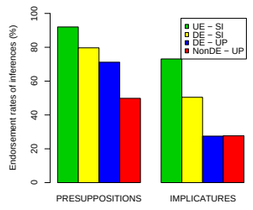
Presuppositions vs. Scalar Implicatures: an Experimental Study

Emmanuel Chemla (LSCP and ENS, Paris) – e-mail: chemla ⊗ ens.fr
Philippe Schlenker (UCLA and Institut Jean-Nicod)

Fig. 1: General patterns

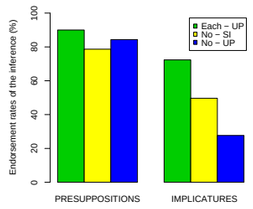


Presuppositions trigger universal inferences (UP), sensitive to the monotonicity of the quantifier.

Implicatures do not trigger universal inferences.

Endorsement rates of inferences depending on: 1) nature of the trigger; 2) monotonicity of the quantifier (UE, DE or nonDE); 3) the form of the inference (UP or SI).

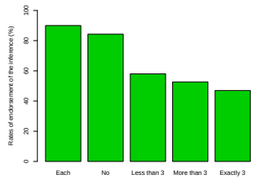
Fig.2: The quantifier 'No'



The predictions of SI (similar to EP here) are too weak for presuppositions.

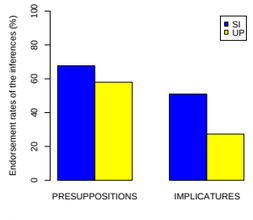
Endorsement rates of inferences in *No* sentences depending on: 1) the nature of the trigger (pres. vs. impl.); 2) the nature of the inference: universal (UP) vs. existential (i.e. SI here). (Results for "Each" are given as a reference).

Fig.3: Differences between quantifiers



Robustness of universal inferences for **presuppositions** depends on the quantifier.

Fig.4: The quantifier 'Less than 3'



UP and SI inferences are similar for presuppositions ($F(1,29) = 3.16$; $p = .086$); different for implicatures ($F(1,29) = 17.2$; $p < .001$).

Endorsement rates of inferences in *Less than 3* sentences depending on: 1) the nature of the trigger (pres. vs. impl.); 2) the nature of the inference: universal (UP) vs. implicature-like (SI).

1. The problem

Sentences in (1) contain a presupposition trigger in the scope of a quantifier; what do they presuppose?

(1) a. No student knows that he is stupid.
b. Less than 3 students know they are stupid.
c. More than 3 students know they are stupid.

Schematically: if $\mathcal{Q}$ is a quantifier, if A and B are predicates, if B presupposes B', what does (2) presuppose?

(2) $[\mathcal{Q}x : A(x)]B(x)$ presupposes:
$\exists x\, A(x) \wedge B'(x)$?; $\neg([\mathcal{Q}x : A(x)]B'(x))$?; $[\forall x : A(x)]B'(x)$?

2. Proposals

Presuppositions are studied as a kind of **inferences**.
(See Kadmon (2001) for discussion of UP and EP)

• **Universal Presupposition (UP)**.
Heim (1983) and Schlenker (2006) both predict that every sentence in (1) presupposes:

(3) Every student is stupid.

Important note: Schlenker's derivation of presuppositions involves a competitor. This competitor may be degraded for independent reasons and this raises new predictions about relative strenghts of presuppositions (i.e. robustness of inferences across speakers, contexts...).

• **Existential Presupposition (EP)**.
Beaver (1994, 2001) argues that sentences in (1) presuppose:

(4) There is a stupid student.

Note: In Upward Entailing (UE) contexts (e.g., (1c)), the presupposition is weaker than the assertion and, thus, does not produce detectable additional inferences.

• **Scalar Implicature (SI).**
EP predictions are weaker than what a straightforward theory in terms of scalar implicatures could predict. Assuming for instance that factive verbs are involved in asymmetrical scales like $< p,\ x$ know $p >$. The prediction is now that sentences in (1) imply respectively:

(5) a. At least one student is stupid. *(similar to EP)*
i.e. ¬(No student is stupid)
b. At least 3 students are stupid. *(stronger than EP)*
i.e. ¬(Less than 3 students are stupid)
c. No additional inference *(similar to EP)*

Important note: This account passes the S-sentences (negation, conditional, question) test for presuppositions.

3. Aims and questions

This debate has suffered from two difficulties:
1) Sentences in (1) raise two superfluous difficulties (domain restrictions and irrelevant bound readings) also present in original examples;
2) The judgments involved are too subtle to rely on the introspection abilities of a few people.

