Presupposed Ignorance and Scalar Strengthening

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Outline:

(§1) **Observation:** Presupposed ignorance

(§2) Preliminary account presupposed ignorance inferences

(§3-) **Main topic:** How scalar implicatures (SIs) and presuppositions interact

(1) John is $\boxed{\text{(un)aware}}$ that some of the students smoke.

Proposal: Two scalar mechanisms

1. Presupposed Ignorance Principle
2. Exhaustivity operator (Exh)

1 The Puzzle: Presupposed Ignorance

- The standard analysis of *too*:

(2) John, too, VP.
  a. Asserts: John VP
  b. Presupposes: Another salient individual (the *antecedent*) VP

- This explains the felicity of (3a) and the infelicity of (3b).

(3) a. Mary will go to Yale. John, too, will go to Yale.
  b. Mary will go to Yale. #John, too, will go to Harvard.

- But now observe:

(4) Mary will go to Yale. #John, too, will go to Yale or Harvard.

Why is this bad? Mary will go to Yale, so she'll go to Yale or Harvard![1]

[1](i) seems to sound better than (4), if uttered in a context where the primary interest of the conversation is to find out who will go to Oxbridge, as David Pesetsky pointed out at LFRG at MIT (June 2, 2014).

(i) Mary will go to Oxford. (?)John, too, will go to Oxford or Cambridge.

We claim that this observation is not incompatible with our analysis to be presented below on the assumption that in such a context, the set of alternatives is contextually restricted and exclude the disjuncts (cf. Fox & Katzir 2011).

- Quite intuitively, 'John, too, will go to Yale or Harvard' seems to suggest that it is not commonly known that the antecedent (Mary) will go to Yale or Harvard, (5c):

  (5) John, too, will go to Yale or Harvard.
  a. Assertion: John will go to Yale or Harvard.
  b. Presupposition: The antecedent will go to Yale or Harvard.
  c. **Presupposed ignorance inferences:**
  $\neg CG$(the antecedent will go to Yale)
  $\neg CG$(the antecedent will go to Harvard)

  We'll call these additional inferences *presupposed ignorance inferences*.

- In the following example, the presupposed ignorance inferences are satisfied.

  (6) Mary will go to Yale or Harvard. John, too, will go to Yale or Harvard.

  The first sentence of (6) is associated with ignorance inferences.

  (7) Mary will go to Yale or Harvard.
  a. Asserts: Mary will go to Yale or Harvard.
  b. Ignorance inferences:
  (i) $\neg B_s$(Mary will go to Yale)
  (ii) $\neg B_s$(Mary will go to Harvard)

- Generally, items that give rise to ignorance inferences in simple sentences give rise to presupposed ignorance inferences in presupposed contexts:

  – The effect of presupposed ignorance arises with other presupposition triggers (we'll see why we are using negative factive predicates here):

    (8) a. Mary will go to Yale.
    #But John is **unaware** that she will go to Yale or Harvard.

  – and also with other ignorance inducing items, like *at least*.

    (9) a. Mary has three children. #John, too, has **at least** two children.
    b. Mary has three children. #But John is unaware that she has **at least** two children.

- Items that do not trigger ignorance do not give rise to the effects (as sharply, as because they sometimes do give rise to ignorance inferences).

  (10) a. Mary will go to Yale. John, too, will go to **an** Ivy League university.
  b. Mary has three children. John, too, has **more than one** child.
  c. Berlin is freezing. Göttingen, too, is cold.

2 The Presupposed Ignorance Principle

- In order to derive the presupposed ignorance inference, we postulate the following principle:

(11) **The Presupposed Ignorance Principle** (PIP)
ϕ_p is infelicitous in context c if ϕ_p has an alternative ψ_q such that
a. q is not weaker than p; and
b. c satisfies q.

