 'he,' would be possible in such a case.

(7)   **[Italian]**
             Pavarotti crede   che   gli e un genio.
             Pavarotti believes COMP he is a   genius.
             'Pavarotti believes that he's a genius.'
                                            (Anand, 2006, no. 1b; based on Chierchia, 1989)

A similar pattern has been observed for other attitude predicates that allow infinitive VP complements, which are standardly analyzed as containing the null subject PRO.[4] For example, compare (8), which contains *want* with an infinitive complement, with (9), which contains *want* with the reflexive pronoun *himself*.

(8)   Lingens wants to get out of the Stanford library.

(9)   Lingens wants himself to get out of the Stanford library.

If, upon reading a biography of himself, Lingens comes to feel sorry for the amnesiac lost in the Stanford library and wishes that this man would find his way out (but does not realize that he himself is Lingens), then his benevolent wish might be reported with (9), but cannot be reported with (8).

This means that there is at least one construction where a *de se* interpretation is obligatory, and therefore must be encoded somehow in the semantics. This leaves open the question of whether examples like (5) are actually ambiguous, having a *de se* interpretation and a non-*de-se* interpretation. I will not address that question here.

2.3. Epistemic Modals in Attitude Reports and *De Se* Interpretation

Consider a sentence where an epistemic modal is embedded under *think*, as in (10).

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[4] The observation about the obligatory *de se* interpretation in control constructions (also known as Equi-noun phrase deletion) is originally due to Morgan (1970).

(10)   Sue thinks it might be raining.

As I observed early on, the "knower," that is, the person whose knowledge is relevant for interpreting the embedded epistemic modal *might*, has to be the attitude holder – in this case, Sue. Thus (10) means, roughly, that Sue thinks that it's compatible with her knowledge that it's raining. I spent some time discussing the fact that, under appropriate assumptions about the relationship between belief and knowledge, this becomes equivalent to saying that it's compatible with Sue's beliefs that it's raining. However, now I want to bring attention to another fact: for (10) to be true, it must not only be the case that the individual Sue has a particular belief about the individual Sue's knowledge state, but Sue must also realize that it's her own knowledge state that the belief is about, meaning that the belief reported in (10) is crucially *de se*. (This was pointed out to me by Pranav Anand, p.c.) Put another way, to properly understand the paraphrase "Sue believes that it's compatible with her knowledge that it's raining," *her* must be interpreted *de se*. To see this more clearly, consider an example like (11), in the context given.

(11)   [Context: Sam is a spokesperson for NASA who is frustrated at what he sees as a lack of scientific understanding among the general public and, especially, the media. He decides to vent his frustration by announcing false discoveries to journalists in some of his frequent television interviews. He starts small by saying that a black hole has been found 100 light years away, then saying that a new satellite is forming around Mars. Then, on a particularly prominent talk show, he announces that there is evidence of water on the moon. This creates a media frenzy, his supervisors catch on to what he is doing, and first thing the next morning he is fired. In despair and determined to forget his stupidity, he goes home and drowns his sorrows in alcohol. He gets so drunk that when he switches on the T.V. and happens to see a clip of his own interview announcing the possibility of water on the moon, he doesn't recognize the man as himself. He thinks to himself, "Wow, that idiot thinks there might be water on the moon. People sure are stupid about science."]

    # Sam thinks there might be water on the moon.

In the context given, Sam does come to believe that it is compatible with the knowledge of the man on T.V. that there is water on the moon, and in fact that man happens to be Sam himself, but (11) cannot be used to report Sam's belief.[5]

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[5] If we construct a similar example using a predicate of personal taste, a non-*de-se* reading at first seems to be possible. For example, (i) could be used in a context where Sam unknowingly saw himself on T.V.

Not coincidentally, the semantics I gave for *think* and *might* directly capture the obligatory *de se* interpretation of sentences like (10) and (11). On my view, (11) has the meaning in (12a), which can be simplified to (12b).

(12) (a) $[\![(11)]\!]^{w,t,j} = 1$ iff $\forall <w',t',x> \in Dox_{w,t,Sam}: \exists <w'',t'',y> \in Epist_{w',t',x}:$ there is water on the moon in w'' at t''

  (b) $= 1$ iff $\exists <w',t',x> \in Dox_{w,t,Sam}:$ there is water on the moon in w' at t'

According to (12a), *Sam thinks there might be water on the moon* is true iff all of Sam's doxastic alternatives have some epistemic alternative(s) where there is water on the moon. More precisely, it says that for all triples $<w',t',x>$ such that it's compatible with Sam's beliefs in the actual world and time that he is x in w' at t', x's knowledge in w' at t' is compatible with there being water on the moon. The combination of doxastic alternatives and epistemic alternatives thus captures the obligatory *de se* interpretation of embedded epistemic modals.

2.4. The Immediateness Requirement

We have just looked at two cases where attitudes are obligatorily *de se*; the first involved embedded infinitives as in (6) and (8), and the second involved embedded epistemic modals as in (10) and (11). These two types of examples have something else in common as well: in cases where one attitude report is embedded inside another, the obligatory *de se* interpretation always applies to the closest attitude holder. For example, in (13), *might* must be linked to Bill's knowledge, not Sue's.

(13) Sue thinks that Bill thinks it might be raining.

That is, (13) can only mean that Sue thinks that Bill has a certain belief about his own knowledge (namely, that it's compatible with it raining). It cannot mean that Sue thinks that Bill thinks that her (Sue's) knowledge is compatible with it raining. Note that the latter could still be a *de se* belief – Sue could believe that she, herself, is the person whose knowledge state Bill has a belief about – but this reading is still not allowed for (13). I

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eating cat food and expressing enjoyment. However, this is expected on my view because *tasty* can take a silent referential argument referring to the man on T.V.

  (i) Sam thinks that cat food is tasty.

will refer to this property of epistemic modals as the "immediateness" requirement. (It is tempting to call it a locality requirement, but I don't want to suggest that it is syntactic in nature.)

My analysis accounts for the immediateness requirement for epistemic modals. This is easy to see if we just start with a singly embedded case such as (14a), which has the meaning in (14b).

(14) (a)   Bill thinks it might be raining.

(b) $[\![(a)]\!]^{w,t,j} = 1$ iff $\forall <w',t',x> \in Dox_{w,t,Bill}$: $\exists <w'',t'',y> \in Epist_{w',t',x}$: it's raining in w'' at t''

The *de se* interpretation has already been forced at this point because of the way the judge-dependent proposition *it might be raining* interacts with the doxastic alternatives. If (14a) is embedded inside another attitude report, as in (15a), then it has the meaning in (15b).

(15) (a)   Sue thinks that Bill thinks it might be raining.

[=(13)]

(b) $[\![(a)]\!]^{w,t,j} = [\![thinks]\!]^{w,t,j}$ ($[\![Bill\ thinks\ it\ might\ be\ raining]\!]^{w,t,j}$) (Sue)

= 1 iff $\forall <w',t',x> \in Dox_{w,t,Sue}$: $[\![Bill\ thinks\ it\ might\ be\ raining]\!]^{w',t',Sue}$

= 1 iff $\forall <w',t',x> \in Dox_{w,t,Sue}$: 1 iff $\forall <w'',t'',y> \in Dox_{w',t',Bill}$:

$\exists <w_3,t_3,z> \in Epist_{w'',t'',y}$: it's raining in w_3 at t_3

According to (15b), *Sue thinks that Bill thinks it might be raining* is true iff for all of Sue's doxastic alternatives, all of Bill's doxastic alternatives have an epistemic alternative where it's raining. This correctly links the *de se* interpretation to Bill instead of Sue. Indeed, in the context of this analysis, it's difficult to see how it could be otherwise, since the *de se* interpretation is already derived before (14a) is further embedded.

It turns out that the immediateness requirement also applies to cases of obligatory *de se* with embedded infinitives. That is, the implied subject of an embedded infinitive must

be linked to the closest attitude holder – or, put differently, PRO must be controlled by the closest subject (at least in the relevant cases). We can see this from examples like (16) and (17). For example, (16) can only mean that Sue wants it to be the case that Bill wants it to be the case that he himself goes to the party. It cannot mean that Sue wants it to be the case that Bill wants her to go to the party. Similarly, (17) can only mean that Sue tried to make it the case that Bill wants to go to the party, not that she tried to make it the case that Bill wanted her to go the party. Again, these readings could still be *de se*, but are not allowed for (16)-(17).[6]

(16)   Sue wants Bill to want to go to the party.

(17)   Sue tried to get Bill to want to go to the party.

I suggest that the immediateness requirement is a key diagnostic for distinguishing between two different families of *de se* constructions. As we saw with the case of embedded epistemic modals in (13)–(15), the type of obligatory *de se* that comes with the immediateness requirement falls naturally and unavoidably out of interactions between the semantics of judge-dependent propositions and attitude predicates. We have seen that embedded infinitive clauses as in (16)–(17) have an obligatory *de se* interpretation of the same kind; this suggests that it should be captured the same way, as I will propose in Section 3. I will suggest below that there is a second family of *de se* constructions which should be given a different kind of account.

2.5. *De Se* Constructions Not Subject to the Immediateness Requirement

The immediateness requirement does not apply in the case of pronouns that can be optionally interpreted *de se*, as in (5) above. Whether or not the *de se* interpretation is treated as a separate reading, it is equally available for a lower or higher attitude holder. For example, consider (18).

(18)   Sue thinks that Mary thinks that she is a genius.

In (18), the pronoun *she* in the embedded clause can refer to either Sue or Mary, and moreover a *de se* construal seems to be equally available in either case. That is, it could

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[6] I will say more about the analysis of ECM and object control constructions in Sections 3.3 and 4.1 below.

be that all of Sue's doxastic alternatives <w′,t′,x> are such that Mary thinks in w′ at t′ that x is a genius; or, alternatively, it could be that Sue thinks that all of Mary's doxastic alternatives <w″,t″,y> are such that Mary thinks that y is a genius.

It is tempting to take this as evidence that there is no separate *de se* reading of pronouns in sentences like (18); however, the presence or absence of the immediateness requirement does not correlate with whether the *de se* interpretation is obligatory. There is a well-attested class of expressions in natural languages which are obligatorily interpreted *de se* but which, it turns out, are not subject to the immediateness requirement. These include shifting indexicals of the kind found in Amharic and Zazaki[7] (Schlenker, 1999, 2003; Anand & Nevins, 2003), and logophors of the kind found in West African languages such as Ewe, Yoruba, and Abe (Hagège, 1974; Clements, 1975; Pulleyblank, 1986; Koopman & Sportiche, 1989; Anand & Nevins, 2003). One typical example of a shifting indexical is given in (19), from Amharic. The first-person indexical in (19) can either refer to the speaker of the utterance or to the reported speaker, John.

(19) **[Amharic]**

ĵon ĵəgna nə-ññ   yɨl-all
John hero be.PRES-ls   says-3sm
'John says that {I am, he is} a hero.'
[Lit: "John says that I am a hero."]

(Schlenker, 2003, no. 53)

A typical example of a West African-type logophor is given in (20), from Ewe. Here the pronoun *yè* can only refer to the reported speaker, Kofi.

(20) **[Ewe]**

Kofi be   yè-dzo
Kofi say   LOG-leave
'Kofi said that he (Kofi) left.'

(Clements, 1975, no. 1)

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[7] Amharic is a Semitic language spoken in Ethiopia; Zazaki is an Indo-Iranian language spoken by ethnic Kurds in Turkey.

Crucially, it has been observed that both shifting indexicals (when they have their shifted interpretations) and logophors generally must be interpreted *de se*.[8] That is, a sentence like (19) can only report a situation where John said, "I am a hero," not one where, for example, he unknowingly saw himself on T.V. and said, "he is a hero." However, shifting indexicals and logophors are not subject to the immediateness requirement. We can see this from looking at cases where one speech or attitude report is embedded in another, as in (21) (from Zazaki) and (22) (from Ewe).

(21)   **[Zazaki]**

Ali Fatima-ra va   kɛ   Rojda Bill-ra va   ɛz to-ra   miradiša
Ali Fatima-to said that Rojda Bill-to said I   you-to angry.be.PRES
(1 possible reading)
'Ali said to Fatima, "Rojda said to Bill that I am angry at you" '
[Lit: Ali said to Fatima that Rojda said to Bill that I am angry at you]

(Anand & Nevins, 2004)

(22)   **[Ewe]**

Kofi xɔ-e   se   be Ama gblɔ be yè-fu-i
Kofi receive-PRO hear   Ama say   LOG-beat-PRO
(i) 'Kofi$_i$ believed that Ama said that he$_i$ beat her'
(ii) 'Kofi$_i$ believed that Ama$_i$ said that she$_i$ beat him'

(Clements, 1975, no. 73)

There is a reading of (21) on which the indexicals 'I' and 'you,' which are located in the most embedded clause, refer to the speaker and hearer of the higher speech report, that is, Ali and Fatima (rather than Rojda and Bill or the actual speaker and addressee of the sentence). Similarly, there is a reading of (22) on which the logophor *yè* refers to the subject of the higher belief report, that is Kofi (and not Ama). These are both analogous to the interpretation of (18) on which *she* refers to Sue instead of Mary, except that the *de se* interpretation is obligatory in (21)–(22).

    I will not give an analysis of this second family of *de se* constructions which are not subject to the immediateness requirement; I bring them up only to show that they are

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[8] This has not been verified for every relevant language and item, but Schlenker (2003) shows it for Amharic 'I' and discusses the issue for logophors (citing, e.g., Kusumoto, 1998, for Bafut logophors). Also see Anand's (2006) discussion.

distinct from the *de se* constructions I will be concerned with here. My expectation is that this family of *de se* expressions should be analyzed using manipulation of context variables, along the lines of proposals by Schlenker (2003), von Stechow (2002), and/or Anand (2006). To give a very informal idea of the approach taken by these kind of proposals, the Amharic example in (19) would come out to mean something along the lines of (23). (I refer the reader to references cited for details.)

(23)   (19) = true iff in all possible contexts of utterance c_1 such that what Kofi said is true in the world of c_1, the speaker of c_1 is a hero.

This captures the *de se* interpretation of the shifted indexical for the following reason: suppose that Kofi had unknowingly seen himself on T.V. and said, "He is a hero." There are possible worlds (including all of those compatible with what Kofi believes) in which the man on T.V. is not the same person as Kofi, and the man on T.V. is a hero but Kofi is not. In these worlds, then, there are possible contexts of utterance c_1 where what Kofi said is true in the world where it was uttered (since the man on T.V. is a hero) but where the speaker of c_1 (i.e., Kofi) is not a hero. Examples with logophors would work similarly.

I have emphatically left open the question of whether sentences like (18) should be treated as truly ambiguous between *de se* readings and non-*de-se* readings, since the answer is not important for my purposes. If they are treated as ambiguous, though, the *de se* versions would need to belong to the same family of *de se* constructions as those containing shifting indexicals or logophors. One possibility (which really goes back to Castañeda, 1966, 1968) is to treat regular pronouns such as *she* as ambiguous between normal pronouns, which are not *de se*, and logophors, which are *de se*.

In sum, my claim is not that the judge-dependent system eliminates the need for other mechanisms that derive *de se* interpretations. What I am saying is simply this: we have already seen that judge dependency is independently motivated by the behavior of epistemic modals, conditionals, and predicates of personal taste; we have also seen that notions like doxastic alternatives are independently needed to account for the *de se* interpretation of embedded infinitives; and we have seen that when we put these together,

we automatically derive a particular kind of *de se* interpretation, namely the special kind that is subject to the immediateness requirement. Given these facts, it makes sense to account for this special kind of *de se* interpretation using judge dependency. What I foresee, then, is that a comprehensive account of *de se* interpretations will distinguish between two sharply delineated families of *de se* constructions, those involving the judge parameter and those involving context shifting, where the first is subject to the immediateness requirement and the second is not. This view makes the prediction, then, that any bona fide *de se* constructions which are not subject to the immediateness requirement must be able to be captured through reference to shifting contexts. I leave it to future work to see how this is borne out.

3. Analysis of Obligatory *De Se* in Infinitive Complements

3.1. The Property View of *De Se* Attitudes

A standard way to capture the obligatory *de se* interpretation of examples like (6) and (8) is to analyze attitudes as relations between an individual (the attitude holder) and a property, rather than between an individual and a proposition (see, e.g., Lewis, 1979; Cresswell, 1985; Chierchia, 1989; Anand, 2006). This amounts to giving the lexical entries in (24)–(25) to *credere*, 'believe' from (6) and *want* from (8). The lexical entry for *want* involves a notion of "*want*-alternatives" that is analogous to doxastic alternatives. Note that this is in a standard system without the judge parameter, so the index only consists of a world-time pair, and the variable P stands for an (intensional) one-place property (type $<s,<i,et>>$).

(24) $[\![credere, (\text{'believe'})]\!]^{w,t} = [\lambda P_{<s,<i,et>>} . [\lambda z_e . \forall <w',t',x> \in Dox_{w,t,z}: P(w')(t')(x)=1]]$

(25) $[\![want]\!]^{w,t} = [\lambda P_{<s,<i,et>>} . [\lambda z_e. \forall <w',t',x> \in Want_{w,t,z}: P(w')(t')(x)=1]]$
[where $Want_{w,t,z}$ is defined as in (26)]

(26) Want alternatives:

$Want_{w,t,z}$: $\{<w',t',x>$: it fits with what z wants in w at t for z to be x in w' at t'$\}$

According to (24), "z *crede* P," 'z believes P' is true iff all of z's doxastic alternatives $\langle w',t',x \rangle$ are such that x has the property P in w′ at t′. According to (25), along with the definition in (26), "z wants P" is true iff in all of z's want alternatives $\langle w',t',x \rangle$, x has the property P in w′ at t′, where z's want alternatives are those world-time-individual triples $\langle w',t',x \rangle$ such that being x in w′ at t′ would satisfy what z wants.

