Dissatisfaction Theory
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1 Aims

• Sharpen some well-known problems for Satisfaction Theory (‘ST’).
• Sketch a new theory of presupposition which solves those problems.

2 Subject Matter

Semantic presupposition (‘SP’) identified by enriched family of sentences test.
We do not assume e.g. that SPs are truth-value gaps or constraints on input contexts (‘presupposition’ is an unfortunately loaded name).

3 Satisfaction Theory

Two planks:

(1) Stalnaker’s Bridge: An assertion of p_r can only update c if c ⊨ r.
(2) ST Projection: p can only update c if all its constituents have their SPs locally entailed. p SPs r iff c ⊨ r for all c which p can update.

4 Conditionals

ST’s predictions about SPs under connectives and attitude predicates are widely recognized not to match observed speaker presuppositions.
I argue these problems are worse than has been recognized.
First, ST predicts

(3) If p then q_r
       □ST p ⊃ r

But speakers are often felt to presuppose r, not just p ⊃ r:

(4) If Theo hates sonnets, so does his wife.
       □ST Theo hates sonnets ⊃ Theo has a wife.
       □OBS Theo has a wife.

Response: ST is right about semantic presupposition, but interlocutors often, for pragmatic reasons, take the speaker to presuppose the unconditional.
Problem: conditional SPs get strengthened even when there is strong pragmatic pressure not to do so. Consider:

(5)  a. How’s Jo’s health?
    b. ??I don’t know; he has diabetes or MS, I don’t know which. But if he restricts his sugar intake at dinner tonight, then his diabetes is under control.
       \[ \sim_{ST} \text{Jo restricts his sugar intake} \supset \sim_{OBS} \text{Jo has diabetes.} \]

Thus the incoherence of (5-b).

By a principle of charitable interpretation.

But if conditionals had conditional SPs which are optionally strengthened through pragmatic reasoning, that strengthening should be blocked here.

Upshot: ST plus pragmatic strengthening is *prima facie* inadequate.

5 Attitudes

Second, ST predicts

(6)  S [believes/wants] p_r
       \[ \sim_{ST} S \text{ believes r.} \]

But speakers are often felt to presuppose r as well:

(7)  Jo believes that his uncle will visit soon.
       \[ \sim_{ST} \text{Jo believes he has an uncle}. \]
       \[ \sim_{OBS} \text{Jo has an uncle.} \]


Response: pragmatic strengthening again. We tend to defer to a belief if it is presupposed (rather than asserted) that someone holds it.

Again, this approach predicts that if we create pragmatic pressure against this kind of deference, the inference will disappear. But it doesn’t:

(8)  Bernhard has many mistaken beliefs about Bugandan politics. He thinks that Buganda’s king has stopped attending parliament!
       \[ \sim_{ST} \text{Bernhard thinks Buganda has a king who used to attend parliament.} \]
       \[ \sim_{OBS} \text{Buganda has a king who used to attend parliament.} \]

(9)  ??I don’t know whether the vase was broken. But Lucy thinks that it was Susie who broke it.
       \[ \sim_{ST} \text{Lucy thinks someone broke the vase.} \]
       \[ \sim_{OBS} \text{Someone broke the vase.} \]

Again: ST plus pragmatic strengthening is *prima facie* inadequate.

Generalization: ST makes correct predictions when no accommodation is needed, but excessively weak predictions in other cases.
6 Dissatisfaction Theory

Dissatisfaction Theory (‘DT’) replaces ST’s two planks as follows:

(10) **Side Entailments:** SPs are side entailments.

As side entailments, SPs are hard to target with propositional anaphors and shouldn’t answer a QUD; they impose their content rather than propose it.

(11) **DT Projection:** The SP of an atomic sentence filters past a node iff it isn’t locally entailed at that node.

An obvious resemblance to *ST Projection*. But while *satisfaction* theory sees SPs as *constraints* that must be locally *satisfied*, *dissatisfaction* theory sees SPs as contents that are always passed up *unless* locally satisfied.

Roughly: We match the predictions of ST about when a sentence SPs nothing; but make stronger predictions in other cases.

7 Conditionals

(12) If p then q.

DT predicts (12) SPs r unless p contextually entails r; then it SPs nothing.

We thus accommodate intuitions that drive ST, since we predict no SPs for

(13) If p, q.
(14) If Theo has a wife, then his wife likes sonnets.

But we also accommodate the intuitions elicited above: e.g. that

(15) If Theo hates sonnets, so does his wife.

- **Side Entailments** is crucial here: if we stuck with *Stalnaker’s Bridge*, speakers would still be predicted to have a choice between conditional and unconditional accommodation, and the Proviso Problem would re-arise.

- What of cases which seem to confirm ST’s conditional predictions?

(16) If France is a monarchy, then its king is tall.

- **ST** France is a monarchy ⊃ France has a king.
- **DT** France has a king.

*Question 1:* When is a conditional inference of this kind available?

*Hypothesis:* iff the inference is a *default* of some kind.

