

Semantics and the Objects of Assertion

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Abstract: This paper concerns the relationship between compositional semantic theories of a familiar kind (e.g. Kaplan 1989) and the objects of assertion. The main issue concerns the role of *indices* (or *circumstances of evaluation*) in a semantic theory. If indices contain a parameter X (e.g. world, time, ‘judge’), must the objects of assertion be things that vary in truth value over X ? Conversely, if indices *fail* to contain a parameter X , must the objects of assertion be invariant in truth value over X ? I argue for negative answers to both questions, and explore the consequences of this for a number of debates in the philosophy of language.

1 Introduction

The aim of this paper is to argue that the relationship between semantics and the question of what the objects of assertion are is less direct than it is often thought to be, and to explore the consequences of this for debates in the philosophy of language. By “semantics” I mean something quite precise: a compositional, truth-conditional semantic theory capable of handling both indexicality and ‘shifty phenomena’ of various sorts (e.g. tense and modality). Theories of this sort were first articulated and defended in the 1960s and 1970s, and are perhaps most familiar to philosophers through the work of David Kaplan (1989) and David Lewis (1980).

The question about the objects of assertion I have in mind concerns their *semantic type*. Are the propositions we assert *classical propositions*, things that have different truth values relative to different possible worlds, but whose truth value remains invariant across time and person? Or are they, as temporalists think, *temporal propositions*, things that vary in truth value over both world and time? Or are they, as relativists think, *judge-dependent* or *centered propositions*, things that vary in truth value across world, time, and person?¹

¹When I say that the objects of assertion are things that vary in truth value over worlds, I mean that *some* of the things we assert are true in some worlds, false in others. I don’t mean to imply that every content asserted is contingent. The same goes, *mutatis mutandis*, for the claim that the objects of assertion vary in truth value across times and/or individuals.

Also, since the main issues in this paper concern the semantic type of propositions, all of the issues that I’ll be dealing with can be raised without the assumption that propositions are structured entities; for simplicity, I proceed without that assumption.

A number of recent disputes in the philosophy of language – disputes over relativism and temporalism, for example – turn on the question of what the objects of assertion are. These debates typically presuppose two ‘Kaplanian dogmas’ about the relationship between semantics and the objects of assertion:

First Dogma:

If the index of a semantic theory contains a parameter X (e.g. world, time, ‘judge’), then the semantic theory entails that the objects of assertion vary in truth value over X .

Second Dogma:

If the index of a semantic theory does *not* contain a parameter X , then the semantic theory entails that the objects of assertion do not vary in truth value over X .

The *index* (or *circumstance of evaluation*) of a semantic theory is a sequence of parameters needed for stating the truth conditions of sentences containing intensional operators. If, for example, we treat modals and tenses as intensional operators, then the index will need to contain a possible world and a time. The two dogmas claim a tight connection between the question of what goes in the index and the question of what the objects of assertion are. But despite their popularity, the two dogmas are false, and this, as one might expect, has interesting consequences for the debates in question.

Lewis (1980) first showed that the First Dogma was false: a parameter X might occur in the index even though the objects of assertion are ‘ X -specific,’ they do not vary in truth value over X (section 2). This observation creates space for a type of context sensitivity that frequently goes unnoticed, one that not even Lewis himself isolated and examined. I argue that the possibility of this kind of context sensitivity – which I call *shiftable context sensitivity* – undermines a certain objection to contextualism about epistemic modals (section 3). I then argue for the converse of Lewis’s point: the Second Dogma is false. Even if indices fail to contain a parameter X , the objects of assertion might nevertheless be ‘ X -neutral,’ they might vary in truth value over X . A consequence of this is that showing that tenses or modals ought to be given an ‘extensional’ treatment is no argument for time- or world-specific objects of assertion, contrary to what some have thought (section 4). The resulting picture is one on which the connection between semantics and the question of what the objects of assertion are is much less direct than it is often thought to be.

2 Kaplan, Lewis, and ‘content’

I’ll begin by telling a story involving Kaplan and Lewis and the notion of the *content* of a sentence at a context. The upshot of the story is that we should distinguish between two notions of *content*, a *compositional* notion and an informational or *assertoric* notion. Put in terms of indices, the story teaches us that our First Dogma is false: putting a parameter X in the index does not commit one to X -neutral objects of assertion.

Let's start with some background. Anyone familiar with contemporary philosophy of language will know of David Kaplan's distinction between two kinds of meaning, the *character* and the *content* of an expression (Kaplan 1989). The character of a sentence is something like a rule of use: it tells you what the sentence can be used to say when used in an arbitrary context. So the character of "It's raining today" tells you that the sentence can be used in a Monday-context to say that it's raining on Monday, in a Tuesday-context to say that it's raining on Tuesday, and so on. The notion of character plays no role in my story, however, and so I set it aside. The content of a sentence ϕ at a context c is, Kaplan tells us, *what is said* by ϕ at c . An utterance of "It is raining today" on Monday says that it is raining on Monday, and so the content of "It is raining today" relative to a Monday-context is the proposition that it is raining on Monday.

Although it is not entirely clear exactly what Kaplan meant by "what is said," it is tempting to read him as saying that content of a sentence ϕ at a context c is the central piece of information that would be communicated by an utterance of ϕ in c . If that's right, then contents will play a central role in a general theory of linguistic communication; they are the things we assert in speech.² Let me say a bit more about this role that contents are supposed to play. On a simple, schematic picture of linguistic communication, it works something like this: I believe something, p , and want you to believe it too. So I say something whose truth depends on p . If all goes well, you understand my utterance and come to believe p too (or at least realize that I want you to believe p). The information I communicate is p , and p is the content of my utterance (i.e. the content of the sentence I uttered in the context in which I uttered it). A slightly more theoretically articulated version of this picture is Stalnaker's account of how conversation proceeds (Stalnaker 1978). On that view, the content of an assertive utterance is what the utterance adds to the *common ground*, the shared body of information that is presupposed by the participants of the conversation. But given either picture, Kaplan's contents play a role in linguistic communication.

In addition to being what is said by a stand-alone sentence in a context, Kaplan assigns contents a compositional role in his formal semantic theory. Explaining this second role for contents requires some setting up, so bear with me. The semantic theories in which we are interested are *truth-conditional* and *compositional*. The idea of truth-conditional semantics is that to know the meaning of a sentence is to know how things would have to be in order for the sentence to be true. A truth-conditional theory for (a fragment of) English thus outputs claims like this:

The sentence "There is a bag of potatoes in the pantry" is true iff
there is a bag of potatoes in the pantry.

Or – to put it in the notation familiar from formal semantics – claims like this:

²Some commentators think this is not what Kaplan had in mind (e.g. Stanley 2002, 322). Since I'm not primarily interested in the details of Kaplan's views, and since it seems to me that philosophers often assume that Kaplanian content is assertoric content, I will proceed as if this is Kaplan's view.

$\llbracket \text{There is a bag of potatoes in the pantry} \rrbracket = 1$ iff there is a bag of potatoes in the pantry.

The double brackets “ $\llbracket \rrbracket$ ” denote a function from expressions to extensions; so this should be read as:

The extension of “There is a bag of potatoes in the pantry” is 1 (truth) iff there is a bag of potatoes in the pantry.

A *compositional* semantic theory shows how to compute the truth-conditions of sentences from the meanings or semantic values of their parts, the primitive lexical items contained in the sentence. The theories of Kaplan and Lewis are compositional, truth-conditional theories that are distinguished by their ability to treat two sets of linguistic phenomena: context sensitive expressions and shifty phenomena like tense and modality. They do this by relativising the relevant notion of truth in two different ways. Consider first context-sensitive expressions like “I”, “here”, and “now”. Note that a sentence like “I am hungry” does not have truth-conditions absolutely, as it were, but only relative to potential contexts of utterance. For whether a particular utterance of that sentence is true or not depends not only on who is hungry when, but on who the speaker is and the time at which the utterance occurs. The sentence is true *relative to a context* iff the speaker of the context is hungry at the time of the context. So a semantic theory capable of handling context-sensitive expressions will state the truth-conditions of sentences *relative to contexts*. This means that the output of our semantic theory will now look something like this:

$\llbracket \text{I am hungry} \rrbracket^c = 1$ iff the speaker of c is hungry at the time of c at the world of c .

