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Dynamic Semantics

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Abstract

This entry focuses on foundational issues in dynamic semantics and static semantics, specifically on what is conceptually at stake between the dynamic framework and the classic, truth-conditional framework, and consequently what kinds of evidence support each framework. The article examines two questions. First, it explores the consequences of taking the proposition as central semantic notion as characteristic of static semantics, and argues that this is not as limiting in accounting for discourse dynamics as many think. Specifically, it explores what it means for a static semantics to incorporate the notion of context change potential in a dynamic pragmatics and denies that this conception of static semantics requires that all updates to the context be eliminative and distributive. Second, it argues that the central difference between the two frameworks is whether semantics or pragmatics accounts for dynamic effects, and explores what this means for the oft-heard claim that dynamic semantics blurs the semantics/pragmatic distinction.

Keywords: dynamic semantics, static semantics, truth-conditional semantics, pragmatics, context, discourse, discourse dynamics, semantics-pragmatics distinction, dynamic pragmatics

A useful starting point is to think of classical, static semantics as taking the semantic content of sentences to be propositions, which determine truth conditions, and the semantic values of sub-sentential expressions to be their contributions to the truth-conditions of the whole sentence. By contrast, dynamic semantics takes updates to the conversational context as a starting point. The semantic values of discourses, sentences, and sub-sentential expressions are what they contribute to the

current state of the discourse, generally conceived of as *context change potentials* (CCPs), which are functions from context to context, or relations between contexts. Intuitively, they are instructions or recipes for updating the context. There is no one concept of context that is inherent to the dynamic semantic framework, though contexts are generally thought to be representations of the current state of the conversation, or the information states of the conversational participants, and not the literal, physical environment in which the conversation takes place, and they are richer than a Kaplanian index, which generally keeps track of only the speaker, addressee, time, place, and maybe a few other things. People disagree as to what exactly has to be in the context, and they also disagree as to whether the context is a sort of mental object, or an abstract, objective representation of the state of the conversation.

Since the late 1970s, much work has been done in dynamic semantics, and it would be impossible to canvas it all here. Some examples of the kind of data that motivates dynamic semantics and the dynamic treatments of that data will be briefly discussed in §1 below. This entry will not focus on the evaluation of specific theories. I will also put aside the question of how much dynamic phenomena there is in discourse, as well as the question of how Discourse Representation Theory (DRT) fits into the classification of static and dynamic theories. Rather, I'll focus on the question of what is really at stake between the dynamic and static conceptions of semantics. In §2, I explore the consequences of taking the centrality of the proposition as characteristic of the static view, arguing that this is not as limiting in accounting for discourse dynamics as many think. In §3 I propose that the difference between static and dynamic semantics ultimately lies in whether pragmatics or semantics accounts for discourse dynamics and what this means for claims that dynamic semantics blurs the semantics/pragmatics distinction.

1 Data

In the beginning, dynamic semantics was primarily motivated by two phenomena: unbound anaphora and presupposition. Since then, it has been fruitfully applied to various other phenomena including modals, conditionals, and imperatives. It is beyond the scope of the present paper to give a full overview or evaluation of all the dynamic accounts of the various phenomena. This brief overview is just meant to give the reader a feel for the dynamic semantic framework as well as a point of reference for the discussion below.

1.1 Presupposition

Some sentences seem to take for granted other information. For example, when someone says (1a) they are taking for granted (1b). Call (1b) the presupposition of (1a):

(1) a. Claudia stopped smoking.

b. Claudia used to smoke.

Presuppositions are also marked by their *projection behavior*, that is, some sentences that embed other sentences with presuppositions have the same presuppositions as the sentences they embed, while others don't. For example (2a-b) both also presuppose (1b), while (2c) doesn't:

(2) a. Claudia hasn't stopped smoking.

b. Has Claudia stopped smoking?

c. If Claudia used to smoke, she stopped smoking.

Moreover, sentences with presuppositions display *order effects*; the first in each of the following two pairs is felicitous, while the (b) sentence is infelicitous:

(3) a. Claudia used to smoke and she stopped smoking.

b. # Claudia stopped smoking and she used to smoke.

(4) a. Claudia used to smoke. She stopped smoking.

b. #Claudia stopped smoking. She used to smoke.

The classic dynamic semantics for presupposition projection was first proposed by Heim (1983).[1] The key to Heim's theory of presupposition is the dynamic conception of *support* (also called *acceptance*, *admittance*, or *satisfaction*): a context supports a sentence ϕ if and only if updating with ϕ returns the same state, that is, the content of ϕ was already contained in the context. (Formally, context c supports ϕ iff $c[\phi] = c$.) The idea is that for a context to be updated with a presuppositional sentence like (1a), the context has to support the presupposition, otherwise the update cannot succeed. Suppose for simplicity that contexts are just sets of worlds, namely those worlds left as open possibilities given the current state of the conversation. Here is a sample of Heimian semantic clauses:

Basic case: $c[\phi] = \left\{ \begin{array}{l} \text{if c supports the presuppositions of } \phi\text{, } c \cap \phi \\ \text{undefined otherwise} \end{array} \right\}$
Negation: $c[\neg\phi] = c - c[\phi]$ (where '-' is set-subtraction)
Conjunction: $c[\phi \text{ and } \psi] = c[\phi][\psi]$
Conditional: $c[\phi \rightarrow \psi] = c - (c[\phi] - c[\phi][\psi])$

There are a few things to note. First, as in all dynamic semantic systems, conjunction is not commutative. Conjunction amounts to updating first with the first conjunct and then with the second. Since conjunction and sequential sentences are both treated the same, this explains the order effects observed in (3) and (4). Suppose we begin with a context in which it is an open question whether Claudia used to smoke. In the felicitous cases, the context is first updated with the information that Claudia used to smoke; this is an ordinary, basic case kind of update (there are no presuppositions to be satisfied). The context now supports the presupposition of the second sentence, and so everything proceeds just fine. But in the second case, the context doesn't support the presupposition of the first sentence, and the update crashes. The clause for negation explains why (2a) also presupposes that Claudia used to smoke; since updating a context c with $\neg\phi$ involves updating c with ϕ along the way, c has to support the presuppositions of ϕ. The clause for the conditional explains why (2c) doesn't presuppose that Claudia used to smoke. The only context that has to support the presuppositions of the consequent (i.e. 'Claudia stopped smoking') is the context c updated with antecedent, and since the antecedent just is the presupposition of the consequent, it is guaranteed to do so.

This brings us to another important feature of dynamic semantics: dynamic semantics distinguishes between a notion of *global* and *local* context. The global context is just what we've been thinking of as the context, the state of the conversation at any point. A local context is a temporary context created while processing a larger expression. For example, in the case of Heim's semantics for conditionals, a local context is created by temporarily updating with the antecedent before updating with the consequent, but this update with the antecedent is not permanent — it does not get passed on to the output context after the processing of the conditional is complete.

1.2 Anaphora

Pronouns anaphoric on indefinites also demonstrate seemingly dynamic properties both at the discourse and sub-sentential level. For example, in (5), the pronoun in the (b) sentence gets its value from the indefinite 'a woman' , but 'a woman' neither

syntactically binds the pronoun nor does it straightforwardly provide a referent, since 'a woman' is not a referring term:

(5) a. A woman walked in.

b. She sat down.

