Dynamic Semantics, Derived Presuppositions, and the Proviso Problem

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1 Background. The proviso problem (Geurts 1996) is a descriptive inadequacy of satisfaction-type theories of presupposition projection (Heim 1983). The two canonical examples are presuppositions within conditionals and those in attitude reports. Schematically:

(1) $\phi \longrightarrow \psi_{\chi}$

a. Presupposition$_{\text{sat}}$: $\phi \longrightarrow \chi$

b. Presupposition$_{\text{default}}$: χ

(2) $believes_J\ \psi_{\chi}$

a. Presupposition$_{\text{sat}}$: $believes_J\ \chi$

b. Presupposition$_{\text{default}}$: χ and $believes_J\ \chi$

DRT models (Geurts 1999) predict the (b) presuppositions above ("strengthened" presuppositions), by basing projection on structure. But DRT fails to model true conditional presuppositions like (1a), which Beaver (2001) shows to be possible (3).

(3) If Jane takes a bath, Bill will be annoyed that there is no more hot water.
Presupposition$_{\text{sat+default}}$: If Jane takes a bath, there will be no more hot water.

However, there are also clear cases where a conditional presupposition (4a) is not the natural one that seems to be construed, but rather the simple, "strengthened" one (4b).

(4) If Jane goes to London, her sister will pick her up at the airport.

a. Presupposition$_{\text{sat}}$: If Jane goes to London, she has a sister.

b. Presupposition$_{\text{default}}$: Jane has a sister.

And Geurts (1996) shows that one simple proposal for a solution doesn't work. That solution, expanded on in Beaver 2001, is that the conditional presupposition is the one that is derived as a matter of projection, but a hearer reasons, where applicable, that the nonconditional presupposition is probably true too.

The problem with this idea is that it predicts that *any* sentence which has (4a) as its derived presupposition should be subject to the same type of reasoning. But that doesn't seem to be true; (5) never seems to give rise to a presupposition that Jane has a sister.

(5) John knows that if Jane goes to London, she has a sister.

a. Presupposition$_{\text{sat}}$: If Jane goes to London, she has a sister.

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b. Presupposition$_{\text{default}}$: If Jane goes to London, she has a sister.

The relevant difference between (4) and (5) seems intuitively clear: (4) has a subconstituent which, if it were the entire utterance, would give rise to presupposition (4b), while (5) does not have such a subconstituent.

2 Proposal. I propose along with DRT that strengthening is a strictly structural phenomenon, but within a satisfaction-type projection mechanism, a fully compositional variant of Heim's (1983) dynamic semantics. To illustrate, let us allow ϕ, ψ, and χ to stand both for sets of possible worlds and for atomic sentences whose truth-conditional content corresponds to such sets. Then the semantics of such sentences are the update functions in (6); presuppositions impose defined-ness conditions.

(6) a. $[\![\phi]\!] = \lambda c.\, c \cap \phi$
b. $[\![\psi_\chi]\!] = \lambda c.$ defined iff $c \subseteq \chi$; where defined $= c \cap \psi$

Connectives and belief operators are also defined analogously to Heim's system, using prefixed function notation and assuming a right-branching binary-branching structure for connectives.

(7) a. $[\![\wedge]\!] = \lambda U_2 \lambda U_1 \lambda c.\, U_2(U_1(c))$
b. $[\![\rightarrow]\!] = \lambda U_2 \lambda U_1 \lambda c [[c \setminus U_1(c)] \cup U_2(U_1(c))]$
c. $[\![\text{believes}]\!] = \lambda U \lambda x \lambda c.\, \{w \in c : U\big(Dox_x(w)\big) = Dox_x(w)\}$

The presuppositions of a subconstituent S′ of a sentence S can be optionally inherited as presuppositions of S, by coindexing (cf. Schlenker 2011a) S with S′ (8). (A constituent with a superscript inherits the presuppositions of a subconstituent with the corresponding subscript.) The presuppositions of the lower constituent are then inherited by the higher one, via (9). Since the underlying system is dynamic, it is unproblematic to project these derived presuppositions up the tree, as (10) (an instantiation of (8a)) shows is desirable.

It also, unlike Singh's (2010) related structural proposal, allows intermediate strengthening, or cases where an embedded constituent inherits the presuppositions of a further embedded one (schematized in (8b)), which Schlenker shows is possible (11). Because it is based on structure, it has no trouble with presuppositions embedded in belief reports (8b, c), as instantiated in (11).

(8) a. $[_{CP^2}\ \upsilon \rightarrow [_{CP_2} \phi \rightarrow \psi_\chi]]$
Presup: $\phi \rightarrow \chi$

b. $[_{CP}\ a\ believes\ [_{CP^2}\ \phi \rightarrow [_{CP_2}\ \psi_\chi]]]$
Presup: $a\ believes\ \chi$

c. $[_{CP^2} a\ believes\ [_{CP_2}\ \phi \rightarrow \psi_\chi]]$
Presup: $\phi \rightarrow \chi$

(9) $[\![[_{CP^n} \ldots x_n]]\!] = \lambda c.$ defined iff $[\![x]\!](c)$ is defined; where defined = $[\![\text{CP}]\!](c)$

(10) If Bill gets dirty, then if Jane takes a bath, Bill will be annoyed that there is no more hot water.
Presupposition$_{\text{default}}$: If Jane takes a bath, there will be no more hot water. *or* There is/will be no more hot water.