*Question 2:* How does DT predict this kind of conditional inference?
Hypothesis: if the predicted SP of DT would yield infelicity of some kind, the interlocutors will cast around for a default which would rescue the assertion.

They will accommodate the default and evaluate the utterance against the updated context, to avoid the infelicity.

Upshot: a speaker will sometimes be felt to presuppose a default conditional as a way of rescuing her assertion (not as an SP).

8 Attitudes

DT predicts

(17) \( S \) [believes/wants] \( p_r \).

SPs \( r \) unless \( r \) is entailed by \( S \)'s [belief/desire]-worlds as viewed in \( c \). So:

(18) \( S \) believes \( p_r \).

Both predictions here are correct. Section A.5 below shows how DT can capture ST’s predictions.

Since \( r \) (‘Jo has an uncle’) will be locally entailed. Assuming that \( S \)'s desire-worlds are a subset of her belief-worlds, as in Heim (1992) a.o.,

Heim (1992), Sudo (2014) propose to avoid this by invoking modal subordination.

And we improve on the predictions of ST for want-want sequences:

(19) \( S \) believes \( r \), and \( S \) [believes/wants] \( p_r \).

(20) Jo believes he has an uncle, and believes that his uncle will visit.

(21) Jo believes he has an uncle, and he wants his uncle to visit.

DT also captures intuitions behind ST: both predict no SPs for (19)-(21):

(22) \( S \) wants \( r \) and \( S \) wants \( p_r \).

And we improve on the predictions of ST for want-want sequences:

(23) Sue wants it to have rained, and wants it to have stopped raining.

A Appendix: Sketch of Implementation

Implementation requires commitments beyond the core planks of DT.

Two dimensions of content. \([\cdot]^c\) takes a string \( \alpha \) to a set \( \{\pi, \mu_{st}\} \), s.t. \( \mu \) is \( \alpha \)'s 'main' content at \( c \) (of type \( \{st\} \)), and \( \pi \) is the set of \( \alpha \)'s SPs at \( c \) (of type \( \Sigma \)).

Bivalent framework; we remain agnostic about what to say if e.g. \( \mu(w) = 1 \) but for some \( \delta \in \pi, \delta(w) = 0 \). Various possibilities for defining entailment.
A.1 Pragmatics

When $[α]^c = \{π_\Sigma, μ_\text{st}\}$, asserting $α$ will impose $\bigcap π$ on the common ground (barring objections); and will propose to add $μ$ to the common ground.

A.2 Compositional Semantics

**Abbreviations and Assumptions:**

- Shorthands: $[α]_\mu^c$ is $α$’s main content at $c$, $[α]_\mu^s$ its SP content.
- For any sets $s, r$: let $s^{r/\mu}$ be the set of elements of $s$ not locally entailed by $r$.
- Each node $α$ is tagged with that node’s local context, $κ_α$.

**Composition Rules:** We extend Heim and Kratzer (1998) as follows:

1. **Functional Application:** For node $α$ with daughters $β, γ$, with $[γ]_\mu^c$ in the domain of $[β]_\mu^c$: $[α]_\mu^c = \{δ^{x, x^\mu}, [β]_\mu^c(([γ]_\mu^c))\}$, with $δ$ the smallest set s.t. for all $ρ$:
   - $ρ \in ([β]_\mu^c \setminus D_\text{st})^{κ_β/\mu} \times [γ]_\mu^c$ $→ f(ρ) ∈ δ$.
   - $ρ \in ([γ]_\mu^c \setminus D_\text{st})^{κ_γ/\mu} \times [β]_\mu^c$ $→ f(ρ) ∈ δ$.
   - $ρ \in ([β]_\mu^c \cup [γ]_\mu^c) \setminus D_\text{st} \rightarrow ρ ∈ δ$.

   **Intuition:** SPs freely functionally apply with either dimension of content of sister, until they become propositions. Then pass up iff not locally entailed.
   
   1. normal FA for main contents
   
   2. the SP content is the set of contents not locally entailed at $α$ which are

   - propositions SPed by either daughter; or
   - obtained by functional application of a non-propositional element SPed (but not locally entailed) by one daughter, with either the main or SP content of the other daughter.

2. **Predicate Abstraction:** For node $α$ with daughters $β$ and $γ$, where $β$ dominates only a numerical index $i$, for any variable assignment $g$:

   $[α]_g^a = \{ f_{e, st} : \exists ρ_{st} ∈ [γ]_g^a (ρ = [δ]_μ^g \land f = λx_e. [δ]_{μ}^{g/f_i}) \}, λx_e. [γ]_μ^{g/f_i}\}$.

   **PA** applies normally to main content and pointwise to SP content.

A.3 Key Predictions: Propositional Fragment

For the ‘propositional fragment’ we validate DT Projection: propositional SPs move up the tree unless they hit a node where they are locally entailed.
A.4 Key Predictions: Predication

Ordinary predication is straightforward. E.g. let

\[ \llbracket \text{won} \rrbracket = \{ \lambda x. \lambda w. x \text{ participated in } w \}, \lambda x. \lambda w. x \text{ won in } w \} \]

\[ \llbracket \text{S won} \rrbracket^\top = \{ \lambda w. S \text{ participated in } w \}, \lambda w. S \text{ won in } w \} \]

Assumption: conjunction and negation are of types \langle st, \langle st, st \rangle \rangle, \langle st, st \rangle \text{ resp.}

Else have unwanted interactions with presupposed material.