Furthermore, these sorts of examples exhibit order effects similar to those in the case of presupposition (the (b) sentences in each discourse are infelicitous on a reading in which 'a woman' and 'she' are co-indexed):

(6) a. A woman walked in and she sat down.

b. # She sat down and a woman walked in.

(7) a. A woman walked in. She sat down.

b. # She sat down. A woman walked in.

Unbound anaphora also interacts in apparently systematic ways with connectives, quantifiers, and operators, for example, anaphora is generally unavailable when the indefinite is embedded under negation:

(8) It's not the case that a woman walked in. #She sat down.

Indefinites also provide values for unbound anaphoric pronouns at a sub-sentential level, called *donkey sentences* after the example made famous by Geach (1962):

(9) If a farmer owns a donkey, he beats it.

(10) Every farmer who owns a donkey beats it.

Abstracting away from the particularities of various views, on the dynamic semantic framework, indefinites are generally thought to introduce *discourse referents*, which then provide values for subsequent anaphoric pronouns. Adding discourse referents to the context requires that we think of contexts as more complex than just sets of worlds; they have to include at least sets of worlds and discourse referents (which can be modeled, for example, as sets of assignment functions). Discourse referents are not to be confused with referents, or objects in the world, but intuitively represent something like objects for the sake of conversation (or according to the conversation). For example, in (5), there is not necessarily a particular woman in the world that the discourse is about, but there is, according to the conversation, a

single object under discussion that has the properties of being a woman, walking in (to the contextually salient place) and sitting down. (5a) introduces a discourse referent (into the global context), call it x, which has the properties of being a woman and walking in. The (b) sentence then tests the context, only allowing through those values for x that also include the property of sitting down. In this way, the indefinite in the first sentence dynamically (semantically) binds the pronoun in the second sentence without syntactically binding it.[2]

Certain connectives, like conjunction, allow values to be passed from the first conjunct to the second (but not vice versa, so again, conjunction is non-commutative). Other connectives, like the negation and conditional, block anaphoric connection between indefinite and pronoun when the indefinite occurs within the scope of the connective and the pronoun outside of it, but license the connection when they are both within the scope of the same connective. Another way to think about it in the dynamic semantic framework is that indefinites in certain contexts, like unembedded or in conjunctions, introduce discourse referents into global context. When embedded under negation, quantification or in a conditional, they introduce discourse referents merely into the local context but not the global context, and some (like, arguably, disjunction), neither license discourse referents in global nor local contexts.

1.3 Epistemic modals

Epistemic modals also exhibit order effects in conjunctions and in consecutive sentences, for example, where the door is opened to reveal who is behind it at the ellipsis:

(11) a. Mary Anne might be at the door... Mary Anne is not at the door.

b. #Mary Anne is not at the door... Mary Anne might be at the door.

Furthermore, as Yalcin (2007) points out, it is not easy to treat the infelicity of examples like (11b) pragmatically, by appealing to Moore's paradox considerations, because the infelicity persists when embedded under supposition:

(12) # Suppose Mary Anne is not at the door and she might be at the door.

Though Yalcin does not technically propose a dynamic semantics, his semantics uses the tools of the traditional dynamic semantics for epistemic modals, following Veltman (1996). In dynamic semantics, epistemic modals like 'might' and 'must' are treated like tests on the context, where the context is taken to be a set of worlds representing some information state (it is open whether this is the information state

of the speaker, or some group, etc.). 'Might ϕ' tests to see if the context contains at least one ϕ-world. If it does, the entire context passes through as output, unchanged. If there is no ϕ-world, the update crashes, and there is no output (or the output is the absurd state, which is empty). 'Must ϕ' tests to see if every world in the context is a ϕ-world; if so, the context passes through unchanged, and if not, the update crashes.

This explains the contrast between (11a) and (11b). Suppose it is an open possibility that Mary Anne or Kristy is at the door. Then updating with (11a) proceeds flawlessly. The first sentence tests the context for a Mary Anne at the door-world. Since there is at least one (by hypothesis), the context is output unchanged. Then we get the information that Mary Anne is not at the door, which changes the context by eliminating all Mary Anne at the door-worlds. But in (11b), things are not so smooth. The first sentence eliminates all the Mary Anne at the door-worlds, and so when we get to the second sentence, the update crashes. This explains the infelicity of discourse (11b).[3] Add to this, as, roughly, Yalcin does, that *suppose* shifts the information state to be the set of worlds compatible with the agent's suppositions, and we can also explain why (12) is bad, since it puts incompatible demands on the agent's suppositional state — the first embedded conjunct will update the state so that there are no Mary Anne-worlds in it, and so updating with the second conjunct will cause a crash.[4]

2 The centrality of the proposition

A central aspect of dynamic semantics is that the discourse, rather than the sentence, is the primary object of semantic study. Following Yalcin (2013), call this *discourse primacy*. The meanings of expressions are just what they contribute to a discourse. Dynamic semantics takes the two-way interaction between sentence (or, really, expression) and context as another central semantic notion: expressions, by virtue of their semantic contents being context change potentials, are both context-sensitive and context-affecting. In this way, one of the central insights of dynamic semantics is that information flows throughout a discourse, in the sense that something introduced by one expression can be picked up by a later expression in the discourse. Though I think it is right to say that taking these ideas as the central *semantic* notion is indeed definitive of what it is to be a dynamic semantics, it is not as though static semantics denies (nor should it deny) that information flows throughout a discourse, that sentences are (at least sometimes) both context-sensitive and context-affecting, or that they are building blocks in the meaning of a larger discourse.

What does it mean for a static semantics to accept that sentences are both

context-sensitive and context-affecting, or, in other words, that sentences have CCPs? This idea, after all, seems antithetical to static semantics. On a static semantics, sentences can only have CCPs in a derivative sense, since it is utterances, not sentences, that change the context. But we can talk about a sentence having a CCP in the sense that an utterance of that sentence characteristically has a certain effect on the context. For classical static semantics, the proposition or truth conditions is the central semantic notion. Updates to the context are defined on, or at least highly constrained by, the proposition expressed. Call this thesis *proposition-centrality*.[5] When people talk of a notion of update for a static semantics, they invariably talk about updating with the informational content (truth conditions) of the proposition expressed. This is most commonly formally represented as update by intersection on the context set. The context set contains the worlds that are open possibilities for the purposes of the conversation; when a new proposition has been asserted and accepted, its effect on this context is to eliminate all the worlds that conflict with it.

Just as static semantics need not eschew context change, dynamic semantics need not (and does not) eschew propositions and truth conditions. For a dynamic semantics, these are the derivative notions. Taking Heim's basic case for example, the proposition expressed can be derived from the update — it is the information added to the context (truth conditional content can be similarly derived in the more complex cases by tracking the information change to the context). In fact, it was one of Heim's aims in coming up with the account to give a unified explanation of both the presupposition projection properties and the truth-conditional properties of sentences. One can also derive truth-conditional content from updates that do not simply involve intersecting sets of worlds. For example, in Dynamic Predicate Logic (DPL),[6] which was designed to account for the unbound anaphora data, an existential quantifier changes the value of the variable associated with the quantifier. For example, the indefinite (interpreted as existential quantifier) in (7a) makes the context forget whatever it had previously assigned to, say, x, and outputs a context in which the set of assignment functions are all the possible ones (that differ at most from the input in what they assign to x) that assign x something in the interpretation of *woman* and *sat down*. In this way, DPL records a new discourse referent in the context. But this also yields the existential truth-conditional content, since the update will only be successful in the case that there is at least one appropriate individual in the model to assign to the variable.[7] In fact, discourse primacy can be a bit of a misleading thesis about dynamic semantics. While it is true that the discourse is the primary semantic object, on a dynamic semantics expressions are always interpreted incrementally (leaving open whether this is incremental according to surface structure or logical form). Things later on in discourse can depend on

something earlier in discourse for their meaning, but never vice versa; it is not like we need to interpret an entire discourse before we get content — even truth-conditional content — for a smaller expression, though we do (generally) need to interpret the earlier part of a discourse to get the truth-conditional content of a later part.