The double brackets “ $\llbracket \rrbracket$ ” now denote a two-place function taking expression-context pairs to extensions. For most purposes, we can identify a context c with a quadruple consisting of a world w_c , a time t_c , a speaker x_c , and a location l_c , where x_c is at l_c at t_c in w_c . This will allow us to treat modal (“actually”), temporal (“now”), and locative (“here”) indexicals in a manner similar to our treatment of “I”.

The second type of phenomena these theories aim to treat is what I’m calling shifty phenomena, which I take to include modality, tense, and locative expressions (e.g. “In Boston”). Take a sentence like (1):

1. Sam could have been a philosopher.

On standard treatments, (1) decomposes into a modal operator and an embedded sentence:

Possibly [Sam is a philosopher]

Unlike the familiar logical connectives (“and”, “not”, etc.), “possibly” cannot be treated as a function from truth values to truth values. For what would the

function be? It should map truth to truth, since actuality entails possibility, but what should it map falsity to? There are two options: it maps falsity to falsity or falsity to truth. The first gets the wrong result when ϕ is false but contingent, the second when ϕ is necessarily false. So the semantic value of “Sam is a philosopher” – what it contributes to the truth-conditions of (1) – cannot simply be its extension (truth value).

It is here where we encounter the second role for Kaplan’s contents. The idea of intensional semantics is to treat the semantic value of a sentence embedded under an operator like “possibly” not as a truth value (extension) but as something that (potentially) takes different truth values at different possible worlds (intension). The meaning of “possibly” can then be understood as a function from these semantic values to truth values: it maps the semantic value of a sentence ϕ to truth iff there is a world at which the semantic value of ϕ is true. So (2) is true iff there is a world w such that the semantic value of “Sam is a philosopher” is true at w . A similar treatment can be given to tenses and locative expressions: we take the semantic values of sentences to be things that (potentially) take different truth values at different times and locations, and treat tenses and location expressions as functions from these variable semantic values to truth values. The second role of Kaplan’s contents is to serve as these variable semantic values; contents are the inputs to intensional operators.

A standard way of implementing this idea formally involves further relativising the relevant notion of truth, so that our semantics now characterises the notion of truth relative to a context and an *index*. If we treat tenses and location expressions along the lines of modal operators like “possibly”, then an index i will be a triple of a possible world w_i , a time t_i , and a location l_i .^{3,4} Kaplan then defines the content of a sentence ϕ at a context c as a function that maps an index i to truth iff ϕ is true at c and i :

$$\text{Kaplanian Content of } \phi \text{ at } c: \lambda i. [\![\phi]\!]^{c,i} \text{ }^5$$

So the content of ϕ at c can take different truth values at different possible worlds, times, and locations, as desired. And the truth conditions of (1) can now be compositionally generated as follows:

³Since both context and index are sequences of broadly similar sorts of parameters, one might wonder why both are needed. Why not simply have one set of parameters that plays the role of both context and index? The reason is that indexicals tend not to shift under intensional operators: “It will always be the case that Sam is now hungry” has no reading on which it means that Sam will always be hungry, a prediction not generated by a singly-indexed semantics (see Cresswell (1990) for more detail).

Note that even if natural languages contain *monsters* – operators that shift the the context parameter – the standard arguments for ‘double-indexing’ go through, since all they require is that some indexicals fail to shift under some operators. Arguments for monsters are discussed in Schlenker (1999, 2003), Anand and Nevins (2004), and Anand (2006).

⁴It is currently a matter of controversy as to which expressions (if any) should be treated as index-shifting operators, and what (if anything) should go in the index (e.g. King 2003; Schaffer Forthcoming). This issue will be discussed in more detail in §4.

⁵Note that the double brackets “[]” now denote a three-place function taking expression-context-index triples to extensions. And note that $\lambda i. [\![\phi]\!]^{c,i}$ is the function f such that, for any index i , $f(i) = 1$ iff $[\![\phi]\!]^{c,i} = 1$.

$\llbracket \text{Possibly } [\text{Sam is a philosopher}] \rrbracket^{c,i} = 1$ iff

$\llbracket \text{Possibly} \rrbracket^{c,i} (\lambda i'. \llbracket \text{Sam is a philosopher} \rrbracket^{c,i'}) = 1$ iff

There is a world w (accessible from w_i) such that
 $\lambda i'. \llbracket \text{Sam is a philosopher} \rrbracket^{c,i'}(w, t_i, l_i) = 1$ iff

There is a world w (accessible from w_i) such that
 $\llbracket \text{Sam is a philosopher} \rrbracket^{c,\langle w, t_i, l_i \rangle} = 1$ iff

There is a world w (accessible from w_i) such that Sam is a philosopher at t_i in w .

Temporal and locative expressions can be given a parallel treatment. Note the role played by the Kaplanian content of “Sam is a philosopher” in the second line of this derivation.

So the content of a sentence plays two roles in Kaplan’s overall theory: it plays a compositional role in the semantics proper, as the input to intensional operators, and it plays an informational role, as the *assertoric content* of a sentence at a context. One of the central lessons in David Lewis’s paper “Index, Context, and Content” (Lewis 1980) is that these two roles place very different demands on what we can take contents to be. Since contents are the objects of assertion, they will have to be responsive to our views about what the objects of thought and talk are like. If, for example, we think that the information we normally convey in speech is time-specific, i.e. not something that changes its truth value over time, then we will want contents to likewise be time-specific. But since Kaplanian contents are also the inputs to operators, they must also be sensitive to what kinds of operators natural language contains. For example, if natural language contains temporal operators, then indices will have to contain time parameters, and so contents will be functions from time-containing indices to truth values. Thus, if natural language contains temporal operators, contents will have to be time-neutral, i.e. things that change their truth value over time.

So there is potential conflict between the two jobs Kaplan’s contents are intended to play. If they fulfill the assertion role, they may not suitable for playing the compositional role, but if they fulfill the compositional role, they may not be suitable for playing the assertion role. For Lewis, this conflict took on a specific form: he needed highly variable contents to play the compositional role, since he thought natural language should be understood as containing modal, temporal, locative, and standards-of-precision operators; but he needed highly specific contents to play the assertion role, since, following Stalnaker (1978), he took the objects of thought and talk to be possible worlds propositions.⁶ But Lewis’s specific commitments on these two matters are less important than the general point that the assertion role and the compositional role might place

⁶This was pre-“Attitudes, *De Dicto* and *De Se*”-Lewis; see page 39 in the reprinted version of Lewis (1980).

incompatible demands on a singular notion of content.⁷

Lewis offered a simple solution to this problem: drop the requirement that a single object – *the* content – play both these roles. Define one kind of content – assertoric content – to play the assertion role, and define a second kind – compositional content – to play the compositional role.⁸ As long as both types of content are easily definable in terms of the formal semantic theory, no problem remains.

This raises two questions: First, what is the compositional content of a sentence at a context? Kaplanian contents – functions from indices to truth values – are well-suited to play this role, so we may continue to follow Kaplan in identifying Kaplanian content with compositional content.⁹ If we accept this identification then an analogue of our First Dogma will hold true for Kaplanian content: if a parameter X occurs in the index, Kaplanian contents will be X -neutral. Second question: what is the assertoric content of a sentence at a context? What are the objects of assertion? How we answer this question will be influenced by our independent views about the what the objects of thought and talk are. Since Lewis took the objects of thought and talk to be possible worlds propositions, he defined the assertoric content of a sentence at a context as follows:

$$\text{Classical Proposition of } \phi \text{ at } c: \lambda w. \llbracket \phi \rrbracket^{c, \langle w, t_c, l_c \rangle}$$

Here what we've done is taken the Kaplanian content of ϕ at c and ‘fixed’ the time and location parameters to the values supplied by the context, t_c and l_c . This process leaves us with the possible worlds proposition that Lewis takes to be the assertoric content.¹⁰

Two points are important here: First, note that it follows immediately from Lewis's picture that the First Dogma discussed at the outset of the paper is false. Even if a parameter X occurs in the index, the objects of assertion need not be X -neutral. On Lewis's picture, indices contain time and location parameters, but the objects of assertion are neither time-neutral nor location-neutral. They are neutral only with respect to possible world.

