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Projecting Presuppositions with Scalar Implicatures

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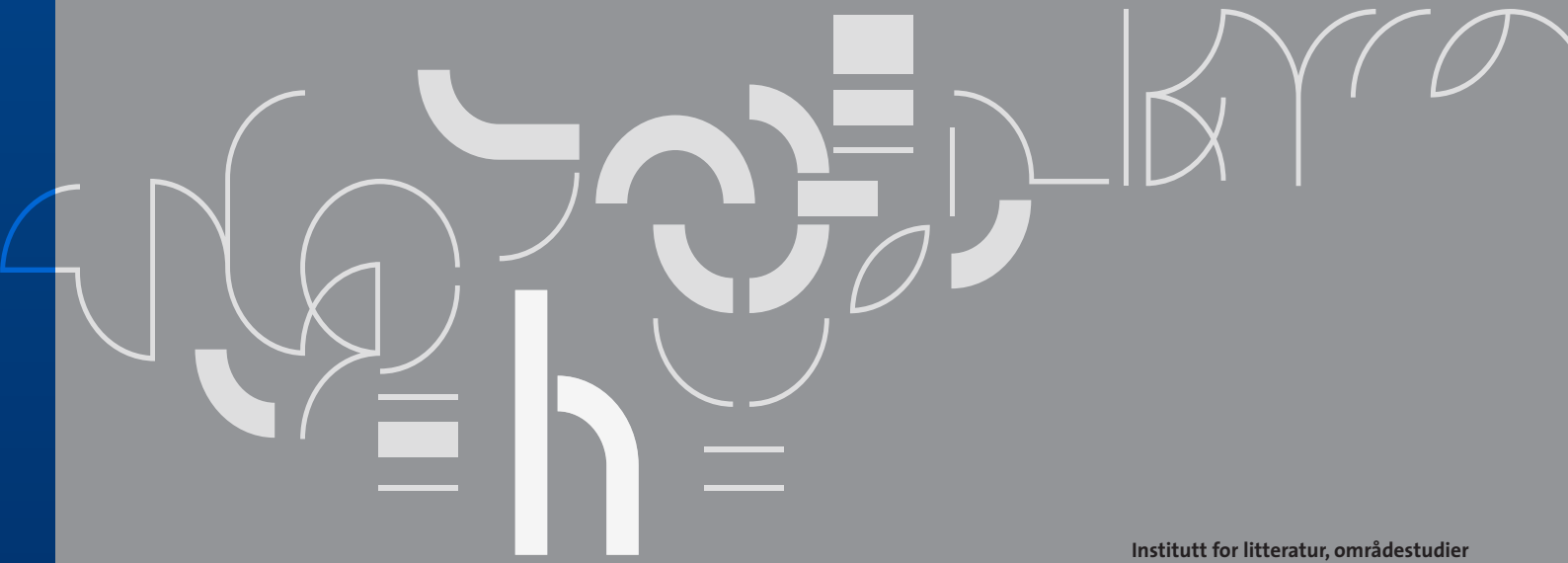

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Projecting Presuppositions with Scalar Implicatures *

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Abstract

I present a system which reconciles free choice permission effect with other scalar implicatures. The core idea is to cluster together alternatives which are obtained by similar transformations of the original sentence (e.g., replacement of a given item with a stronger item). Interestingly, this system can be extended to account for presupposition projection.

1 Introduction

The sentence in (1) is a standard example of free choice permission (see Kamp, 1973):

(1) John may eat an apple or a banana.

(2) a. John may eat an apple.
b. John may eat a banana.

The sentence contains a disjunction in the scope of an existential modal, and yet it is interpreted as the conjunction of the modal statements in (2): John may eat an apple and John may eat a banana. Kratzer (2002) (followed by, e.g., Alonso-Ovalle, 2005) argued that these inferences should be analyzed as scalar implicatures.

Scalar implicatures are inferences arising from the comparison between a sentence and its potential alternatives. For instance, one could argue that the words *some* and *all* are in competition – they belong to a common *scale* of items: ⟨ some, all ⟩ – so that sentence (3) raises the alternative in (3-a). This alternative is stronger than the original sentence (3), and so it would have been more "efficient" to utter it instead of (3). One may thus conclude that the speaker did not utter it because s/he does not believe that this alternative is true in the first place, hence the scalar implicature reported in (3-b).