To take stock so far of the differences between static and dynamic semantics, aside from what comes first and what is derivative, both can (and do) have a notion of proposition, truth conditions, discourse-level informational content, and context change potential. So the mere observation of order effects at the level of discourse, or the observation that one sentence can introduce information that another picks up on, is not sufficient for motivating dynamic semantics, as long as those order effects can be accounted for by the interaction between the proposition expressed and the context. For example, in the case of the order effects of presuppositions in (4), a static semantics can give exactly the same explanation as a dynamic semantics, except it appeals to the pragmatic update of the context rather than a semantic notion of CCP. In (4a), the first sentence introduces the information that Claudia used to smoke. If the proposition is accepted, its informational content gets added to the context set. So when we get to the second sentence, the presupposition is satisfied. But reverse the order of the sentences as in (4b), and the problem is predicted in the same way as dynamic semantics does: the presupposition of the first sentence is not satisfied.

However, whether something is taken as a primary or derivative notion does matter. First of all, dynamic semanticists don't have to deny that sentences have truth conditions or express propositions (in the derivative sense), but they can.[8] Hence dynamic semantics can easily accommodate updates from which no proposition or truth-conditional content can be derived, such as (arguably) the tests of epistemic modals. Second, dynamic semantics does not accept proposition-centrality, and so has no problem more generally with non-truth-conditional updates, such as the introduction of discourse referents by indefinites. In fact, especially in the anaphora literature, this point is often used to motivate dynamic semantics, since it seems that updating baed on truth-conditional content cannot distinguish between the felicity and infelicity, respectively, of minimal pairs such as:

(13) Bryan owns a bicycle. It is grey.

(14) # Bryan is a bicycle-owner. It is grey.[9]

Finally, in the traditional picture of context change in static semantics, updates are defined *globally* (the intersection of the proposition with the context). Not only does defining them on propositions present *prima facie* problems for dealing with non-truth-conditional update, but it also presents problems for *sub*-sentential updates.

In dynamic semantics, context change is part of the recursive compositional calculus; it does not discriminate between sub-sentential or cross-sentential context change; recall that one innovation of dynamic semantics is defining merely local contexts that are created during the processing of an expression and dismissed afterwards.

So if there is good evidence that non-truth-conditional updates are required, or that sub-sentential update is required, does that mean it's game over for static semantics? Or is this at least very, very good evidence for dynamic semantics? Even putting aside the vexed question of what counts as good evidence for non-truth-conditional update or sub-sentential dynamics, the issue is still a lot more subtle than this.[10] Before I address this point, there is a related formal point often made in the literature. Update by intersection has the property of being *eliminative* (also known as *introspective*) and *distributive* (also know as *continuous*). When the context is a set of points (whether these are worlds, assignment functions, etc.), an update is eliminative just in case the output context is a subset of the input context:

Eliminativity: An update $[\phi]$ is eliminative iff for all contexts c, $c[\phi] \subseteq c$

An update is distributive iff it works point-wise, that is, if updating each element in the context separately and then taking the union of the result is equivalent to updating the context as a whole:

Distributivity: An update $[\phi]$ is distributive iff for all contexts c, $c[\phi] = \bigcup_{i \in c}\{i\}[\phi]$

So it is often said that a semantics is static just in case it is intersective, or eliminative and distributive (the original result is from van Benthem (1986), and is cited by Groenendijk and Stokhof (1991b), Gillies (2001), Dever (2006), Gillies and von Fintel (2007), Dever (2013), Willer (2015), among others). It is tied to the idea of the centrality of the proposition in static semantics, since if updates with propositions are performed by intersection, and update by intersection is eliminative and distributive, then, the thought goes, non-eliminative and non-distributive updates are not proposition-centric. The update encoded by indefinites (the introduction of a new discourse referent) in DPL is an example of a non-eliminative update, since '$\exists x$' effectively resets what the assignment functions in the context assign to x. The test encoded by 'might' is an example of a non-distributive update, since $\Diamond\phi$ tests for a ϕ-world in the whole information state (which can't be accomplished by testing each point). So another question is: if there is good evidence that non-eliminative or non-distributive updates are required (or at least, are by far the most elegant way of doing things), is this evidence in favor of dynamic semantics? Again, I think

things are a lot more subtle than this, and static semantics can retain a lot of proposition centrality even if the associated pragmatics involves some non-eliminative or non-distributive updates.[11]

There are two things one could mean by proposition-centrality. First, that updates to the context are always updates with the informational content of the proposition. Second, that updates to the context are always updates based on the proposition expressed, but not necessarily updates with the informational content. In either case, there is no reason to think update in a static system *always* has to be update by intersection and therefore eliminative and distributive. Take the first case: suppose all we ever update with is the informational content. Update by intersection is not an arbitrary choice. It models the gaining of information, motivated by the Stalnakerian idea that the goal of conversation, generally speaking, is inquiry, and that rational agents like us will not keep open possibilities that conflict with something accepted in the conversation. But inquiry into which world is the actual world is not the goal of every conversation. For example, in a situation in which we are brainstorming, we probably don't want to eliminate possibilities as new ones are proposed, as the propositions are offered tentatively, and we want the ability to potentially entertain contradictory propositions at the same time. Or in the case in which we are merely supposing, we might want to temporarily update with a proposition, but not permanently alter the global context. At the very least, how the context gets updated can depend on what a speaker is doing with a proposition, or the general sort of activity that conversational participants are engaged in.

Second, and more interestingly, being proposition-centric and being truth-conditions-centric are separable. We can define a system in which propositions are the basic semantic unit, all updates are based on propositions expressed, but not all updates are updates with the truth-conditional content of the proposition expressed. For example, Stalnaker himself distinguishes between two effects of every assertion: the essential effect, updating with the truth-conditional content expressed, and the commonplace effect, which involves updating with things like the fact that the speaker is speaking, that the speaker spoke English, that the speaker said the words she did, etc.[12] This is an update based solely on the assertion of a proposition without updating with the informational content. Of course, the commonplace effect doesn't require the assertion of a proposition (uttering a bunch of random words will also have a commonplace effect), but it is an effect on the context of asserting a proposition nevertheless (the essential effect doesn't require the assertion of a proposition either — it can be accomplished, for example, by a goat walking into the room).

Furthermore, there are other plausible, coherent, non-truth-conditional yet proposition-centric updates. For example, in other work I have argued that the introduction of

discourse referents can be pragmatically motivated (in fact *should* be, but that is a story for another day). There is nothing in the static view of semantics that dictates that contexts must be conceived as sets of worlds, or something equivalent. Historically, a rich notion of context, especially one containing discourse referents, is associated with dynamic semantics. Early theories of discourse anaphora, namely Kamp (1981) and Heim (1982), were the first to have a fully developed discourse referent-based theory of the semantics of pronouns. But discourse referents, and other discourse informational elements of context more generally, are logically independent from dynamic semantics. A static semantics can have a rich notion of context, one just a rich as that of dynamic semantics.[13] In particular, it can take seriously the idea that the context must track discourse referents, and take seriously that conversational participants track discourse referents to understand anaphoric connections (and perhaps more) in conversation. Merely employing discourse referents in one's theory does not reduce the centrality of the proposition.