⁷I think that this general point is more important than the central thesis of Lewis's paper, which is the claim that a semantic theory in which semantic values are ‘constant but complicated’ (viz. characters) is equivalent to one in which they are ‘variable but simple’ (viz. Kaplanian contents). The point I'm focusing on – that compositional and assertoric content can come apart – is something Lewis says in the course of defending his central thesis.

⁸This is similar to Michael Dummett's distinction between *assertoric content* and *ingredient sense* (Dummett 1991, 48), as emphasized in a series of papers by Jason Stanley (Stanley 1997a,b, 2000). Lewis uses the term “semantic value” for what I am calling “compositional content,” and he uses “propositional content” for what I am calling “assertoric content”.

⁹Unless, of course, natural language contains monsters. If that's the case, and if we want a uniform notion of compositional content, we may wish to identify compositional contents with characters (Anand and Nevins 2004, n. 7).

¹⁰Actually, Lewis (again following Stalnaker (1978)) thinks there are two possible worlds propositions associated with any sentence in context, both of which play a role in communication: the *horizontal* (which is the proposition described in the text) and the *diagonal*. We gloss over this subtlety here, though the diagonal will reappear later in our discussion.

Second, once we see that we can separate out the compositional and assertoric notions of content, we see that no particular definition of assertoric content, Lewis's included, is forced upon us by the semantics. The semantics constrains what we can take to be the assertoric content – assuming we want that notion to be definable in terms of the semantic theory – but it does not determine a unique candidate for playing that role. Lewis identified the assertoric content of ϕ at c with a possible worlds proposition that he defined in a particular way, but different theorists might adopt different accounts of assertoric content, depending on their antecedent views about the objects of thought and talk.

A temporalist, for example, might say that assertoric content of ϕ at c is the *temporal proposition* of ϕ at c , defined as follows:

$$\text{Temporal Proposition of } \phi \text{ at } c: \lambda \langle w, t \rangle. \llbracket \phi \rrbracket^{c, \langle w, t, l_c \rangle}$$

This is a function from world-time pairs to truth values, something that varies truth value over times. And theorists impressed by the centered worlds account of *de se* attitudes (Lewis 1979) may think that the *centered diagonal proposition* of ϕ at c plays an important role in communication (Heim 2004, Ninan Forthcoming):

$$\text{Centered Diagonal Proposition of } \phi \text{ at } c: \lambda \langle w, t, x \rangle. \llbracket \phi \rrbracket^{\langle w, t, x, l_c \rangle, \langle w, t, l_c \rangle}$$

Two further comments: First, it might be that there is no such thing as *the* assertoric content of a sentence at a context: one might, for example, think that possible worlds propositions and temporal propositions both have a role to play in theorizing about linguistic communication (see footnote 10 for another example). Second, nothing we've said so far rules out the possibility that compositional and assertoric content will in fact coincide. It could turn out that our best semantic theory requires compositional contents of type T , and that our best theory of linguistic communication tells us that assertoric contents are also things of type T . What I am suggesting is that things don't *have to* be this way.

It might be worth pointing out that, on my Lewisian set-up, the definition of assertoric content has a status similar to Kaplan's definition of *truth at a context*. Note that our semantics proper defines the notion of truth at a context *and index*. But suppose someone in context c says, "Sam is a philosopher". What is the index relevant for determining whether or not this sentence is true in this context? At least in the normal case, the answer is that it is the index *determined by* the context that matters. To find the index determined by a context c , we simply set the value of each index parameter to its corresponding context parameter; so the index determined by c is $\langle w_c, t_c, l_c \rangle$. This yields Kaplan's definition of truth at a context:

$$\text{A sentence } \phi \text{ is true at a context } c \text{ iff } \llbracket \phi \rrbracket^{c, \langle w_c, t_c, l_c \rangle} = 1$$

But note that the notion of truth at context *simpliciter* (as opposed to truth a context and index) plays no role in our formal semantics proper, the compositional derivation of truth-conditions. Rather, it is a notion that is defined only

once we have the semantic theory in hand; it is part of the *postsemantics*, to use the terminology of MacFarlane (2003, 329). I propose that the definition of assertoric content also be regarded as part of the postsemantics, and that its theoretical significance is comparable to that of the definition of truth at a context.

To summarize: Lewis showed that we can and should distinguish between the compositional content of a sentence at a context and the assertoric content of a sentence at a context. He argued that those notions come apart in a particular way, but the details of his specific views are less important than the general conceptual point that these are two distinct notions that we should not conflate. Lewis's discussion also shows that our First Dogma is false, since one can put a certain parameter X in the index while rejecting the view that the objects of assertion are X -neutral.¹¹

3 Indices and epistemic modals

As I noted at the outset of the paper, Lewis's observation creates space for a type of context sensitivity that tends to get overlooked in the literature, a type of context sensitivity which even Lewis himself did not isolate and examine. This type of context sensitivity is relevant to the recent debate over epistemic modals because it enables us to formulate a type of contextualism that is immune to a certain objection that relativists have made against more familiar forms of contextualism. The particular objection to contextualism that I have in mind is based on arguments in Egan et al. (2005) and Weathererson (2008). I will set up the issues in the way Weathererson does for the most part, but will also take some liberties in how I formulate the problem.

3.1 Problems for traditional contextualism

Contextualists about epistemic modals say that sentences like (2) express different propositions in different contexts:

2. Sam might be in Boston.

For concreteness, and to set up the contrast with relativism, let's suppose that the contextualist holds that (2) expresses a possible worlds proposition. There

¹¹I should mention that Kaplan was not wholly insensitive to the point I am attributing to Lewis. For example, he writes:

This functional notion of the content of a sentence in a context may not, because of the neutrality with respect to time and place, say, exactly correspond to the classical conception of a proposition. But the classical conception can be introduced by adding the demonstratives 'now' and 'here' to the sentence and taking the content of the result. (Kaplan 1989, 504) (Also see p. 546.)

What Kaplan doesn't say (though I have no doubt he realized it) is that the content of a sentence ϕ at a context c so defined is not the compositional content of ϕ at c , i.e. not what ϕ contributes to larger structures in which it is embedded. Perhaps if Kaplan had expanded on these remarks, he would have ended up with a distinction much like Lewis's.

are two questions contextualists need to answer: (i) What proposition does (2) express in an arbitrary context? and (ii) How are the mechanics of the context dependency of (2) to be understood?

Let me start with the first question. The standard view is that “might” expresses existential quantification over a set of possibilities compatible with some contextually relevant body of knowledge, so that (2) says that there is a possibility w compatible with the relevant body of knowledge such that Sam is in Boston in w . The first question concerns whose knowledge is relevant for determining the set of possibilities over which the modal quantifies. One plausible constraint on any answer to this question is what Egan et al. (2005) call the *speaker inclusion constraint*, which says that at least the speaker’s knowledge is relevant. If this constraint holds, then (2) is true only if it is compatible with what the speaker knows that Sam is in Boston. If this is right, then (2) either means something like “it is compatible with what I know that Sam is in Boston” (if only the speaker matters) or “it is compatible with what we know that Sam is in Boston” (if parties in addition to the speaker matter). We can say that a proposition is known by a group iff every member of the group knows the proposition.

As Weatherson (2008, 534) points out, one motivation for the speaker inclusion constraint is that it provides us with a neat explanation of the infelicity of Moore-paradoxical “might”-sentences like (3):

3. # Sam is in Boston, but he might not be.