- For (4): Mary will go to Yale. #John, too, will go to Yale or Harvard.
  - We assume the Sauerland alternatives for 'A or B':

$$\begin{tikzcd}[column sep=small, row sep=tiny] & A \arrow[dr, dash] & \\ A \text{ or } B \arrow[ur, dash] \arrow[dr, dash] & & A \text{ and } B \\ & B \arrow[ur, dash] & \end{tikzcd}$$

(12) The alternatives for 'John, too, will go to Yale or Harvard':
a. John, too, will go to Yale.
b. John, too, will go to Harvard.
c. John, too, will go to Yale and Harvard.

  - Assuming that the antecedent is fixed to Mary across the alternatives, the PIP says:

(13) 'John, too, will go to Yale or Harvard' is infelicitous in c if any of the following is true:
a. c satisfies 'Mary will go to Yale'.
b. c satisfies 'Mary will go to Harvard'.
c. c satisfies 'Mary will go to Yale and Harvard'.

In other words, the presupposed ignorance inferences are:

(14) a. $\neg CG($Mary will go to Yale$)$
b. $\neg CG($Mary will go to Harvard$)$
c. $\neg CG($Mary will go to Yale and Harvard$)$

  - In (4), since the first sentence says Mary will go to Yale, the second sentence is infelicitous.

- This accounts for other examples in the previous section (skipped for reasons of time; for 'at least n', the alternatives are 'exactly n', 'exactly $n+1$', etc.)
- Future research: Does the PIP follow from a more general pragmatic principle?
- Excursus on Maximize Presupposition (MP):
  - MP does not derive presupposed ignorance.

(15) MP
ϕ_p is infelicitous in c if there is an alternative ψ_q such that
a. ψ_q and ϕ_p are contextually equivalent in c; and
b. q is stronger than p.

  - In our examples, the first condition is not met, so MP derives no inferences.
  - Further research: If we have the PIP, do we really need MP?

- The Presupposed Ignorance Principle (PIP) derives presupposed ignorance inferences.
- We'll use the PIP to explain certain kinds of interactions between SIs and presuppositions, but we'll also see that the PIP fails to account for certain aspects of the phenomenon.

- To fix the problem, we'll postulate a second mechanism of scalar strengthening by the exhaustivity operator (Exh).

3 Gajewski & Sharvit on Scalar Items in Strawson-DE Contexts

Claim: The PIP explains certain aspects of the interactions between SIs and presuppositions, especially Gajewski & Sharvit's observation about SIs triggered in Strawson D(ownward)E(ntailing) contexts.

- **G&S's observation**: (16) has a reading where only the presupposition has a SI. (Sharvit & Gajewski 2008, Gajewski & Sharvit 2012)

  (16) John is $\boxed{\text{unaware}}$ that some of the students smoke.

  - We ignore the wide scoping reading of 'some')
  - Roughly, the relevant reading looks like:

    (17) a. Assertion: $\neg B_j$(some of the students smoke)
    b. Presupposition: Some of the students smoke, and <u>not all of the students smoke</u>

  - Indeed, the sentence is infelicitous, if CG(all of the students smoke):

    (18) All of the students in this department smoke. #But John's unaware that some do.

  (The wide scope/specific reading of *some* would be felicitous; the narrow scope reading means: "John doesn't know whether there are smokers among the students")

- 'Unaware' is negative in the assertion and positive in the (factive) presupposition. G&S's observation generalises to other Strawson DE contexts.
- NB: (16) potentially has multiple readings. In particular, an embedded SI might be available. But it is truth-conditionally distinguishable.

  (19) a. Assertion: $\neg B_j$(some of the students smoke, and <u>not all of the students smoke</u>)
  b. Presupposition: Some of the students smoke, and <u>not all of the students smoke</u>

  This is compatible with John believing all of the students smoke, unlike the reading we are after.

- G&S's argue that their observation is problematic for certain views of SIs. They claim:
  - It is problematic for theories with the exhaustivity operator (Exh)
  - G&S propose a system based on Chierchia's (2004) grammatical theory of SIs coupled with a two dimensional theory of presupposition (Karttunen & Peters 1979).