In Lewis (2012, 2014), I motivate updates with new discourse referents consistently with proposition-centrality. When a speaker asserts an existential proposition, she has explicitly asserted the existence of some object. Since the set of discourse referents in the context models the objects under discussion, what the speaker said has to connect to the discourse referents in some way. If she had wanted to talk about an existing discourse referent, she had good ways of doing so: using a name, a demonstrative, a definite description, or a pronoun. So she must have intended to talk about something new. Introducing something new in the conversation raises the conversational participants' expectations that someone will say something more about it, and so it gets added to the set of discourse referents. What distinguishes assertions of things like (13) from (14) is that the former, but not the latter, is a good indication of a speaker's plan to potentially go on and say something further about a bicycle. As in dynamic semantics, the existence of an appropriate discourse referent licenses anaphoric pronouns and provides a value for them. The update is the same non-eliminative update we get in DPL and other dynamic semantics for anaphora (exactly how the update is realized formally depends on how one chooses to model discourse referents, but, for example, if we model them as sets of assignment functions following DPL, the update looks exactly the same). But the explanation for why the update occurs is proposition-centric: it is derived from broadly Gricean reasoning based on the fact that the speaker has asserted an existential proposition.[14] I do not have the space to fully defend this view here or compare its merits to dynamic semantics, but this is not the point. The point is that it is well within the reach of static systems to have coherent, pragmatically motivated, non-eliminative, non-truth-conditional updates and remain proposition-centric. The point is also not

that this is the only or the best static alternative to account for the anaphora data; the most popular static alternatives, d-type theories of pronouns, do not overtly appeal to updates to the context or discourse referents, so their relative merits are best left for another discussion. However, it should be noted that the view I've outlined above is compatible with a d-type semantics for pronouns.[15]

What about non-distributive updates like the one for 'might'? On a proposition-centric, static view, we cannot get away with exactly what Veltman has — no truth conditions at all, merely a test on the context. But it is fairly straightforward to motivate the same non-distributive update based on a standard contextualist semantics for 'might'. On the standard view, an utterance of 'might ϕ' expresses the proposition that ϕ is compatible with some contextually relevant body of information. The first thing to note is that we don't need non-distributive updates to get an accurate representation of the context set or to explain the order effects (though we may need them for other reasons). In cases where a speaker speaks truly when asserting *might* ϕ, ϕ will be an open possibility according to the context set of the conversation, since unless we are in a defective context, if ϕ is compatible with some contextually relevant body of information, it will also be an open possibility according to the context. Updating with the propositional content of *might* ϕ will eliminate any worlds in which ϕ is not compatible with the contextually relevant body of information in that world, but will leave the ϕ-worlds in the context set that are compatible with the contextually relevant body of information in that world. So insofar as what is desired for an accurate representation of the context set after *might* ϕ has been uttered is that it is one that contains some ϕ-worlds, ordinary intersective update with an off-the-shelf contextualist semantics will do the job. This is also sufficient for explaining the order effects like those displayed in (11). In (11a), the context is first updated with the information that it is compatible with (say) the speaker's knowledge that Mary Anne is at the door. After the door is opened to reveal Kristy, the context is further updated with the information that Mary Anne is not at the door. But in (11b), we first get the information that Mary Anne is not at the door, so there are no Mary Anne at the door-worlds in the context set. So it is not compatible with the speaker's knowledge (or anyone else's in the conversation) that Mary Anne is at the door.

But what about the idea that underlies the dynamic semantic treatment of 'might', which on many incarnations has less to do with the context set than the intentional states of the conversational participants? As Veltman (1996) writes:

> The idea behind the analysis of 'might' is this: One has to agree to *might* ϕ if ϕ is consistent with one's knowledge — or rather with what one takes to be one's knowledge. Otherwise *might* ϕ is to be rejected. (p.227)

This is the motivation behind the non-distributive test. But the same update can be motivated based on the proposition expressed — when someone asserts that ϕ is compatible with some contextually relevant body of knowledge, it is only natural for the hearer(s) to check if ϕ is also compatible with their knowledge.[16] So a hearer can accept that what a speaker expressed with an utterance of *might* ϕ as true (say that ϕ is compatible with the speaker's knowledge) without wanting to accept *might* ϕ for herself.[17] Representing this check on an agent's intentional state just is the non-distributive test to see if there is a ϕ-world. This is not to argue that static semantics plus pragmatics can do everything dynamic semantics can when it comes to modals; for instance, I have said nothing here about Yalcin's data regarding embedding under supposition.[18] Rather, again, this is to show that non-distributive updates are no obstacle to proposition-centrality.

These are not the only cases in which we can define non-intersective, non-truth-conditional updates to the context while keeping propositions as the basic, central semantic object. In other work,[19] I have argued that the pragmatic effect of counterfactual conditionals is to change which worlds are relevant for the truth value of subsequent counterfactuals (and this is not accomplished merely by eliminating formerly relevant worlds; most often more worlds are added).[20] There are theories that take questions under discussion as something that the context tracks;[21] in this case ordinary assertions can affect the set of questions under discussion in various ways. This is, again, not to argue here that static semantics plus pragmatics can do everything that dynamic semantics can do — this would take a much more extensive argument and detailed examination of all the data than there is room for in this paper. Rather, the point is, one can have a proposition-centric, static view with a much more complex relationship to updating the context than most people give it credit for. The focus on informational-update only and along with it the formal properties of eliminativity and distributivity is misguided.

Recall that there was a second challenge to proposition-centrality. What happens if it turns out we need *sub-sentential* updates? In this case, the updates (intersective or otherwise) are not something that occur after the semantic value for an entire sentence has been calculated, but contribute to that very calculation. If we need sub-sentential updates, then at the very least, some of the centrality of the proposition is lost, since some of the updates will not be based on a proposition expressed since they occur prior to the proposition being calculated. In all of the central cases for dynamic semantics, like presupposition, anaphora, and epistemic modals, there are cases of embedded phenomena. Historically speaking, when it comes to anaphora and presupposition, some of the basic data has always been sub-sentential. Furthermore, an increasing amount and complexity of sub-sentential data that seems to speak

in favor of a dynamic semantics (or something close to it) has been raised in the literature, such as Yalcin's data for epistemic modals, to name just one case. The sub-sentential data often presents a deeper challenge to the static picture, since even if one thinks that pragmatic principles can explain discourse dynamics, it is a different story when that dynamics is a part of the recursive compositional process.