A.5 Key Predictions: Some Intensional Operations

Thus, in contrast to Potts (2005), it’s crucial that the SP contents can functionally apply within their own dimension. I assume that SP material is also entailed by the main content.

This is important in getting belief ascriptions right, and for the ‘managed’ binding puzzle. ‘α \Rightarrow DT β’ should now be read as ‘β denotes a proposition in \llbracket α \rrbracket_c π according to DT’.

Recapturing ST’s prediction that ‘S believes p’ SPs ‘S believes r’:

\[ \llbracket \text{believes} \rrbracket = \{ \lambda \sigma. \lambda x. \lambda w. \forall p_{st} \in \sigma : \forall w' \in Dox_x(w) : p(w') = 1 \}, \lambda p_{st}. \lambda x. \lambda w. \forall w' \in Dox_x(w) : p(w') = 1 \} \]

\[ \llbracket \text{wants} \rrbracket = \{ \lambda \sigma. \lambda x. \lambda w. \forall p_{st} \in \sigma : \forall w' \in Dox_x(w) : p(w') = 1 \}, \lambda p_{st}. \lambda x. \lambda w. \forall w' \in Bul_x(w) : p(w') = 1 \} \]

Then in a null context:

\[ S \llbracket \text{believes/wants} \rrbracket p_r. \]

\[ \Rightarrow DT r. \quad \text{[by composition rules alone]} \]

\[ \Rightarrow DT S \text{ believes } r. \quad \text{[by composition rules plus entry for ‘believes’]} \]

\[ \llbracket \text{knows} \rrbracket = \{ \lambda \sigma. \lambda x. \lambda w. \forall p_{st} \in \sigma : \forall w' \in K_x(w) : p(w') = 1, \lambda p. p \}, \lambda p_{st}. \lambda x. \lambda w. \forall w' \in K_x(w) : p(w') = 1 \} \]

Then in a null context:

\[ S \text{ knows } p_r. \]

\[ \Rightarrow DT r. \quad \text{[by composition rules alone]} \]

\[ \Rightarrow DT S \text{ knows } r. \quad \text{[by composition rules plus entry for ‘knows’]} \]

\[ \Rightarrow DT p. \quad \text{[by composition rules plus entry for ‘knows’]} \]

A.6 Key Predictions: Nuclear Scope of Quantifiers

For any quantifier \( Q \):

\[ Q(f)(g) \]

\[ \Rightarrow DT Q(f)(h) \quad \text{[by FA and PA]} \]

Every student won.

\[ \Rightarrow DT \text{ Every student participated.} \]

Some student won.

\[ \Rightarrow DT \text{ Some student participated.} \]

Most students won.

\[ \Rightarrow DT \text{ Most students participated.} \]

So far so good. Problems for right- down- and non-monotone quantifiers:

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(37) \( \text{No}(f)(g_h) \sim_{\text{DT}} \text{No}(f)(h) \)

(38) No student won.
\( \sim_{\text{DT}} \) No student participated.

This is wrong. Must assume decomposition of negative quantifiers, e.g.:

(39) \( \text{No}(f)(g_h) \approx \text{Not}(\text{some}(f)(g_h)) \)
\( \sim_{\text{DT}} \text{Some}(f)(h) \)

A.7 Key Predictions: Restrictor of Quantifiers

Plausible predictions wrt projection out of scope. But not wrt restrictors:

(40) \( Q(f_h)(g) \sim_{\text{DT}} Q(h)(g) \)

(41) Everyone who won a race is happy.
\( \sim_{\text{DT}} \) Everyone who participated in a race is happy.

This is wrong. For positive quantifiers, predicts SP stronger than assertion.

Possibility: tacit domain argument which must entail the restrictor’s SP.

Result: universal projection out of the restrictor in the domain.

Plausible, provided the domain doesn’t have to line up with anything explicit.

A.8 Notes and Questions

- Source of triggers?
- How are local contexts calculated?
- Relation to theories of CIs, ‘expressive’ SPs.
- If DT is right, why do things work this way?

References


See Sauerland (2000) a.o. for evidence from split scope readings, cross-linguistic data.

Prediction will depend on how negative quantifiers decompose. E.g., controversial whether this is strong enough for ‘none’. Could get stronger projection if we assume different decomposition. Similar moves elsewhere: ‘fewer than \( n \)’ \( \approx \) ‘not(\( n \))’; ‘exactly one’ \( \approx \) ‘only(one)’.

This would render the SP ‘inert’ in our system. We could motivate this on Gricean grounds (don’t SP something stronger than assertion) or grammaticalize it.

DT is compatible with different accounts, including pragmatic ones like Stalnaker (1974), Simons (2001).

N.B.: on DT, SPs are never old; makes the contrast with CIs less striking.


