Irene Heim. Presupposition Projection and the Semantics of Attitude Verbs Journal of Semantics 9: 183-221

1. Introduction: Presupposition projections in attitude verbs

(1) Patrick sells his cello
(2) Patrick wants to sell his cello.

(1) presupposes that Patrick owns a *cello.* (2) also seems to presuppose that Patrick owns a cello.

However, (3) is consistent. If the sentence as whole presupposed that Patrick owns a cello, (3) would be a contradiction.

(3) Patrick is under the misconception that he owns a cello, and he wants to sell **his cello**.

Karttunen (1973, 1974): (2) presupposes, not that Patrick owns a cello, but rather that *Patrick believes* he owns a cello.

According to Karttunen, this generalizes to all other non-factive verbs: *believe, think, expect, fear, intend, suspect, assume,* and *hope*.

(4) If σ is a verb of propositional attitude, then a context c satisfies the presuppositions of '$\alpha\sigma\phi$' only if $B_\alpha(c)$ satisfies the presuppositions of ϕ*;* where '$B_\alpha(c)$' stands for the set of beliefs attributed to a in c.

The rule for 'and':

(5) Context c satisfies the presuppositions of 'ϕ and ψ' just in case
(i) c satisfies the presuppositions of ϕ, and
(ii) the context that results from c by the assertion of ϕ satisfies the presuppositions of ψ.

This accounts for the intuition that (2) as a whole presupposes nothing: there are no requirements on the initial context.

(6) A sentence presupposes nothing iff every possible context satisfies its presuppositions.

Whatever the initial context may have been like, the first conjunct in (3) creates from it an intermediate context in which Patrick is attributed the belief that he owns a cello, and that intermediate context thus satisfies the presuppositions of the second conjunct.

How do we account for the intuition that (2) in isolation commits the speaker to Patrick's owning a cello?

Karttunen: some additional conversational principle to the effect that, unless it has been indicated otherwise, Patrick can be assumed to share the speaker's beliefs.

2. The theoretical framework

This theoretical framework is 'a radical elaboration of ideas of Robert Stalnaker'.

Four principles:

1. The meaning of a sentence is its *context change potential* (CCP)

A CCP is a function from contexts to contexts.

Contexts are states of information, sets of possible worlds.

The change effected by the CCP of a sentence consists of updating that information by what the sentence says.

2. Not only complete (matrix) sentences have context change potentials, but so do embedded sentences

the CCPs of complex sentences are compositionally determined by the CCPs of their constituents.

3. The presuppositions of a sentence are requirements on the context, that is, they determine which contexts its CCP can be applied to. Whenever a sentence presupposes something, it must be evaluated in a context that already entails that presupposition.

These requirements are uncancellable, cannot be weakened; under certain conditions, a context may be fixed up to meet them, but never the other way round.

4. The phenomena of so-called presupposition projection are just a by-product of the way the CCP of a complex sentence is composed from the CCPs of its parts.

Example:

- Suppose we start with the 'empty' context, where nothing is presupposed yet. This is W, the set of all possible worlds.
- Imagine that in this context W, there occurs a (successful) assertion of the atomic sentence *it is raining*
- The result will be a new context, a subset of W, which containsjust those worlds where it is raining.

The CCP of *it is raining* is the instruction to conjoin (that is: intersect) whatever the current context may be with the proposition that it is raining.

The notation '$c + \phi$': the result of executing the CCP of LF ϕ on the context

(7) For any context c, c+ *it is raining* = $\{w \in c$: it is raining in w$\}$

The CCPs of complex sentences are determined compositionally on the basis of the CCPs of their parts.

For truthfunctional connectives, we have semantic rules like the following (where \ is set-theoretic complementation).

(8) c + not ϕ = c\(c + ϕ)

If you apply the CCP of *not [it is raining]* (the LF of *it isn't raining)* to W, what you get by is the set of all worlds in which it isn't raining.

The definition of the CCP of a sentence encodes not just its content but also its presupposition.

The CCP of a sentence without any presupposition will be a *total* function from contexts to contexts.

In general, CCPs are partial: they are defined only for those contexts that satisfy the presuppositions of the sentence in question.

For example, *John's cat is hungry* presupposes that John has a unique cat. The CCP of this sentence is only defined for contexts that entail that John has a unique cat. (The entailment relation between contexts is the subset relation.)

(9) c + *John's cat is hungry* is defined iff
c $\subseteq$ {w: John has a unique cat in w};
where defined, c + *John's cat is hungry* = {w$\in$c: John has a hungry cat in w}

not [John's cat is hungry] also presupposes that John has a unique cat. Negation is predicted to be a 'hole' .