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(3) John read some of the books.
   a. Alternative: John read all the books.
   b. Scalar implicature: $\neg B_s[$ John read all the books. $]$

Consider example (1) again. It is important for most theories of scalar implicatures that (2-a) and (2-b) are alternatives to sentence (1). Since these alternatives are logically stronger than the sentence itself, just as (3-a) is stronger than (3), we should infer that the speaker does not believe that these alternatives are true, contrary to the original intuition.

This puzzle has motivated various departures from the usual implementations of the Gricean understanding of scalar implicatures which was sketched above (Grice, 1967): see, e.g., Fox (2006), Klinedinst (2006) and Schulz (2003). In this paper, I present a new proposal which has the additional virtue to make surprisingly accurate predictions for presupposition projection.

2 Proposal

On a traditional account of scalar implicatures, an alternative generates a scalar implicature on the basis of its overall relation with the sentence it is an alternative of. For instance, the scalar implicature (3-b) arises because the alternative (3-a) is stronger than the original sentence (3). In other words, alternatives crucially differ in that they are stronger or weaker than the original sentence.

On the present account, the status given to an alternative is directly tight to the type of transformation needed to produce this alternative. Roughly, alternatives crucially differ in that they are obtained via the replacement of an item by a stronger or a weaker scale-mate. This leads to the following principle:

(4) Similarity Principle: The speaker should be in a similar epistemic attitude towards alternatives obtained via the same type of transformations.

What transformations are of the same type? What does it mean to be in a similar epistemic attitude towards various alternatives? The next section provides a first illustration of these notions at work.

2.1 First illustration

Consider sentence (5).

(5) John ate an apple or a banana.

Several types of transformations can be applied to this sentence to obtain alternatives. First, one may transform the sentence by keeping only one of the two disjuncts, leading to the following two alternatives:

(6) a. John ate an apple.
b. John ate a banana.

The similarity principle (4) requires that the speaker have a similar epistemic attitude towards these two sentences. The intended meaning is that if the speaker believes one of the two alternatives, s/he ought to believe the other one as well. This can be implemented as follows: $B_s[\,(6\text{-a})\,] \longleftrightarrow B_s[\,(6\text{-b})\,]$. This reflects the following intuition: if the speaker believes that John ate an apple and does not believe that John ate a banana, the sentence is infelicitous, even though it is true.

Another transformation that can be applied to sentence (5) is the replacement of the item *or* with its stronger scale-mate *and*, leading to the following alternative:

(7) John ate an apple and a banana.

This is a replacement of an item with a stronger item. To implement the effect of such a transformation, the sentence will be clustered with the alternative in (8), where $\otimes_\perp$ stands for a super strong connective which yields a contradiction at the first site of the appropriate type.

(8) John ate an apple $\otimes_\perp$ a banana.

Applying the similarity principle to this new cluster of alternatives – (7) and (8) are obtained by the same type of transformations: replacements of *or* with stronger items – we obtain the following inference: $B_s[\,(7)\,] \longleftrightarrow B_s[\,(8)\,]$. Since (8) is contradictory, this simply says that $\neg B_s[\,(7)\,]$. This inference corresponds to the exclusive reading of the disjunction: it is not the case that the speaker believes that John ate both an apple and a banana.

In fact, we only derived a primary implicature, it needs to be enriched into a secondary implicature: $B_s[\,\neg(7)\,]$, the speaker believes that John did not eat both fruits (see Soames, 1982; Horn, 1989). To achieve this enrichment, one could follow previous proposals and recruit a contextual "competence assumption" (see Spector, 2003, van Rooij, 2004 and specially Sauerland, 2004 for the version which would be most immediately applicable in the present framework).