If the speaker inclusion constraint holds, then we can explain the infelicity of (3) along the following lines: In uttering the first conjunct, the speaker represents herself as knowing that Sam is in Boston (Kp), perhaps because knowledge is the *norm of assertion* in the sense of Williamson (2000, Ch. 11). If the speaker inclusion constraint holds, then in uttering the second conjunct, the speaker says that it is compatible with what she knows that Sam is not in Boston ($\neg K \neg p$). And that implies that she does not know that he is in Boston ($\neg Kp$). So the sentence is infelicitous because the speaker at once represents herself as knowing that Sam is in Boston and as not knowing that he is in Boston.^{12,13}

What about the second question? How does the context dependence of “might” work? Is “might” a simple indexical like “I” or “today”? On the indexical hypothesis, the semantics for “might” might look like this:

¹²Yalcin (2007) provides an extensive study of how sentences like (3) embed in various environments. But for the unembedded case, he seems sympathetic to this sort of account (see p. 985).

¹³In spite of this motivation, the speaker inclusion constraint is not uncontroversial: see the discussion of ‘exocentric’ uses of “might” in Egan et al. (2005). Thus, one way the contextualist could try to avoid Weatherson’s argument is to deny the speaker inclusion constraint. This isn’t as easy as it might sound, however, since it would seem to require providing an alternative explanation of the infelicity of (3). In any case, I will show that the contextualist doesn’t *need* to take this route, since he has a way of responding to Weatherson’s argument that doesn’t involve denying speaker inclusion. (For a defence of speaker inclusion, see Stephenson (2007) and Weatherson (2008).)

$\llbracket \text{might } \phi \rrbracket^{c,i} = 1$ iff there is a possible world w compatible what the relevant group in c (which includes x_c) knows at t_i in w_i such that ϕ is true at w .

Unfortunately, this hypothesis is more or less refuted by the fact that the set of possibilities over which “might” quantifies appears to shift when “might” is embedded under attitude verbs, attitude verbs which don’t appear to monstrously shift the relevant parameters of the context. Consider a sentence like (4):

4. John thinks that Sam might be in Boston.

Arguably, the truth of (4) in a context c does not require John to think that it is compatible with what the relevant group in c knows that Sam is in Boston (Egan et al. 2005; Stephenson 2007). All that the truth of (4) requires is that John thinks that it is compatible with what *he* (John) knows that Sam is in Boston.

But that interpretation won’t be predicted on the indexical view, since the set of possibilities over which the modal quantifies is tied to the context parameter c , and c does not appear to shift under “thinks” in the appropriate way. To see this, note that (5) does not mean what (4) means, as it should if the indexical account were correct and “thinks” monstrously shifted the relevant parameters of the context:

5. John thinks that it is compatible with what I/we know that Sam is in Boston.

So the indexical account would appear to be wrong. Instead, contextualists might hold that sentences like (2) contain a *hidden variable* in the structure which is assigned a value by a contextually determined variable assignment. So far, we have not included variable assignments in our points of evaluation, but we would need to in order to treat quantificational expressions. We also assume that free pronouns and hidden variables receive a value from the variable assignment, which is itself determined by the context of utterance (via intentions, salience, pointing, etc.).¹⁴ On this proposal, “might ϕ ” has the following logical form and semantics:

$\llbracket \text{Might } x \phi \rrbracket^{c,i,g} = 1$ iff

There is a world w compatible with what $g(x)$ knows at t_i in w_i such that $\llbracket \phi \rrbracket^{c,\langle w, t_i, l_i \rangle, g} = 1$

Here, g is the contextually determined variable assignment.

How does this proposal help account for the fact that “might” shifts under “thinks” in (4)? There are two ways the present proposal can predict the right truth conditions for (4). First, the hidden variable might be free, in which case

¹⁴We might wish to regard the variable assignment as a coordinate of either the context or the index.

the variable assignment can assign it John. The result will be a reading on which (4) is true iff John thinks it is compatible with what he (John) knows that Sam is in Boston, as desired. Alternatively, the sentence might have this structure:

John λx x thinks [might x Sam is in Boston]

If the sentence has this structure, it will again be true iff John thinks it is compatible with what he (John) knows that Sam is in Boston. So the hidden variable account is superior to the indexical account, insofar as it permits the set of worlds which the modal quantifies over in (4) to be the set of worlds compatible with what John thinks he knows.¹⁵

But as Weatherson points out, the speaker inclusion constraint poses a difficulty for this proposal. We noted earlier that the infelicity of Moore-paradoxical “might”-sentences motivates the adoption of that constraint. But in order for the hidden variable account to predict the speaker inclusion constraint more will have to be said about the semantics of the hidden variable. For if the semantics places no constraints on what value the hidden variable can take in unembedded sentences, it is hard to see how the account will satisfy the constraint.

Often when a hidden variable is posited, we *want* the account to be extremely flexible, in order to model the fact that there are very few constraints on what the context is permitted to assign as a value to the variable. This point is often made in connection with the adjective “local” which many theorists believe combines with a hidden variable over individuals, so that “local” always means “local relative to x ”. Flexibility is a virtue in this case, since if an individual i is salient in the context, “local” can almost always mean “local relative to i ” (Egan et al. 2005, 149; Portner 2009, 180). So we want there to be few semantic constraints on the hidden variable associated with “local” in order to accurately reflect facts about its usage.

But given that we accept the speaker inclusion constraint, we want to avoid such flexibility in the present case. Mere salience cannot be enough to make something the value of the hidden variable associated with “might”, otherwise (3) (repeated below) would have a reading on which it was acceptable.

3. # Sam is in Boston, but he might not be.

For surely *Sam* will be salient in any context in which (3) is uttered, in which case (3) should have a reading on which it says: Sam is in Boston, but it is compatible with what he knows that he’s not in Boston. But, as Weatherson observes, the sentence has no such reading since it is simply infelicitous (534).

Overt pronouns provide a model for how to semantically constrain the value of a variable, since it is widely agreed that there are semantic constraints on the

¹⁵One problem with this proposal is that it doesn’t make the shift *obligatory*, since nothing has been said to rule out the possibility that the variable is free and is assigned someone other than John. This is a problem because it seems that (4) can *only* be read as saying something about what John thinks is compatible with his knowledge; it cannot be read as saying something about what John thinks is compatible with the knowledge of someone salient-in- c . I leave this problem aside here, but see footnote 18 for further discussion.

application of overt pronouns. For example, when free, “she” can only refer to a contextually salient female. A standard way of capturing this generalization in the semantics is to assume that “she” has a feminine phi-feature, which is interpreted as a presupposition on the acceptable referents for the pronoun (Heim and Kratzer 1998, 125, 244):

$$[\![\text{she}_2]\!]^{c,i,g} : g(2) \text{ is female. } g(2)$$

A note on this notation: this essentially means that $[\![\text{she}_2]\!]$ is a partial function from $\langle c, i, g \rangle$ -triples to individuals. The function is only defined for a given $\langle c, i, g \rangle$ if g maps 2 to a female; where defined it maps $\langle c, i, g \rangle$ to $g(2)$.

Thus, one could try to capture the speaker inclusion constraint by holding that the hidden pronoun has a first-person (singular or plural) phi-feature requiring its value to be either the speaker or a group that includes the speaker. Let the h_i be the hidden variables associated with “might”. Then we have the following:

$$[\![h_3]\!]^{c,i,g} : g(3) \text{ is (a group that includes) } x_c. \ g(3)$$

The resulting account will satisfy the speaker inclusion constraint, and so explain the infelicity of sentences like (3). For any variable assignment which assigns to the hidden variable associated with “might” a group that does not include the speaker will violate the presupposition on the hidden variable.

The problem with this proposal is that it jeopardizes the hidden variabilist’s account of epistemic modals under attitude verbs (sentences like (4)). We noted two ways the hidden variable contextualist could handle that data. The first is to say that the hidden variable is free and is assigned John by the context. But we can no longer say this, at least not in general. For suppose (4) is uttered in a context in which John is neither the speaker nor party to the conversation in any way. Since on the present account the hidden variable has a presupposition which requires it to pick out (a group that includes) the speaker, if the variable is assigned John, we will have a case of presupposition failure. So the correct reading for (4) is not predicted if the variable is free.