Of course, it is always an option to argue that sub-sentential dynamics are not necessary, and contrary to superficial appearances, the sub-sentential data is importantly different from the cross-sentential data. But supposing we do accept sub-sentential updates, there are at least three ways we can think of how this affects proposition-centrality. First, one might think that this is a significant enough departure from the static picture to count as dynamic, since something dynamic goes on at the level of semantic composition. (Or, because there doesn't have to be a sharp line between static and dynamic semantics, we can think that this is more dynamic than a purely static account, but not a fully dynamic system.) On the other hand, one might think that as long as the compositional process results in an ordinary, static proposition, we have not abandoned the core of the static picture or proposition-centrality. (This is arguably the position of Paul Dekker (2012), who thinks that composition is dynamic, but meanings are static.) Finally, one might think that as long as the sub-sentential updates are also motivated pragmatically *and* the result of the compositional process is a proposition, we have not abandoned the core of the static picture.[22] There are two more things to be said for this last option. First is that if the sub-sentential updates can be motivated on the basis of assertion-like speech acts, this maintains even more proposition-centrality. This is roughly the strategy of Stalnaker (2010) in his pragmatic account of presupposition. This is easiest to motivate in the case of conjunction, since when a speaker asserts anything of the form 'A and B', by the time she gets to the 'and', the audience knows that she is committed to A, no matter what B is. Since speech is processed incrementally, this also accounts for the order effects involving conjunction without making conjunction logically non-commutative. In the case of conditionals, Stalnaker proposes that the speaker has *supposed* the antecedent, which induces a temporary update on the context. On the other hand, given that it is consistent with the static picture (though perhaps not the *classical* static picture) to have pragmatic intrusion of all sorts, one might think that any pragmatically motivated update, not necessarily ones that mimic assertion-based updates, are kosher on a static view. This seems to be the position of Philippe Schlenker on presupposition, who argues for the creation of local contexts based on both broadly Gricean and general processing considerations.[23] This is not to say, however, that either of these strategies are successful. Stalnaker's theory has been criticized as insufficiently general[24], and the

status of (some of) Schlenker's rules as genuinely pragmatic is questionable.

The foregoing discussion might leave one wondering what good evidence for a dynamic semantic framework would look like. Evidence that updates to the context, whether cross-sentential or sub-sentential, are not pragmatically motivated, or that we need to take context change potential rather than propositions as basic to account for certain logical features of language, like entailments, are all good evidence. That is, evidence of context-change-centrality or discourse primacy rather than proposition-centrality is good evidence for dynamic semantics. The main moral of the above discussion is that proposition-centrality is indeed a useful way of characterizing static frameworks, keeping in mind that this is neither proposed as a necessary nor sufficient condition. But the association of proposition-centrality with merely truth-conditional update, update by intersection, and the properties of eliminativity and distributivity is best abandoned. Non-truth-conditional, non-eliminative, and non-distributive updates can all be pragmatically motivated while keeping propositions as the central semantic notion. All this seems to bring us right to the vexed issue of the semantics/pragmatics distinction and its relationship to dynamic semantics, which will be the topic of the next section.

3 Dynamic semantics and semantics/pragmatics distinction

It is my contention that the central difference between a static framework and a dynamic one is whether updates to the context (i.e. discourse dynamics) are accounted for by pragmatics or semantics. Call this the *semantics-pragmatics thesis*.[25] Semantics describes facts about conventionally encoded meaning, or the content of an expression at a context in accordance with its conventionally encoded meaning (in the case of context-sensitivity). I take this to be a fairly common way of conceiving of semantics. I am thinking of pragmatics as an explanation of what gets communicated or what otherwise goes on in discourse based on the fact that conversations are (typically) joint activities among (generally speaking) rational agents. While I don't take this to be an uncontroversial definition of pragmatics, I take it to be representative of a Gricean tradition, very broadly construed. These definitions are neutral between a dynamic and static semantics in the sense that they allow for either framework to be in theory a correct characterization of semantics, as opposed to, for example, a definition of semantics in terms of truth conditions or involving the absence of context-sensitivity, which would by definition exclude dynamic semantics.[26]

It seems unquestionable that there is something dynamic that goes on in dis-

course, and that linguistic interpretation has an important two-way connection to context (though we can certainly question the extent of the dynamics in particular cases). As we've seen, in the case of a dynamic semantics, context change is the central semantic notion; in a static semantics, context change is defined on propositions, which are the central semantic notion. Call the latter a static semantics with *dynamic pragmatics*.[27] Let me say a little more about what I mean by a dynamic pragmatics. In a dynamic pragmatics, updates to the context are explained by broadly pragmatic considerations: the rationality of agents, the purpose of conversation, etc. I take Stalnaker's explanation of update by intersection to be an example of dynamic pragmatics *par excellence*. Again, on his view, when someone asserts a proposition, if it is accepted, its effect on the context set is modeled by intersection because the purpose of conversation is generally inquiry, and it is irrational for the conversational participants, when engaged in such an activity, to keep open possibilities that conflict with what they have just accepted. Hence we have ordinary, static, sets of worlds propositions as the central semantic notion, and update to the context explained by these general pragmatic principles. By contrast, when we look at dynamic semantics, even basic intersective updates are no longer explained by appealing to general pragmatic principles. For example, as Schlenker (2011a) points out, when it comes to dynamic semantics, even in Heim's basic, intersective system, "the 'context set' became a technical notion, with no claim that the speech act participants literally believe local contexts (i.e. local context sets)" (p.852).

The semantics-pragmatics thesis seems to be threatened by a view commonly expressed in conversation, though less commonly articulated in print, that dynamic semantics does away with the distinction between semantics and pragmatics. It is not always clear what people mean by this. I will explore what they could possibly mean by this and what these various interpretations imply for the fate of the semantics-pragmatics thesis. I will argue that the thesis holds for at least a significant, mainstream body of work that goes under the heading "dynamic semantics".

From the outset, it should be noted that no one presumably means that dynamic semantics completely gets rid of the semantics/pragmatics distinction. I know of no dynamic semanticist who thinks that classic examples of particularized implicatures should not be distinguished from semantics. No dynamic semanticist gives a semantic explanation of why Grice's famous example of the letter of recommendation implicates that Mr. X is not a good philosopher or that why saying of B that he "hasn't been to jail yet" when asked about his new job implicates something about his personality (or the nature of his job). The alleged blurring of the distinction has to do with the kinds of phenomena that are closer to the penumbra between semantics and pragmatics.

One thing that could be meant when saying that dynamic semantics blurs the distinction is that what semantics really should be focused on is conversation, linguistic communication, or linguistic interpretation in general and treating these things in a formal, systematic, and empirically accurate way. Whether certain aspects of linguistic interpretation best go under the headings "semantics" or "pragmatics" doesn't really matter for the project. If this is really what is going on, then the semantics-pragmatics thesis is in some trouble, since it's not clear we can even make sense of it. Furthermore, if this is right, perhaps static and dynamic semantics are not competing frameworks, but compatible, distinct projects that both happen to go under the heading "semantics". There is still the interesting question of which is the more fruitful project, or the one that is best to be engaged in if we want a better understanding of language, but they are not incompatible, and it is possible that they are both fruitful in their own ways. On this picture, static semantics is the project of investigating what is conventionally encoded in language, or what is 'hard-wired' into language, and what meanings support indefeasible entailments between sentences. By contrast, dynamic semantics investigates more-or-less systematic features of conversation, like the treatment of variables, presuppositions, and contextual information, whether they are conventionally encoded or derived from more general considerations.