This requires that the relevant infinitive clauses (e.g., *to get out of the Stanford library*) be treated as properties of type $\langle e,t \rangle$ (assuming they combine with the attitude predicate by Intensional Functional Application). Ignoring the internal structure and presence of PRO, then, the infinitive clauses from (6) and (8) need to have the meanings in (27)–(28).

(27) $[\![\text{di essere un genio ('to be a genius')}]\!]^{w,t} = [\lambda y \, . \, y \text{ is a genius in } w \text{ at } t]$

(28) $[\![\text{to get out of the Stanford library}]\!]^{w,t} = [\lambda y \, . \, y \text{ gets out of the Stanford library in } w \text{ at } t]$

Putting these together, the resulting meanings for (6) and (8) are given in (29) and (30), respectively.

(29) $[\![(6)]\!]^{w,t} = [\![\text{credere ('believes')}]\!]^{w,t} \, (\, [\lambda w''_s \, . [\lambda t''_i \, . \, [\![\text{di essere un genio ('to be a genius')}]\!]^{w'',t''} \,] \,] \,) \, (\text{Pavarotti})$

   $= 1 \text{ iff } \forall \langle w',t',x \rangle \in \text{Dox}_{w,t,\text{Pavarotti}} \colon x \text{ is a genius in } w' \text{ at } t'$

(30) $[\![(8)]\!]^{w,t} = [\![\text{want}]\!]^{w,t} \, (\, [\lambda w''_s \, . [\lambda t''_i \, . \, [\![\text{to get out of the Stanford library}]\!]^{w'',t''} \,] \,] \,) \, (\text{Lingens})$

   $= 1 \text{ iff } \forall \langle w',t',x \rangle \in \text{Want}_{w,t,\text{Lingens}} \colon x \text{ gets out of the Stanford library in } w' \text{ at } t'$

Thus the Italian sentence in (6), *Pavarotti crede di essere un genio*, 'Pavarotti believes that he's a genius' is true iff all of Pavarotti's doxastic alternatives $\langle w',t',x \rangle$ are such that x is a genius in w′ at t′. Similarly, the English sentence in (8), *Lingens wants to get out of the Stanford library*, is true iff all of Lingens's want alternatives $\langle w',t',x \rangle$ are such that x gets out of the Stanford library in w′ at t′. These are intuitively the correct meanings, and they capture the obligatory *de se* interpretation of these sentences.

Now let's turn to the internal structure of the infinitive complements. These are standardly analyzed as containing the subject PRO, which is widely assumed to be a pronoun and thus of type e. On this view, infinitive clauses denote properties, and so something more needs to be said about how a sentence of the form [PRO VP] denotes a property. Chierchia's (1989) widely adopted solution is to assume that PRO is a pronoun that is obligatorily bound by an abstraction operator, meaning that the infinitive *to be a genius*, e.g., has the structure in (31).

(31) Op_1 [PRO_1 [to be a genius]]

Following widely accepted views of operator-binding (as in, e.g., Heim & Kratzer, 1998), this will give the infinitive clause *to be a genius* the appropriate property meaning (the same as that in (27)).

There are other obvious possibilities, of course. For example, PRO could be taken to be semantically vacuous; or we could eliminate PRO from the theory altogether and treat *de se* attitude predicates as combining directly with VPs rather than sentences. The choice between these various options will not matter here (though see note 14.)

Given this view of *de se* attitudes, we now need to ask how non-*de-se* attitudes are captured in this theory. For example, we need to be able to predict the meaning of (5), repeated in (32), in the context where Lingens has read a bibliography of himself but does not realize that it's about him.

(32)   Lingens thinks that he's lost in the Stanford library.
             [non-*de-se* interpretation]

In this case, we want this sentence to say that all of Lingens's doxastic alternatives <w′,t′,x> are such that Lingens is lost in the Stanford library in w′ at t′. (This says nothing about "x.") There are two ways to achieve this. The first way is to say that *think* is ambiguous between a meaning equivalent to (29) and a standard one where it takes a proposition. (Chierchia, 1989 takes this approach.) The second way is to say that *think* always takes properties, and to redefine the relevant embedded clauses as denoting properties which are vacuous in a particular sense. (This more closely follows Lewis,

1979.) For example, the embedded clause *he's lost in the Stanford library* in (32) would denote the property in (33) (putting aside the issue of the interpretation of pronouns).

(33) $[\![$he's lost in the Stanford library$]\!]^{w,t} = [\lambda y$. Lingens is lost in the Stanford library in w at t]

This property is vacuous in the sense that the lambda expression introduces a variable y that does not appear in the description of the predicate.

There are trade-offs between the two options. On the first kind of view, there is some redundancy in letting attitude predicates have both a property-taking and a proposition-taking meaning. On the second kind of view, another decision has to be made about whether matrix clauses should be treated the same way as embedded clauses. Even if all sentences that serve as arguments of attitude predicates are treated as properties, matrix clauses could still be treated as type t; in this case, there would be a fundamental semantic distinction between two kinds of sentences. On the other hand, matrix clauses could be treated as properties as well, in which case there would be an extra individual argument that is systematically idle in matrix sentences.

Once again, this still leaves open the question of whether the optional *de se* interpretation of (32) is a separate reading of the sentence.

3.2. A Judge-Dependent Proposal

Recall that the meaning I have given to *think* is in (34).

(34) $[\![$think$]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>}$. $[\lambda z_e$. $\forall <w',t',x> \in Dox_{w,t,z}: p(w')(t')(x) = 1]$]

Roughly speaking, this says that "z thinks that p" is true iff in all of z's doxastic alternatives (which are world-time-individual triples), p is true at that triple. Crucially, since I treat propositions as sets of world-time-individual triples (following Lasersohn, 2005), this means that they are already the right kind of thing to apply directly to doxastic alternatives in this way. It also means that if the propositional argument of *think* is judge-dependent, the judge is in effect shifted to the attitude holder, in a way that is *de se* and satisfies the immediateness requirement, as discussed above.

Notice that the lexical entry for *think* in (34) is exactly the same as the one for *credere*, 'believe' given in (24) above. The clausal argument of the attitude predicate is intended to be thought of as a property in (24) and as a proposition in (34), but since a proposition on my view is of type $\langle s, \langle i, et \rangle\rangle$, this amounts to the same thing. An analogous lexical entry for *want* is given in (35), using the same notion of want alternatives defined in (26). Again, this is exactly the same as the property-taking version in (25) except that the argument of type $\langle s, \langle i, et \rangle\rangle$ is now thought of as a proposition. (35) says that "z wants p" is true iff p is true at all of z's want alternatives.

(35) $\qquad [\![\text{want}]\!]^{w,t,j} = [\lambda p_{\langle s, \langle i, et \rangle\rangle} . [\lambda z_e . \forall \langle w', t', x \rangle \in \text{Want}_{w,t,z} : p(w')(t')(x)=1]\,]$

In my system, then, the most straightforward way to capture the obligatory *de se* interpretation of infinitive clauses is not to have them denote properties, but rather judge-dependent propositions. Specifically, the meanings for the infinitive clauses in (27)–(28) should be replaced with those in (36)–(37).

(36) $\qquad [\![\text{di essere un genio ('to be a genius')}]\!]^{w,t,j} = 1$ iff j is a genius in w at t

(37) $\qquad [\![\text{to get out of the Stanford library}]\!]^{w,t,j} = 1$ iff j gets out of the Stanford library in w at t

According to these meanings, the infinitive phrase *to be a genius* (for example) is a proposition that is true if the judge is a genius.[9,10]

The next question is how to derive the meanings in (36)–(37). If these infinitive clauses have PRO as their subject, where PRO is taken to be an obligatorily bound pronoun, they will denote one-place properties (on my view, type $\langle s, \langle i, \langle e, et \rangle\rangle\rangle$) rather than propositions. Treating PRO as an unbound pronoun will not help either, since then the subject will not be linked to the judge parameter. What we need is for the subject of

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[9] This raises the question of why infinitive clauses cannot be asserted, since judge-dependent propositions can of course be asserted. Thus I probably need to assume that an infinitive cannot head a matrix clause for reasons relating to tense or to purely syntactic requirements.

[10] By this point "judge" may seem to have become something of a misnomer, since there is no obvious intuitive sense in which the subject of an infinitive sentence is the person "judging" it. However, the use of the judge parameter in control constructions will generally be closely connected to an attitude of the controller, as we will see, and so in that sense it makes just as much sense to use the term as it does for the "knower" of epistemic modals. In any case I don't think the term "judge" should be taken too literally.

these infinitives to be something that simply denotes the judge. Recall that I have argued

for just such an item, PRO$_J$, whose lexical entry is repeated in (38).

(38) $[\![PRO_J]\!]^{w,t,j} = j$

I suggest, then, that the subject of the infinitive clauses in sentences like (6) and (8) is not

PRO, as standardly construed, but PRO$_J$. There are at least two ways to understand this

proposal. One possibility is that PRO should be reanalyzed as PRO$_J$, in all cases where it

is thought to occur.[11] Another possibility is that PRO still exists, but does not appear in

these particular kinds of cases. I will discuss evidence that speaks to this question in

Section 4 below.

    If we take the subject of these infinitives to be PRO$_J$, this will straightforwardly give

them the (judge-dependent) propositional meanings in (36)–(37). For example, (37) is

derived as shown in (39).

(39) $[\![PRO_J$ to get out of the Stanford library$]\!]^{w,t,j} = [\lambda y$. y gets out of the
            Stanford library in w at t] (j)

            = 1 iff j gets out of the Stanford library in w at t

The resulting meaning of (8), *Lingens wants to get out of the Stanford library*, is shown

in (40).

(40) $[\![(8)]\!]^{w,t,j} = [\![$Lingens wants PRO$_J$ to get out of the Stanford library$]\!]^{w,t,j}$

            $= [\![$want$]\!]^{w,t,j}$ ([$\lambda w''$. [$\lambda t''$. [$\lambda j''$. $[\![PRO_J$ to get out of the Stanford
            library$]\!]^{w'',t'',j''}$]]]) (Lingens)

            = 1 iff $\forall <w',t',x> \in$ Want$_{w,t,Lingens}$: x gets out of the Stanford library in w' at
            t'

This says that *Lingens wants to get out of the Stanford library* is true iff all of Lingens's

want alternatives <w',t',x> are such that x gets out of the Stanford library in w' at t',

which captures the obligatory *de se* interpretation of this sentence.

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[11] This might loosely be seen as a variation on the view that PRO is a "logophor" in some sense (see, e.g.,
Williams, 1992; Landau, 2000), which is echoed by a suggestion by Anand that one instantiation of an
Amharic shifting indexical is "a local logophor (hence something of the equivalent of PRO)" (Anand,
2006: p. 102).

The main motivation behind my analysis of these examples has been to derive their obligatory *de se* interpretation in a way that fits naturally into the judge-dependent system. In effect, though, I have also suggested that the control properties of *want* and *credere*, 'think' follow from their lexical semantics, since the meanings I have given them force the controller to be the attitude holder.[12] (This happens to be the subject in both of these cases, but in Section 4.1 I will discuss cases where it is the object.) The goal of deriving control relations from the lexical semantics of control predicates has been the impetus for a number of analyses of control, particularly around the 1980s.[13] One particular approach within that tradition is to connect control relations to general properties of the situation or event-types involved (as, e.g., in Jackendoff, 1974; Farkas, 1988; Sag & Pollard, 1991). My proposal is of this kind. For example, on Sag & Pollard's (1991) view (also citing Comrie, 1984), the fact that *want* is a subject control verb comes from it being of the "orientation" type, which means that the controller is the "experiencer." (Italian *credere*, 'think' could also be placed in this category.) On my view, this follows from the fact that *want* and *credere* express simple attitudes of the subject towards some proposition, with no additional mediating attitudes involved.

3.3. Non-*De-Se* Cases and ECM

On this approach, nothing special needs to be said about cases of non-*de-se* attitudes, such as the non-*de-se* interpretation of (5), repeated again in (41).

(41)   Lingens thinks that he's lost in the Stanford library. [non-*de-se* interpretation]

Again putting aside the details of the interpretation of pronouns, the *that*-clause in (41) simply denotes the proposition in (42), which is non-judge-dependent.

(42)   [[that he [Lingens] is lost in the Stanford library]]^{w,t,j} = 1 iff Lingens is lost in the Stanford library in w at t

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[12] This fact about the meanings is independent of the judge-dependent semantics, since the same effect could be achieved by giving them the property-based meanings from (24)–(25) (Section 3.1).
[13] Some examples are Jackendoff (1974), Bach (1979), Bach & Partee (1980), Jacobson (1982), Klein & Sag (1982), Chierchia (1983, 1984), Dowty (1985), Chierchia & Jacobson (1986), Farkas (1988), and Sag & Pollard (1991).

When this is taken as the argument of *think* in (41), the resulting meaning is given in (43).

(43) $[\![(41)]\!]^{w,t,j} = [\![\text{think}]\!]^{w,t,j} ([\lambda w''. [\lambda t''. [\lambda j''. [\![\text{that he [Lingens] is lost in the Stanford library}]\!]^{w'',t'',j''}]]]$ (Lingens)

   $=1$ iff $\forall <w',t',x> \in \text{Dox}_{w,t,\text{Lingens}}$: Lingens is lost in the Stanford library in w' at t'

This says that *Lingens thinks that he's lost in the Stanford library* is true (on a non-*de-se* interpretation) iff in all of Lingens's doxastic alternatives, the individual Lingens is lost in the Stanford library. This can be true in the context where Lingens reads a biography about himself but does not realize that he himself is the person the biography is about. Formally, the non-*de-se* nature of this interpretation is captured by the fact that the "x" in Lingens's doxastic alternatives $<w',t',x>$ does not appear in the description "Lingens is lost in the library in w' at t'." (As I discussed in Section 2.5, if there is a distinguished *de se* reading of the sentence, it would not be derived using judge dependency.)

Similarly, the meaning I gave to *want* immediately carries over to the use of *want* in ECM constructions, also known as object-raising, exemplified in (44).

(44)   Sue wants Mary to be happy.

I assume that (44) has the structure in (45a), where the entire infinitive clause *Mary to be happy* is a single syntactic and semantic argument of *want* (see, e.g., Haegeman, 1994: pp. 169–171). Using the meaning for *want* from (35), this predicts that (44) has the meaning in (45b). (I assume that *Mary to be happy* is true at a world-time-judge triple $<w,t,j>$ iff Mary is happy in w at t.)

(45)   (a)   Sue [$_{VP}$ wants [$_S$ Mary to be happy]]

   (b) $[\![(a)]\!]^{w,t,j} = [\![\text{want}]\!]^{w,t,j} ([\lambda w''. [\lambda t''. [\lambda j''. [\![\text{Mary to be happy}]\!]^{w'',t'',j''}]]])$ (Sue)

   $= 1$ iff $\forall <w',t',x> \in \text{Want}_{w,t,\text{Sue}}$: Mary is happy in w' at t'

This says that (44) is true if in all of Sue's want alternatives <w′,t′,x>, Mary is happy in w′ at t′, which is the correct meaning. This attitude report is predicted not to have any *de se* quality because the subject of the infinitive clause is *Mary* rather than PRO$_J$, and thus the infinitive argument expresses a non-judge-dependent proposition.

In a sense, what I have done to derive cases of non-*de-se* attitudes and ECM constructions is the same thing that would be accomplished by making all sentences denote properties. Some of those properties are vacuous in the sense that their formalizations involve vacuous binding of an individual variable, in the same way that the formalizations of non-judge-dependent propositions involve vacuous binding of a variable for the judge parameter. Either way there has to be an idle wheel somewhere in these cases. The difference is that on my view, that wheel is independently needed (for epistemic modals and predicates of personal taste), and it is not always idle in matrix clauses.

4. <u>More on Control Constructions</u>

I have proposed that the infinitive clause in an example like *Lingens wants to get out of the Stanford library* has PRO$_J$ as its subject. The fact that the implicit subject is "controlled" by the subject of the higher clause follows from the semantics of the attitude predicates and general aspects of the judge-dependent system. This raises the question of which, if any, other putative cases of controlled PRO (within the Government-Binding/Minimalist approach to syntax[14]) can be treated instead as PRO$_J$. In this section I will briefly discuss a few prominent cases, some of which are amenable to this analysis and some of which are not. I will not attempt here to review the literature on control

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[14] There are, of course, syntactic views where PRO is not posited, and bare infinitivals and gerunds are taken to have no subject at all, especially within approaches to syntax that are more lexicalist and surface-based than the general Government-Binding/Minimalist approach. Such a view could still be combined with my approach to *de se* attitudes with infinitivals, provided that the silent item PRO$_J$ were added (or replaced with a category-changing rule with the same effect). In this case the question of which occurrences of PRO can be reanalyzed as PRO$_J$ becomes instead the question of which kinds of apparently subjectless VPs actually contain PRO$_J$ as a silent subject (or undergo some equivalent process). The issues that arise in these kind of theories might well be different, but the basic phenomena are the same, and so the various constructions I consider below would still have some impact on how to analyze VPs that lack overt subjects. For a discussion of raising and control on one view of this kind, see Jacobson (1992).

theory, which is full of intricacies and controversies, but will simply take as my starting

point what I consider to be a standard Government/Binding view of control.[15]

4.1. Object Control

The view of PRO as PRO$_J$ can be fairly easily extended to the case of object control.