  G&S's conclusions are too strong and also their proposal has a number of empirical problems, but we don't go into the details today (see a paper version of this talk!).

- **Our analysis**: G&S's observation is a special case of presupposed ignorance.
  - The relevant alternative to (16) is:

(20) John is $\boxed{\text{unaware}}$ that **all** of the students smoke.

- Because this alternative has a stronger presupposition, the PIP says:

  (16) is infelicitous if CG(all of the students smoke).

- In other words, the presupposed ignorance inference is: $\neg CG$(all of the students smoke).

- Notice that what we predict is weaker than G&S's analysis. But this is not a bad prediction, as the sentence is felicitous in a context where $\neg CG$($\neg$all of the students smoke), provided that we also have $\neg CG$(all of the students smoke).

(21) (Context: We know some of the students smoke, but don't know whether all do.)
Prof. Jones knows nothing about the students. He's $\boxed{\text{unaware}}$ that some of the students smoke, for example.

- Nonetheless, we do think that G&S's stronger presupposition is the one we often perceive, especially out of the blue. In order to derive it, we suggest to use *Epistemic Step for Presuppositions* proposed by Chemla (2008).

(22) Epistemic Step for Presuppositions: $\neg CG(p) \rightsquigarrow CG(\neg p)$

Today, we won't go into the details of this derivation.

Section summary: The PIP explains SIs triggered in Strawson DE contexts. They do not affect assertions, but give rise to presupposed ignorance inferences.

4 Scalar Items in Strawson-UE Contexts

- **Problem**: The PIP makes wrong predictions for scalar items in Strawson U(pward)E(ntailing) contexts, e.g. (23):

(23) John is $\boxed{\text{aware}}$ that some of the students smoke.

Unlike (16), It is quite natural to use (23) in contexts where CG(all of the students smoke).

(24) A: All of the students are smokers in this department! Do professors know this?
B: Well, Prof. Jones is aware that some of the students smoke.

- It is important that the relevant reading is different from the embedded SI reading, which would be infelicitous in (24).

(25) a. Assertion: B_j(some but not all of the students smoke)
b. Presupposition: Some but not all of the students smoke

We are not committed to the existence of this reading.

- It is also not the case that there is no SI in (24). Rather, the assertion has a SI:

(26) B_j(some of the students smoke) and $\underline{\neg B_j(\text{all of the students smoke})}$

- The PIP doesn't explain this observation: It predicts the same presupposed ignorance inference as the Strawson DE example (16).

- The relevant alternative is:

(27) John is $\boxed{\text{aware}}$ that **all** of the students smoke'.

- This alternative has a stronger presupposition, so the PIP says the sentence is infelicitous if CG(all of the students smoke).
- So the presupposed ignorance inference is $\neg CG$(all of the students smoke), which should make the sentence infelicitous in the context (24).
- Even if the optionality of SIs is granted, there still is a contrast between (16) and (23).

Data summary:

- Strawson DE: No SI in assertion + Presupposed Ignorance, (16).
- Strawson UE: SI in assertion (+ Stronger presupposition), (23).

Strawson UE cases are problematic for the PIP!

- (This observation is also problematic for G&S's theory.)
- In order to solve this problem, we postulate a different scalar strengthening mechanism: the **exhaustivity operator (Exh)**. We claim that Exh is a presupposition hole for the negated alternatives.
- Some remarks, before moving on:

1. The most natural prosody of (23) has a focus prominence on 'some':

(28) John is $\boxed{\text{aware}}$ that SOME of the students smoke.

2. A similar reading arises with 'only' in the matrix clause + focus:

(29) John is **only** $\boxed{\text{aware}}$ that SOME of the students smoke.

3. With 'unaware', the scalar item cannot be focused, with or without 'only'.

(30) John is (only) $\boxed{\text{unaware}}$ that SOME of the students smoke.

We'll explain these in the next section.