The second way we suggested the hidden variable account might treat (4) involves assigning it the following structure:

$$\text{John } \lambda x \ x \text{ thinks [might } x \text{ Sam is in Boston]}$$

But this proposal is also problematic. For in addition to constraining what a free pronoun can refer to, a pronoun’s phi-features also constrain what sorts of antecedents can bind it.¹⁶ For example, “her” can be bound by “every girl”, but not by “every boy”:

- 6. (a) Every girl_i loves her_i mother.
- (b) # Every boy_i loves her_i mother.

¹⁶There is growing literature on this topic. See, for example, Schlenker (1999, 2003), von Stetow (2002, 2003), Heim (2008), and Kratzer (2009).

This type of pattern is typically explained by presence or lack of phi-featural agreement between the binder and the pronoun. Since such agreement is present in (6a), binding is possible; since it is not in (6b), binding is not possible. And, importantly for the present case, pronouns with the *first-person* phi-feature can typically only be bound by an appropriate first-person antecedent (von Stechow 2002, attributed to Heim):

7. (a) Only I did my homework. (Bound reading \approx “I did my homework and for all individuals $x(x \neq \text{me} \rightarrow x \text{ didn't do } x\text{'s homework.})$ ”)
(b) Only John did my homework. (No bound reading available.)
8. (a) Only we got a question we understood. (Bound reading \approx “We got a question we understood and for all groups $g(g \neq \text{us} \rightarrow g \text{ didn't get a question that } g \text{ understood})$ ”)
(b) Only they got a question we understood. (No bound reading available.)

So if the hidden variable associated with “might” possessed the first-person phi-feature, then we would expect to observe some constraints on what sort of antecedent could bind it. In particular, we might expect that it could be bound by an antecedent containing a first-person pronoun, but not otherwise. But then the hidden variabilist’s proposed structure for (4) is illicit, since it has a proper name (“John”) binding a pronoun with first-person phi-features. Since those elements do not exhibit phi-featural agreement – (7b) shows that “John” does not possess the first-person phi-feature – such binding will be prohibited.¹⁷

So the hidden variabilist either needs to find a different explanation of why the speaker inclusion constraint holds (or an explanation of the infelicity of (3) which does not invoke the constraint) or he needs to find a different explanation of why “might” can shift under attitude verbs like “thinks.” Neither task looks easy. So if hidden variabilism and the indexical approach exhaust the options for contextualists, contextualism would appear to be in trouble.

3.2 Shiftable contextualism

In essence, Weatherston is arguing that the contextualist is unable to accommodate two pieces of data:

- a. The fact that “John thinks Sam might be in Boston” is true iff John thinks it is compatible with what *he* (John) knows that Sam is in Boston.

¹⁷The main divergence between my discussion and Weatherston’s concerns this point about bound variables. He writes: “Semantic constraints on indexical terms [pronouns] hold, as a rule, for both embedded and unembedded uses of those indexicals.” (534). It’s not clear that this is true, however, since a standard way of analyzing sentences like (7a) (e.g. von Stechow 2002, 2003) treats the occurrence of “my” in that sentence as a bound variable, in which case it does not pick out the speaker. But it is presumably a semantic constraint on the first-person pronoun that it picks out the speaker when not bound. What is true is that a pronoun’s phi-features give rise to constraints on what sorts of antecedents can bind it, a fact which, as we’ve seen, does create a problem for the hidden variable hypothesis.

- b. The infelicity of Moore-paradoxical “might” sentences like (3).

Data point (a) by itself scuppered the initial indexical account which we considered, and points (a) and (b) together created a dilemma for the hidden variable contextualist. In order to explain (b), the hidden variabilist needed to claim that the hidden variable associated with “might” possesses the first-person phi-feature. But the latter claim seemed to prevent the hidden variabilist from explaining (a). The hidden variable in (4) can't be free, for otherwise it would have to take the speaker as value, given that the variable has the first-person phi-feature. Nor can the hidden variable in (4) be bound by “John”, since those two elements do not exhibit phi-featural agreement.

But contextualism is not sunk. I will argue that what I shall call *shiftable contextualism* offers an elegant treatment of both pieces of data. If that's right, then (a) and (b) do not constitute argument against contextualism after all—they only constitute an argument against *specific versions* of contextualism. Shiftable contextualism consists of two components: (i) a semantic theory, and (ii) a definition of assertoric content. After outlining shiftable contextualism, I'll come back to say why relativists might have thought that (a) and (b) provide motivation for relativism.

The semantics begins by expanding the index so that it includes an individual (or a ‘judge’); so an index i is now a triple consisting of a world w_i , a time t_i , and an individual x_i (I ignore the location parameter for simplicity). The next step is to make the meaning of “might” sensitive to the individual parameter in the right way. One simple way to do this is to write it directly into the lexical entry of “might”:

$$\llbracket \text{might } \phi \rrbracket^{c,i,g} = 1 \text{ iff there is a world } w \text{ compatible with what } x_i \text{ knows at } t_i \text{ in } w_i \text{ such that } \llbracket \phi \rrbracket^{c,\langle w,t_i,x_i \rangle,g} = 1$$

The next crucial component is the meaning of attitude verbs like “thinks”. We want “thinks” to do two things: (i) to quantify over the possible worlds compatible with what the attitude holder x thinks, and (ii) to shift the value of the individual coordinate of the index to x . Thus, we have:

$$\llbracket \text{John thinks } \phi \rrbracket^{c,i,g} = 1 \text{ iff}$$

All the worlds w compatible with what John thinks at t_i in w_i are such that $\lambda i'. \llbracket \phi \rrbracket^{c,i',g}(w, t_i, \text{John}) = 1$ iff

All the worlds w compatible with what John thinks at t_i in w_i are such that $\llbracket \phi \rrbracket^{c,\langle w,t_i,\text{John} \rangle,g} = 1$

Putting these pieces together demonstrates how the account deals with data point (a), the fact that John is individual whose body of knowledge is relevant for interpreting the modal:

- a. $\llbracket \text{John thinks might Sam is in Boston} \rrbracket^{c,i,g} = 1$ iff

- b. All the worlds w compatible with what John thinks at t_i in w_i are such that $\lambda i'. \llbracket \text{might Sam is in Boston} \rrbracket^{c, i', g}(w, t_i, \text{John}) = 1$ iff
- c. All the worlds w compatible with what John thinks at t_i in w_i are such that $\llbracket \text{might Sam is in Boston} \rrbracket^{c, \langle w, t_i, \text{John} \rangle, g} = 1$ iff
- d. All the worlds w compatible with what John thinks at t_i in w_i are such that there is a world w' compatible with what John knows at t_i in w such that Sam is in Boston at t_i in w' .¹⁸

(Note the role the compositional/Kaplanian content of “Sam might be in Boston” plays in line (b).) On this semantics, the modal in (4) ends up quantifying over the worlds compatible with what John thinks *he* (John) knows, not over the worlds compatible with what John thinks (a group including) the speaker knows, as it was on the indexical account. So (4) is true at a context c iff John thinks (at t_c in w_c) that it is compatible with what *he* (John) knows that Sam is in Boston, as desired.

What about data point (b), the infelicity of Moore-paradoxical “might”-sentences like (3), repeated here:

- 3. # Sam is in Boston, but he might not be.

To explain how shiftable contextualism handles this, we should say something about the shiftable contextualist’s definition of assertoric content.