Object control occurs with verbs such as *persuade*, *convince*, *ask*, *tell*, *order*, *warn*, and

defy, as exemplified in (46).[16]

(46) (a)   Sue persuaded Mary to take Sam to the movies.

      (b)   Sue told Mary to take Sam to the movies.

      (c)   Sue defied Mary to leave Sam behind.

I assume that both syntactically and semantically, object control verbs take two

arguments: a DP, and an infinitive clause with PRO$_J$ as subject. For example, (46a) has

the structure in (47).

(47)   Sue [$_{VP}$ persuaded [Mary] [$_S$ PRO$_J$ to take Sam to the movies]]

This is in line with standard views within the Government/Binding framework (see, e.g.,

Haegeman, 1994, Ch. 5) except, of course, for replacing PRO with PRO$_J$.

    There are well known reasons why these verbs need to take the DP argument

separately rather than simply combining with an infinitive clause, as in (48).

(48)   Sue [$_{VP}$ persuaded [$_S$ Mary to take Sam to the movies]]

Essentially, it comes down to the fact that the DP argument makes a crucial contribution

to the meaning of the sentence – or, as it's usually stated, it gets a theta role from the

higher verb. We can see this in two ways: first, from the fact that expletive subjects are

impossible with object control verbs, as in (49); and, second, from the fact that (50a) does

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[15] My background assumptions owe something to the discussion in Haegeman's textbook (Haegeman, 1994, Ch. 5) and a literature review by Adler (2006, Ch. 2). Some other key sources for the syntax and semantics of control include Chomsky (1981), Chierchia (1984), Williams (1992), and Landau (2000), to name a few.

[16] These are a representative sample of a list of more than 20 object control verbs given in Jacobson (1992: pp. 162–163).

not entail (50b), even though *Mary takes Sam to the movies* entails that Sam goes with Mary to the movies.

(49) (a) * The bride persuaded it to be obvious that she was happy.

(b) * The director told there to be actors on the stage.

(50) (a) Sue persuaded Mary to take Sam to the movies.

(b) Sue persuaded Sam to go with Mary to the movies.

What object control verbs have in common is that they all in some way involve one individual (e.g., Sue) getting another individual (e.g., Mary) to have particular intentions towards some action. This generalization is discussed by Sag & Pollard (1991), citing Comrie (1984); Sag & Pollard call these events of the "influence" type, where the controller is the "influenced participant. For example, for x to persuade y to do P is for x to cause y (through some kind of force of reasoning) to intend to do P; for x to tell y to do P is for x to try (through an imperative speech act) to cause y to intend to do P; for x to defy y to do P is for x to do something like try (through a particular kind of speech act) to get y to intend not to do P (or else!). In order to give lexical meanings for these kind of verbs, then, we first need to have an idea of what it means to intend something. As the reader hopefully expects by now, I suggest that a notion of "intention alternatives" is in order. This is defined in (51).

(51) Intention alternatives:

$\text{Intend}_{w,t,z}$: $\{<w',t',x>$: it fits with what z intends in w at t for z to be x in w' at t'$\}$

Using this notion, we can then give *persuade* (and *convince*, on the relevant use) a lexical entry along the lines of (52).

(52) $[\![\text{persuade}]\!]^{w,t,j} = [\![\text{convince}]\!]^{w,t,j} = [\lambda y_e . [\lambda p_{<s,<i,et>>} . [\lambda z_e .$ z communicates with y in a way that causes it to be the case that $\forall <w',t',x> \in \text{Intend}_{w,t,y}$: $p(w')(t')(x) = 1]\,]\,]$

This says, roughly speaking, that "z convinces y (to) p" means that z communicates with y in a way that causes y to intend p.[17] Since p is evaluated with respect to the intention alternatives of the direct object ("y"), the judge is in effect shifted to the direct object.

The meaning of (46a) (minus the past tense) is computed in (53), using the lexical entry for *persuade* in (52) and the structure in (47).

(53) $[\![(46a)]\!]^{w,t,j} = [\![$Sue persuades Mary to take Sam to the movies$]\!]^{w,t,j}$

   $= [\![$persuade$]\!]^{w,t,j}$ (Mary) ($[\lambda w'' . [\lambda t'' . [\lambda j'' . [\![PRO_J$ to take Sam to the movies$]\!]^{w,t,j}$]]]) (Sue)

   $= 1$ iff Sue communicates with Mary in a way that causes it to be the case that $\forall <w',t',x> \in$ Intend$_{w,t,Mary}$: x takes Sam to the movies in w' at t'

This says that *Sue persuades Mary to take Sam to the movies* is true iff Sue communicates with Mary in a way that causes Mary to intend to take Sam to the movies, which seems to be the correct meaning.[18]

Similarly, *tell* (on the relevant use) can be given the lexical meaning in (54), which predicts that the sentence in (46b) (again, minus the past tense) has the meaning in (55), which is exactly analogous to the case of *persuade* in (53). Other object control verbs can be treated similarly.

(54) $[\![$tell$]\!]^{w,t,j} = [\lambda y_e . [\lambda p_{<s,<i,et>>} . [\lambda z_e .$ z performs an imperative speech act addressed to y whose purpose is to make it the case that $\forall <w',t',x> \in$ Intend$_{w,t,y}$: p(w')(t')(x) = 1]]]

(55) $[\![(46b)]\!]^{w,t,j} = [\![$Sue tells Mary to take Sam to the movies$]\!]^{w,t,j}$

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[17] The notion of intention referred to in the lexical meaning for *persuade* does not behave exactly the same as the English word *intend*. Both contain a requirement of some kind of agency towards a described action, but an essentially non-agentive predicate can be more easily coerced into an agentive interpretation with *intend*. For example, (i) is acceptable, but (ii) is not (Kai von Fintel, p.c.).

   (i)   John intends to be rich one day.
   (ii) ?? Mary persuaded John to be rich one day.

[18] There is a technical problem here in that according to (53), it must be the case that for every world-time-individual triple compatible with Mary's intentions, she takes Sam to the movies in that world <u>at that time</u>, which requires her to intend to take Sam to the movies constantly. I will make the optimistic assumption that this problem can be overcome by a proper treatment of tense and of the future orientation of certain infinitives (see, e.g., Stowell, 1982; Abusch, 1998, 2004; Wurmbrand, 2006); I will leave this to future work.

$= [\![\text{tell}]\!]^{w,t,j}$ (Mary) ($[\lambda w'' . [\lambda t'' . [\lambda j'' . [\![\text{PRO}_J \text{ to take Sam to the}$
movies$]\!]^{w,t,j}$]]]) (Sue)

= 1 iff Sue performs an imperative speech act addressed to Mary whose
purpose is to make it the case that $\forall <w',t',x> \in \text{Intend}_{w,t,Mary}$: x takes Sam
to the movies in w′ at t′.

Here, again, I have in effect proposed a view on which the control properties of verbs like
persuade and *tell* are derived from their lexical semantics. In this case, the reason the
controller must be the object is because the attitude that applies most directly to the
embedded proposition at the level of semantics is an attitude of the object – in all of these
cases, the attitude of intention.[19]

It is worth noting that there is a second use of *convince* (and *persuade* for at least
some speakers), illustrated in (56).

(56)   Sue convinced Mary that it was raining.

Instead of an infinitival clause, this use takes a regular finite clause with an overt subject,
in this case *it was raining*. On this use, what the subject (in this case Sue) seems to be
doing is causing the direct object (in this case Mary) to come to believe the embedded
clause, rather than to intend it in some sense. Thus this use needs a meaning different
from that in (52) – but only minimally so, as it turns out. We can give *convince* on this
use the lexical entry in (57).

(57) $[\![\text{convince}_2]\!]^{w,t,j} = [\lambda y_e . [\lambda p_{<s,<i,et>>} . [\lambda z_e . z \text{ communicates with y in a way}$
             that causes it to be the case that $\forall <w',t',x> \in \text{Dox}_{w,t,y}$: p(w′)(t′)(x) = 1]]]

The only difference between (57) and (52) is that the attitude involved is belief, and so
the lexical entry makes reference to $\text{Dox}_{w,t,y}$ (the doxastic alternatives of y in w at t)
rather than $\text{Intend}_{w,t,y}$. (Recall that $\text{Dox}_{w,t,y}$, the doxastic alternatives of y in w at t, is the
set of triples <w′,t′,x> such that it is compatible with what y knows in w at t that he/she/it

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[19] Again, this is independent of the judge-dependent semantics, since *persuade* (for example) could be
given the property-based meaning in (i). (In fact, this is the same as (52) except that the argument of type
<s,<i,et>> is construed as a property rather than as a proposition.)

   (i) $[\![\text{persuade}]\!]^{w,t} = [\lambda y_e . [\lambda P_{<s,<i,et>>} . [\lambda z_e . z \text{ communicates with y in a way that causes it to be the case}$
          that $\forall <w',t',x> \in \text{Intend}_{w,t,y}$: P(w′)(t′)(x) = 1]]]

is x in w′ at t′.) This predicts that (56) has the meaning in (58) (again, putting aside the past tense).

(58) $[\![(56)]\!]^{w,t,j} = [\![convince_2]\!]^{w,t,j}$ (Mary) ([λw″ . [λt″ . [λj″ . $[\![it's raining]\!]^{w'',t'',j''}$]]]) (Sue)

         = 1 iff Sue communicates with Mary in a way that causes it to be the case that $\forall <w',t',x> \in Dox_{w,t,Mary}$: it's raining in w′ at t′

This says that *Sue convinces Mary that it's raining* is true iff Sue communicates with Mary in a way that causes Mary to believe that it's raining, which again is the correct meaning.

   This also predicts that when this second use of *convince* embeds a proposition containing a judge-dependent item, the judge should be linked to the direct object. For example, (59a) (minus the past tense) is predicted to have the meaning in (59b), where *might* is linked to the mental state of the direct object, Mary.

(59) (a)   Sue convinced Mary that it might be raining.

      (b) $[\![(a)]\!]^{w,t,j}$ = 1 iff Sue communicates with Mary in a way that causes it to be the case that $\forall <w',t',x> \in Dox_{w,t,Mary}$: $\exists <w'',t'',y> \in Epist_{w',t',x}$: it's raining in w″ at t″

              = 1 iff Sue communicates with Mary in a way that causes it to be the case that $\exists <w',t',x> \in Dox_{w,t,Mary}$: it's raining in w′ at t′

This says that (59a) is true iff Sue communicated with Mary in a way that caused it to be compatible with Mary's beliefs that it's raining (making the usual simplification from belief of knowledge to simple belief), which seems to be correct.

4.2. Extensional Adjuncts

Another construction commonly thought to contain PRO is sentences with adverbial gerunds such (60a–b) (see, e.g., Williams, 1992; Adler, 2006, Ch. 2).

(60) (a)   Sam left without saying goodbye.

      (b)   Sue walked down the street (while) singing.

If the gerunds are taken to have PRO subjects, the structures for (60a–b) should be something like (61a–b), respectively.

(61) (a)   Sam [left [$_{AdvP}$ without PRO saying goodbye]]

(b)   Sue [walked down the street [$_{AdvP}$ (while) PRO singing]]

Since these are extensional contexts, we cannot treat the null subject of these gerunds as PRO$_J$. If we did, (60a), for example, would have the bizarre meaning that Sam left without the judge saying goodbye. A speaker could assert this proposition provided that Sam left without them saying goodbye, and if it were added to the common ground, it would have the same effect as adding the proposition that Sam left without the group of conversational participants saying goodbye. Clearly the sentence does not have this meaning, and so this seems to be a case where the silent subject of a non-finite clause cannot be assimilated to PRO$_J$. This suggests that there do have to be two kinds of silent subjects for infinitivals and gerunds, where perhaps examples like those in (60) involve something like traditional PRO.

4.3. Partial Control

It has been observed that certain control verbs allow an interpretation where the silent subject PRO seems to refer not to the subject of the higher clause, but rather to a larger group that is contextually salient and includes that individual (see, e.g., Lawler, 1972; Martin, 1996; Petter, 1998; Landau, 2000). These "partial control" verbs include *want*, *prefer*, *decide*, and *intend*, as illustrated in (62).

(62) (a)   John told Mary that he preferred to meet at 6:00.

(Adler, 2006, no. 15d)

(b)   The chair decided to gather during the strike.

(based on Adler, 2006, no. 15e)

(c)   John told Mary that he intended to separate before it was too late.

(Adler, 2006, no. 15f)

(d)   Mary wants to meet at the movie theatre (but Sam wants her to take him there).

We can tell that the implicit subject of the lower clauses in these cases refers to a group because the embedded predicates *meet*, *gather*, and *separate* are collective predicates, hence the unacceptability of the corresponding sentences in (63).

(63) (a)   */# John met at 6:00.   [cf. (62a/d)]

    (b)   */# The chair gathered during the strike.   [cf. (62b)]

    (c)   */# John separated before it was too late.   [cf. (62c)]

As Landau (2000) and others observe, some control verbs do not allow partial control. (Landau calls these "exhaustive control" verbs.) One example is *manage*, illustrated in (64).

(64)   */# The chair managed to gather during the strike.

<div align="right">(based on Landau, 2000, Ch. 2, no. 2a)</div>

I will have little of significance to add to the discussion of the phenomenon of partial control, and what determines whether a particular control verb allows it or not, but I would at least like to show that it is not an insurmountable problem for the view of PRO as PRO$_J$.

Note first that even cases of partial control are obligatorily interpreted *de se* in the sense that the attitude holder must know that they themselves are part of the group involved. For example, suppose the amnesiac Lingens reads a biography of himself (not realizing that it's about him). Suppose further that he comes to believe that this man Lingens has regular meetings with his biographer, and for some reason develops a desire for the meetings to occur in the lobby of the Stanford library. This desire cannot be reported with (65).

(65)   Lingens wants to meet in the Stanford library lobby.

For (65) to be true, Lingens would have to realize that his desire is about a group that includes himself.

To account for partial control, Landau (2000, Ch. 2) assumes, among other things, that PRO can carry a feature for semantic plurality. Simplifying somewhat, this means

that there is a "singular" PRO and a "plural" PRO. (It is crucial for him that these are semantic features, not syntactic phi-features.) Essentially, partial control occurs when the subject of the higher clause is singular but PRO is plural, which is allowed under certain conditions because of the particular way that agreement relations work between the higher and lower clause.[20]

Without going into the details of Landau's analysis, I will just show that there is a coherent way to posit a plural version of PRO_J, which will yield the right interpretation for partial control cases. Borrowing an idea of Kratzer (2006, to appear), I assume that the plural version of PRO_J refers to the unique salient group containing the judge, rather than the judge alone. A lexical entry for this plural version of PRO_J, which I'll call $PRO_{J\text{-}PLUR}$, is given in (66).

(66) $[\![PRO_{J\text{-}PLUR}]\!]^{c;\, w,t,j} = G_c(j)$,
            where $G_c(x)$ = the salient group containing x in context c

For example, the partial control structure in (67a), which contains $PRO_{J\text{-}PLUR}$, is predicted to have the meaning in (67b).

(67)   (a)   Mary wants $[PRO_{J\text{-}PLUR}$ to meet$]$

      (b) $[\![(a)]\!]^{c;\, w,t,j} = [\![want]\!]^{w,t,j}$
             $(\, [\lambda w''\, .\, [\lambda t''\, .\, [\lambda j''\, .\, [\![PRO_{J\text{-}PLUR} \text{ to meet}]\!]^{c;\, w'',t'',j''}\,]\,]\,]\,)$ (Mary)

             $= 1$ iff $\forall <w',t',x> \in Want_{w,t,Mary}$: $G_c(x)$ meets in w' at t'

This says that *Mary wants to meet* is true iff for all of Mary's want alternatives <w',t',x>, the salient group containing x meets in w' at t', which captures the "partial" nature of the control. It also correctly predicts that the attitude is still *de se* in the relevant sense, as seen in example (65) above.

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[20] This has to do with whether the infinitive clause contains tense or not; thus Landau links the possibility of partial control to the possibility of having a certain kind of temporal mismatch between the higher and lower clauses. The relevant kind of mismatch is allowed with partial control verbs such as *want* (i), but not with exhaustive control verbs such as *manage* (ii).

  (i)   Yesterday, John wanted to solve the problem tomorrow.   (Landau, 2000, Ch. 1, no. 11b)
  (ii) * Yesterday, John managed to solve the problem tomorrow.   (Landau, 2000, Ch. 1, no. 11a)

I leave it to future work to determine to what extent Landau's account of the distribution of partial control could be adapted to fit the judge-dependent view I suggest, once my view is modified to correctly capture the temporal interpretation of control clauses (see note 18).

Another possibility is to modify the lexical meanings of the relevant verbs, again using Kratzer's notion of the salient group containing an individual. There are two ways to do this, which I will illustrate using *want*. The first way is to build the plurality into the statement about the attitude holders want alternatives, as in (68).