Perhaps there are some people out there who think this.[28] I do take this to be a genuine worry about the conceptual difference between static and dynamic semantics espoused by the semantics-pragmatics thesis. There are two ways we can think of this take on dynamic semantics. The first is that the project of dynamic semantics is an important stepping stone, but not ultimately the correct framework. If updates are genuinely pragmatically motivated, then the semantics and pragmatics are separable and we could likely get away with a static notion of meaning and pragmatics working alongside it. That is to say, once we discover more about pragmatics, the innovations of dynamic semantics will turn out to have pragmatic underpinnings, and we will be able to incorporate important features of dynamic semantics in a static semantics with a dynamic pragmatics. In this way, dynamic semantics is an indispensable project, because it gives us tools for a systematic account of discourse data without worrying about the theoretical underpinnings, but a temporary one on the path to a static semantics/dynamic pragmatics. The semantics-pragmatics thesis stands as a thesis about the difference between static and dynamic semantics as end goal rather than means, but not as a thesis about the difference between static and dynamic semantics as means to an end. On the other hand, it is possible that once the semantics and pragmatics are separated, the static semantic meanings we are left with look nothing like propositions or, in the case of sub-sentential expressions, con-

tributions to propositions. That is, semantics and pragmatics are inextricably linked in such a way that it doesn't make much sense to separate them. Part of this may derive from discovering that typical updates to the context are partly pragmatically derived but partly conventional at the same time. In this case, perhaps we could still have a static semantics with a pragmatics that works alongside it, but it would not look much like our classic view of static semantics, and probably wouldn't be of much interest as a distinct view from dynamic semantics. This is the worst case scenario for the semantics-pragmatics thesis, because in this scenario we have good reason to think a significant portion of discourse dynamics is pragmatic, but nevertheless we should maintain a dynamic framework, so it doesn't make sense to distinguish static and dynamic semantics in terms of the role of pragmatics in explaining discourse dynamics.

In reality, however, for the most part this sort of position doesn't appear to be the position held by the people actually doing dynamic semantics. I am not aware of anyone in the literature who explicitly holds anything like this (aside from perhaps David Beaver, whose position I will return to below). It is possible that different people all working under the heading of "dynamic semantics" are actually doing different things, but if a significant number are doing what we would (more or less) traditionally call semantics as I've outlined it above, then the semantics-pragmatics thesis is unaffected for at least this significant body of work in dynamic semantics. There is no indication that those working in dynamic semantics are incorporating anything they think of as genuinely pragmatic into the semantics, and many indications that they are treating the phenomena as semantic. Consider for contrast work on embedded implicatures, which is about how and whether pragmatics should be integrated into semantics, in the sense that it should be part of the intuitive literal content of a sentence or expression, or part of the recursive compositional calculus that yields that content. For example, it has long been noted that things like scalar implicatures and consequential 'and' appear to embed in constructions like disjunctions, conditionals, and under attitude verbs. For example:

(15) If I give some of my students an extension, the others will be upset.

(16) (The party won't turn out well for me.) Either I'll get drunk and no one will talk to me, or no one will talk to me and I'll get drunk. (Examples from Simons (2011), p.611-12)

In a series of papers, Mandy Simons (2010, 2011, 2013) has argued that general Gricean considerations can apply at a sub-sentential level, and so we can give a neo-Gricean explanation of such examples, incorporating pragmatically conveyed material into the literal content of the sentence. The details are not important for the

present point; the idea is that this is an example of what integrating genuinely pragmatic features with semantics looks like — it involves showing how general pragmatic principles apply at the sub-sentential level. The enrichment of the content at a local level is explained by appealing to general features of discourse and the rationality of the conversational participants.[29] [30]

By contrast, in the dynamic semantics literature, there is no appeal to the incorporation of pragmatics in the recursive compositional calculus. What does the work in explaining the discourse dynamics observed in presupposition projection, anaphora, epistemic modals, conditionals and more is written into the semantic clauses of the operators, connectives, and atomic formulae, as we saw in the examples above in §1. These are appeals to the conventionally encoded meanings of these expressions, not general considerations about rationality or conversation, and certainly not locally calculated implicatures. If they did appeal to such general considerations, the sort of criticisms levied against pragmatic approaches to presupposition projection would be inappropriate. Both Stalnaker and Schlenker's appeals to pragmatic principles have been criticized as insufficiently general; if dynamic semantics was the result of encoding the same pragmatic principles in a formal system, it would have little to stand on in its criticism. In a similar way, the novelty and familiarity conditions on indefinite and definite expressions, respectively, is not a matter of reasoning about the meaning of of the indefinite or definite expression, rather it is a matter of convention. For example, in Heim's File Change Semantics, the Novelty-Familiarity condition[31] is explicitly stipulated, not derived from more general consideration about rationality. Of course, the context change rule associated with indefinites and definites (that the former add new discourse referents and the latter update old ones) don't need to be also stipulated — they fall out of the novelty-familiarity condition and how the contexts work. But these also don't appeal to considerations involving rational agents engaged in communicative activity.

However, this is not to say that Heim's view or that of any other dynamic semantics can't or don't have anything to do with rationality (or, at least, more than arbitrary convention). Some dynamic traditions, particularly those inspired by Kamp's Discourse Representation Theory,[32] are in the business of doing semantics qua theory of both meaning-form relation *and* theory of processing or cognition more generally; different implementations take this relationship more or less seriously. The question of how much dynamic semantics relates to processing and how processing relates to semantics and pragmatics is a difficult one, one that deserves consideration at more length than I have room for here, and so I put the question aside for now.[33]

Despite this historical connection to processing, however it is to be taken, a large swath of mainstream dynamic semantics doesn't seem to work in that tradi-

tion (or, that tradition plays no obvious role). In fact, what inspired Groenendijk and Stokhof's DPL, one of the earliest dynamic semantics, was creating a semantics inspired by Kamp's DRT, but that explicitly incorporates compositionality and eliminates the connection to mental representation. Groenendijk and Stokhof's work, like other early work in dynamic semantics (e.g. Muskens (1991)), emphasizes the notion of meaning as state change in order to account for recalcitrant data (in this case, unbound anaphora) and doing so by employing compositional semantic frameworks (like Montague semantics), rather than on any connection with mental cognition or rationality. In the course of considerable discussion of the motivations for the framework, there is no discussion of dynamic semantics being a placeholder for what will ultimately be accounted for by pragmatics. Rather there is much discussion of static notions of semantics not being able to account for certain kinds of linguistic data. Much work in dynamic semantics stems from this tradition.

Another point in favor of the interpretation that dynamic semantics is in the business of accounting for conventionally encoded meaning is that a large part of what motivates the inclusion of CCPs at the level of semantic clauses is accounting for various entailment relations. On the dynamic semantic view, these entailments are not the defeasible entailments of something like Stalnaker's reasonable inference but true entailments. For example, Beaver (2001) writes when introducing his dynamic system:

> I will attempt to follow a long standing tradition of philosophers and semanticists. The data will consist of implications between sentences of natural language, and to account for the data I will define logics which yield these implications as entailments between formulae, combined with a general way of translating from natural language into the logic. (p.143)

Some dynamic semanticists explicitly appeal to to the fact that dynamics are found at the sub-sentential level as evidence that they are genuinely semantic phenomena. This reflects that these dynamic semanticists do not view their own project as incorporating pragmatic elements into semantics, for if they did, the argument that there is no pragmatic motivation for the intra-sentential phenomena would not be relevant. For example Adrian Brasoveanu (ms) writes:

> Intra-sentential donkey anaphora to structure provides a much stronger argument for the idea that plural info states are *semantically* necessary. To see this consider anaphora to value first: a pragmatic account is plausible for cases of cross-sentential anaphora (e..g in *A man came in. He sat down*, the pronoun *he* can be taken to refer to whatever man is pragmatically brought to salience by the use of an indefinite in the first sentence),

> but less plausible for cases of intra-sentential donkey anaphora (no particular donkey is brought to salience in *Every farmer who owns a donkey beats it.* (p.5-6, emphasis in original)[34]

If dynamic semantics is right, we can say that some things we *used* to think of as pragmatic, like presupposition or cross-sentential anaphora, actually turn out to be semantic. But this is not blurring semantics and pragmatics. This is a discovery that something formerly thought to be pragmatic is semantic.