As a genuine contextualist (as opposed to relativist), the shiftable contextualist wants the assertoric content of an epistemically modalized sentence to be something that does not vary in truth value across individuals. Let’s assume that the shiftable contextualist wants the assertoric content of a sentence at a context to be a possible worlds proposition. To achieve this end, the shiftable contextualist can adopt Lewis’s definition of assertoric content: the assertoric content of a sentence at a context is the proposition one gets by abstracting over the world parameter in the index while setting all the other index parameters to their corresponding context values. If we assume that the ‘corresponding context value’ for the individual parameter of the index is the speaker, a simple “might”-claim like (2) will express the following proposition:

$$\begin{aligned} & \lambda w. \llbracket \text{Might Sam is in Boston} \rrbracket^{c, \langle w, t_c, x_c \rangle, g} \\ &= \lambda w. \text{there is a world } w' \text{ compatible with what } x_c \text{ knows at } t_c \text{ in } w \text{ such} \\ & \quad \text{that Sam is in Boston in } w'. \end{aligned}$$

The modal ends up quantifying over the worlds compatible with what the speaker knows. This is because the lexical entry for “might” ensures that it quantifies over the worlds compatible with what the individual in the index

¹⁸Note that this semantics makes the shift obligatory: (4) *must* be read as saying that John thinks it is compatible with what he knows that Sam is in Boston. Earlier we noted that this is a desirable prediction, one not yielded by the hidden variable account (see n. 15).

knows, and that parameter is set to the speaker in the definition of assertoric content.

So, on this account, the assertoric content of (2) at a context c is the proposition that it is compatible with the speaker knows that Sam is in Boston. So the account satisfies the speaker inclusion constraint, which means we can explain the infelicity of (3) just as we did earlier. In uttering the first conjunct, the speaker represents herself as knowing that Sam is in Boston (Kp). But the second conjunct expresses the proposition that it is compatible with what the speaker knows that Sam is not in Boston ($\neg K \neg p$). So in uttering the second conjunct, the speaker implies that she does not know that Sam is in Boston ($\neg Kp$). The sentence is infelicitous because in uttering it, the speaker is bound to represent her epistemic state in an inconsistent way.

So the shiftable contextualist about epistemic modals can explain both the infelicity of sentences like (3), and the fact that the interpretation of “might” shifts under attitude verbs. That means that this version of contextualism escapes Weathererson’s argument.

This account is contextualist because sentences like (2) express different propositions in different contexts, propositions which do not vary in truth value across individuals. “Shiftable” is appropriate since the individual whose knowledge is relevant for interpreting the modal can be (non-monstrously) shifted from its default value (the speaker) by an attitude operator. In general, shiftable contextualism about an expression e will arise whenever (a) e is sensitive to parameter X of the index, but (b) parameter X is fixed to its corresponding context value in the definition of assertoric content. Lewis’s own specific combination of views gives rise to shiftable contextualism about any expression that is sensitive to the time or to the location or to the standards-of-precision parameter of the index.

Shiftable contextualism about epistemic modals tends to get overlooked in the literature on these topics.¹⁹ Why is that? Recall the First Dogma: if indices contain a parameter X , then the objects of assertion must be X -neutral. If you assume that something like the First Dogma is true, you will overlook the possibility of shiftable contextualism. The First Dogma say that since the semantics adopted by the shiftable contextualist about epistemic modals has an individual parameter in the index, the objects of assertion must be ‘individual-neutral.’ More specifically, if you identify Kaplanian/compositional content with assertoric content, you get the result that the assertoric content of (2) is a centered proposition (cf. line (b) of the derivation on p. 16):

$$\begin{aligned} & \lambda\langle w, t, x \rangle. [\text{Might Sam is in Boston}]^{c, \langle w, t, x \rangle, g} \\ &= \lambda\langle w, t, x \rangle. \text{it is compatible with what } x \text{ knows at } t \text{ in } w \text{ that Sam is in Boston.} \end{aligned}$$

¹⁹A notable exception is Yalcin (2007), who is admirably clear on the relationship between the semantics proper and the question of what information is expressed by a sentence at a context (see, for example, p. 1006). What Yalcin calls “the diagonal view” (1009ff.) is very similar in certain respects to shiftable contextualism.

But this isn't compatible with contextualism, since on this view the assertoric content of (2) doesn't vary across contexts. Rather, this view is a form of *relativism* about epistemic modals, relativism being the view that the assertoric content of a sentence like (2) varies in truth value across individuals.²⁰ If the assertoric content of (2) is the above 'individual-neutral' proposition, the result is relativism, because that individual-neutral proposition could be true for me (if I don't know where Sam is), but false for you (if you know he's in London).

Thus, if you assume the First Dogma, you will simply overlook the possibility of a position like shiftable contextualism. But as we saw in the last section, the First Dogma is false: simply accepting that a certain parameter X appears in the index does not commit one to X -neutral assertoric contents. Thus, simply accepting the 'individual in the index' semantics does not commit one to relativism. A contextualist can accept that semantics so long as she is careful about how she defines the assertoric content of a sentence at a context.

4 Extensional semantics and the objects of assertion

So far we've been examining the First Dogma and what its failure might mean for the debate over epistemic modals. We now turn our attention to the Second Dogma, which says that if the index does *not* contain a parameter X , then the objects of assertion must be X -specific. Whether the Second Dogma is true is an interesting question in light of the recent trend among linguists and philosophers towards *extensional* treatments of shifty phenomena like tense and modality. So far we've been assuming the traditional intensional approach to these expressions, an approach pioneered by Kaplan and Lewis, among others. But in recent years, a number of linguists and philosophers have argued that shifty phenomena like tense and modality ought be treated *extensionally*, i.e. within a system of object language quantifiers and variables that range over times and worlds. Instead of having worlds and times in the index, an extensional system has world and time variables appearing explicitly in the syntax (think of the difference between modal logic, on the one hand, and a first-order theory that employs explicit quantification over possible worlds, on the other).

There are at least two motivations for moving towards an extensional treatment of a given shifty phenomenon. The first is that there are certain parallels between the shifty phenomenon in question, on the one hand, and ordinary pronouns ("he", "she", etc.), on the other. This point has been most extensively

²⁰On this way of carving things up, *nonindexical contextualism* and *assessment relativism* are both species of relativism (see MacFarlane (2009) for this distinction). Those two positions differ on the definition of truth at a context, but agree on what the assertoric content of a sentence at a context is. Since I'm largely interested in the connection between semantics and assertoric content, it makes sense to gloss over that distinction in the present context. (For general skepticism about the utility of the distinction between nonindexical contextualism and assessment relativism, see Cappelen and Hawthorne (2009, 20 - 24).)

I should mention that Portner (2009, 178ff.) responds to a similar anti-contextualist argument by pointing out that Tamina Stephenson's (2007) semantics evades that argument. But Stephenson's view would count as a version of relativism on the (admittedly somewhat stipulative) taxonomy adopted here.

pursued in connection with tense (Partee 1973; Kratzer 1998), but a similar case has also been made for modality (Stone 1997; Schlenker 2006). In the case of tense, theorists have pointed out that, like pronouns, tenses give rise to deictic readings, anaphoric readings, bound readings, and ‘pseudo-bound’ (or ‘donkey’) readings. And tenses, like pronouns, can lose interpretable phi-features under binding (sequence of tense). Given these striking parallels, goes this argument, tenses and pronouns ought to be treated in a parallel fashion. Since pronouns are treated within an extensional system, tenses should likewise be treated extensionally. A similar argument can be made in the modal case.

The second argument concerns expressive power and more general theoretical virtues. So far we’ve been considering quite simple intensional semantic theories, theories with a context and single index. A number of arguments – summarized in Cresswell (1990) – show that such theories cannot model the full expressive power of natural language. Indeed, Cresswell argues that natural language possesses the expressive power of a language that has explicit quantification over times and possible worlds. This by itself does not motivate an extensional treatment, however, since Cresswell also shows how an *intensional* theory can be enriched so that it has the expressive power of an extensional system (the required intensional system has infinitely many operators and indices). However, some theorists have suggested that extensional theories should nevertheless be preferred to rich intensional theories on grounds of explanatory power, simplicity, and elegance. For example, Kusumoto (2005, 354 - 355) tentatively suggests that extensional approaches to tense may be in a better position to explain data concerning the temporal interpretation of nouns in argument position and noun-modifying participles, while King (2003, 221 - 223) argues that extensional theories of tense are simpler, more elegant, and more faithful to surface structure than their intensional counterparts.