(68) $[\![want]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . [\lambda z_e. \forall <w',t',x> \in Want_{w,t,z}: \mathbf{p(w')(t')(\underline{G(x)})}=1]]$

where $Want_{w,t,z} = \{<w',t',x>:$ it fits with what z wants in w at t for z to be x in w' at t'$\}$, and G(x) is the contextually salient group containing x.

This says that "z wants p" is true iff in all of z's want alternatives $<w',t',x>$, p is true at world w', time t', and the judge that is the contextually relevant group including x.

The second way of doing this is to keep the basic lexical meaning for *want* and build the plurality into the notion of want alternatives, as in (69).

(69) $[\![want]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . [\lambda z_e. \forall <w',t',X> \in Want_{w,t,z}: p(w')(t')(X)=1]]$

where $Want_{w,t,z} = \{<w',t',X>:$ it fits with what z wants in w at t for $\mathbf{\underline{G(z)}\ to\ be\ X}$ in w' at t'$\}$, and G(x) is the contextually salient group containing x.

This says that "z wants p" is true iff for all the triples $<w',t',X>$ such that it fits with what z wants for G(z) to be the group X in w' at t', p is true at $<w',t',X>$.

4.4. Non-Obligatory Control

A significant amount of discussion in the literature has gone to analyzing so-called non-obligatory control: cases where PRO does not seem to have an overt controller in the same sentence or where its apparent controller is in a structural position that is not expected to be able to enter into the right syntactic relation with PRO (see, e.g., Bresnan, 1982; Williams, 1992; Kawasaki, 1993; Landau, 2000, 2001). Some examples are given in (70).[21] (I have underlined the apparent controller and the relevant non-finite clause.)

(70)   (a)   <u>Tom</u> felt sheepish. <u>Pinching those elephants</u> was foolish.

(Adler, 2006, no. 24a; citing Bresnan, 1982)

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[21] To simplify matters, I am focusing on cases where PRO has a referential interpretation rather than an arbitrary interpretation. I leave it as an open question how much of what I say about the referential cases could be extended to arbitrary or generic cases.

(b)   Frankly, I'm worried about <u>Mary</u>. … <u>Getting herself photographed</u> with those starving wolves was dangerous.

(Adler, 2006, no. 24b; citing Bresnan, 1982)

(c)   John said to <u>Mary</u> that it would be easy <u>to prepare herself</u> for the exam.

(Adler, 2006, no. 26)

As with extensional adjuncts, it is generally not possible to treat these as containing PRO$_J$. However, there is a sub-type of apparent non-obligatory control involving predicates of personal taste that can be analyzed this way given certain assumptions. Epstein (1984) observes that in examples like (71), the implicit subject of the infinitival clause (*to play baseball*) is the same person whose experience is evaluated by the predicate *fun*. He intended this example to be interpreted generically, but it also has an interpretation where it says that it's fun, for the judge, for the judge to play baseball, and I will focus on this interpretation. (On this interpretation, a speaker S can assert (71) provided that S playing baseball is fun for S, and a hearer H will accept it if H playing baseball is fun for H.)

(71)   It is fun to play baseball.

(Epstein, 1984, no. 1)

Epstein observes further that if the implicit argument of *fun* is made explicit, the required link remains, as in (72), which seems to mean that it's fun, for Lucy, for Lucy herself to play baseball.

(72)   It is fun for Lucy to play baseball.

(Epstein, 1984, no. 3)

(Actually, (72) is ambiguous, but Epstein intends it on the reading equivalent to *Playing baseball is fun for Lucy*; I will return to the second reading below.)

However, if both of the implicit elements are made explicit, they do not have to corefer, as shown in (73).

(73)   It is fun for Lucy for Joe to play baseball.

(Epstein, 1984, no. 9)

Note that the same pattern holds for gerunds, so (74)–(76) pattern with (71)–(73), respectively.

(74)   Playing baseball is fun.

(75)   Playing baseball is fun for Lucy.

(76)   Joe playing baseball is fun for Lucy.

I will put aside questions about the structure and interpretation of copular sentences, and will simply assume that in these sentences *fun* takes two arguments in the semantics: the gerund (or infinitival), and an expression giving the person whose experience is relevant (either PRO$_J$ or a referential argument).[22] In my analysis of predicates of personal taste in Chapter 2, I assumed that both arguments of *fun* are individuals, but it is straightforward to extend this so that one of the arguments can be a proposition. For simplicity, I will assume a second lexical entry for *fun* along the lines of (77) (and similar meanings for other predicates of personal taste).

(77) $[\![\text{fun}_2]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . [\lambda y_e . \text{ it is fun for y in w at t if } p(w)(t)(y) = 1]\,]$

This says that "p is fun for y" is true iff y enjoys the fact (when it holds) that p is true as judged by y. My claim is essentially that *fun* denotes a relation between individuals and propositions that has to do with the proposition as judged by that individual.[23]

Now, consider the example from (74) (and similarly (71)). If both of the implicit elements are PRO$_J$, as in (78a), then the meaning is (78b) (under the assumptions I outlined above).

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[22] The approach I will take here is based closely on suggestions by Irene Heim (p.c.). It is also somewhat reminiscent of Chierchia & Jacobson's (1986) analysis of verbs like *bother*, *prove*, and *make* in the so-called Super Equi construction, except of course that I treat the non-finite clause as a judge-dependent proposition rather than as a property.

[23] The lexical entry in (77) has the stipulative quality of simply shifting the judge parameter to the "y" argument without a mediating attitude, which I have avoided in other cases. It might be possible to get around this by defining a notion of a person's "fun alternatives," which are triples <w′,t′,x> such that it's compatible with the person's idea of what is fun for them to be x in w′ at t′. Then "p is fun for y" would be true iff all of the triples <w′,t′,x> where p is true are among y's fun alternatives. Note that the quantification goes in the reverse direction compared to the meanings of *want* and *think*. (Thanks to Kai von Fintel, p.c. for discussion of this point). It is not clear to me, though, that *fun* really has this kind of modal component to its meaning, and so I leave this as an open question.

(78) (a) [PRO$_J$ Playing baseball] [is fun$_2$ PRO$_J$]

(b) $[\![(a)]\!]^{w,t,j} = [\![fun_2]\!]^{w,t,j}$ ([λw′ . [λt′ . [λj′ . $[\![PRO_J \text{ playing baseball}]\!]^{w′,t′,j′}$]]]) ($[\![PRO_J]\!]^{w,t,j}$)

= 1 iff it is fun for j in w at t if j plays baseball in w at t

This says that it is fun, for the judge, for the judge to play baseball, which seems to be correct.

Now consider (75) (and similarly (72)), where the argument of *fun* is made explicit. Again assuming that the implicit subject is PRO$_J$, as in (79a), the predicted meaning is (79b).

(79) (a) [PRO$_J$ Playing baseball] [is fun$_2$ for Lucy]

(b) $[\![(a)]\!]^{w,t,j} = [\![fun_2]\!]^{w,t,j}$ ([λw′ . [λt′ . [λj′ . $[\![PRO_J \text{ playing baseball}]\!]^{w′,t′,j′}$]]]) (Lucy)

= it is fun for Lucy in w at t if Lucy plays baseball in w at t

This says that it is fun, for Lucy, for Lucy herself to play baseball, which again seems to be correct.

This also predicts that (71) and (74) should have a reading where *fun* is evaluated with respect to a salient referent, in which case the implied subject of the infinitive or gerund has to be the same individual. This kind of interpretation does indeed seem to be possible in (80), which can mean that it's fun for the cat if the cat hunts mice.

(80) [Context: Sam is watching his cat hunt mice, and says:]
      Look! I guess hunting mice is fun.

Now consider the case where both arguments are made explicit, as in (76) and (73). The structure and predicted meaning for (76) is given in (81a–b).

(81) (a) [Joe Playing baseball] [is fun$_2$ for Lucy]

(b) $[\![(a)]\!]^{w,t,j} = [\![fun_2]\!]^{w,t,j}$ ([λw′ . [λt′ . [λj′ . $[\![\text{Joe playing baseball}]\!]^{w′,t′,j′}$]]]) (Lucy)

= 1 iff it is fun for Lucy in w at t if Joe plays baseball in w at t

This says that it is fun for Lucy if Joe plays baseball, which again seems to be correct.

Finally, to complete the paradigm, we need to look at cases where the subject of the non-finite clause is made explicit and the argument of the predicate of personal taste is left implicit, as in (83).

(82)   ?? Joe playing baseball is fun.

The prediction is that (82) should be able to mean that it's fun for the judge when Joe plays baseball. For some reason, (82) sounds a bit odd to me; however, to the extent that it is acceptable it clearly has this meaning, rather than meaning that Joe enjoys playing baseball. Some better examples are given in (83).

(83)   (a)   It's fun for the Yankees to get beaten so thoroughly.

       (b)   ? The Yankees getting beaten so thoroughly is fun.

                                                                    (Kai von Fintel, p.c.)

Notice that (83a) is ambiguous (as was (72)), between a masochistic reading where the Yankees enjoy being beaten (perhaps within the fantasy world of their rival Red Sox fans) and a second one where seeing the Yankees lose is fun for the judge. The first reading comes from a structure where the two arguments of *fun* are *for the Yankees* and *to get beaten so thoroughly*, and the second reading comes from a structure where the two arguments of *fun* are PRO$_J$ and the sentential expression *for the Yankees to get beaten so thoroughly*. The second reading is the intended one, and is clearly the more plausible one in this case. On this reading, the prediction is that a speaker could assert (83a) provided that it's fun for them for the Yankees to get beaten, and a hearer could object if it isn't fun for them. This is borne out, as seen in (84).

(84)   Sam: It's fun for the Yankees to get beaten so thoroughly.
            Sue: No, it's not. It's much more fun when there's a close game.

For some reason, the version with a *to*-infinitival still sounds better than the version with a gerund in (83b), but again to the extent that (83b) is acceptable it clearly has the same meaning.

To sum up, then, while non-obligatory control cannot generally be reduced to cases of PRO$_J$, Epstein's examples do seem to be amenable to this analysis. I leave it to future work to investigate whether any other cases of non-obligatory control can be analyzed along similar lines.

5. <u>Multiple occurrences of PRO$_J$</u>

5.1. An Apparent Problem

In the preceding sections I have proposed that the same mechanism used for predicates of personal taste – judge dependency, in the form of PRO$_J$ – can also be used to explain the obligatory *de se* interpretation in control structures. Specifically, for at least a subset of control structures, I have proposed that what has been called PRO is actually the same as the item PRO$_J$ that I posited to be a possible implicit argument of predicates of personal taste. If judge dependency in predicates of personal taste uses the same mechanism as these cases of control, we might expect them to interact in a seamless way. For example, we should expect to find sentences of the general form in (85), where the subject of the infinitive clause and the implicit argument of the predicate of personal taste are both PRO$_J$, and thus where it is intuitively clear that they corefer.

(85) $\qquad$ X $\left\{ \begin{array}{l} \text{tried} \\ \text{wants} \end{array} \right\}$ PRO$_J$ to be $\left\{ \begin{array}{l} \text{fun} \\ \text{tasty} \end{array} \right\}$ PRO$_J$

It turns out to be difficult to construct such examples, because things that have the potential to be tasty or fun – cakes, cat food, parties, roller coasters, games, and so on – don't tend to be the kind of entities that have either attitudes (*de se* or otherwise) or sensory and psychological experiences such as taste and enjoyment. For this reason, it is not surprising that (86) is odd.

(86) $\qquad$ # The cake wants to be tasty.

However, relevant examples can be constructed if we are creative enough with the context. In some types of fiction and fairy tales all sorts of normally inanimate objects can walk, talk, and have feelings. We might imagine something along the lines of the

animated kitchen utensils in Disney's *Beauty and the Beast*, or one of the more obscure "Oz" books by L. Frank Baum, where a magician creates a powder that will bring to life any object it is sprinkled on (giving rise to, among other things, a talking, flying sofa). In my experience of these stories, typically these sorts of odd creatures don't eat, but if they can magically develop the kind of vocal apparatus needed to produce spoken human language, presumably they could magically develop some kind of digestive system as well. Given this creative license, then, we can construct appropriate examples.

First, imagine a magical living cake named Cakey. Cakey is able to walk, talk, think, feel, and even eat; his diet consists mainly of flour, sugar, and eggs, as you might imagine, or instant cake mix when he's on the run, plus regular leavening supplements. Fortunately for Cakey, it doesn't hurt him at all if someone cuts a slice of him and eats it – it causes more of a tickling sensation – and he can regenerate the missing piece provided he eats an adequate diet. In fact, he needs to regularly have pieces eaten and regenerated in order to stay fresh and moist and generally in good health. This means that if no one is around to take a slice, he has to cut off pieces of himself, and either eat them or throw them away. One might expect him to be squeamish about self-cannibalism, but actually he objects much more strongly to having dried-up pieces of his own body lying around, and thus usually goes for the option of eating pieces of himself even though, oddly enough, they always taste terrible to him. Now consider the story in (87).[24]

(87)   [Context: Cakey woke up one morning and realized that no one had taken a slice of him in almost a week. He was starting to get stale and was feeling achy and lethargic. He called his friends to see if they would come by and have a slice, but none of them were home except Sam, who had just gone on a diet. Since he had no other choice, Cakey went to the kitchen and cut off a few small pieces of himself, which he then ate. As usual, the pieces tasted terrible to him. This was very frustrating because all of his friends who had tasted slices of him had always enjoyed them.]

  (a) # This was very frustrating. Cakey wanted to be tasty!

  (b) This was very frustrating. Cakey wanted to taste good to himself!

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[24] For readers familiar with the work of Douglas Adams (of *Hitchhiker's Guide to the Galaxy* fame), Kai von Fintel (p.c.) pointed out that Adams's *Restaurant at the End of the Universe* contains a similar story of a genetically engineered cow who offers itself eagerly to diners. However, from what I can gather from a brief survey of secondary sources, there is no mention in this story of the cow eating itself, which is a crucial part of the scenario here.

Sentence (87a) sounds odd in this context. It seems to mean that Cakey wants to taste good to someone else (or perhaps to other people in general), which is infelicitous given the fact that he already knows he tastes good to everyone who has ever tried a slice of him, besides himself. In this case, the problem is not that it's pragmatically implausible for Cakey to taste himself, since, for one thing, we have set up a context where he actually does so, and, for another, the sentence is perfectly acceptable with an explicit *to himself* as in (87b).

A less exotic example can be constructed with the predicate *fun*, since people are sometimes described as being fun in a way similar to games or parties. If other people can find someone fun, then there seems to be no reason why they can't find themselves fun. However, consider (88).

(88) [Context: Sue hates spending time alone. When she's with other people, they always seem to enjoy her company, appreciating her stories and laughing at her jokes, but she just can't ever seem to entertain herself, and wishes that she could.]

    (a) # Sue wants to be fun.

    (b) (?) Sue wants to be fun for herself.

Again, (88a) sounds odd in this context. It could mean that Sue wants other people to find her fun, but in the context it's given that she already knows that they do. When an explicit *for herself* is added as in (88b), the sentence sounds much better.[25]

So far, nothing in my analysis would predict that (87a) and (88a) cannot have the reading where *tasty* or *fun* takes PRO$_J$. My view predicts that one possible structure for (88a), for example, is (89a), which would have the meaning in (89b).

(89) (a) Sue [wants [PRO$_J$ to be fun PRO$_J$]]

    (b) $[\![(89a)]\!]^{w,t,j} = [\![\text{want}]\!]^{w,t,j}$
       ([$\lambda w''$. [$\lambda t''$. [$\lambda j''$. $[\![\text{PRO}_J \text{ to be fun PRO}_J]\!]^{w'',t'',j''}$]]]) (Sue)

       $= 1$ iff $\forall <w',t',x> \in \text{Want}_{w,t,\text{Sue}}$: x is fun for x in w' at t'

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[25] For some reason, (88b) doesn't sound perfect to me either, although it's better than (88a). This may be because it is more difficult to add an explicit argument to *fun* on the meaning that applies to people than on the meaning that applies to parties and roller coasters. For example, it seems easier to say *The roller coaster is fun for Sue* than *Sam is fun for Sue*.

It seems to be an unexplained generalization, then, that in control sentences of the form "x wants to be tasty/fun," the predicate of personal taste cannot be interpreted in a judge-dependent way, which is to say it cannot take PRO_J. For the moment, I will refer to this as the "double-PRO_J restriction," given in (90).

(90)   <u>Double-PRO_J Restriction</u>: In a clause of the form [PRO_J be PRED X], where PRED is a predicate of personal taste such as *tasty* or *fun* and X is the (silent or overt) argument of PRED, X $\neq PRO_J$.

Below I will develop an explanation of the double-PRO_J restriction.

5.2. Solution

On the face of it, the double-PRO_J restriction seems to be a problem for my proposal that PRO in these examples is PRO_J. If the implicit subject of the control clause and the implicit argument of the predicate of personal taste are the same expression (PRO_J), refer to the same object, and use the same semantic mechanism, they ought to go together in a straightforward dovetailing way. However, there is another way to look at it. Notice that in a structure of the form in (89a), the two instances of PRO_J are co-arguments of *tasty*, and accordingly the first PRO_J c-commands the second within the clause (assuming that the presence of the copula *be* is irrelevant). This is just the kind of configuration that gives rise to Principle B violations.[26] Therefore we can explain the double-PRO_J restriction as an instance of Principle B.[27] For simplicity I will assume a version of Principle B given in (91).