I would like to propose a very similar kind of enrichment except that it fits better with the present technical framework. The standard epistemic step relies on the following intuition: unless there is reason to think otherwise, if a speaker does not believe that X is true (i.e. $\neg B_s[\,X\,]$), it is likely to be because s/he believes that X is false (i.e. $B_s[\,\neg X\,]$). The parallel idea I propose to adopt is that if a speaker has a similar attitude towards

X and Y (i.e. $B_s[X] \longleftrightarrow B_s[Y]$), it is likely to be because s/he believes that X and Y have the same truth-value (i.e. $B_s[X \longleftrightarrow Y]$).

As a result, the above inference that $B_s[(7)] \longleftrightarrow B_s[(8)]$ would be enriched into $B_s[(7) \longleftrightarrow (8)]$ which states that the speaker believes that (7) is false (because (8) is contradictory).

One might wonder why we could not apply the same enrichment to the inference obtained from the cluster of alternatives in (6). We would obtain that $B_s[$(6-a) $\longleftrightarrow$ (6-b)$]$: the speaker believes that John ate both fruits or none of them. Given that s/he said (5), we would then infer that the speaker believes that John ate both fruits. This inference is incompatible with the *primary* inference derives from the other cluster of alternatives (i.e. $B_s[\neg$John ate both fruits$]$). The enrichment is thus naturally blocked for this first cluster of alternatives in a fully standard way: secondary implicatures are blocked because they are incompatible with other primary implicatures, see Sauerland (2004).

2.2 Roadmap to derive scalar implicatures

Various transformations may be applied to derive the alternatives to a given sentence. Some of these transformations are similar: replacements of a given scalar item with various weaker scale-mates, replacements of a given scalar item with various stronger scale-mates, or replacements of a connected phrase with one or the other of the two connected phrases. The Similarity principle (4) requires that similar transformations yield e-similar alternatives, i.e. alternatives which have the same status in the speaker's mind: $B_s[X] \longleftrightarrow B_s[Y]$. Any of these relatively weak inferences may be enriched into $B_s[X \longleftrightarrow Y]$ if the result is consistent with all the weak inferences.

The three main steps of the derivation are given below:

Step 1: similar transformations and sets of alternatives

Identify first the types of transformations which apply to the sentence S. There are two sources of transformations (scalar items and connective phrases that can be split) and three types of transformations:

(9) Three types of transformations

a. Stronger replacements (from a scale). (e.g., {or → and}, {or → $\otimes_\bot$})

b. Weaker replacements (from a scale). (e.g., {and → or}, {and → $\otimes_\top$})

c. Each connective can be split in two. (technically: $\{A \otimes B \rightarrow A\}$, $\{A \otimes B \rightarrow B\}$)

Each set of transformations of the same type produces a cluster of alternatives.

(10) Clusters of alternatives:

a. $\{ X_1 , X_2 \}$,

b. $\{ Y_1 , Y_2 \}$, ...

Step 2: primary inferences

After the alternatives have been clustered, the similarity principle can be applied: it requires that the speaker is in a similar epistemic attitude towards each alternative from a given set:

(11) Primary similarity inferences:
a. $B_s[\ X_1\ ] \longleftrightarrow B_s[\ X_2\ ]$,
b. $B_s[\ Y_1\ ] \longleftrightarrow B_s[\ Y_2\ ]$, ...

Step 3: secondary inferences

The last step is to enrich the previous inferences: Strengthen each of the inferences above that can be strengthened consistently with all of these inferences (and consistently with the assertion itself as well):

(12) (Potential) secondary similarity inferences:
a. $B_s[\ X_1 \longleftrightarrow X_2\ ]$ is compatible with the inferences in (11),
b. $*B_s[\ Y_1 \longleftrightarrow Y_2\ ]$ is blocked because incompatible with (11), ...

2.3 Summary of the proposal

I presented in this section a new framework to treat alternatives and derive scalar implicatures. The core idea is to cluster alternatives on the basis of the transformations needed to derive them as alternatives in the first place. The motivations for this framework come from its empirical coverage.

3 Applications

In this section, I review a few examples which show the proposal at work.