5 Exh as a Presupposition Hole

- One of the definitions of Exh is (31) (Groenendijk & Stokhof 1984, Chierchia 2006, Chierchia et al. 2012, Fox 2007, van Rooij & Schulz 2004, Spector 2003, 2007).

(31) $[\![\textbf{Exh}_{Alt(\phi)}\ \phi]\!]^w = [\![\phi]\!]^w = 1 \wedge \forall\psi \in Alt(\phi)[IE_\phi(\psi) \Rightarrow [\![\psi]\!]^w = 0]$

- We'll suppress the set of alternatives $Alt(\phi)$.
- $IE_\phi(\psi)$ stands for 'ϕ is **Innocently Excludable (IE)** given ϕ' (Fox 2007).
  We need IE instead of 'non-weaker than' to take care of disjunctions with the Sauerland alternatives.
- Example:

(32) $[\![$**Exh(some of the students smoke)**$]\!]^w$ = 1 iff
$\underbrace{\text{some of the students smoke in } w}_{\phi}$ and $\underbrace{\text{not all of the students smoke in } w}_{\neg\psi}$

- What happens when ϕ and ψ have presuppositions???
- We propose that Exh is a **presupposition hole** with respect to the IE alternatives, i.e. it passes up their presuppositions.[2]
- Here's a trivalent formulation (nothing hinges on the framework):

(33) $$[\![\textbf{Exh}_{Alt(\phi)}\ \phi]\!]^w = \begin{cases} 1 & \text{if } [\![\phi]\!]^w = 1 \wedge \forall\psi \in Alt(\phi)[IE_\phi(\psi) \Rightarrow [\![\psi]\!]^w = 0] \\ 0 & \text{if } [\![\phi]\!]^w = 1 \vee \exists\psi_q \in Alt(\phi)[IE_\phi(\psi) \wedge [\![\psi]\!]^w = 1] \\ \# & \text{if } [\![\phi]\!]^w = \# \vee \underline{\exists\psi \in Alt(\phi)[IE_\phi(\psi) \wedge [\![\psi]\!]^w = \#]} \end{cases}$$

  In words: 'Exh(ϕ_p)' yields a presupposition failure if:

  – the prejacent presupposition p is not satisfied; or
  – there's an IE alternative ψ_q whose presupposition q is not satisfied.

- This is a 'natural' assumption, because Exh is a kind of negation (+conjunction), and negation is a presupposition hole.
- This derives the desired reading for the Strawson UE example (23).

  (34) Exh(John is aware that some of the students smoke)

  – IE Alternative: 'John is aware that all of the students smoke'
  – So (34) presupposes: some of the students smoke, and <u>all of the students smoke</u>.
  – And (34) asserts: B_j(some of the students smoke) and $\underline{\neg B_j(\text{all of the students smoke})}$.

- What about the PIP? We assume that **the PIP applies *after* Exh**. Then the PIP will be vacuous in this case, because the sentence already presupposes all of the students smoke, which is as strong as the presupposition of the 'all'-alternative.
- We explain the remarks made in the previous section with natural auxiliary assumptions, which are arguably uncontroversial:

  1. The relevant reading of the Strawson UE example (23) involves a prosodic prominence on 'some', (28).
     —**Assumption:** Exh associates with focus.
  2. An overt 'only' has the same effect, (29).
     —**Assumption:** 'Only' has a similar meaning to Exh. That 'only' is a presupposition hole is independently motivated:

     (35) Of these three boys, only John went back to London.
     Presupposition: all the three boys are from London.

  3. In the Strawson DE (16), the scalar item cannot be focused.
     —**Assumption**: A focus prominence on a scalar item requires the presence of Exh, and a vacuous application of Exh is banned.

     (36) *Exh(John is unaware that SOME of the students smoke)

     In this case the 'all'-alternative is entailed, and cannot be negated without giving rise to a contradiction. The same story for the version with 'only', i.e. a vacuous application of 'only' is banned.