(91)   Principle B: A non-reflexive nominal expression cannot be a co-argument of the same predicate as a coreferential nominal expression.

Along with more well-known facts, Principle B predicts that (92) cannot have an interpretation where *him* refers to Cakey; to get that interpretation the reflexive *himself*

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[26] Readers unfamiliar with Principles A, B, and C of the Binding Theory may refer to any syntax textbook in the Government/Binding framework, such as Haegeman (1994, Ch. 4). Essentially, though, Principle B is postulated to capture the fact that in a sentence like (i), *he* and *him* cannot refer to the same person, and that for this interpretation, the reflexive *himself* must be used as in (ii).

   (i)   * He_i likes him_i.

   (ii) He_i likes $himself_i$.

[27] This was suggested to me by Irene Heim (p.c.).

must be used instead, as in (92b). The case of (93a–b) is exactly parallel (*her* cannot refer to Sue).

(92) (a)   * Cakey$_i$ tastes terrible to him$_i$.

      (b)   Cakey$_i$ tastes terrible to himself$_i$.

(93) (a)   * Sue$_i$ wants to be fun for her$_i$.

      (b)   (?) Sue$_i$ wants to be fun for herself$_i$.

The structure that would be needed to get the double-PRO$_J$ interpretation in (87a) and (88a) are given in (94) and (95), respectively.

(94)   * Cakey wanted [PRO$_J$ to be tasty PRO$_J$]

(95)   * Sue wants [PRO$_J$ to be fun PRO$_J$]

The embedded clauses in (94)–(95) are exactly analogous to the sentences in (92a) and (93a) in that the two instances of PRO$_J$ are coreferential (for any world-time-judge triple <w,t,j>, they both refer to j) and are co-arguments of *tasty* or *fun*.

Note that two instances of PRO$_J$ can occur in the same clause when they are not co-arguments. Example (96a), of the type based on Epstein (1984) and discussed in Section 4.4 above, is a case in point. On the relevant interpretation, it has the structure given schematically in (96b)

(96) (a)   Playing baseball is fun.   [=(74)]

      (b)   [PRO$_J$ playing baseball] is [fun PRO$_J$]

In (96b), the first PRO$_J$ is an argument of *play*(*ing*), while the second is an argument of *fun*, so they are not co-arguments.

Similarly, (97a) has an interpretation on which it has roughly the structure in (97b). The first instance of PRO$_J$ is an argument of *eat* whereas the second is part of an

adjectival phrase modifying *cake*, and so is not itself an argument of *eat*. The situation is similar for (98)–(99).[28]

(97) (a) Sam wants to eat a tasty cake.

(b) Sam [$_{VP}$ wants [$_S$ PRO$_J$ to eat [$_{DP}$ a [tasty PRO$_J$] cake]]]

(98) (a) Sam wants to eat a cake that's tasty.

(b) Sam [$_{VP}$ wants [$_S$ PRO$_J$ to eat [$_{DP}$ a cake [$_{CP}$ that t is tasty PRO$_J$]]]

(99) (a) Sam wants to bring a tasty cake to the potluck.

(b) Sam [$_{VP}$ wants [$_S$ PRO$_J$ to bring [$_{DP}$ a [tasty PRO$_J$] cake]   [$_{PP}$ to the potluck]]]

A possible interpretation of (97a) and (98a), indeed the most natural one, is that Sam wants to eat a cake that tastes good to him (Sam himself). A more obvious interpretation for (99a) might be that Sam wants to bring a cake to the potluck that will taste good to the guests in general, thus showing off his baking skills; on this reading *tasty* would take a silent argument referring to something like the group of guests at the party. However, we could also imagine that Sam knows that he has unusual taste (or that the other guests do) and thinks his cake might be the only thing at the potluck that he will like; in this context, he might only care about the cake tasting good to him, and (99a) could still be used in this context. Note that overt non-reflexive pronouns are also possible in these configurations, as shown in (100)–(101).[29]

(100) Sam$_i$ wants to eat a cake that tastes good to him$_i$.

(101) Sam$_i$ wants to bring a cake that tastes good to him$_i$ to the potluck.

In the end, then, the restriction on having two occurrences of PRO$_J$ is not surprising. In fact, if PRO in these constructions were not the same item as PRO$_J$, it is difficult to see what would rule out the relevant readings. The only remaining thing to explain is why

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[28] The importance of these facts were pointed out to me by Irene Heim (p.c.).
[29] (100) has to stand in as the analogue to both (97) and (98) because *tasty* does not allow explicit arguments in prenominal position. (For example, **a tasty to me cake* is ungrammatical.)

PRO$_J$ does not have a reflexive form, at least in English. (It would be interesting to see if there is evidence of such an item in any other languages.) I leave this question open.

Chapter 5

Imagination and Moorean Paradoxes

1. <u>Introduction</u>

In this chapter I will discuss puzzles related to Moore's paradox which crucially involve judge-dependent items and attitude reports using predicates like *imagine*. I will start by looking at the semantics of *imagine* in Section 2, where it will be treated as an attitude with some similarities to *think* or *believe*. Then in Section 3 I will introduce a puzzle brought up by Yalcin (2005) for epistemic modals, discuss Yalcin's proposed solution, and bring up a similar puzzle which is not helped by Yalcin's system. In Section 4, I propose a solution to both puzzles, which involves some changes to the semantics of *imagine* proposed in Section 2.

2. <u>*Imagine*</u>

I will start by looking at the meaning of *imagine*. I will focus on its use in things like daydreaming and fantasy, where the attitude holder is doing something like building up a fictional situation, perhaps thinking about the experiences they would have in that situation. Examples of this are given in (1) and (2).

(1)   [Context: A recording of a guided meditation.]
            Close your eyes. Imagine that you're in an open field. The sun is
            shining….

(2)   [Context: A teacher giving a lesson in living history.]

Imagine that you're the child of a peasant farmer. You live in a small cottage with your mother, father, some aunts and uncles, grandparents, and your brothers and sisters. …

These use the imperative, so that the attitude holder is the addressee, and I will tend to use the imperative to evoke this interpretation. I will also focus on examples where the embedded clause is indicative rather than subjunctive (as in *imagine that you were in an open field*), but this is less crucial.

There is a second use of *imagine* that seems to mean something very close to *believe* or *conclude*. For example, if our friend Fred was scheduled to arrive at the airport three hours ago and has a short drive home, I might utter (3).

(3)   I imagine Fred is home by now.

Unlike in (1)–(2), the speaker in (3) is not thinking about an experience involving Fred being home. Imagination seems to be involved instead in the process of coming to believe that Fred is at home (for example, by imagining the length of time it would take for Fred to get off the plane, collect his luggage, and drive home). I will put aside this second use. For the moment, I will also put aside the use of *imagine* where it takes a nominal argument, as in *imagine a bear*.

Going back to the use exemplified in (1)–(2), now let's look at what happens when a sentence containing a judge-dependent item is embedded under *imagine*. I will start with predicates of personal taste because their behavior is relatively clear, then look at epistemic modals. First consider (4)–(5).

(4)   Imagine that you're eating a cake for dessert, and it tastes good.

(5)   Imagine that the cake sitting in front of you tastes good.

The attitude holder (in this case, the addressee) is the person whose taste experience is relevant. That is, to imagine that a cake tastes good is to imagine that it tastes good to oneself, just as to think a cake tastes good is (roughly) to think it tastes good to oneself.

Note that, also as with *think*, the predicate of personal taste can be linked to a salient referent, as in (6).

(6)   Imagine that your cat is eating cat food, and it tastes good.

I assume, as before, that *tastes good* in (4)–(5) takes PRO$_J$ as its argument, and *tastes good* in (6) takes a silent argument referring to the cat.

    It seems to be more difficult to embed epistemic modals. For example, the sentences in (7) seem a bit odd out of the blue.

(7)   (a)   ?? Imagine that it might be raining.

    (b)   ?? Imagine that the butler must be the murderer.

My suspicion is that imagining something usually requires conjuring up a vivid image or experience, and knowledge states are hard to have a vivid experience of. (Something more may need to be said to capture this, but I'll put this aside.) If more material is added that brings out the importance of the mental state, as in (8), the sentences become more natural.

(8)   (a)   Imagine that it might be raining, but you're not sure.

    (b)   Imagine that the butler must be the murderer, but you have no way to prove it.

In (8a–b), the epistemic modals *might* and *must* are clearly linked to the attitude holder. For example, roughly speaking, (8b) tells the addressee to imagine knowing that the butler is the murderer but not being able to prove it to others.

    As expected, epistemic modals cannot be linked to a salient referent under *imagine*, such as Mary in (9a) or Sherlock in (9b). For example, the addressee cannot comply with (9a) while also imagining that he or she knows that it isn't raining.

(9)   (a)   Imagine that it might be raining, but Mary isn't sure.
       [might ≠ compatible with Mary's knowledge]

    (b)   Imagine that the butler must be the murderer, but Sherlock can't prove it.
       [must ≠ follows from Sherlock's knowledge]

Thus *imagine* seems to manipulate the judge parameter in the same way that *think* does, so it makes sense to treat them in similar ways. For *think*, I exploited the self-locating nature of doxastic alternatives to manipulate the judge parameter. I would like to do the same thing for *imagine*. I will define the "imagination alternatives" of a person x in a world and time w and t as the set of world-time-individual triples <w′,t′,y> such that it is compatible with what x is imagining in w at t that x is y in w′ at t′. This is repeated in (10), and a lexical meaning for *imagine* using this notion is given in (11).

(10)   Imagination alternatives:

            $\text{Imagine}_{w,t,z}$ = {<w′,t′,x>: it is compatible with what z is imagining in w at t that he/she/it is x in w′ at t′}

(11) $[\![\text{imagine}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>} . [\lambda z_e . \forall <w′,t′,x> \in \text{Imagine}_{w,t,z}:$
            $p(w′)(t′)(x) = 1]\,]$

In a sense, of course, this doesn't tell us very much about what it means to imagine something, except that it bears formal similarities to belief. But it does predict that judge-dependent items embedded under *imagine* will be linked to the attitude holder. For example, "Sam imagines that the cake is tasty" (where *tasty* combines with PRO$_J$) has the meaning in (12).

(12) $[\![\text{Sam imagines that the cake is tasty PRO}_J]\!]^{w,t,j} = [\![\text{imagine}]\!]^{w,t,j}$
            $(\,[\![\text{the cake is tasty PRO}_J]\!]^{w,t,j}\,) (\text{ Sam })$

            $= 1$ iff $\forall <w′,t′,x> \in \text{Imagine}_{w,t,\text{Sam}}: [\![\text{the cake is tasty PRO}_J]\!]^{w′,t′,x} = 1$

            $= 1$ iff $\forall <w′,t′,x> \in \text{Imagine}_{w,t,\text{Sam}}:$ the cake tastes good to x in w′ at t′

This says that Sam imagines that the cake is tasty iff every triple <w′,t′,x> compatible with what Sam is imagining (i.e., with the fictional situation he is building up) is such that the cake tastes good to x in w′ at t′ – in other words, if Sam imagines that the cake tastes good to him.

    Let me finish by noting that I have focused on examples in the imperative in order to bring out a particular interpretation of *imagine*, but this interpretation is also generally available in declarative contexts, as illustrated in (13).

(13) (a)   Whenever Sam feels tense, he imagines that he's back in his home town.

      (b)   Mary was bored and tired of working, so she leaned back in her chair and imagined that she was a world-famous gymnast.

3. <u>The Puzzles</u>

In this section I will introduce the two puzzles to be addressed. In Sections 3.1 and 3.2, I discuss the puzzle brought up by Yalcin (2005) and his proposed solution. Then in Section 3.3 I introduce a second puzzle that Yalcin's system does not solve.

3.1. Yalcin's Puzzle

The starting point for Yalcin's puzzle is Moore's paradox, exemplified by sentences like (14).

(14)   # It's raining but I don't know that it's raining.[1]

The notable fact about sentences like (14), known as Moore's paradox, is that they're not logically contradictory (it's perfectly possible for it to be raining without the speaker knowing it), and yet they sound contradictory. Moore's paradox is well known, and so is its solution: although a sentence of the form "p but I don't know that p" is not logically contradictory, it cannot be felicitously asserted in any context because it violates the norm of assertion for a speaker to assert p while also asserting that they don't know that p. This follows from any reasonable norm of assertion (including the one I have proposed), along with the assumption that asserting a conjunction involves asserting its conjuncts.

Yalcin (2005) discusses sentences like (15), which are also odd and contradictory-sounding.[2]

(15)   # It isn't raining but it might be raining.

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[1] I've changed *and* to *but* when this leads to a more natural sentence (or might be expected to do so). I assume that the truth-conditional content of *but* is the same as *and*, or at least includes the meaning of *and* (as well as possibly other content).

[2] This is further evidence against a simple contextualist view of epistemic modals where the relevant knowledge is simply that of some salient individual or group. As long as that individual or group does not include the speaker, (15) ought to be perfectly acceptable on such a view.

At first glance, (15) looks like another case of Moore's paradox: it is perfectly possible that any particular person or group's epistemic state allows for the possibility that it's raining even though in fact it isn't raining, but (15) cannot be asserted because the two conjuncts put conflicting requirements on the speaker. That is, asserting *it isn't raining* requires that the speaker know (or believe) that it isn't raining, whereas asserting that it might be raining requires that this not be the case. This follows from my view of epistemic modals, as well as any view that requires the speaker to be part of the group whose knowledge is relevant. However, as Yalcin points out, (15) is contradictory in a more significant way: not only can it not be asserted in a matrix clause, as in (15), but it cannot be embedded under *imagine*. Simple Moore-paradoxical sentences like (14), on the other hand, become perfectly acceptable under *imagine*. To see the difference, compare (16) to (17).[3]

(16)   Imagine that it's raining but you don't know that it's raining.

(based on Yalcin, 2005, no. 4)

(17)   # Imagine that it isn't raining but it might be raining.

(based on Yalcin, 2005, no. 5)

While (16) sounds coherent and non-contradictory, (17) is just as bad as the corresponding matrix case (15).

In summary, then, Yalcin's observation is that sentences of the form "not p but might p" behave differently than traditional Moore-paradoxical sentences involving attitude reports, as in "p but I don't know that p." Traditional Moore-paradoxical sentences become acceptable when embedded under *imagine*, whereas Yalcin's sentences remain unacceptable.

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[3] Yalcin's observation is actually the more general one that sentences like (15) cannot be "supposed," "conceived" of, "imagined," or "entertained" (Yalcin, 2005: p. 233). I will only be addressing the facts with *imagine*, and leave it for future work to see whether the explanation I will offer can be extended to these other attitudes.

3.2. Yalcin's Account of Epistemic Modals

Yalcin (2005) proposes a theory of epistemic modals that is dynamic and probabilistic.[4] It's dynamic in the sense that the meaning of sentences is given in terms of the effect they have on the context set in a conversation, i.e., as context change potentials, but the probabilistic nature of the account is more crucial. On Yalcin's view, the context set is a set of "credence functions" rather than a set of worlds or of indices. A credence function maps propositions (including worlds) to probability values, and the set of them in the context set together determine the degree to which different propositions are accepted in the context. For example, if it is completely open in a context whether a proposition p holds, then for every value n between 0 and 1, there will be some credence function in the context set that maps p to n. On the other hand, if p is completely accepted in a context, then all of the credence functions in the context set will map p to the probability value 1. (If a proposition p is completely ruled out, then all of the credence functions in the context set will map p to 0, which is the same as "not p" being completely accepted.) The content of an attitude such as *imagine* is treated similarly as a set of credence functions.

Yalcin treats epistemic modals essentially as modulators of force. On his view, normal, non-modal assertions contain a silent assertion operator, and a successful assertion of p restricts the context set to credence functions that map p to 1. In declarative utterances with epistemic modals such as *might*, on the other hand, the modal takes the place of the assertion operator. A successful declarative utterance of "might p" restricts the context set to credence functions that map p to a probability value greater than 0. Similarly, a successful declarative utterance of "probably p" restricts the context set to credence functions that map p to a probability value greater than 0.5.

On Yalcin's view, then, the reason that it is impossible to make a declarative utterance of the form "not p but might p" is not because it violates a conversational norm but because it would lead to an empty context set. For example, in (15), repeated in (18), the first part of the utterance has the form [assert [not [it be raining]]], which restricts

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[4] Yalcin cites views of epistemic modals as modulators of assertoric force (e.g., Wittgenstein, 1953; Toulmin, 1956), Bayesian models of belief (e.g., Jeffrey, 1987; Kaplan, 1996), and Veltman's (1996) dynamic account of epistemic modals as precursors to his view.

the context set to credence functions that map the proposition that it's raining to 0. The second part has the form [might [it be raining]], which restricts the context set to credence functions that map the proposition that it's raining to a value greater than 0. These restrictions are contradictory – that is, they will always lead to the empty context set – and so the utterance is impossible.

(18)   # It isn't raining but it might be raining.

It is impossible to imagine something of the form "not p but might p" for a similar reason since the content of a propositional attitude is also treated as a set of credence functions. Imagining "not p" restricts this set to credence functions that map p to 0, and imagining "might p" restricts this set to functions that map p to a value greater than 0, and so both cannot be imagined together.[5] This explains the impossibility of (17), for example, repeated in (19).

(19)   # Imagine that it isn't raining but it might be raining.

