Be Articulate!

A Pragmatic Solution to the Projection Problem

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The Projection Problem

- John knows that he is incompetent
  # in case John is competent.

- a. John is incompetent and he knows that he is.
  false in case John is competent.
  b. If John is incompetent, he knows it
  true / false (but not #) in case John is competent.

- a. John is depressed and he knows that he is incompetent.
  # in case John is competent.
  b. If John is depressed, he knows that he is incompetent.
  # in case John is competent.

- **Lessons [to be disputed]**
  a. Sentences can be true, false, or #.
  b. Trivalent logic alone won't suffice.

Context Update I

- **Stalnaker's Analysis: a pragmatic solution**

  a. John is incompetent and he knows that he is.

  Step 1: Update the Context Set C with *J. is incompetent*

  C[John is incompetent]={w∈C: J. is incompetent in w}=C'

  Step 2: Update the intermediate Context Set C' with *he knows that he is incompetent*

  C'[he knows it]={w∈C: J. is incompetent in w and J. believes in w that J. is incompetent}

  b. #John knows that he is incompetent and he is.

- **Ideas:** (i) The assertion of a conjunction is a succession of two assertions. (ii) The analysis is pragmatic.

Context Update II

- **Problems with Stalnaker's Analysis**

  a. It is not clear that the notion of 'intermediate Context (Set)' makes sense (e.g. *None of my students is both rich and proud of it*).

  b. It is unclear how the analysis can extend, say, to disjunction or quantifiers (e.g. a disjunction cannot be equated with a succession of two assertions)

- **Heim's Analysis: a semantic solution**

  a. Rule: C[F and G] = (C[F])[G], unless C[F]=#

  b. Results: same as before, except that they can be extended.

Context Update III

- **Problem: is the account explanatory? (Soames 1989)**

  C[F and G] = (C[F])[G]
  C[F and* G] = (C[G])[F]

  When F and G are not presuppositional,
  C[F and G]=C[F and* G]={w∈C: F is true in w and G is true in w}

- **There are many ways to define the CCP of *or*...**
  C[F or^1 G] = C[F] ∪ C[G], unless one of those is #
  C[F or^2 G] = C[F] ∪ C[not F][G], unless one of those is #
  C[F or^3 G] = C[not G][F] ∪ C[G], unless one of those is #

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- **Assumptions**

  (i) There are just two truth values

  (≈ local accommodation is the basic case)

  (ii) Meaning is not dynamic: there **is** a Context Set, but it **need not get modified** as a sentence is processed.

- **Be Articulate! [= primitive principle]**

  Under certain conditions, if *F* is contextually equivalent to *p and F*, *p* is considered as a 'pre-condition' of F and one should say **___ [p and F] ___**

  rather than **___ F ____**

  ... unless the full conjunction is ruled out by independent pragmatic constraints.

  Notation: we write F= pp' if p is the 'precondition' of F

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- **Solution** (for d, d' of type t or <e, t>)
  Say _ d and dd' __ rather than __ dd' __ unless ...
  (i) one can be certain that **d and** does no work no matter what the end of the sentence is **[this derives Heim 1983]**
  [but don't rule out: **John resides in France and he lives in Paris**]
  (ii) one can be certain that **and dd'** does no work once the beginning of the sentence is heard **[new predictions]**

- **John knows that it's raining**
  Speaker should have said: **It's raining and John knows it**
  unless... the first conjunct **It's raining** was doing no work
  which happens if... **C |= It's raining**

- **If it's raining, John knows it**: ok without a presupposition because **#If it's raining, it's raining and John knows it**

Transparency I: Asymmetric Version

- Let <u>d</u> be of type t or <e, t>. If **for each c' of the same type as d and for each acceptable sentence completion b'**

  C $\models$ a (d and c') b' $\Leftrightarrow$ a c' b'

  d and should not have been uttered in the first place!

- Thus **a <u>d</u>d' b** is acceptable in C if

  a (d and <u>d</u>d') b is **not** acceptable in C, i.e. if

  for each c' of the same type as d and for each acceptable sentence completion b'

  C $\models$ a (d and c') b' $\Leftrightarrow$ a c' b'

An Incorrect Alternative

- **Transparency* (WRONG!)**

  a dd' b is acceptable in C if
  C |= a (d and d’) b ⇔ a d’ b

- It is John who won
  a. Presupposition: Exactly one person won.
  b. Assertion: John won.

- **(Wrong) Prediction of Transparency***

  C |= Exactly one person won and John won ⇔John won
  i.e. C |= John won ⇒ Exactly one person won

pp'

Transparency: for all syntactically acceptable b', c',
C |= (p and c') b' ⇔ c' b'

***Claim: Transparency* is satisfied** ⇔ **C |= p**

⇐ If C |= p, for any c', (p and c') and c' have the same contextual meaning, hence the result.