With these difficulties in mind, our aim was to:
• Establish an effective methodology to obtain robust data
• Compare UP and SI (similar to or stronger than EP).
• Investigate finer-grained differences between quantifiers, triggers etc.

4. Experimental methodology

• 30 native speakers of French
• Context: *After an exam session, 5 or 6 teachers individually met 10 students of their class (including a student named John); these teachers now informally discuss about their students. These teachers are very well informed about their students, honest, fair...*
• Non logical inferential task, 2 examples were provided:

"John & Mary did A." *suggests that:* John did A.	"John did A and B." *suggests that:* John did A before B.
No *Yes*	*No* *Yes*

• We eliminated potential problems due to domain restrictions by explicitly referring to a particular set of individuals (e.g., *None of these 10 students* replaced *No student*).

Experimental conditions

• Triggers:
- Presupposition triggers: *know* and *ignore*, *start* and *stop*, definite descriptions (*his computer*).
- Implicatures: <*all*,*some*>,<*and*,*or*>,<*excellent*,*good*>
• Environments:
- Inferences: universal (UP) and implicature-like (SI)
- 'Quantifiers': *John*, *I doubt that John*, *More than 3 of these 10 s.*, *Each...*, *Less than 3...*, *None...*, *Exactly 3...*

5. Four examples

(**Pres. triggered by *know*; quantifier: *Less than 3*-DE**)
1. Less than 3 of these 10 students know that their father is about to receive a congratulation letter.
⇝ The father of each of these 10 students is about to receive a congratulation letter. *(UP)*
2. Less than 3... know that their father is about to receive a c.l.
⇝ The father of at least 3... is about to receive a c.l. *(SI)*

(**Impl. triggered by <*and*, *or*>; quantifier: *No* - DE**)
3. None... read the handout and did an exercise.
⇝ Each... did (at least) one or the other. *(UP)*
4. None... read the handout and did an exercise.
⇝ At least one... did (at least) one among the two. *(SI)*

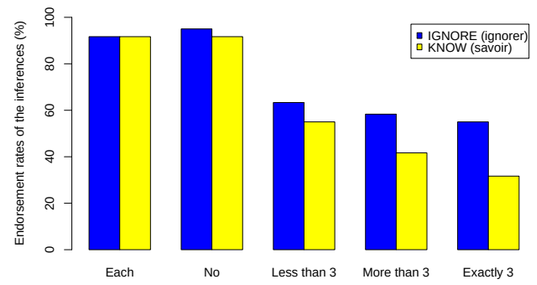
6. Results

• Presuppositions are not implicatures (cf. Fig.1).
• *No* sentences trigger universal presuppositions (cf. Fig.2), EP (or SI) predictions are too weak.
• Fig.1 suggests that DE quantifiers enable strong universal inferences, a closer look may moderate this conclusion (cf. Fig.3). (This does not weaken the previous conclusion about SI or EP, cf. Fig.4).
• In certain environments, *ignore* may be 'more factive' than *know* (cf. Fig.5) as discussed by Schlenker.
• Resisting global accommodation is costly (cf. Fig.6).

7. Conclusions

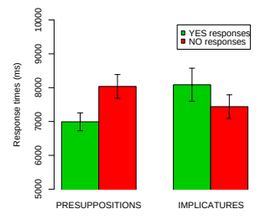
• Efficient and simple **methodology**; crucial improvement of the data
• **Universal presuppositions** are established
• Presuppositions and scalar implicatures are differentiated (while classical presuppositions tests did not)
• **Subtler differences** as suggested by Schlenker (2006) become accessible

Fig.5: *Ignore* vs. *Know*



Endorsement rates of universal inferences depending on 1) the factive verb (*ignore* vs. *know*) and 2) the quantifier in the target sentence.

Fig.6: Different processing profiles



Implicature inferences require additional time (NS cf. Bott & Noveck, 2004),

Accommodation is the default
($F(1,29) = 30.0$; $p < .001$)

Acceptation and rejection latencies for presupposition (UP inferences) and implicatures (SI inferences).

Notations:

UE/DE: Upward/Downward Entailing context (or quantifier by extension)
SI: Scalar Implicature (or inference predicted by scalar comparisons by extension)
UP: Universal Presupposition (or universal inference in general, for cases of scalar items)
The term "implicature" is often used as a shortcut for "(indirect) scalar implicature"

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