<div align="right">(based on Yalcin, 2005, no. 5)</div>

For traditional Moore-paradoxical sentences such as (14), repeated in (20), Yalcin retains a standard pragmatic explanation. In this case the two conjuncts do not put conflicting requirements on the context set, but it would violate the norm of assertion to assert that it's raining but that the speaker doesn't know it.

(20)   # It's raining but I don't know that it's raining.

When a Moore-paradoxical sentence is embedded under *imagine* as in (16), repeated in (21), there are no relevant norms of conversation to be violated, and so the sentences become acceptable.

(21)   Imagine that it's raining but you don't know that it's raining.

<div align="right">(based on Yalcin, 2005, no. 4)</div>

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[5] There is a technical problem with Yalcin's system here. Propositions themselves do not put requirements on credence functions – only the assertion operator and epistemic modals do that. Thus putting "not p" under *imagine* should not by itself restrict the set of credence functions representing what is imagined. Yalcin could get around this by assuming that the assertion operator is embedded under *imagine*, but it is not clear if he makes that assumption.

3.3. A New Moorean Puzzle

Given my semantic and pragmatic analysis of predicates of personal taste, we can also construct apparently Moore-paradoxical cases like (22).

(22)   # The cake tastes good but it doesn't taste good to me.

Provided *tastes good* is given the interpretation where it takes PRO$_J$, the sentence does indeed sound contradictory when asserted. (This judgment is complicated somewhat by the fact that *tastes good* could also potentially take a silent referential argument, but I think it's clear that the judge-dependent reading also exists, and is contradictory.) This is expected on my view of the norm of assertion, since in order for a speaker to assert (22), they would have to believe that the cake tastes good to them and also believe that it doesn't.

Like Yalcin's cases, though, (22) remains contradictory when it is embedded under *imagine* (or, I should say, there remains a relevant reading that is contradictory). We can see this in (23).

(23)   # Imagine that the cake tastes good but it doesn't taste good to you.

As I discussed in Section 2, it seems that to imagine that a cake tastes good is to imagine that it tastes good to oneself; thus (23) seems to be instructing the addressee to imagine that the cake both tastes good to them and does not taste good to them, which is impossible.

To summarize, then, we have considered three types of sentences that are potentially examples of Moore's paradox, which I'll call types I-III. Type I is standard Moore-paradoxical sentences such as *It's raining but I don't know that it's raining* or *It's raining but I think it isn't raining*. Type II is Yalcin's sentences, where p is replaced with its negation and the attitude report is replaced with an epistemically modalized sentence. Type III is like Yalcin's cases except that the epistemically modalized sentence is replaced with one containing a predicate of personal taste (with PRO$_J$ as its argument) and the simple sentence is replaced with a sentence containing a predicate of personal taste with an explicit argument. The three cases are rendered schematically in (24)–(26),

respectively. ("**PRED**" stands for a predicate of personal taste and "**&**" indicates any conjunction including *but*.)

(24)   **Type I: p & I don't know that p**   (Moore's paradox)
        Example:

    # It's raining but I don't know that it's raining.

(25)   **Type II: not p & might p**   (Yalcin's puzzle)
        Example:

    # It isn't raining but it might be raining.

(26)   **Type III: X PRED + X not PRED to me**
        Example:

    # The cake tastes good but it doesn't taste good to me.

We have seen that the three cases show two different patterns: Type I sentences become acceptable when embedded under *imagine*, while types II and III do not.

4. <u>Proposal</u>

In this section I will try to solve both puzzles together. I will start in Section 4.1 by giving what I believe is the correct empirical generalization. In Sections 4.2–4.3, I discuss a distinction that is often drawn between two ways of imagining which can be characterized as objective (or "from the outside") and subjective (or "from the inside"). I propose that *imagine* is ambiguous between a subjective and objective reading, and that subjective and objective *imagine* take different kinds of propositions as arguments. In Section 4.4, I add assumptions about pronouns that appear with *imagine* and *dream* with a particular kind of *de se* interpretation. Then in Section 4.5 I show how my analysis and assumptions help lead us towards a unified solution to the two puzzles. I close in Section 4.6 by connecting my discussion of Moorean puzzles with my judge-dependent approach to control constructions from Chapter 4.

4.1. The Generalization

On a view like Yalcin's, there is no reason to expect a sentence like *It isn't raining but it might be raining* (Type II) to have the same behavior as one like *The cake tastes good but*

it doesn't taste good to me (Type III). The two have no obvious feature in common other than their similar behavior. In the system that I have proposed, though, Type II and III sentences do share a property that distinguishes them from Type I sentences, namely that of expressing judge-dependent propositions. To see this, first recall that a non-judge-dependent proposition is simply one that is a constant function with respect to the judge parameter. For example, *it's raining* does not depend on the judge parameter, since it's true at <w,t,j> iff it's raining in w at t. Second, note that if two independent, non-tautologous, non-contradictory propositions are conjoined with truth-functional *and*, the conjunction will be judge-dependent if even one of the conjuncts is judge-dependent, and will be non-judge-dependent only if both of the conjuncts are non-judge-dependent.[6]

Now, in the examples of Type I that we have considered (and that Yalcin considers), the first conjunct is always non-judge-dependent (for example, *it's raining*). All belief and knowledge reports are non-judge-dependent as well, even if the embedded clause is judge-dependent, because of the way the attitude predicates manipulate the judge parameter of the embedded clause. This means that Type I sentences are conjunctions of two non-judge-dependent propositions, and so they are non-judge-dependent. On the other hand, any sentence with an unembedded judge-dependent item, such as an epistemic modal or a predicate of personal taste taking PRO_J, is judge-dependent (for example, *it might be raining* or *the cake tastes good*). This means that Type II and Type III sentences have one judge-dependent conjunct, and so are themselves judge-dependent. (In both cases the other conjunct is non-judge-dependent.)

As an empirical hypothesis, then, I suggest that given a sentence that is potentially Moore-paradoxical, whether it will become acceptable when embedded under *imagine* depends on whether it is judge-dependent. If it is non-judge-dependent, it will become acceptable, and if it is judge-dependent it will not.

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[6] Proof: **[Part I]** Suppose p and q are non-judge-dependent propositions. Then for any world w, time t, and individuals j_1 and j_2, $p(w)(t)(j_1) = p(w)(t)(j_2)$ and $q(w)(t)(j_1) = q(w)(t)(j_2)$, from which it follows that $[p\&q](w)(t)(j_1) = [p\&q](w)(t)(j_2)$. **[Part II]** Now suppose p and q are independent propositions, and p is judge-dependent. Then there is some world w, time t, and individuals j_1 and j_2 such that $p(w)(t)(j_1) = 1$ and $p(w)(t)(j_2) = 0$. Since q is independent of p, there must be some such choice of w, t, and j_1 such that $q(w)(t)(j_1) = 1$. It follows that $[p\&q](w)(t)(j_1) = 1$ and $[p\&q](w)(t)(j_2) = 0$, therefore $[p\&q]$ is judge-dependent.

4.2. Two Ways of Imagining

It is common in philosophy to draw a distinction between imagining "from the inside" and "from the outside."[7] The distinction is often illustrated using examples like (27)–(28).

(27)   I imagined skiing down the hill.

(Ninan, 2007, no. 2a)

(28)   I imagined that I was skiing down the hill.

(Ninan, 2007, no. 3a)

In the case of (27), what the speaker imagines is the experience of moving down the hill, complete with sensory perceptions of the way the hill looks and feels as well as the internal sense of fear or excitement. There is an interpretation of (28), on the other hand, where the speaker might be imagining what it would look like, say, in a movie, if they were skiing down the hill.

Here's another way to get at the distinction: in English, *imagine* can take DPs as arguments, as in (29), as well as subjectless gerunds, as in (30a–b), in addition to propositional CP arguments as in (31) and the cases we have looked at so far.

(29)   Imagine a cat.

(30) (a)   Imagine climbing up a tree.

      (b)   Imagine being a cat.

(31)   Imagine that a cat is climbing up a tree.

When you imagine a thing, as in (29), you normally do something like build up a mental image of that thing, looking at it from the outside. When you imagine doing something, as in (30), you think of what the experience of doing that thing would feel like, from the inside. When *imagine* takes a DP or subjectless gerund as an argument, the perspective seems to be linked to the type of argument, with an external perspective going with DP

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[7] This has been discussed recently by, e.g., Ninan (2007) and Recanati (2007). (Also see, e.g., B. Williams, 1966; Nagel, 1974; Peacocke, 1985; Walton, 1990; Shoemaker, 1994; Velleman, 1996; Hill, 1997; M. Martin, 2002; Higginbotham, 2003, all cited by Ninan.)

arguments and an internal perspective going with gerund arguments. I suggest that with CP (*that*-clause) arguments, either type of perspective is in principle available.

I assume that the two different kinds of perspectives reflect a real ambiguity in the meaning of *imagine*. On one reading, which I will call the objective interpretation, a person thinks about what a situation would look like from the outside. On the other reading, which I will call subjective, they think about what it would be like to be a particular individual in the situation. It's important here that the relevant difference is not between imagining having an experience as yourself and imagining that you're somebody else having the experience. If you imagine being a cat who is climbing up a tree, you are still taking an internal perspective. The relevant difference is between imagining experiencing a situation as an individual (yourself or someone else), and imagining a situation completely from the outside. I assume further that the difference between the subjective and objective interpretations of *imagine* has to do with the way they interact with the judge parameter: subjective *imagine* is essentially the version of *imagine* defined in Section 2, which crucially involves the judge; objective *imagine*, in contrast, crucially does *not* involve the judge. (This is very similar in spirit to Ninan, 2007.)

4.3. Formalization of Objective and Subjective *Imagine*

Let me start with objective *imagine*, which I have suggested crucially does not involve the judge parameter. To formalize this, I will start by defining an "objectivized" version of a proposition, "p^{OBJ}," in (32).

(32)   Objectivized Propositions:

For a proposition p,
p^{OBJ} = is defined iff $\forall w,t,j_1,j_2, p(w)(t)(j_1) = p(w)(t)(j_2)$
If defined, $p^{OBJ} = [\lambda w . [\lambda t .$ for all individuals j, $p(w)(t)(j) = 1]]$

The objectivized version of a proposition p is only defined if p is non-judge-dependent; if defined, it is simply the corresponding function from worlds and times – that is, what the proposition would be on a standard view without the judge parameter. (In set terms, this is a set of world-time pairs rather than world-time-individual triples.)

I propose that objective *imagine* crucially involves the objectivized version of its propositional argument. Since objectivized propositions are sets of world-time pairs, then, we need to define a new notion of objective imagination alternatives. This is given in (33). A lexical entry for objective *imagine* to go with this is given in (34).

(33)　　　　　Objective imagination alternatives:

Imagine-$\text{OBJ}_{w,t,z}$ = {$<w',t'>$: it is compatible with the situation that z is imagining in w at t that it takes place in w' at t'}

(34)　　　　　$[\![\text{imagine}_{\text{OBJ}}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>}: p^{\text{OBJ}}$ is defined $. [\lambda z_e .$
$\forall <w',t'> \in \text{Imagine-OBJ}_{w,t,z}: p^{\text{OBJ}}(w')(t') = 1]$]

In (33), I use "situation" to mean a situation or event in an intuitive sense. This could perhaps be construed in Kratzer's (1989) sense as parts of worlds (with temporal extensions), but I will not take a position on that. Taken together, what (33)–(34) say is that "z imagines that p," on an objective interpretation, means that z is imagining a situation or event, and all the world-time pairs compatible with that situation or event are such that the objectivized version of p is true. It is a semantic presupposition of objective *imagine* that the propositional argument must be non-judge-dependent.

Now I will turn to subjective *imagine*. The notion of imagination alternatives to be used will be essentially the same as the one defined in (10) (Section 2), repeated in (35). I will call these subjective imagination alternatives.

(35)　　　　　Subjective imagination alternatives:

Imagine-$\text{SUBJ}_{w,t,z}$ = {$<w',t',x>$: it is compatible with what z is imagining in w at t that he/she/it is x in w' at t'}

The lexical entry for subjective *imagine* is given in (36). This is essentially the same meaning from (11) in Section 2 except that it has a semantic presupposition that the propositional argument cannot be objectivized – i.e., that it is judge-dependent.

(36)　　　　　$[\![\text{imagine}_{\text{SUBJ}}]\!]^{w,t,j} = [\lambda p_{<s,<i,et>>}: p^{\text{OBJ}}$ is **NOT** defined $. [\lambda z_e .$
$\forall <w',t',x> \in \text{Imagine-SUBJ}_{w,t,z}: p(w')(t')(x) = 1]$]

This says that "z imagines p" (on a subjective interpretation) means, roughly speaking, that z imagines being a person x in a situation where p is true as judged by x, with the extra requirement that it must potentially make a difference who the judge is.

I should mention that it may look like I have done the same work twice by defining two kinds of imagination alternatives and then giving two lexical entries for *imagine*, but this is only a matter of exposition. The definitions of imagination alternatives could be built right into the lexical entries instead. (Similarly, the notion of doxastic alternatives could be built into the meaning of *think*.) Of course, it is crucial that there are two different lexical entries.

My view of subjective *imagine* immediately makes one prediction that seems far too strong: it predicts that it is impossible to imagine any non-judge-dependent proposition subjectively, or "from the inside." I propose, though, that non-judge-dependent propositions can be taken as an argument of subjective *imagine* if they are converted into judge-dependent propositions in a particular way. Specifically, I suggest that any typical, non-judge-dependent proposition p can be systematically shifted to a proposition that is true at a world-time-judge triple $<w,t,j>$ iff j knows that p is true. For example, the proposition that it's raining, which is true at $<w,t,j>$ iff it's raining in w at t, would be changed to a proposition that is true at $<w,t,j>$ iff j knows that it's raining in w at t. I will call the shifted version a "subjectivized" proposition, on analogy with the objectivized propositions discussed above. The notion of a subjectivized proposition is defined in (37); it involves epistemic alternatives, the definition of which is repeated in (38).

(37)   Subjectivized Propositions:

   For a proposition p,
   $p^{SUBJ} = [\lambda w . [\lambda t . [\lambda j . \forall <w',t',x>\in Epist_{w,t,j}: p(w')(t')(x) = 1]]]$

(38)   Epistemic alternatives:

   $Epist_{w,t,z} = \{<w',t',x>:$ it's compatible with what z knows in w at t that he/she/it is x in w' at t'$\}$

This means that it is possible to imagine subjectively that it's raining. In this case, the argument of subjective *imagine* is not the regular proposition that it's raining, but the

subjectivized proposition that it's raining; thus to imagine subjectively (or from the inside) that it's raining is to imagine knowing that it's raining. Of course, it is also possible to imagine objectively that it's raining, which is to imagine a situation or event of rain. Note that on the formulation I have given, the notions of objectivized and subjectivized propositions are not quite used in a parallel way (although this could perhaps be changed). Objective *imagine* always takes a regular proposition (set of world-time-individual triples), which must be non-judge-dependent, and then says something about its objectivized version. On the other hand, subjective *imagine* can either take a regular proposition that is judge-dependent or a proposition that has already been subjectivized. In other words, on my view there needs to be something like an operator in the grammar that applies to sentences to give them subjectivized meanings, whereas an analogous operator for objectivized propositions is not needed.

4.4. Dream Pronouns and the Imagination-Self

I have just two more crucial assumptions to make, which have to do with the interpretation of pronouns in sentences like *Imagine that you don't know that p*. To motivate these assumptions, I need to start with a small digression on dream reports. Examples like (39) were discussed by Lakoff (1972), and more recently by Percus & Sauerland (2003b), Anand (2006), and others. (Lakoff's version involved Brigitte Bardot.)

(39)   I dreamt that I was James Dean and I kissed me.

Let's suppose that (39) is spoken by Sue. Then what it means is that Sue had a dream where James Dean kissed Sue, but where the dream was from the perspective of James Dean. In this kind of example, James Dean (the one doing the kissing) is sometimes referred to as Sue's "dream self" and Sue (the one being kissed) as her "bodily counterpart." Pronouns referring to the dream self can be called "dream pronouns." For my purposes, the crucial observation about such examples is simply that in the clause *I*

kissed me, first-person pronouns are used to refer both to the dream self (James Dean) and to the bodily counterpart (Sue).[8]

Notice that similar examples can also be constructed with *imagine*. For example, (40) can have an interpretation roughly equivalent to (41).[9]

(40)   Imagine that you're James Dean and you're kissing you.

(41)   Imagine being James Dean and kissing you.

In this case, we can say that the "imagination self" is again James Dean, and the bodily counterpart of the imaginer is the addressee ("you"). Again, the crucial point for my purposes is that *you* is used to refer to both the imagination self and the bodily counterpart of the imaginer. I will call pronouns that refer to the imagination self "imagination pronouns."

Now let's look again at an example of what I called Type III, from (26), repeated in (42).

(42)   # Imagine that the cake tastes good but it doesn't taste good to you.

The sentence becomes much more coherent in a context where the imagination self is not the same as the bodily counterpart of the imaginer. For example, consider (43).

(43)   Imagine that you're James Dean, and the cake tastes good but it doesn't
            taste good to <u>you</u>.

(43) is acceptable provided that the underlined pronoun refers to the bodily counterpart of the imaginer rather than the imagination self. For example, if (43) were addressed to Sue, it would instruct her to conjure up a situation where the cake tastes good to James Dean but doesn't taste good to Sue, and to imagine this from the perspective of James Dean.