⇒ Take b' to be empty, and take c' to be a tautology.
Then Transparency requires that
C |= (p and c') ⇔ c'
hence C |= (p and c'), hence C |= p.

(p and $\underline{q}$q')

- **John is an idiot and he knows that he is incompetent**
  Prediction: C |= John is an idiot ⇒ John is incompetent

Transparency: for all syntactically acceptable b’, c’,
C |= (p and (q and c’) b’ ⇔ (p and c’ b’

Claim: ***Transparency*** **is satisfied ⇔ C |= p ⇒ q**

⇐ : Straightforward
⇒ : Taking b’ =) and c’ to be some tautology, we have:
C |= (p and (q and c’)) ⇔ (p and c’), hence
C |= (p and q) ⇔ p, hence in particular
C |= p ⇒ q

(if p. <u>q</u>q')

- **If John is an idiot, he knows that he is incompetent**
  Prediction: C |= John is an idiot ⇒ John is incompetent

Transparency: for all syntactically acceptable b', c',
C |= (if p . (q and c') b' ⇔ (if p . c' b'

***Claim: Transparency* is satisfied** ⇔ **C |= p ⇒ q**
[We treat conditionals as **material implications**]

⇐ : Straightforward
⇒ : Taking b' =) and c' to be some tautology, we get:
C |= (if p. (q and c')) ⇔ (if p . c'), hence
C |= (if p. q)

General Results

- **Theorem 1**

  For a propositional logic (with *not*, *and*, *or* and *if*), this system is fully equivalent to Heim 1983, supplemented with the disjunction of Beaver 2001.

  not $\underline{p}p'$ presupposes p
  (p and $\underline{q}q'$) presupposes p $\Rightarrow$ q
  (p or $\underline{q}q'$) presupposes (not p) $\Rightarrow$ q
  (if $\underline{p}p'$. q) presupposes p
  (if p . $\underline{q}q'$) presupposes p $\Rightarrow$ q

  (... but the result applies in full generality, not to just unembedded sentences).

General Results

- **Theorem 2**

  Under Conditions C1 and C2, **the equivalence can be extended to a system that includes any generalized quantifier** that satisfies Permutation Invariance, Extension and Conservativity.

  C1: Non-Triviality (any quantificational clause should 'have a chance' of a making a non-trivial contribution)

  C2: Restrictors hold of a constant number of individuals throughout the Context Set.

- **Additional Result**

  This system derives the projective behavior of connectives from their truth-conditional contribution, and hence it is predictive.

Unless

- Unless John didn't come, Mary will know that he is here.

- **a. Prediction of Heim 1983:** No prediction (*unless* is not discussed)

  b. Prediction of *Transparency*: There should be no presupposition (if: John came $\Rightarrow$ John is here)
  This follows from the equivalence:

  Unless John didn't come, q
  $\Leftrightarrow$ Unless John didn't come, <u>John came</u> and q.

While

- While John worked for the KGB, Mary knew that he wasn't entirely truthful about his professional situation.

- **a. Prediction of Heim 1983:** No prediction (*while* is not discussed)

  b. Prediction of *Transparency*: Given knowledge that a spy is not entirely truthful about his professional situation, there should be no presupposition.
  This follows from the equivalence:
  While John worked for the KGB, q
  $\Leftrightarrow$ While John worked for the KGB, he worked for the KGB and q

Problems

- a. If John is an idiot, he knows that he is incompetent.
  b. John knows that he is incompetent, if he is an idiot.

- a. This house has no bathroom or the bathroom is well hidden (after Partee).
  b. The bathroom is well hidden or this house has no bathroom.

- a. If this house has a bathroom, the bathroom is well hidden.
  b. If the bathroom is not hidden, this house has no bathroom

Notes: **If p, q ≈ If not q, not p**

If not (p and q), not p ≈ If p, p and q ≈ If not q, not p

Problems

- These cases are problematic for our *implementation* of *Be Articulate!*, but not for the idea that there is competition between pp' and (p and pp')

- a. John lives in Paris, if he resides in France.
  b. ?John resides in France and he lives in Paris, if he resides in France

- a. John lives in Paris or he doesn't reside in France.
  b. (?)[John resides in France and he lives in Paris] or he doesn't reside in France.

- a. If John doesn't live in Paris, he doesn't reside in France
  b. ?If John doesn't both reside in France and live in Paris, he doesn't reside in France.