(10) c + not ϕ = is defined iff c + ϕ is,
in which case c + not ϕ =c\(c + ϕ)

Notice that the spelled-out rule (10) is fully recoverable from the abbreviated version of (8): the added top line states just what it takes for the expression to the right of the equation sign below to denote a context.

3. Belief reports

3.1 The meaning

What we want:

(11) For any context c, c + α *believes* ϕ is defined only if...
Where defined, *c* + α *believes* ϕ =

The starting point is Hintikka's semantics (1969):

(12) John believes that it is raining.

(13) ⟦(12)⟧(w) = 1 iff it is raining in every world w' that is doxastically accessible for John in w.

In the context-change framework, the same can be expressed as

(14) For any c, c +*John believes it is raining*
$= \{w \in c$: for every $w' \in Dox_j(w)$, it is raining in $w'\}$.

(15) For any $w \in W$,
$Dox_j(w) = \{w' \in W$: w' conforms to what John believes in w$\}$

What is the contribution of *it is raining*?

(16) For any c, c + *John believes it is raining*
$= \{w \in c$: $Dox_j(w)$ + *it is raining* $= Dox_j(w)\}$

Let's generalize it:

(17) For any c, c + α *believes* $\phi = \{w \in c: Dox_\alpha(w) + \phi = Dox_\alpha(w)\}$
(18) For any c, c + α *believes* $\phi = \{w \in c: Dox_\alpha(w) + \phi =$ same$\}$

With presuppositions:

(19) For any context c,
[c + α *believes* ϕ is defined iff $Dox_\alpha(w) + \phi$ is defined for each $w \in c$].
Where defined, c + α *believes* $\phi = \{w \in c: Dox_\alpha (w) + \phi =$same$\}$

3.2 Predictions

If the CCP of ϕ makes non-trivial demands on its input context, then so does the CCP of α *believes* ϕ.

If the CCP of ϕ is defined only for contexts that entail a certain proposition p, then the CCP of α *believes* ϕ is defined only for those c all of whose elements w map onto $Dox_\alpha(w)$ that entail p.

In other words, α *believes* ϕ is defined only for those c, which entail that α believes p.

We want to derive that (20) as whole presupposes nothing.

(20) John believes that $Mary_1$ is here, and he believes that $Susan_F$ is here too_1.

(21) $\phi[\alpha_F]too_1$ presupposes $x_1 \neq \alpha$ & $\phi[x_1]$.

In this case *too* means 'in addition to Mary'.

(22) For any c,
c + *Susan$_F$ is here too,* is defined iff Mary is here in every world in c.
Where defined, c + *Susan$_F$ is here too,* = {w∈c: Susan is here in w}.

The rule for 'and'

(23) [c + *ϕ and ψ* is defined iff c + ϕ and (c + *ϕ)* + ψ are defined.]
Where defined, c + *ϕ and ψ* = (c + *ϕ)* + ψ

We want to show that any context (even the completely information-less W) is in the domain of the CCP of (20).

- Let c be an arbitrary context ⊆W.
- By rule (23), c + (20) is defined just in case both c + *John believes Mary, is here* and (c + *John believes Mary, is here) + he believes Susan$_F$ is here too,* are.
- c +*John believes Mary, is here* is defined. This follows trivially from the fact that *Mary is here* has no presuppositions, it is always defined.
- We also know from rule (17) what c + *John believes Mary is here* (henceforth abbreviated as c') is as shown in (24).

(24) c' := c + *John believes Mary$_1$ is here* =
{w∈c: Mary is here in all w'∈Dox_j(w)}

- Now we need to establish if c' + *he believes Susan$_F$ is here too,* is defined too.
- By rule (19) this is so iff Dox,(w) + *Susan$_F$ is here too,* is defined for every w∈c'. Let w be an arbitrary w∈c'. It follows by (24) that Mary is here in all w'∈Dox_j(w).
- According to (22), this in turn guarantees the definedness of Dox_j(w) + *Susan$_F$ is here too,*.

The utterance of the first conjunct of (20) is responsible for the fact that the second conjunct's presuppositional requirement is satisfied by the intermediate context against which it is evaluated.

This correctly captures the fact that (25) is bad.

(25) #John doubts that Mary$_1$ is here and/but believes that Susan$_F$ is here too$_1$.

Doubt means something like *not believe.* After the first conjunct in (25), we then have a context for all whose elements w Dox_j(w) fails to entail Mary's being here. Dox_j(w) + *Susan is here too,* is guaranteed to be undefined for all of w.

Alternative explanation could be: every presupposition is also an entailment of the minimal sentence that carries it. (25) would mean something like (26).

(26) John doubts that $Mary_1$ is here and/but believes that $Mary_1$, is here and $Susan_F$ is here too_1

Such an approach would fail to account for the badness of (27), as it predicts it should be equivalent to (28).