(11) Mary believes that if Obama agrees to meet with me, I will realize that he is a genius.
Presupposition$_{\text{default}}$: Mary believes that he [Obama] is a genius.

3 Comparison with Previous Approaches .The current proposal has advantages over several other recent ones. Some, such as (Schlenker 2011a, b), can predict both presuppositions of (1), but only if χ is an elementary presupposition (as with DRT), one triggered by a lexical item. With a derived presupposition (such as the conditional presupposition itself, (1b)), they cannot predict the full range of options (12).

(12) $\upsilon \longrightarrow [\phi \longrightarrow \psi_\chi]$

a. Presupposition$_{\text{default}}$: $\upsilon \longrightarrow [\phi \longrightarrow \chi]$ or $\phi \longrightarrow \chi$ or χ
b. Presupposition$_{\text{triggering}}$: $\upsilon \longrightarrow [\phi \longrightarrow \chi]$ or χ

In (12), these theories allow for either χ to project fully or for a full conditional presupposition, but not the intermediate type in (12a), where the derived presupposition projects. This is because the information contained in a derived presupposition is lost at the next level of embedding.

For example, in Schlenker's 2011a system, a presupposition trigger can be coindexed with the local context of a higher constituent; in (13) n could be 0, 1, or 2. If $n = 0$, we get the basic DRT prediction that the presupposition is χ. If $n = 1$, we get the presupposition that $\upsilon \longrightarrow \chi$. But no indexing results in the presupposition that $\phi \longrightarrow \chi$. The system has no way to index a context with the complex expression $\phi \longrightarrow \psi_\chi$ or derive its presupposition $\phi \longrightarrow \chi$ for further computation.

(13) ${}^{c_0}[\upsilon \longrightarrow {}^{c_1}[\phi \longrightarrow {}^{c_2}[\psi_\chi]_n]]$

Other recent proposals (van Rooij 2007, Lassiter 2012) make the full range of predictions correctly for conditional presuppositions (and other connectives), but do not address belief reports. They invoke relevance; χ in (1) projects iff ϕ is irrelevant to χ; otherwise $\phi \longrightarrow \chi$ projects. The importance of full propositions here makes it unclear how to generalize the proposals.

Singh's (2010) proposal, by contrast, follows the structural insight of DRT that presuppositions are strengthened based on the presuppositions of the subconstituents. However, it allows a sentence S to inherit the presuppositions of any S′ derived by deleting nodes from S, not just constituents of S, on the condition that S′ contains some presuppositional expression also found in S. The allowance of node deletion is intended to account for the phenomenon of semi-conditional presuppositions (14), while the presuppositional condition is intended to prevent the system from making incorrect presuppositions for (15), one of Geurts's motivating examples for the structural approach.

(14) If John is a scuba diver and he wants to impress his girlfriend, he'll bring his wetsuit.

Presupposition$_{default}$: If John is a scuba diver, he has a wetsuit.

(15) a. Mary knows that if John flew to Toronto last week, he has a sister.
b. By deletion: Mary knows that he[John][1] has a sister.
c. Presupposition of (15b): John has a sister.

While (15b) does presuppose that John has a sister, and (15b) is obtainable by deleting nodes from (15a), (15b) does not contain any presuppositional constituent from (15a). However, for a slightly different example (16), the system overgenerates presuppositionality.

(16) a. Mary knows that if John flew to Toronto last week, his sister picked him up.
b. By deletion: Mary knows that his[John's] sister picked him up.
c. Presupposition of (16b): John has a sister who picked him up.

(16b) is the result of deleting nodes in (16a), and it does contain a presuppositional constituent from (16a). So Singh predicts, contrary to fact, that (16a) could presuppose that John's sister picked him up. The proposal endorsed here does not have this problem; since (16b) is not a constituent of (16a), its presuppositions will not project. I leave it for future research how the system can deal with semi-conditional presuppositions.

4 Conclusion. In order to capture the full range of data related to the proviso problem, we need a structure-sensitive theory which allows access to derived presuppositions for the purposes of strengthening. The case of projection from within attitude reports makes the case especially well that the relevant data cannot be captured within a theory that fails to meet these conditions.

This rules out many recent proposals in the literature which fail to fulfill one or more of these conditions or another. It rules out purely meaning-based theories for failing to be structure-sensitive, and it rules out trigger-based theories for failing to allow access to derived presuppositions. I have also shown that the correct theory allows strengthening at intermediate levels, which when combined with observed constraints on available interpretations, rules out the possibility that strengthening is accomplished solely by accommodation.

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[1] See Singh 2010 for discussion of the issue of anaphor replacement.