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[8] I will not be able to do justice here to the full range of phenomena and restrictions related to dream pronouns. I refer the reader to Percus & Sauerland (2003a, 2003b) and Anand (2006, 2007), and leave it to future work to see how their observations could be captured in a system like mine, and to what extent their approaches to dream reports could be carried over to it.

[9] Anand (2006) also suggests that *imagine* and *dream* may have similar behavior, though he focuses on the case of *dream*, as much of the literature seems to do.

The correct generalization about Type III sentences, then, is that they remain unacceptable under *imagine* when they involve an imagination pronoun.

I will not give a formal account of imagination pronouns here, or dream pronouns for that matter, and leave that to future work. All I will do here is make the following two assumptions, with the hope that the foregoing discussion lends them some plausibility. First, I assume that imagination pronouns only occur with subjective *imagine*. Second, I assume that imagination pronouns satisfy the semantic principle in (44), where *pro$_{imag\text{-}self}$* stands for an imagination pronoun (one that refers to the imagination self). As before, I am putting aside details of the interpretation of pronouns, and in particular I'm putting aside how imagination pronouns come to refer to the imagination self.

(44)　　　　　Imagination Self Principle:

　　　　　For any world w′ time t′, and index k, $\exists$x: <w′,t′,x>$\in$Imagine-S$_{\text{UBJ}k}$ $\leftrightarrow$ <w′,t′,$[\![$pro$_{\text{imag-self}}]\!]^k$>$\in$Imagine-S$_{\text{UBJ}k}$.[10]

This says that if it is compatible with what z is (subjectively) imagining in w at t that they are in world w′ at time t′ (i.e., that they are some individual x in w′ at t′) then the triple consisting of the world w′, the time t′, and the individual referred to by an imagination pronoun must also be among their (subjective) imagination alternatives. (The converse follows trivially, since the imagination self is an individual.) This is just another way of saying that the imagination self is the individual that the imaginer is imagining themselves to be. Again, I will not attempt to derive (44) from other principles, but simply take it as a basic assumption.

One might think that I could achieve the same effect more straightforwardly by simply assuming that imagination pronouns are morphological variants of PRO$_J$, that is, that pronouns such as *I*, *you*, *he*, *she*, etc. are ambiguous between a regular version and one that refers to the judge. The reason I have not suggested this is because imagination pronouns do not have the same behavior as PRO$_J$ and other judge-dependent items. In particular, although they are obligatorily *de se* in an obvious sense, they are not subject to the immediateness requirement that I discussed in Chapter 4. Recall, for example, that in

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[10] As in Chapter 3, Section 4, I use k as a variable for a world-time-individual triple.

(45), the implicit subject of the lowest VP (*to go to the party*) is not only obligatorily *de se*, but also must refer to Bill, not Sue. In other words, the subject of the lowest clause (which I proposed is PRO$_J$), must be interpreted *de se* with respect to the most immediate attitude holder.

(45)   Sue wants Bill to want __ to go to the party.

Imagination pronouns do not have this property. Consider (46), for example.

(46)   I imagined that I was George Lakoff and that <u>I</u> dreamt that I was Brigitte Bardot and I kissed <u>me</u>.

Suppose that (46) is uttered by Sue. Then it can mean that Sue imagined a situation s_1, in which George Lakoff dreamt about a situation s_2, in which what happened was that Brigitte Bardot kissed George Lakoff, where Sue was imagining s_1 from the perspective of George Lakoff and George Lakoff was dreaming about s_2 from the perspective of Brigitte Bardot. (This is admittedly confusing, but presumably we have to do something like this in order to interpret a sentence like *I imagined that I was Brigitte Bardot and I kissed me*.)

Now, on this interpretation of (46), the two underlined pronouns (*I* and *me*) are both imagination pronouns; they refer to the person who the speaker is imagining themselves to be, that is, George Lakoff. First look at the first one, *I* (in *I dreamt that…*). This pronoun actually is in a position that is consistent with the immediateness requirement: the most immediate attitude holder is the speaker, but the speaker is imagining themselves to be George Lakoff, and so *I* refers *de se* to the most immediate attitude holder. However, now consider the second underlined pronoun, *me* (in *I kissed me*). The most immediate attitude holder is George Lakoff, but George Lakoff is dreaming from the perspective of Brigitte Bardot, and thus *me* does not refer *de se* to the most immediate attitude holder. Rather, it refers *de se* to the attitude holder one step higher – that is, the speaker, imagining themselves to be George Lakoff.

4.5. Explaining the Pattern

Given the analysis and assumptions from Sections 4.3–4.4 above, we can begin to make sense of the contrast between Type I (Moore-paradoxical) cases on the one hand and Type II (Yalcin's examples) and Type III cases on the other. (I won't call my explanation a real solution because it has one significant problem related to compositionality, as I will explain below.)

My basic claim is this: all three types of examples we have been discussing that sound contradictory as assertions (including Moore-paradoxical sentences, Yalcin's cases, and the rest) also create contradictions when imagined subjectively, i.e., when embedded under subjective *imagine*. When imagined objectively, they do not necessarily create contradictions; however, in all but the Moore-paradoxical cases, it is not possible to use objective *imagine* in the first place because the embedded propositions are judge-dependent. I will show this one case at a time.

Recall that Type III sentences are only contradictory under *imagine* if any relevant pronouns are interpreted as imagination pronouns. Therefore, whenever I discuss subjective *imagine*, I will assume that any such pronouns are imagination pronouns.

First consider a Moore-paradoxical case (Type I) such as (47).

(47)   **[Type I]**
         Imagine that it's raining but you don't know that it's raining.

(47) expresses a non-judge-dependent proposition, so in order for it to be embedded under subjective *imagine*, it must be subjectivized. For this case, it won't matter whether each conjunct is subjectivized separately or if the entire sentence is subjectivized as a single unit, but in later cases it will be crucial that subjectivization always happen at the lowest level. (This is where the compositionality problem will come in.) Thus I will do the two conjuncts separately. Assuming *you* is an imagination pronoun, then according to the definition from (37) above (Section 4.3), the subjectivized version of the two conjuncts are the propositions given in (48). I use $[\![\phi]\!]_{¢}^{\text{SUBJ}}$ to stand for the subjectivized version of the proposition expressed by sentence ϕ, and Self$_{\text{Imagine}}$ to stand for the imagination self. As a reminder that *you* is to be interpreted as an imagination pronoun, I

will again subscript it with "imag-self." Note also that I will be leaving out irrelevant details of the internal composition of clauses.

(48) (a) $[\![\text{it's raining}]\!]_\phi^{\text{SUBJ}} = [\lambda w . [\lambda t . [\lambda j . \forall <w',t',x> \in \text{Epist}_{w,t,j}: \text{it's raining in } w' \text{ at } t']]]$

(b) $[\![\text{you don't know that it's raining}]\!]_\phi^{\text{SUBJ}}$
$= [\lambda w . [\lambda t . [\lambda j . \forall <w',t',x> \in \text{Epist}_{w,t,j}: \text{Self}_{\text{imagine}} \text{ doesn't know (in } w' \text{ at } t') \text{ that it's raining in } w' \text{ at } t']]]$

When the conjunction of these is taken as the argument of subjective *imagine*, the predicted meaning is given in (49).

(49) $[\![(47)]\!]^{w*,t*,j}$ [when addressed to H and interpreted subjectively] =
[H is to make it so that]
$\forall <w',t',x> \in \text{Imagine-S}_{\text{UBJ}w*,t*,H}:$
$\forall <w'',t'',y> \in \text{Epist}_{w',t',x}: \text{it's raining in } w'' \text{ at } t'' \text{ and}$
$\text{Self}_{\text{Imagine}} \text{ doesn't know (in } w' \text{ at } t') \text{ that it's raining}$

What this says is that (47) (on a subjective interpretation) instructs the hearer to make it so that in all of their imagination alternatives <w',t',x>, x knows in w' at t' that it's raining but the imagination self doesn't know in w' at t' that it's raining. But if <w',t',x> is among the hearer's imagination alternatives, then <w',t',Self$_{\text{Imagine}}$> is also among them, and so the imagination self must also know in w' at t' that it's raining. This contradicts the requirement of the second conjunct, and so the sentence yields a contradiction.

However, (47) can also be interpreted with objective *imagine*, since the embedded proposition is non-judge-dependent. In this case it will not create a contradiction. The objectivized version of the embedded proposition is given in (50), using the definition from (32) (Section 4.3). I use $[\![\phi]\!]_\phi^{\text{OBJ}}$ to stand for the objectivized version of the proposition expressed by sentence ϕ.

(50) $[\![\text{It's raining but you don't know that it's raining}]\!]_\phi^{\text{OBJ}} = [\lambda w . [\lambda t . \text{it's raining in } w \text{ at } t \text{ but you don't know that it's raining in } w \text{ at } t]]$

When this is taken as the argument of objective *imagine*, the resulting meaning is (51).

(51) $[\![(47)]\!]^{w*,t*,j}$ [when addressed to H and interpreted objectively] =
[H is to make it so that]
$\forall <w',t'> \in$ Imagine-OBJ$_{w*,t*,H}$: it's raining in w' at t' but H doesn't know (in w' at t') that it's raining

On the objective interpretation, (47) instructs the hearer to make it so that in all of their objective imagination alternatives <w',t'>, it's raining in w' at t' but they don't know that it's raining. In other words, the hearer is to conjure up a situation or event where it's raining but their bodily counterpart doesn't know this. Such a situation is perfectly imaginable, and so this is not a contradiction and the sentence is acceptable.

Now let's turn to Type II cases (Yalcin's examples). Consider the sentence in (52).

(52)   **[Type II]**
Imagine that it isn't raining but it might be raining.

First, note that the embedded proposition is judge-dependent (since the second conjunct is), and thus (52) cannot be embedded under objective *imagine*. That means that *imagine* must be interpreted subjectively. Note that the first conjunct of the embedded sentence is non-judge-dependent. I will assume that this means that this conjunct must be subjectivized before it is conjoined with the second conjunct. This gives the proposition in (53).

(53) $[\![$it isn't raining$]\!]_{¢}^{SUBJ} = [\lambda w \,.\, [\lambda t \,.\, [\lambda j \,.\, \forall <w',t',x> \in$ Epist$_{w,t,j}$: it isn't raining in w' at t']]]

Recall that the proposition expressed by *it might be raining* is that in (54). (I will use a $[\![\phi]\!]_{¢}$ to indicate the proposition expressed by the sentence φ.)

(54) $[\![$it might be raining$]\!]_{¢} = [\lambda w \,.\, [\lambda t \,.\, [\lambda j \,.\, \exists <w',t',x> \in$ Epist$_{w,t,j}$: it's raining in w' at t']]]

When the propositions in (53) and (54) are conjoined and embedded under subjective *imagine*, the resulting meaning is given in (55).

(55) $[\![(52)]\!]^{w*,t*,j}$ [when addressed to H and interpreted subjectively] =
[H is to make it so that]
$\forall <w',t',x> \in$ Imagine-SUBJ$_{w*,t*,H}$:

$\forall <w'',t'',y> \in \text{Epist}_{w',t',x}$: it isn't raining in w'' at t'' and
$\exists <w'',t'',y> \in \text{Epist}_{w',t',x}$: it's raining in w'' at t''

This says that (52) instructs the hearer to make it the case that in all of their imagination alternatives $<w',t',x>$, x knows that it isn't raining and at the same time it's compatible with x's knowledge that it's raining. This is a straightforward contradiction, and so this interpretation is not possible. Since it is not possible in this case to use objective *imagine* instead, the sentence is simply deviant.

My assumption that the first conjunct, *it isn't raining*, is subjectivized separately before being conjoined with the second conjunct is crucial, and rather troubling. The assumption is crucial because the entire conjunction expresses a judge-dependent proposition, and so (without the additional assumption) it ought to be possible to embed it, as is, under subjective *imagine*. If this happened, then the requirement of knowing that it isn't raining would not be introduced, and the sentence would not be contradictory. The assumption is troubling because it seems to require that *imagine* "know" what kind of proposition is denoted by each conjunct, rather than by its sentential argument as a whole. This is a blatantly non-compositional requirement, equivalent to the generalization in (56).

(56)   Local Subjectivization Requirement: If z imagines subjectively that p & q,
            then z must imagine subjectively that p and imagine subjectively that q.

I certainly hope that we can explain these phenomena related to Moorean paradoxes without resorting to a non-compositional principle of this kind, but I leave it to future work to see if it is possible to derive the generalization (56) from principles or assumptions of a more compositional nature.

Finally, consider the Type III case in (57).

(57)   **[Type III]**

            # Imagine that the cake tastes good but it doesn't taste good to you.

As with the Type I case, I assume that *you* is an imagination pronoun. I also assume that the argument of *tastes good* in the first conjunct is PRO$_J$. (If either of these did not hold,

then the sentence would actually be acceptable, as discussed in Sections 3.3 and 4.4, and

thus would not pose a puzzle in the first place.) Now, note that, as with Type II cases, the

embedded proposition is judge-dependent, in this case because of the first conjunct.

Therefore the only possible interpretation of (57) is one using subjective *imagine*. As

with the Type II cases, I assume that the non-judge-dependent conjunct must be

subjectivized. The subjectivized version of this proposition is given in (58).

(58)　　　　$[\![\text{the cake doesn't taste good to you}]\!]_{\cent}^{\text{SUBJ}}$
　　　　　　$= [\lambda w . [\lambda t . [\lambda j . \forall <w',t',x> \in \text{Epist}_{w,t,j}: \text{the cake doesn't taste good to}$
　　　　　　$\text{Self}_{\text{Imagine}} \text{ in } w' \text{ at } t']\,]\,]$

When this is conjoined with the first conjunct and embedded under subjective *imagine*,

the resulting meaning is in (59).

(59)　　　　$[\![(57)]\!]^{w*,t*,j}$ [when addressed to H and interpreted subjectively] =
　　　　　　[H is to make it so that]
　　　　　　$\forall <w',t',x> \in \text{Imagine-SUBJ}_{w*,t*,H}: \text{the cake tastes good to x in } w' \text{ at } t' \text{ and}$
　　　　　　$\forall <w'',t'',y> \in \text{Epist}_{w',t',x}: \text{the cake doesn't taste good to Self}_{\text{Imagine}} \text{ in } w'' \text{ at } t''$

This means that (57) instructs the hearer to make it so that all of their imagination

alternatives $<w',t',x>$ are such that the cake tastes good to x in w' at t' but at the same

time x knows (in w' at t') that the cake doesn't taste good to the imagination self. By the

Imagination Self Principle (44), this means that all of their imagination alternatives

$<w',t',x>$ must be such that the cake tastes good to x but x knows that the cake doesn't

taste good to x, which is a contradiction.[11]

　　　In summary, then, all three types of sentences lead to contradictions when embedded

under subjective *imagine*. Type II and III examples are judge-dependent, and thus are

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[11] A difficulty arises with sentences like (i), which contains two epistemic modals, one of which is
embedded in an attitude report.
　(i)　# Imagine that it might be raining but you think it must not be raining.
This seems to behave like a Type III example, which is expected given that it contains one judge-dependent
conjunct and one non-judge-dependent conjunct. However, my proposal would predict that on a subjective
interpretation, (i) instructs the hearer to conjure up a situation where it is compatible with their knowledge
that it's raining but where they (know that) they believe that this is not compatible with their knowledge.
This is not actually a contradiction; rather, it should simply be asking the hearer to imagine being wrong
about their own knowledge, which is a perfectly coherent thing to imagine. Thus I do not have an
explanation for the behavior of (i), and leave it as an open puzzle.

impossible with objective *imagine* as well. Type I examples, on the other hand, are non-judge-dependent, and so they are possible with objective *imagine*, and in fact they do not lead to contradictions when embedded under objective *imagine*.

4.6. *Imagine* with Non-Finite Complements

I will close with a prediction that my proposal makes when combined with the judge-dependent view of control from Chapter 4. Consider example (60), alongside the regular Moore-paradoxical case in (61).

(60)   Imagine being surrounded by rain but not knowing that it's raining.

(Irene Heim, p.c.)

(61)   Imagine that it's raining but you don't know that it's raining.

Note that (60) closely resembles (61): in both cases, the first conjunct of the embedded sentence says something about the fact that it's raining, and the second conjunct says that the imaginer doesn't know this fact. Note also that (60) is perfectly acceptable. What it seems to do is ask the addressee to imagine being a person x such that x is surrounded by rain and x doesn't know it.

Recall from Section 4.5 that (61) created a contradiction if *imagine* was interpreted subjectively, but could be rescued by interpreting *imagine* objectively instead. It's possible to use objective *imagine* in this case because the embedded proposition is non-judge-dependent. Now, on my view from Chapter 4, the clauses *being surrounded by rain* and *not knowing that it's raining* have PRO$_J$ as their subject; thus the propositions expressed by the two conjuncts are those in (62).