3.1 Usual scalar implicatures

3.1.1 Bare disjunction

Example (5) repeated below already showed the predictions of the present proposal for a bare disjunctive sentence:

(13) John ate an apple or a banana.
(14) Predicted inferences:
a. $B_s[\text{John ate an apple}] \longleftrightarrow B_s[\text{John ate a banana}]$

b. $B_s[$ John ate an apple and a banana $\longleftrightarrow \bot]$

The first inference due to the split of the disjunction yields the inference that if the speaker believes that John ate one of the two fruits, s/he believes that John ate the other one as well (see (14-a)). This inference remains a primary inference for reasons discussed above. The second inference is presented in (14-b) (the alternative with the connective $\otimes_\bot$ which is used to mimic a stereotypical stronger replacement is contradictory in this case, hence the $\bot$-sign). Overall, we obtain that the speaker believes that John did not eat both fruits (the exclusive reading of the disjunction) and that s/he does not know which fruit John actually ate.[1]

This example illustrates several aspects of the present proposal. First, it illustrates how regular scalar items are handled: the $\langle$ or, and $\rangle$-scale yields the exclusive reading of the disjunction (see (14-b)). Second, it illustrates how connectives give rise to additional alternatives, and how these alternatives lead to usual "ignorance" inferences.[2] As shown in the next example, the counterpart of this ignorance inference yields the free choice effects when nothing blocks the primary similarity inference to be enriched into a secondary similarity inference.

3.2 Free choice effects

Consider example (1) repeated below as (15).

(15) John may eat an apple or a banana.

This sentence comes with two sets of alternatives: 1) the alternatives obtained from stronger replacements of the item *or* (see (16)) and 2) the alternatives obtained from splitting the connective phrase in two (see (17)):[3]

(16) a. John may eat an apple and a banana.
b. John may eat an apple $\otimes_\bot$ a banana. , i.e. $\Diamond\bot$, i.e. $\bot$

(17) a. John may eat an apple.
b. John may eat a banana.

Applying the similarity principle to each of these sets yield the following primary inferences:

[1] If the speaker believed that John ate an apple, s/he would also believe that John ate a banana which is incompatible with the exclusive reading. Hence, the speaker does not believe that John ate an apple, and by the same reasoning s/he does not believe that the speaker ate a banana.

[2] The alternatives obtained are standard, the way they are treated is new although it is very close to a proposal from Klinedinst (2005).

[3] I disregard the alternatives potentially raised by the existential modal.

(18) $B_s[$ John may eat an apple and a banana $] \longleftrightarrow B_s[\,\bot\,]$
i.e. $\neg B_s[$ John may eat an apple and a banana $]$

(19) $B_s[$ John may eat an apple $] \longleftrightarrow B_s[$ John may eat a banana $]$

Each of these primary inferences can be enriched into its secondary version:

(20) $B_s[$ John may eat an apple and a banana $\longleftrightarrow \bot\,]$
i.e. $B_s[\neg$John may eat an apple and a banana $]$

(21) $B_s[$ John may eat an apple $\longleftrightarrow$ John may eat a banana $]$

Indeed, nothing prevents us from drawing these strong inferences, since the outcome is consistent. Overall, the speaker should believe that John cannot eat both fruits (see (20)), although John may eat an apple just as much as John may eat a banana (both cannot be false because of the bare meaning of the sentence, hence both have to be true because of (21)). This reading corresponds to the free choice permission effect mentioned in the introduction.

Quite generally, the present proposal predicts that ignorance implicatures and free choice effects may alternate, depending on whether the inference relying on the connective split can acquire its "secondary" version (as in modal contexts such as (15) and in various other quantified environments) or not (as in non-embedded contexts such as (5)).

4 Extension to presupposition

The most interesting virtue of the present proposal is that it can be extended to account for the projection properties of presupposition. To do so, one must simply define alternatives raised by presupposition triggers. The projection behavior of presupposition would then simply follow from the semantics of the embedding environment.

4.1 Alternatives

For the purpose of this paper, I will simply postulate that a presupposition trigger of the form $S\langle p\rangle$ (e.g., the phrase *know that p*) clusters two sets of alternatives together:

(22) a. p, $\top$
b. $\neg$p, $\bot$

The underlying idea is that the presupposition trigger raises the question as to whether its presupposition holds (p or not p?). For the purpose of this paper, I simply rely on its own empirical predictions to motivate this hypothesis.