My interest here is not in deciding whether or not we should adopt an extensional theory of tense and/or modality. Rather, I am interested in what this development might mean for what we can take the objects of assertion to be. If tense, for example, ought to be treated extensionally, then indices would no longer contain times. If the Second Dogma is true, this would mean that the objects of assertion are time-specific. A similar argument could be run from an extensional account of modality to the claim that the objects of assertion are *world*-specific.

Indeed, several theorists *have* made claims of this sort, assuming something like our Second Dogma.²¹ Consider, for example, a recent dispute between Recanati (2004) and Stanley (2005) over temporalism, the doctrine that the objects of assertion vary in truth value across times.²² In his discussion, Recanati considers an objection to temporalism which says that if contents were neutral with respect to time, then they would not be truth-evaluatable, because they would

²¹See, for example, King (2003), Stanley (2005), and Schaffer (Forthcoming, 2009). Brogaard (2007) also assumes the Second Dogma, but since she seeks to defend temporalism, she defends an intensional treatment of tense.

²²A.N. Prior is perhaps the best-known defender of temporalism. See, for example, Prior (1968).

be incomplete. Recanati responds by pointing out that this argument fails if circumstances of evaluation contain times, because then time-neutral contents can still be evaluated for truth relative to the time parameter of a circumstance:

Once it is admitted that we need a circumstance over and above the content to be evaluated, we can part with Frege and, following Prior, tolerate contents that are not ‘semantically complete’ in Frege’s sense, that is, endowed with absolute truth-conditions. We can, because the circumstance is there which enables the content to be suitably completed. Thus the content of tensed sentences is semantically incomplete, yet the circumstance (the time) relative to which such a sentence is evaluated is sufficient to complete it.
(Recanati 2004, 122)

Stanley responds that since tenses ought to be treated extensionally, indices do not contain times, and so Recanati’s defense of temporalism is undermined:

The problem with Recanati’s appeal to circumstances of evaluation to justify incomplete semantic contents is that it is in tension with much of current linguistic research... most linguists hold, contra Recanati, that tenses are not operators, and times are part of semantic content, rather than being features of circumstances of evaluation... Recanati must show this entire line of research to be incorrect. In particular, he must demonstrate the viability of (say) an operator account of phenomena, such as sequence of tense, which have led researchers to treat tenses as predicates of times or events. This is a substantial obstacle to Recanati’s program. Indeed, one way of seeing the debate between indexicalism [Stanley’s view] and contextualism [Recanati’s view] is that the indexicalist position is the natural descendant of the trend in linguistic theory (starting with Partee (1973)) away from operator approaches of tense, and relativity of content generally, and towards explicit syntactic representation of elements that were once thought of as features of circumstances of evaluation.²³ (Stanley 2005, 245)

As I understand this passage, Stanley argues that since tenses should be treated extensionally, contents should be thought of as time-specific (“times are part of semantic content”). Stanley also sees the move “away from operator approaches to tense” as part of a more general move away from the “relativity of content.” As we move away from intensional approaches towards extensional ones, contents become less ‘relative,’ in the sense that their truth values are specified

²³I should note that it is not clear to me that Recanati’s argument requires that there be a time parameter in the indices employed in the semantics proper, as Stanley seems to assume. All the argument requires is the idea that ‘it takes two to make a truth’ (Austin 1971, 124)—a content and a thing relative to which we can evaluate that content for truth. We might call that latter object a *circumstance of evaluation*, but circumstances in this sense need not be the same sorts of things as the indices that figure in the semantics proper.

relative to a fewer number of parameters. All this suggests that Stanley thinks something like our Second Dogma is true, and that an extensional treatment of a parameter X leads to X -specific contents.

In his influential (2003) paper, King endorses an analogue of the Second Dogma, one which says that if indices do not contain a parameter X , then *semantic values* (i.e. compositional contents) must be X -specific:

I shall argue that temporal expressions (including tenses) and location expressions are not best understood as sentence operators that shift features of the index of evaluation. If this is correct, then indices do not need to contain times or locations for such purported operators to shift... This leaves only worlds and standards of precision as coordinates of indices. And this, in turn, leaves us with the view that variable but simple semantic values of sentences are, or determine, functions from worlds and standards of precision to truth-values. (215)

Since functions from worlds and standards are location- and time-specific, King's semantic values (compositional contents) are location- and time-specific. This suggests that King thinks that if indices fail to contain location- and time-parameters, then compositional contents will be location- and time-specific, an analogue of the Second Dogma. Although this principle concerns compositional, rather than assertoric, content, it is obviously closely related to the Second Dogma, especially in light of the overall aim of King's paper, which is to defend the identity of compositional and assertoric content.

Schaffer (2009) extends this general line to the modal case, arguing that Partee-style considerations suggest that both tenses and modals should be treated extensionally:

King – drawing on referential treatments of temporality – argues that propositions are specific with respect to time. I will be drawing on referential treatments of modality to argue that propositions are equally specific with respect to world. (1)

Like Stanley and King, Schaffer assumes that one can move from an extensional treatment of a parameter X to the claim that contents are X -specific.

But what exactly is the argument for the move from ‘no X parameter in the index’ to ‘ X -specific assertoric (or compositional) contents’? Why should we think anything like the Second Dogma is true? To answer this question, it will help to look at a specific example. I'll consider the case of tense, and, in particular, a slight variant of the extensional semantics for tense discussed in Kusumoto (1999, Ch.1).

To see how that theory works, consider a past tensed sentence like (9):

9. Elliot danced.

On the proposed analysis, (9) has the following logical form:

$t^* \text{ PAST } \lambda t_2 t_2 \text{ Elliot dances}$

Each predicate takes a time argument: t_2 is a time variable and an argument of “dances” and t^* is an argument of the past tense. t^* is a designated element that directly picks out the utterance time (cf. Dowty 1982; King 2003):

$$[t^*]^{c,w_i,g} = t_c$$

Note that in this system, indices contain only worlds.

The past tense receives the following lexical entry:

$$[\text{PAST}]^{c,w_i,g} = \lambda p_{\langle r,t \rangle}. \lambda t_r. \text{ there is a time } t' < t \text{ such that } p(t') = 1.^{24}$$

Here p is a meta-language variable ranging over functions from times to truth values, and t a meta-language variable ranging over times (times are of type r).

Given this semantics, the extension of (9) at a point of evaluation is a truth value:

$$[t^* \text{ PAST } \lambda t_2 t_2 \text{ Elliot dances}]^{c,w_i,g} = 1 \text{ iff there is a time } t < t_c \text{ such that Elliot dances at } t \text{ in } w_i.$$

And since the index contains only a world, abstracting over the index yields a function from worlds to truth values, i.e. a possible worlds proposition:

$$\begin{aligned} \lambda w. [t^* \text{ PAST } \lambda t_2 t_2 \text{ Elliot dances}]^{c,w,g} \\ = \lambda w. \text{ there is a time } t < t_c \text{ such that Elliot danced at } t \text{ in } w. \end{aligned}$$

Since possible worlds propositions are time-specific – they do not vary in truth value over times – it would appear that contents on this account are time-specific.

Stanley et al. presumably have an argument like this in mind when they suggest that an extensional account of tense is incompatible with time-neutral assertoric contents (or compositional contents in King’s case). It’s worth pointing that even if one is happy with this particular result – eternalism about assertoric content – one might be concerned about this *general style* of argument, since, as Schaffer points out, a parallel argument can be made for the claim that the objects of assertion are modally specific. But many theorists will be less pleased with *that* result. For most philosophers assume, for a variety of different reasons, that the objects of thought and talk are things that can vary in truth value across possible worlds. For example, one needs assertoric contents to determine contingent possible worlds propositions if one wants to model assertions as attempts to remove possible worlds from the ‘context set,’ in the sense of Stalnaker (1978).²⁵

²⁴As Lasersohn (1999, 536 - 537) and Recanati (2007, 56) point out, the quantification over past times should probably be contextually restricted to deal with examples of ‘deictic tense’ (Partee 1973).