Beaver (2001, 2002) is the best candidate for an exception to what I've been arguing. For example, in Beaver (2002) he writes that "nobody should be serious in thinking that what goes under the term *dynamic semantics* is just semantics" (p.191), and goes on to define a framework called *Transition Preference Pragmatics* that obviates the need to pre-index anaphors and antecedents. In Beaver (2001), he writes:

> I propose a way in which the CCP account of sentence presupposition may be formally combined with an account of the inferential processes which hearers use when determining the assumptions of the speaker. (p.138)

Both the 2001 and the 2002 accounts are a way of modeling a conversational participant's uncertainty about what actual change to the context has been induced by a speaker's particular utterance. It is clear that Beaver incorporates both genuinely semantic and genuinely pragmatic features into a single system. But in actuality, there is no blurring of the semantics/pragmatics distinction; his system has a clear semantic component and a clear pragmatic component. What he has, essentially, is both a dynamic semantics and a dynamic pragmatics. His basic semantic clauses are functions from contexts to contexts (states to states), motivated by such classically semantic features as entailments between sentences, and common arguments for dynamic semantics, like the non-commutativity of conjunction. To model uncertainty, he then introduces the notion of an *information set*, which is a set of information states (ordered in terms of preference by common sense). Updates to information sets are functions from CCPs to information sets. The update to the information set does involve pragmatics, but it is defined on top of the existing semantic notion of a CCP.[35] A potential argument in favor of dynamic semantics is that this kind of interface is difficult or impossible to have in a system that combines static semantics and dynamic pragmatics. This is an interesting project for future research, and if this suggestion is right, there may be good reason for maintaining a dynamic semantics even if it turns out that much of the explanation for discourse dynamics is pragmatic.

What I think people mean when they say dynamic semantics blurs the semantics/pragmatics distinction is something closer to this: dynamic semantics deals with issues of *use* of language, not just truth conditions. At its most basic level, the traditional distinction between semantics and pragmatics has it that semantics deals with the relationship between linguistic expressions and the objects for which they stand, while pragmatics deals with the relationship between linguistic expressions and their use, or expressions and their interpreters. In dynamic semantics, the objects that linguistic expressions stand for are context change potentials, and contexts involve some representation of the state of conversations, which often have something to do with the intentional states of the conversational participants. The old way of dividing things up clearly no longer works when it comes to dynamic semantics. There are also some people who think of semantics as the project of assigning truth-evaluable contents to sentences (and their contribution to truth-evaluable contents to sub-sentential expressions) and leave the effect those contents have on the beliefs of the speakers to pragmatics. Again, on this way of dividing things up, the semantics/pragmatics distinction is clearly blurred in dynamic semantics.

All this may be true, but it doesn't affect the kind of semantics/pragmatics distinction at play in the semantics-pragmatics thesis above, nor does it affect a terribly interesting notion of the semantics/pragmatics distinction. The semantics/pragmatics distinction at play in the semantics-pragamtics thesis is one where pragmatic explanations are motivated by general principles about human rationality and the purpose of conversation. By contrast, semantic explanations are about what is conventionally encoded, about what supports entailment relations, about what gets into the recursive compositional calculus, about what a competent language user has to know to know a language. It is these latter things that dynamic semantics is interested in; it is these latter things that according to dynamic semantics, context change potentials are all about. Rather than blur the semantics/pragmatics distinction in an interesting way, what dynamic semantics does is show us our basic semantics/pragmatics distinction in terms of expression-object relation and use is just not good enough. Dynamic semantics abstracts away from concrete situations of use and deals in general, (allegedly) systematic patterns of interaction with context. This abstraction away from specific situations of use, the focus on universal, indefeasible features of language is just the stuff that is traditionally the focus of semantic questions.

4 Conclusion

An interesting question, then, is whether there is good evidence, in either direction, that updates to the context are a hard-wired matter of semantic competence or better explained by appeal to general principles of rationality. I've argued that bad evidence for dynamic semantics includes order effects, the two-way interaction between context and content, and non-distributive or non-eliminative updates to the context. All these, on their own, equally support a dynamic semantics or a static semantics with a dynamic pragmatics. Some good evidence in favor of dynamic semantics would include evidence that these discourse dynamics are not best explained pragmatically, that they support indefeasible entailments, or that they are needed for sub-sentential composition in a way that cannot be explained by appeal to sub-sentential pragmatics. On the other hand, good evidence in favor of a static semantics is that there is not as much true dynamics (i.e. context change) in discourse as meets the eye, that discourse dynamics are best explained by appeal to general pragmatic principles, or that it is best to keep updates to the context separate from the semantics.[36]

Notes

[1]Though Heim's semantics is by no means universally accepted among dynamic semanticists, views in this basic Heimian tradition have been quite popular since its introduction. For example, see Heim (1992), Chierchia (1995), Beaver (2001), and Rothschild (2011). For a dynamic semantics in the spirit of Heim that takes contexts to be stacks of states instead of sets of worlds, see Zeevat (1992). For criticisms of Heim's approach see Soames (1989), Geurts (1999), Schlenker (2007, 2008a,b, 2009, 2011a,b).

[2]For dynamic semantic accounts of anaphora see Heim (1982), Groenendijk and Stokhof (1990), Groenendijk and Stokhof (1991a), Muskens (1991), Chierchia (1995), Groenendijk et al. (1996), Beaver (2001), Heim (2002), Brasoveanu (2008, 2011).

[3]These same clauses serve to explain some embedding data in Beaver (2001), though accounting for embeddings gets considerably more complex in Dever (2013).

[4]This is a very rough overview. On Yalcin's semantics, modals are (static) restrictions of the information state rather than tests. For further illumination on the connection between Yalcin's semantics and dynamic semantics, see Klinedinst and Rothschild (2012), Willer (2015), and Rothschild (ms) (`http://dynsem.github.io/vy.html`).

[5]Dever (2006) calls this *propositional determination of pragmatic effects* or *PDPE*. As he notes:

> A semantics can be static even without the PDPE, but the *interest* of the statics decrease (*sic.*) as violations of the PDPE increase. The ideal Static picture would have additional forces flowing from the proposition expressed. (p.6)

[6]See Groenendijk and Stokhof (1991a).

[7]Like many dynamic semantics, DPL defines truth as successful update. I will be putting aside the interesting question of in what sense these are equivalent notions.

[8]I am ignoring here that there is an important sense in which static semanticists can do so as well. For example, classic expressivists have a static semantic picture without truth conditions or propositions.

[9]For example, see Heim (1982) and Groenendijk and Stokhof (1991a).

[10]For a good discussion of the complexities involved in deciding whether a piece of linguistic data counts as evidence of truly dynamic features see Rothschild and Yalcin (2015).

[11]There are many problems with using eliminativity and distributivity as the defining features of a static system, which are pointed out most clearly by Rothschild and Yalcin (2015). They define a system as strongly static iff it is isomorphic to some intersective system, appealing to the properties of idempotence and commutativity as the key properties of a strongly static system, which, unlike eliminativity and distributivity, are clearly defined regardless of the technical details of a system. The considerations in Rothschild and Yalcin (2015) are different from the ones in this paper, though not entirely unrelated.