4.2 Simple case

Consider the sentence in (23):

(23) John knows he's lucky.

(23) raises two sets of alternatives:

(24) a. p, $\top$
b. $\neg$p, $\bot$

These sets of alternatives raise the following similarity inferences: $B_s[\,p \longleftrightarrow \top\,]$, and $B_s[\,\neg p \longleftrightarrow \bot\,]$.[4] Both inferences boil down to $B_s[\,p\,]$: p is indeed the presuppositional inference we want to derive for (23).

4.3 Negation

Consider now the negation of the previous sentence:

(25) John doesn't know that he's lucky.

(25) raises the same sets of alternatives as (23), except that everything has to be embedded under negation:

(26) a. $\neg(\ p), \neg(\top)$ i.e. $\neg p, \bot$
b. $\neg(\neg p), \neg(\bot)$ i.e. $p, \top$

These are the same alternatives as above, and the similarity inference is also the same: a sentence and its negation trigger the same presupposition.

4.4 Quantified examples

More interestingly, the present proposal makes fined-grained predictions for presupposition triggers embedded in various quantified environments. I present here the case of the scope of the quantifier *None* which best illustrates this point. Experimental results from Chemla (2007) show that presupposition triggers embedded in the scope of *No* support universal inferences:

(27) None of these students knows that he's lucky.
Universal inference: Each of them is lucky.

[4] I disregard the 'primary' inferences here. Interestingly, they would lead to the same overall result.

This inference is predicted by the present proposal. To see this, consider a schematic version of the sentence above:

(28) No x: S⟨x⟩.

Because this sentence contains a presupposition trigger, it raises two sets of alternatives:

(29) a. No x: p(x), No x: ⊤
b. No x: ¬p(x), No x: ⊥

'No x: ⊤' (roughly: 'no individual is such that the tautology is true') is false and 'No x: ⊥' (roughly: 'no individual is such that the contradiction is true') is true.[5] Hence, similarity predicts the following inferences:

(30) a. B_s[¬(No x: p(x))]
b. B_s[No x: ¬p(x)]

The b. inference above says that no individual is such that the presupposition does not hold for him/her. In other words, every individual satisfies the presupposition, and this is the universal inference we expect. The other inference is the existential counterpart of this inference (some individual satisfies the presupposition), it is logically weaker than the universal inference in b. and thus yields no additional prediction.

Hence, the present proposal derives the universal inference we expect for (27). Importantly, it does not predict universal inferences in corresponding cases for scalar implicatures. It predicts an existential inference for the following sentence with the scalar item *all* embedded in the scope of the quantifier *None*:

(31) None of these students read all the books.
Existential inference: at least one of them read some of the books.

The only set of alternatives which is created by the scalar item *all* patterns like (29-a) above and this predicts an existential inference corresponding to (30-a), and no universal inference corresponding to (30-b). In short, presupposition triggers project stronger inferences than scalar items, simply because they raise more alternatives.

5 Conclusion

I very briefly presented a new system which reconciles scalar implicatures and free choice effects. The core difference with standard accounts of scalar implicatures is the following:

[5] This is the case provided that the domain of individuals is not empty, which I assume here for simplicity.

under the present proposal, the treatment of a given alternative depends on the transformation which leads to this alternative (e.g., replacement of an item by a stronger or a weaker item) rather than on the comparison between the sentence and its alternatives as a final product.

Assuming new alternatives for presupposition triggers, the present proposal also provides a solution to the projection problem for presupposition. This extension maintains the distinctions between the projection properties of the two phenomena because the structures of the alternatives involved differ, but the underlying projection system is identical.

The present system is an existence proof that the differences between the projection behavior of presuppositions and scalar implicatures are minor. If this is correct, then it suggests that we should pay more attention to other aspects of the two phenomena, e.g., are the status of these two types of inferences so different (scalar implicatures are supposed to be inferences about the speaker's beliefs and presuppositions are supposed to be preferentially about the common ground)? Ideally, this type of questions should find an answer from a better understanding of the triggering problem. In the present framework, the triggering problem boils down to the following question: where do alternatives (of scalar items or presupposition triggers) come from?

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