(27) #John doubts that $Mary_1$ is here. He believes that if $Susan_F$ were here too_1, there would be dancing.

(28) John doubts that $Mary_1$ is here. He believes that if $Mary_1$ is here and $Susan_F$ were here too_1, there would be dancing.

4. Want

Idea 1 (to be rejected): the only difference between 'believe' and 'want' is the accessibility function, for 'want' we pick the buletic function.

(29) $Bul_j(w) = \{w' \in W$: w' conforms to what John wants in w).

(30) [c + α *wants* ϕ is defined iff $Bul_\alpha(w) + \phi$ is defined for each $w \in c$].
Where defined, c + α *wants* $\phi = \{w \in c: Bul_\alpha(w) + \phi = \text{same}\}$

Good prediction: in (31) the presupposition is filtered out.

(31) John wants $Fred_1$ to come, and he wants Jim_F to come too_1.

Bad prediction: we do not account for the filtering effect in *believe-want* sequences:

(32) John believes that $Mary_1$ is coming, and he wants $Susan_F$ to come too_1.

The problem is that the sets Dox_α (w) and Bul_α (w) (for any given w) may stand in any relation: i.e. they may be mutually disjoint, they may overlap, one may be a subset of the other, or vice versa.

There are also independent reasons to think that (30) is the wrong approach. For any p and q, if $p \subseteq q$, we predict that x wants p entails x wants q.

Asher (1987): imagine that Nicholas is not willing to pay the $3,000 that he believes it would cost him if he flew to Paris on the Concorde, but he would love to fly on the Concorde if he could get the trip for free. (33) is true, (34) is false.

(33) Nicholas wants a free trip on the Concorde
(34) Nicholas wants a trip on the Concorde.

Stalnaker (1984: 89): 'Suppose I am sick I want to get well. But getting well entails having been sick, and I do not want to have been sick.

Suppose there was a murder. I want to know who committed the murder. But my knowing who committed the murder entails that the murder was committed, and I never wanted the murder to have been committed'.

Idea 2.

Wanting something is preferring it to certain relevant alternatives, the relevant alternatives being those possibilities that the agent believes will be realized if he does not get what he wants.

There is a hidden conditional in every desire report.

John wants you to leave means that John thinks that if you leave he will be in a more desirable world than if you don't leave.

Conditionals:
Lewis (1973) Stalnaker (1968):
A conditional *if* ϕ, ψ is true in a world w iff ψ is true in all ϕ-worlds maximally similar to w.

(35) $Sim_w(p)$: $=\{w' \in W: w' \in p$ and w' resembles w no less than any other world in p$\}$

(36) $w \in [\![if\ \phi,\ \psi]\!]$ iff $Sim_w([\![\phi]\!]) \subseteq [\![\psi]\!]$

In the context change framework:

(37) $c + if\ \phi,\ \psi = \{w \in c: Sim_w(c+\phi)+\psi = \text{same}\}$

Stalnaker (1975: 276): 'when a speaker says *if A*, then everything he is presupposing to hold in the actual situation is presupposed to hold in the hypothetical situation in which *A* is true.'
(37) also makes correct predictions about presupposition projection in conditionals:

- conditionals inherit the presuppositions of their antecedents. unless $c + \phi$ is defined, $c +$ *if* ϕ, ψ won't be either.
- presuppositions of the consequent which are entailed by the antecedent get 'filtered out'. (This is because the CCP of ψ is applied to $Sim_w(c + \phi)$ and this is a subset of $c + \phi$)

Want

(38) 'α *wants* ϕ' is true in w iff
for every $w' \in Dox_\alpha(w)$:
every ϕ-world maximally similar to w' is more desirable to α in w than any non-ϕ-world maximally similar to w'.

In the context change framework:

(39) c+ 'α *wants* ϕ' =
$\{w \in c$: for every $w' \in Dox_\alpha(w)$:
$Sim(Dox_\alpha(w) + \phi) <_{a,w} Sim(Dox_\alpha(w) + \text{not } \phi)\}$

This captures Karttunen's generalization: the presuppositions of *a wants* ϕ are satisfied just in case the subject *a* is presupposed to believe the presuppositions of the complement ϕ. (40) as a whole presupposes nothing, c + (40) is defined regardless of the choice of c

(40) John believes that $Mary_1$ is here, and he wants $Susan_F$ to be here too_1.

- c +*John believes Mary is here* (=: c') is defined for all c and it equals to {w∈c: Mary is here in all w'∈Dox_j(w)}
- It remains to demonstrate the definedness of c' + *he wants* $Susan_F$ *to be here* too_1.
- By (39), we must show that Dox_j(w) + $Susan_F$ *to be here* too_1, and Dox_j(w) + *not [*$Susan_F$ *to be here* too_1*]* are defined for all w∈c' , which (by the *not*- rule and the *too*-rule) means that, for each w∈c', Mary is here in all w'∈Dox_j(w).
- But this was shown above

Problem: we predict that when I know I am sick, (41) would be trivially true.