[12]Stalnaker (1978)

[13]But see Dever (2006) for worries about whether updating rich contexts solely based on the proposition is feasible.

[14]Full disclosure: we need to appeal to the maxim of manner to distinguish existential propositions from truth-conditional equivalents unless structured propositions are used. See Lewis (2012, 2014) for more details of the view.

[15]*D-type* or *e-type* theory of pronouns take pronouns to go proxy for definite descriptions like *the woman who walked in* or simply *the woman*. (See for example, Evans (1977), Neale (1990), Heim (1990), Elbourne (2005).) These views, as I said, do not explicitly invoke discourse referents; in fact they are often viewed as the sort of account we should adopt if we want to eschew discourse referents. Furthermore, they do not explicitly engage in a discussion of updates to the context; on the d-type view, the solution to the problem of unbound anaphora is one that focuses on the semantics of pronouns rather than the flow of information through a discourse. However, d-type theories are far from mutually exclusive from theories involving discourse referents. In general, discourse referents can be fruitfully combined with a d-type semantics for pronouns: for explaining when pronouns are and are not licensed, for co-indexing a pronoun with the correct antecedent (especially in cases of indistinguishable participants), and for providing the right descriptive information for a d-type theory (or otherwise providing a value for the description). (See Lewis (2013) for arguments that d-type theories need to be supplemented with discourse referents; see Schlenker (2013) for arguments that Elbourne's d-type account smuggles in the notion of discourse referents.) Some static accounts that are not d-type accounts include a notion of update, like that proposed by Stalnaker (1998). Stalnaker appeals to the referential intentions of speakers as what grounds how the context is updated for the purposes of tracking anaphoric pronouns; his notion of context remains that of common ground, and the update is still eliminative. Dekker (2004) and van Rooij (2001) both argue for (more or less) static accounts that incorporate discourse referents, but they also want to ground the notion of a discourse referent in the referential intentions of speakers. (For arguments against these referential intentions views, see Lewis (2013).) Sam Cumming employs discourse referents in the semantics of indefinites and pronouns within a static framework; though he is not particularly concerned with updates to the context, an extension of his system that included a robust account of how context interacts with content could potentially include non-eliminative updates for discourse referents based on the content of a sentence containing an indefinite (see Cumming (2013, 2014, 2015)).

[16]This is reminiscent of the intuition behind relativism for epistemic modals, though against

relativism for epistemic modals in that relativists would generally deny that it is possible to agree with the truth of *might* ϕ when ϕ is not compatible with one's own knowledge. It would be straightforward to motivate the non-distributive update on a relativist semantics.

[17]There is some experimental evidence that offers *prima facie* support for a view along these lines. The experiments in Knobe and Yalcin (2014) reveal that people tend to more often judge epistemic modal statements as true than false when they are in a more informed position than the speaker, such that they know that the prejacent is false. But more interestingly for present purposes, they are also much more likely to judge that it is appropriate for the speaker to retract what she said if she comes to learn this information than that what she said was false. This suggests two things that support a view like the one sketched here: 1) that the conversational effects of a modal sentence should be kept separate from their truth or falsity and 2) that epistemic modal claims do have propositional content, as people tend to have fairly robust intuitions about their truth or falsity.

[18]For a defense of the standard contextualist theory of epistemic modals against Yalcin's data, see Dowell (ming). For a non-standard static semantics of epistemic modals that deals with data, see Moss (2015).

[19]See Lewis (2016).

[20]See von Fintel (2001) and Gillies (2007) for arguments in favor of a dynamic semantics for counterfactual conditionals. See Moss (2012) for arguments against these accounts.

[21]See for example Roberts (2004).

[22]As Daniel Rothschild (p.c.) noted, we might also think that if we have dynamic sub-sentential semantics with propositions as the result of the compositional process, then we have a dynamic semantics without discourse primacy.

[23]See Schlenker (2007, 2008a,b, 2009, 2011a,b).

[24]See Dever (2013), Rothschild (2011), and Schlenker (2009, 2011a).

[25]This conception of the difference between dynamic and static semantics is most explicitly also espoused by Dever (2013), but is also present in Yalcin (2013) and the work of Philippe Schlenker on presupposition already cited in this paper.

[26]Martin Stokhof (2014) worries that this sort of characterization of the difference is never going to work because we will be unable to characterize semantics and pragmatics in such a way that is both theory-neutral and sufficiently restrictive to decide between the two views. The above definition is supposed to be theory-neutral in that both static and dynamic semanticists generally accept that some phenomena are accounted for by theories of the first kind and some are accounted for by theories of the second. The characterizations themselves are not supposed to decide between the theories, rather it takes a lot of subtle examination of the data and explanations for the data to determine which category the data falls into.

[27]This term is sometimes used in slightly different ways in the literature. But it is defined this way by Dever (2013), Stalnaker (2014), and my Lewis (2014), among others.

[28]Daniel Rothschild (p.c.) tells me he thinks this — that dynamic semantics may be seen as a system for providing descriptive accounts of linguistic phenomena as a placeholder for a future pragmatic story.

[29]Simons sometimes appeals to a dynamic semantics as the semantic framework best suited to incorporate local enrichment. This may turn out to be right: since dynamic semantics is good at creating local contexts, it is also a useful tool for incorporating pragmatic information compositionally. But this is not the blurring of semantics and pragmatics; rather, it is because dynamic semantics semantically motivates this kind of sub-sentential structure that it can incorporate the pragmatics more easily. If the construction of local contexts themselves were pragmatically moti-

vated, then we wouldn't need the dynamic semantic framework to account for local enrichment of content.

[30]Others who focus on incorporating pragmatics at the sub-sentential level include relevance theorists, like Sperber and Wilson (1986) and Carston (2002), and proponents of truth-conditional pragmatics, like Recanati (2010).

[31]I.e. If a particular index (discourse referent) is associated with an indefinite, it cannot already be in the context, and an index associated with a definite has to already be in the context.

[32]See Kamp (1981), Kamp and Reyle (1993).

[33]One of many questions this raises is how to classify Schlenker's later work on presupposition that appeals primarily to processing facts and not really to general Gricean reasoning.

[34]In other work, Brasoveanu also uses the argument that certain readings of sentences are only correctly predicted given a dynamic semantic account, and not a pragmatic account, e.g. Brasoveanu (2008), p.133, and Brasoveanu (2011), p.1036-7.

[35]As he himself remarks:

> ...[A] model of the semantics-pragmatics interface has been proposed which allows both common-sense reasoning and semantic content to determine the information which a hearer derives from a particular utterance. Thus I have not gone so far as Hobbs, in that common sense reasoning does not determine content in the model I have developed. But I have show a way in which a mechanism operating very much in the spirit of Hobbs' proposals *can be built on top of a compositional theory of meaning.* (p. 249, emphasis mine.)

He says something similar in the 2002 paper: "Here's the big picture. Or at least *a* big picture. Syntactic analysis and compositional interpretation, yield a set of alternative meaning. Each meaning is itself a set of transitions, i.e., pairs of information states conceived of as input and outputs, where an information state is one possible common ground. What do we need pragmatics for? The main reason we need it is to choose the right single transition, the one intended by the speaker, from amongst the set of sets of transitions provided by earlier stages of interpretation." (p.200)

[36]E.g. see Stalnaker (2014) and the introduction to Stalnaker (1999) for arguments in favor of this last point.

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