[2] In a trivalent setting, there are multiple ways to define notions such as entailment, consistency, etc. Since IE is defined in terms of maximal consistency, we should be clear about the definition of consistency. We assume that Φ is consistent if there is at least one w such that for each $\phi \in \Phi$, $\phi(w) = 1$.

(37) *only(John is unaware that SOME of the students smoke)

Summary so far:

- Exh is a presupposition hole (wrt IE alternatives).
- Exh applies before the PIP.

- Because we introduced Exh, we should revisit (4). Notice that it actually does have a SI. To make this point clearer, let's consider (38).

(38) a. Mary speaks French (but not German). #John, too, speaks French or German.
b. Mary speaks French or German. John, too, speaks French or German.

The relevant SI is: John does not speak both. cf. (39):

(39) Mary speaks French (but not German). (?)John, too, speaks a European language.

- **Wong analysis**: Exh $>$ 'too'

(40) Exh(John, too, speaks French or German).

  - Because the IE alternative is (41),

    (41) John, too, speaks French and German.

    the predicted presupposition is: Mary speaks French *and* German.
  - Notice that the PIP is vacuous, because the presuppositions of the alternatives (42) are as strong.

    (42) a. Exh(John, too, speaks French)
    b. Exh(John, too, speaks German)
    c. Exh(John, too, speaks French and German)

    All of these presuppose that Mary speaks both French and German.
  - But this wrongly predicts both (38a) and (38b) are infelicitous.
  - Furthermore, it predicts (43) to be felicitous:

    (43) #Mary speaks French and German. John, too, speaks French or German.

- **Analysis that works**: too $>$ Exh

(44) too(Exh(John speaks French or German))

This presupposes that Mary speaks French or German but not both.

  - The alternatives for the PIP are:

    (45) a. too(Exh(John speaks French))
    b. too(Exh(John speaks German))
    c. too(Exh(John speaks French and German))

  - These presuppose (with Mary being the antecedent):

    (46) a. Mary speaks French but not German.

b. Mary speaks German and not French.
c. Mary speaks German and French.

– Since these presupposition are non-weaker, the PIP yields the following inferences.

(47) a. $\neg CG($Mary speaks French but not German$)$
b. $\neg CG($Mary speaks German and not French$)$
c. $\neg CG($Mary speaks German and French$)$

This is satisfied in (38b), not in (38a) or in (43).

- Why does 'too' take wide scope over Exh? One possibility is that focus association prohibits the Exh>too reading.

(48) a. *Exh JOHN too speaks [FRENCH or GERMAN]
b. JOHN too Exh speaks [FRENCH or GERMAN]

- What about other scalar items? That the following are fine indicates that Exh>too is a possible parse for these sentences.

(49) a. Mary read all of the books. John, too, read some of them.
b. Berlin is freezing. Göttingen, too, is cold.

We don't have a concrete account of these differences at this moment.

6 Conclusions

- Two scalar mechanisms:

(50) **Presupposed Ignorance Principle** (PIP)
ϕ_p is infelicitous in context c if ϕ_p has an alternative ψ_q such that
a. q is non-weaker than p; and
b. c satisfies q.

(51) $$[\![\textbf{Exh}_{Alt(\phi)}\ \phi]\!]^w = \begin{cases} 1 & \text{if } [\![\phi]\!]^w = 1 \wedge \forall\psi \in Alt(\phi)[IE_\phi(\psi) \Rightarrow [\![\psi]\!]^w = 0] \\ 0 & \text{if } [\![\phi]\!]^w = 1 \vee \exists\psi_q \in Alt(\phi)[IE_\phi(\psi) \wedge [\![\psi]\!]^w = 1] \\ \# & \text{if } [\![\phi]\!]^w = \# \vee \underline{\exists\psi \in Alt(\phi)[IE_\phi(\psi) \wedge [\![\psi]\!]^w = \#}] \end{cases}$$

- With these two scalar mechanisms, we explain the scalar inferences triggered in Strawson DE and UE environments.

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