²⁵In an attempt to defend the modal neutrality of compositional contents, King (2003, 228 - 229) argues that modals should in fact be treated as operators. But the issue I’m interested in here is whether one *needs* to do that in order to defend modal neutrality.

I think that this style of argument can be resisted, and that the Second Dogma is in fact false. I will sketch two ways a temporalist can reconcile her views about the objects of assertion with an extensional theory of tense. These strategies will both generalize to the modal case, and so my argument also shows that advocates of modally neutral propositions have nothing to fear from extensional accounts of modality. Only one of the two strategies extends to King's compositional content analogue of the Second Dogma, and so I begin with that one.

In the extensional theory of tense we considered, it was assumed the temporal indexical t^* occurred at the top of each structure. But this is not a mandatory feature of an extensional theory of tense, and not all extant extensional theories make this assumption. Alternatively, one might replace t^* with a time variable which is bound by a λ -binder occurring at the top of the structure. The proposed λ -binder binds all otherwise free time variables in its scope. On this proposal, (9) would have the following logical form:

$$\lambda t_1 t_1 \text{ PAST } \lambda t_2 t_2 \text{ Elliott dances}$$

If the temporalist take this to be the logical form of (9), and then identifies assertoric content with compositional/Kaplanian content, she gets the result that the assertoric content of (9) is the following temporal proposition:

$$\begin{aligned} & \lambda w. [\lambda t_1 t_1 \text{ PAST } \lambda t_2 t_2 \text{ Elliott dances}]^{c,w,g} \\ &= \lambda w. \lambda t. \text{ there is a time } t' < t \text{ such that Elliot danced at } t' \text{ in } w. \end{aligned}^{26}$$

Note that this semantics suffices to show that both the Second Dogma and King's analogue of it fail. The Second Dogma say that if indices fail to contain a time parameter, then the objects of assertion cannot be time-neutral. But here we have a semantic theory without a time parameter in the index *and* we have time-neutral objects of assertion. King's analogue of the Second Dogma says that if indices fail to contain a time parameter, then compositional contents cannot be time-neutral. But again: here we have a semantic theory without a time parameter in the index and we have time-neutral compositional contents.

Note that a parallel move could be made in the modal case. Instead of an extensional semantics that has a modal indexical at the top of each structure, a defender of modal neutrality could posit a λ -binder at the top of the structure which binds otherwise-free world variables. The result would be modally neutral compositional contents, and so if we identify compositional and assertoric content, we will get modally neutral assertoric contents as well.

Earlier I alluded to the fact that theories of this kind can be found in the literature. Schlenker (2004) discusses a theory which posits three λ -binders at the top of each structure, one binding otherwise-free world variables, one binding otherwise-free time variables, and one binding otherwise-free first-person

²⁶Here we have not a function from world-time pairs to truth values, but a notationally equivalent way of representing a temporal proposition: a function from worlds to functions from times to truth values.

pronouns, thus making compositional/assertoric contents centered propositions. Similarly, in his extensional theory of modality, Percus (2000) posits a λ -binder at the topic of each structure binding otherwise-free variables over possible situations, thus making compositional/assertoric contents modally neutral.

Our second strategy for reconciling an extensional treatment of tense with time-neutral contents applies only to assertoric content. Part of the argument against temporalism ran like this: since indices contain only possible worlds, a function from indices to truth values is a function from possible worlds to truth values; since the latter do not vary in truth value over time, the objects of assertion do not vary in truth value over time either. But this argument depends on identifying functions from indices to truth values – compositional/Kaplanian contents – with assertoric contents. But as we learned in section 2 of this paper, this way of defining the notion of assertoric content is not obligatory. So the temporalist can resist this argument by adopting a different definition of assertoric content. In particular, she can accept the foregoing extensional semantics and retain temporalism if she takes the assertoric content of a sentence ϕ at a context c to be the *temporal diagonal* of ϕ at c :

$$\text{Temporal Diagonal of } \phi \text{ at } c: \lambda\langle w, t \rangle. \llbracket \phi \rrbracket^{\langle w, t, x_c \rangle, w, g}$$

Given this definition of assertoric content, we get the result that the assertoric content of (9) is a temporal proposition, one that is true at a world-time pair $\langle w, t \rangle$ just in case Elliott danced at some time t' prior to t in w :

$$\begin{aligned} & \lambda\langle w, t \rangle. \llbracket t^* \text{ PAST } \lambda t_2 t_2 \text{ Elliott dances} \rrbracket^{\langle w, t, x_c \rangle, w, g} \\ &= \lambda\langle w, t \rangle. \text{ there is a time } t' < t \text{ such that Elliott dances at } t' \text{ in } w. \end{aligned}^{27}$$

So if the temporalist accepts this definition of assertoric content, she can accept this particular extensional semantics for tense.²⁸

Note again that a similar strategy would also allow us to combine an extensional account of modality with a commitment to modally neutral objects of assertion. If we have an extensional theory of modality similar to this extensional theory of tense, then identifying the assertoric content of ϕ at c with either the temporal diagonal of ϕ at c or the *diagonal proposition* of ϕ at c will result in modally neutral objects of assertion:

²⁷A more detailed computation:

$$\begin{aligned} & \lambda\langle w, t \rangle. \llbracket t^* \text{ PAST } \lambda t_2 t_2 \text{ Elliott dances} \rrbracket^{\langle w, t, x_c \rangle, w, g} \\ &= \lambda\langle w, t \rangle. [\llbracket \text{PAST} \rrbracket^{\langle w, t, x_c \rangle, w, g} (\llbracket \lambda t_2 t_2 \text{ Elliott dances} \rrbracket^{\langle w, t, x_c \rangle, w, g}) (\llbracket t^* \rrbracket^{\langle w, t, x_c \rangle, w, g})] \\ &= \lambda\langle w, t \rangle. [\llbracket \text{PAST} \rrbracket^{\langle w, t, x_c \rangle, w, g} (\lambda t'. \text{ Elliott dances at } t' \text{ in } w)(t)] \\ &= \lambda\langle w, t \rangle. \text{ there is a time } t'' < t \text{ such that } [\lambda t'. \text{ Elliott dances at } t' \text{ in } w](t'') = 1 \\ &= \lambda\langle w, t \rangle. \text{ there is a time } t'' < t \text{ such that Elliott dances at } t'' \text{ in } w \end{aligned}$$

²⁸Our two versions of temporalism will agree on the assertoric content of all sentences that do not contain temporal indexicals like “now” or “today”. But the second, diagonal account will assign a sentence containing temporal indexicals a content that varies in truth value over times (since the diagonal ‘undoes’ the effect of indexicals on content), whereas the first account will assign such sentences contents that have the same truth value at all times.

Diagonal Proposition of ϕ at c : $\lambda w. \llbracket \phi \rrbracket^{\langle w, t_c, x_c \rangle, w, g}$

Thus, an advocate of time-neutral contents can accept an extensional treatment of tense, and an advocate of world-neutral contents can accept an extensional treatment of modality, so long as each makes the right assumptions about logical form and chooses the right definition of assertoric content. It isn't the *extensional* nature of the semantics that provides theorists like Stanley and King with an argument against time-neutral contents, but rather certain specific features of certain specific extensional theories. The Second Dogma is false: one can accept that a parameter X occurs in the syntax rather than in the index without accepting that the objects of assertion are X -specific.

5 Summary

As Lewis showed, if indices contain a parameter X , the objects of assertion may nevertheless be X -specific. This observation allowed us to formulate a version of contextualism about epistemic modals which is immune to Weatherson's argument. And as we have argued, the converse of Lewis's point is also true: even if indices fail to contain a parameter X , the objects of assertion may nevertheless be X -neutral. Thus, one cannot argue from an extensional treatment of tense or modality to the claim that the objects of assertion are temporally or modally specific.

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