(41) I want to have been sick

If John believes in w that he have been sick, then Dox_j(w) + *not [PRO to have been sick]* is empty, and so is $Sim_{w'}$ applied to it. Since it is trivially true that all the worlds in the empty set are worse than any others, this suffices to make the conclusion true. (39) predicts that, whenever *a* believes ϕ or believes *not* ϕ, it trivially follows that both *a* wants ϕ and wants *not* ϕ.

A fix: want-sentences have an additional presupposition (above and beyond those projected from the complement according to Karttunen's generalization), namely that the subject does not believe the complement nor its negation.

(42) p is in the domain of Sim only if p≠∅; where defined, $Sim_w(p)$: = {w'∈W: w'∈p and w' resembles w no less than any other world in p}

Stalnaker's examples are appropriately classified as infelicitous rather than false: *I don't want to have been sick* is a strange sentence indeed to use for someone who takes for granted that she has been sick.

A problem:

(43) (John hired a babysitter because) he wants to go to the movies tonight.
(44) I want this weekend to last forever. (But I know, of course, that it will be over in a few hours.)
(45) John intends to go to the movies.

What seems to be going on when we assess someone's intention is that we don't take into account *all* his beliefs, but just those that he has about matters unaffected by his own future actions.

intend is the following accessibility function F_α:

(43) For any $w \in W$: $F_\alpha (w) = \{w' \in W$: w' is compatible with everything that α in w believes to be the case no matter how he chooses to act$\}$

It is no longer predicted *John intends to go to the movies* to be a presupposition failure just because John is convinced he will go.

It is predicted it to be inappropriate if he were convinced he'll go no matter how he chooses to act. *This* prediction seems right.

Want has a reading more or less equivalent to *intend*.

A problem: we do not predict that presuppositions are filtered in *want-want* sequences.

(46) John wants $Fred_1$ to come, and he wants Jim_F to come too_1.

Supposing that (as the felicity of the first conjunct requires, by our present analysis) the possibility of Fred not coming is compatible with John's beliefs, the CCP of the second conjunct is not defined for its context.

A similar problem occurs with (47).

(47) If Mary comes, we'll have a quorum. If $Susan_F$ comes too, we'll have a majority.

'I have no solution to this important problem.'

One way to treat these case is by invoking accommodation of an inexplicit restriction.

5. Presuppositions and *de re* readings

(48) uttered in isolation seems to presuppose that it actually was raining, rather than merely that John believes so.

(48) John believes that it stopped raining.

Hypothesis: all cases where attitude verbs seem to be holes result from *de re* construals of (a constituent containing) the presupposition trigger.

(49) John thought that *the person who was going to kill him* had come to read the gas meter.

(50) There is an acquaintance relation D such that
(i) John bore D to the person who was going to kill him, and

(ii) John thought that whoever he bore D to had come to read the gas meter.

Question 1: how to generalize this to presupposition triggers other than definite descritions?
Question 2: this would predict that *de re* readings are always preferred over *de dicto* readings, which contradicts superficial evidence.

(51) John thought I had stopped proof-reading.

John thought of the activity of mine that was in fact a proof-reading, but that he may not have recognized as such, that it had stopped.

For instance, John may have seen me from a distance and thought I was reading a magazine, then (after he had looked away) heard my step, at which point he concluded I must have stopped reading the magazine.

In fact, I was proof-reading my article and continued doing this even as I was walking around.

We can treat the -ing complement of *stop* as a definite description of a process.

(52) There is an acquaintance relation D such that
(i) John bore D to my proof-reading, and
(ii) John thought that the activity he bore D to had stopped.

(53) is quite clearly felicitous even if Mary's parents cannot be assumed to have any beliefs about John.

(53) John: I am already in bed.
Mary: My parents think I_F am alsoj in bed.

(54) Of the property of also being in bed, my parents think that I have it.

A refinement of the standard *de re* analysis: replace existential quantification over acquaintance relations by reference to a contextually salient particular acquaintance relation.

There is not just one *de re* reading (for a given constituent), but there are many—one for each acquaintance relation that the context might supply.

It is natural to pick the one related to the description mentioned in the sentence. In (55) intended acquaintance relation between Ralph and Ortcutt is the one established in the beach-encounter. This reading will be hard to distinguish from a proper *de dicto*.

(55) Ralph thinks the man he saw at the beach is a spy.

The conclusion: the idea that de re readings are the ones that are preferred is defendable despite the initial *intuition* that the default reading is de dicto. *De dicto* readings can be also captures via a *de re* construal.