(62)   (a) $[\![\text{PRO}_J \text{ being surrounded by rain}]\!]_{\cent} = [\lambda w \ . \ [\lambda t \ . \ [\lambda j \ . \ j \text{ is surrounded by rain in w at t}] \ ] \ ]$

(b) $[\![\text{PRO}_J \text{ not knowing that it's raining}]\!]_{\cent} = [\lambda w \ . \ [\lambda t \ . \ [\lambda j \ . \ j \text{ does not know (in w at t) that it's raining}] \ ] \ ]$

These are judge-dependent propositions, and so of course the conjunction is as well. This means that in (60), unlike (61), *imagine* can only be interpreted subjectively. At first glance this seems to pose a problem: since Moore-paradoxical sentences create

contradictions under subjective *imagine*, we might expect (60) to create a contradiction as well, contrary to fact. (This would also follow the generalization in Section 4.1.) However, there is an important difference between the embedded clauses in (60) and (61). In (61), the two conjuncts in the embedded clause expressed non-judge-dependent propositions, and so they had to be subjectivized before they could be embedded under subjective *imagine*. This added a layer of knowledge to the propositions, so that *it's raining* became something like "you know that it's raining," which is what led to the contradiction. In (60), in contrast, the two conjuncts express judge-dependent propositions on their own, and thus do not need to be subjectivized. The proposition taken as the argument of subjective *imagine*, then, is just the simple conjunction of (62a–b), which is shown in (63).

(63) $[\![$PRO$_J$ being surrounded by rain and PRO$_J$ not knowing that it's raining$]\!]_¢$
        $= [\lambda w . [\lambda t . [\lambda j . j$ is surrounded by rain in w at t and j does not know (in w at t) that it's raining$]\ ]\ ]$

When this is taken as the argument of subjective *imagine*, the resulting meaning is given in (64).

(64) $[\![(60)]\!]^{w*,t*,j}$ [when addressed to H and interpreted subjectively] =
        [H is to make it so that]
        $\forall <w',t',x> \in$ Imagine-S$_{\text{UBJ}w*,t*,H}$: x is surrounded by rain in w' at t' and x does not know (in w' at t') that it's raining

This says that (60) instructs the addressee to make it so that, roughly speaking, all of their imagination alternatives are surrounded by rain but don't know that it's raining, which is not a contradiction.

Chapter 6

Conclusions

1. <u>Recap</u>

In this dissertation I have developed a semantic and pragmatic theory based on the premise that propositions are sets of world-time-individual triples, in contrast to standard views that take them to be sets of worlds or world-time pairs. Building on ideas of Lasersohn (2005, 2006), I motivated this view in Chapter 2 with a puzzle that has been observed separately for two classes of expressions: predicates of personal taste (Lasersohn, 2005; also to some extent Mitchell, 1986) and epistemic modals (DeRose, 1991; Egan, Hawthorne & Weatherson, 2005; MacFarlane, 2006; Egan, 2007). I then extended the approach to indicative conditionals in Chapter 3 and *de se* control constructions in Chapter 4. I also discussed how the judge-dependent system could be used to help solve puzzles related to Moore's paradox in Chapter 5.

There are two essential parts to my proposal, which are both introduced in Chapter 2. The first part is semantic: a sentence is evaluated for truth or falsity not just at a world and time but at a world, time, and individual, meaning that certain propositions are subjective in a way that is reflected in the formal semantics. (This individual parameter is mnemonically called the "judge," following Lasersohn's terminology.) For example, the sentence *the cake is tasty* (on one possible reading) is true at a world-time-individual triple <w,t,j> iff the cake tastes good to j in w at t. Informally, we can say that the cake is

tasty iff it tastes good to "the judge." This much comes from Lasersohn (though I make a few modifications to his view). As part of Chapter 2 I extend this approach to epistemic modals; for example, I propose that the sentence *it might be raining* is true at a world-time-individual triple <w,t,j> iff it is compatible with j's knowledge in w at t that it's raining. If we take the view that indicative conditionals involve covert epistemic modals, this gives a natural way to extend the view to conditionals as well, as I do in Chapter 3. This turns out to provide solutions to a number of longstanding puzzles about conditionals, in particular involving the purported inference from "not ϕ or ψ" to "if ϕ then ψ" (which I claim is an illusion caused by the way epistemic modals interact with predicates of belief).

The second part of the proposal is pragmatic, and this part is essential for most of the explanatory force of the proposal. I propose a theory of conversation (adapted from Stalnaker, 1978, 2002) where the context set is a set of world-time-individual triples. The pragmatic proposal has two crucial pieces. First, in every world-time-individual triple <w,t,x> that is a member of the context set of a conversation, x is the plurality of the group of participants in the conversation. This means that we can talk about a "judge of the conversation," which is always the entire group of conversational participants. The second crucial piece is the norm of assertion: in essence, a speaker is allowed to assert a proposition provided that it is true at the triple <world of utterance, time of utterance, speaker> – in other words, if the sentence is true as judged by the speaker themselves. (This follows in a straightforward way from the interaction of the semantics of belief with the view of propositions as sets of world-time-individual triples.) However, because the context set consists of triples whose individual parameter is the plurality of the group of conversational participants, if the speaker's assertion is accepted by their interlocutors, what becomes common ground, roughly speaking, is that the proposition is true as judged by the whole group. Therefore a hearer will only be willing to accept an assertion if the proposition asserted is true as judged by them.

This pragmatic view accounts for conversational stand-offs of the kind that occur in (1)–(2).

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(1)   Sam: This cake is tasty.
         Sue: No it isn't, it tastes terrible!

(2)   Sam: If the butler isn't the murderer, the cook is.
         Sue: (No! / Nuh-uh!) If the butler isn't the murderer, the maid is.

In each case, both Sam and Sue are justified in making their assertions (since each assertion is true as judged by the speaker), but their interlocutor is not willing to accept their assertion, and so neither one can be added to the common ground. Since both are allowed to make their assertions anyway, the argument could continue in the same vein until the participants see its futility.

An additional theme that runs through this work has to do with the semantics of attitude predicates. I pay special attention to *think* in Chapters 2 and 3; *find* and *believe* (to a lesser extent) in Chapter 2; *want* in Chapter 4; *persuade*, *convince*, and *tell* (to a lesser extent) also in Chapter 4; and *imagine* in Chapter 5. I put a particular emphasis on accounting for the way attitude predicates interact with the expressions I look at such as epistemic modals and predicates of personal taste. I assume (following Lewis, 1979; Chierchia, 1989, and others) that the meaning of *think* or *believe*, for example, involves the notion of doxastic alternatives. An individual z's doxastic alternatives in world w at time t are the set of triples $\langle w',t',y \rangle$ such that it's compatible with what z believes in w at t that z (him-/herself) is y in w' at t'. I also suggest analogous notions for other attitude predicates such as *want* and *imagine*.

Doxastic alternatives and analogous notions are independently needed to capture *de se* attitudes, which are attitudes that crucially involve the attitude holder's "self." For example, in (3) (based on an example by Chierchia, 1989), the desire expressed is not simply a desire for Pavarotti to be a genius, but a desire of Pavarotti to himself be a genius. In other words, for all the triples $\langle w,t,x \rangle$ such that it's compatible with what Pavarotti wants for him to be x in w at t, x is a genius.

(3)   Pavarotti wants to be a genius.

On my semantic view, sets of doxastic alternatives (and related notions) are the same kind of formal object as propositions, which allows them to dovetail naturally. In Chapter

4, I observe that this correctly predicts a *de se* property of embedded epistemic modals, and show that another class of *de se* constructions including (3) can be straightforwardly captured in the same way. In particular, I propose that in (3), for example, the infinitive complement *(PRO) to be a genius* has a meaning that crucially depends on the individual "judge" parameter: that is, *(PRO) to be a genius* is true at a world-time-individual triple <w,t,j> iff j is a genius in w at t.

This means, then, that in certain cases, the implicit item that has traditionally been called PRO can be reclassified as an item that simply refers to the judge. I call this item PRO$_J$, and argue for it on independent grounds in Chapter 2 (to serve as an implicit argument of predicates of personal taste). At the end of Chapter 4, I discuss some of the implications of this approach for a traditional view of control.

In Chapter 5, I use the interaction of attitude predicates with the judge parameter to develop a particular way of looking at the distinction between imagining something "from the inside" and "from the outside." I discuss ways that this can help to solve some puzzling facts that are broadly related to Moore's paradox.

In extending the reach of judge dependency to epistemic modals, conditionals, and subjects of nonfinite clauses, my proposal goes well beyond any intuitive notion of a "judge." While predicates of personal taste such as *tasty* and *fun* might seem intuitively to involve the judgment of an individual, it's not at all obvious that this is true for these other expressions. They do all have another property in common, though: in every construction I have discussed that crucially involves the judge parameter, the judge always represents the locus of an internal mental or psychological state that is important for the interpretation of the construction in some way. Notice that I say every *construction*, not every *expression*. For example, in the *de se* control constructions discussed in Chapter 4, the judge-dependent lexical item involved is PRO$_J$, which simply refers to the judge and does not by itself have anything to do with mental or psychological states. Even the entire embedded infinitive clause need not say anything about a mental or psychological state. However, the kinds of expressions that take these infinitival sentences as arguments and operate on them in a way that crucially

manipulates the judge parameter – i.e., control verbs – always involve mental or psychological states held by the judge. My claim, then, is that in any place where the judge parameter is crucial for interpretation at the level of an entire utterance, the judge must represent the individual or group that has a particular mental or psychological state. However, this is not a requirement of a local or compositional kind, but something like a constraint that the grammatical system as a whole must conspire to satisfy. I leave it to future work to investigate whether this characterization of the judge parameter is the right one, and, if so, how to properly formulate this requirement.

2. <u>Issues for Further Study</u>

There are a number of questions and open problems which ought to be investigated in future research, so I will introduce a few of them.

2.1. Broadening the Domain

I have extended the reach of Lasersohn's judge parameter beyond predicates of personal taste like *fun* and *tasty* to epistemic modals, indicative conditionals, and certain infinitive complements, but there are a number of other types of expressions that might be fruitfully analyzed in similar terms. One example is vague scalar predicates; it seems plausible that the location of the cutoff point for a term like *red* is somehow linked to the judge. We would need to look at exactly how the cutoff point relates to the judge, and whether to treat these items as inherently judge dependent (like epistemic modals) or optionally so (as with predicates of personal taste, which are two-place predicates with the option of taking PRO$_J$). Also, since predicates of personal taste such as *fun* and *tasty* are probably also vague and scalar, in addition to being judge-dependent, we would need to see how the judge dependency of the cutoff point interacts with the basic judge dependency of the predicate.

Another example is raising predicates such as *seem*, *appear*, *sound*, and *look*. I suspect that these are exactly parallel to predicates of personal taste: they take an argument which can be made explicit (as in *seem to x*) or left implicit, and can either be referential or be filled by PRO$_J$. However, I leave it to future research to see if this makes

all the right predictions, and to see what other implications this might have either for raising constructions or for the semantics of perception.

To give just one more example, I also think it's possible that other kinds of modality besides epistemic modality also have a component of judge dependency, particularly those that involve internal psychological states. This does not include purely deontic modals such as *can* and *may* (on their meanings denoting permission), *be allowed to*, and related expressions such as *allowed*, *permissible*, etc. These are generally understood with respect to a salient set of rules, and it is likely that the particular set of rules involved is determined purely according to context, as originally proposed by Kratzer (1977, 1981, 1991a). However, such items as *should* and *ought to* may involve reference to the value system or priorities of the judge. This judge-dependent component could potentially either take the place of or come in addition to a component of meaning giving it less than universal strength (as proposed, e.g., by von Fintel & Iatridou, 2006).

One class of expressions that I suspect are *not* amenable to an analysis using the judge parameter includes items with a spatial or temporal orientation such as *in front of*, *behind*, *local*, *prior*, and so on. These include many of the "perspectival" expressions discussed by Mitchell (1986) (though he places predicates of personal taste in the same class). This is consistent with my claim that crucial uses of the judge parameter always involve internal mental or psychological states. The empirical reason behind my suspicion, though, is that it is particularly difficult to imagine a coherent dialogue along the lines of (4).

(4)   [Context: Sam and Sue are standing on opposite sides of a room facing each other. There is a table between them in the middle of the room, and a lamp on the side of the table closer to Sue.]

Sam: The lamp is behind the table.
Sue: # No, it isn't, it's in front of the table!

Sue's response seems odd in this context, unless perhaps she is deliberately misunderstanding Sam to make a joke. This contrasts with similar dialogues using predicates of personal taste such as (1), but it would be worth investigating to what extent the two classes are sharply distinct and to what extent this is a matter of degree.

2.2. Compositional Matters

I have assumed, for example, that *taste good* means the same thing as *tasty*, but have not said anything about how appropriate meanings for *taste* and *good* would combine compositionally to derive this meaning (and similarly for *taste great*, *taste terrible*, *smell good*, and so on). This is not trivial, since things can be said to taste good, sound good, smell good, etc. and also to *be* good. *Good* is a highly vague expression (in the everyday sense of "vague") and also highly context-dependent, but its meaning seems to become much more specific when combined with something like *taste* or *smell*. It is not clear to start with, then, whether *taste* should take *good* as an argument (so that "good" is a way of tasting) or if *good* should take *taste* as an argument (so that tasting good is a way of being good). In addition, since most predicates of personal taste are scalar, a fuller view of their semantics should be put together with an appropriate semantics of degree-denoting expressions.

2.3. Factivity and Double-Access Sentences

Lasersohn (2006) observes that when a predicate of personal taste is embedded under a factive verb such as *recognize*, as in (5), the factive presupposition comes out as a requirement on the taste of the speaker. (This is so even though the assertion involves the taste of the subject.)

(5)   Sam recognizes that licorice is tasty.

(Lasersohn, 2006)

For (5) to be true and felicitous, licorice must taste good both to Sam and to the speaker, and Sam must be aware that it tastes good to him. According to Lasersohn, this is predicted by his system. It is also predicted by my pragmatic view under obvious assumptions. Assuming that "x recognizes that p" presupposes that p, and that presupposing p involves treating it as already being in the common ground, then a speaker who utters (5) must agree that licorice is tasty. In fact, my view predicts that the speaker must be assuming that the other participants in the conversation also think that licorice is tasty, which seems to be correct.

On the other hand, there are similar cases involving attitude predicates commonly thought to be factive where there is no such requirement on the speaker. One example is (6), which uses *discover*.

(6)   Last summer Sam discovered that rollerblading was fun.

It seems to me (and other English speakers I have consulted) that (6) does not commit the speaker to thinking that rollerblading is fun (or even that it used to be fun last summer). Here we can only infer that rollerblading was fun for Sam – that is, for (6) to be true and felicitous, it only needs to be the case that (last summer, at least) rollerblading was fun for Sam, and Sam discovered this. For the moment, I will refer to the kind of factivity that applies to (5) as "full factivity" and the kind that applies to (6) as "partial factivity." (This does not necessarily have any connection to notions of "strong" and "weak" factivity that have sometimes been proposed, which is why I have avoided using these terms.)

I should note that the "partial" factivity that shows up in (6) does not itself pose a problem for my view, in fact quite the contrary. We could simply analyze *discover* in terms of epistemic alternatives, so that "x discovers p" is true iff p is true at all of x's epistemic alternatives (as a result, perhaps, of some kind of event of observation). Epistemic alternatives have a built-in notion of factivity that is only partial in the sense above: the epistemic alternatives of an individual z in world w at time t must always include the triple <w,t,z> itself (I referred to this as the "factivity principle" in Chapter 3), but they need not include any other triples of the form <w,t,y> for any y not identical to z. In other words, we could treat the full factivity of *recognize* in (5) as a true pragmatic presupposition, which treats the content of the complement clause as already being in the common ground; and at the same time we could treat the partial factivity of *discover* in (6) as arising purely from the lexical semantics of the predicate. (This should probably not be conflated with notions of "pragmatic presupposition" and "semantic presupposition" that are sometimes used.) In fact, then, my view predicts that we should find these two different types of factivity.

However, there is a twist. Consider what happens if the embedded past tense in (6) is changed to present tense, as in (7), making a so-called "double-access" construction (see Abusch, 1988, 1991; Ogihara, 1995).

(7)   Last summer Sam discovered that rollerblading is fun.

To assert (7), the speaker must again share the opinion that rollerblading is fun. Compare this to a run-of-the-mill double-access sentence such as (8a). (I am using an example with a factive predicate to make things simpler.)

(8)   (a)   Sam found out that Mary is pregnant.

(Ogihara, 1995, no. 27)

       (b)   Sam found out that Mary was pregnant.

(Ogihara, 1995, no. 28)

The sentence in (8a) carries the additional requirement that Mary's pregnancy be ongoing at the time of utterance; this requirement does not hold for (8b).

It seems intuitively plausible that the extra level of factivity that arises in (7) is somehow related to the extra temporal requirement that arises in (8a), but it is not immediately obvious how to make the connection formally. It would be interesting to investigate further exactly what the relationship is between judge dependency, factivity, and the temporal and aspectual properties of embedded clauses in attitude reports.

2.4. Final Remarks

I will close by drawing attention to what I see as the two crucial ways that my proposal alters basic standard assumptions about the semantics and pragmatics of natural language. First, sentences no longer have truth conditions as normally construed: knowing what a sentence means is not just a matter of knowing what the world has to be like for it to be true, but may also require knowing what one's own internal mental or psychological state must be like. Similarly a group of people engaging in a conversation of the typical, information-exchanging sort can no longer be seen as simply narrowing down what world they're in and what time it is; they must also, in a sense, be narrowing down who they are, as a group, and what sorts of internal mental or psychological states they have in

common. On one way of thinking, these changes constitute a trivial formal extension of existing systems; on another way of thinking, they represent a fundamentally different way of looking at meaning and conversation. My thoughts are still mixed about which way to look at it.

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