Transparency II: Symmetric Version

- **Asymmetric Version of Transparency**

  a <u>d</u>d' b is acceptable in C if **for each c' of the same type as d and for each acceptable sentence completion b'**

  C |= a (d and c') b' ⇔ a c' b'

- **<u>Symmetric</u> Version of Transparency**

  a <u>d</u>d' b is acceptable in C if **for each c' of the same type as d ~~and for each acceptable sentence completion b'~~**

  C |= a (d and c') b ⇔ a c' b

Conjunction Revisited

- #John knows that he is incompetent and he is (incompetent)

- **Problem:** This sentence should be ruled out anyway because the second conjunct is not informative. Compare: #John lives in Paris and he resides in France.

- a. [John knows he is sick] and he has cancer.
  b. I doubt that [John knows he is sick] and that he has cancer.
  c. Is it true that [John knows he is sick] and that he has cancer?
  d. If John knows that he is sick and if he has cancer, he must be depressed

New Predictions: the Second Conjunct

- **Prohibition 1**

  a. #Mary lives in Paris and she resides in France.

  b. #There is a king of France and he exists.

  c. The king of France exists [no presupposition]

  ☞ **Don't say *a (d and dd') b* if C |= (d and dd') ⇔ d**

- **Prohibition 2**

  a. <?>More than three of my students are francophone and French.

  b. <?> More than three of my students are going to be without a job and realize it.

  c. More than three of my students now realize that they are going to be without a job [possible with no presupposition]

  ☞ **Don't say _ *(d and dd')* _ if the contribution of *dd'* is 'too small'.**

Quantification Revisited

- **Fact 1**
  Something close to Heim's 'universal' presuppositions are obtained with some presupposition triggers (*be unaware)*

- a. Each of my students is unaware that he is going to end up unemployed.
  b. None of my students is unaware that he is going to end up unemployed.
  c. More than three of my students are unaware that they are going to end up unemployed.
  d. Less than three of my students are unaware that they are going to end up unemployed.
  e. Exactly three of my students are unaware that they are going to end up unemployed.

Quantification Revisited

- **Fact 2**
  With other presupposition triggers (e.g. *realize*), the monotonicity of the quantifier is crucial.

- a. Each of my students realizes that he is going to end up unemployed
  $\Rightarrow$Each of my students is going to end up unemployed

  b. None of my students realizes that he is going to ...
  $\Rightarrow$Each of my students is going to end up unemployed

  c. (More than) three of my students now realize that ...
  $\not\Rightarrow$Each of my students is going to end up unemployed

  d. Less than three of my students now realize that ...
  $\Rightarrow$Each of my students is going to end up unemployed

Analysis I

- 'be unaware' is the basic case: universal presuppositions
- **Realize I: Upward-Monotonic Case**

  a. More than three of my students [are going to be unemployed and __]

  b. From a., one can infer:

  More than three of my students are going to be unemployed

  c. From b. + a principle according to which If more than three of my students are to be unemployed, (probably) more than three of my students realize that they are, we get: More than three of my students are going to end up unemployed and realize that they are going to end up unemployed

Analysis II

- **Realize II: Downward-Monotonic Case**

  a. None of my students [is incompetent and __]

  b. From a., one **cannot** infer:
  None of my students is incompetent

  (because __ could turn out to be a predicate true of nobody, which would make the sentence trivially true; this, in turn, would make it impossible to infer anything from it).

Analysis III

- **What does it mean that the 2nd conjunct makes a semantic contribution which is 'too small'?**

  C|=More than three of my students [are francophone and _]
  ➢ More than three of my students [are francophone and French]

  For all syntactically acceptable c',
  C |= a (d and c') b ➢ a (d and <u>d</u>d') b

- **Possible Motivation**
  a. ?More than three of my students are francophone and French
  b. Less than three of my students are francophone and French

Conclusion

- **General Properties**
  a. The theory does not need Context Change Potentials (the logic is fully classical)
  b. It makes predictions about projection behavior of connectives once their classical meaning (and their syntax) is known.

- **Part I: Ruling out __ *(d and dd')* __ because of *d***
  a. Asymmetric Transparency almost derives the results of Heim 1983 (=linear order is crucial).
  b. Symmetric Transparency makes predictions in which linear order plays no role.

- **Part II: Ruling out __ *(d and dd')* __ because of *dd'***
  New predictions about projection with quantifiers.

Further Facts I

- a. More than three of my students realize that they are going to end up unemployed

  b. I doubt that more than three of my students realize that they are going to end up unemployed

  c. More than three of my students don't realize that they are going to end up unemployed

Further Facts II

- a. More than three of my students are unaware that they are going to end up unemployed.

  b. [Uttered by a geneticist:]
  More than three of my patients are unaware that their father is not who they think he is