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ONLY: MEANING AND IMPLICATURES
THE VERY INCOMPLETE SHORT VERSION *

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The meaning of 'only' has always been an exciting and challanging issue. Many surprising observations have been made and many sophisticated accounts proposed. In this paper we will not focus on new extraordinatry data and their treatment. Instead, we will show that there is a way to approach the meaning of 'only' that is faithful to classical insights and observations but still can deal with the well-known challenges.

When 'only' is used in examples as (1),

(1) John only introduced [Mary]$_F$ to Sue.

the sentence is intuitively interpreted as stating both $\mathcal{A}$ that except for Mary, John introduced nobody to Sue, and $\mathcal{B}$ that, in fact, he introduced Mary to Sue. In this paper we will argue that contribution $\mathcal{A}$ is due to the semantic meaning of (1), while contribution $\mathcal{B}$ comes about as a pragmatic conversational implicature.

1 A background-alternatives account of 'only'

Let us assume that a sentence has a background-focus structure. The fundamental idea behind our approach to the meaning of 'only' is that it does not impose restrictions on focus alternatives, but on background alternatives. What 'only' does is to say that the background property has an extension that is as small as possible without making the statement in the scope of 'only' false. Assume that the background, B, is of type $\langle f, t\rangle$ (thus, a property of objects of type f) and the focus, F, either of type f or type $\langle\langle f, t\rangle, t\rangle$ – let us assume, without loss of generality, that the second is the case. Then, roughly, we propose the meaning of 'only' to be the following function.

$$[only]_{vSt}(\langle F, B\rangle) = \{w \in W | F(w)(B(w)) \ \&\ \neg\exists B' \subseteq D_{f,E,W} : F(w)(B') \ \&\ B' \subset B(w)\}.$$

What $[only]_{vSt}$ does, intuitively, is to claim that for each world w, $B(w)$ is a minimal elements of $[F](w)$. For example (1), for instance, $F = [\text{Mary}]$ denotes a generalized quantifier of type $\langle\langle e, t\rangle, t\rangle$ and $B = [\text{John introduced to Sue}]$ a predicate of type $\langle e, t\rangle$. The sentence is predicted to be true in w if $B(w)$ is the smallest element of $\{B' \subseteq D_{e,E,W} | \{mary\} \subseteq B'\}$, i.e., if $B(w) = \{mary\}$. Thus, it is predicted for (1) that John introduced Mary to Sue and nobody besides Mary, which is in accordance with intuition. Notice, that there is no restriction imposed on the domain of quantification. Any possible semantic object counts that has the same type as the background predicate.

*In this version we completely ignore (i) popular proposals of dealing with 'only' by quantifying over focus-alternatives, and (ii) ways in which exhaustification can be made more flexible. In the long version of this paper with the same title (though not the same subtitle) we make up for this.

If you take F to be a term answer and B the predicate of a question, then this rule for the interpretation of 'only' is what Groenendijk & Stokhof (1984) have proposed to describe the exhaustive interpretation of a term answer with respect to a question with predicate B. Already in von Stechow (1991) it has been proposed to adapt their approach to a semantic rule for 'only'.

In an earlier paper we have proposed a slightly altered description of exhaustive interpretation than what has been proposed by Groenendijk & Stokhof. This was motivated by certain small misprediction of their approach. For instance, by quantifying over all possible extensions for the background, or question-predicate, meaning postulates for these properties cannot be respected. Because these problems arise with 'only' as well, we propose as starting point a parallel rule for the interpretation of 'only'. The formal definition of $[only]_1(\langle F, B\rangle)$ will make use of the ordering relation '$<_B$' between worlds. We say that $v <_B w$ iff v is exactly like w except that the extension of B in v is smaller than in w: $B(v) \subset B(w)$.

Definition 1 *(The meaning of 'only' - the basic case)*
Let ϕ be a sentence containing 'only' with focus F and background B. We define the meaning $[only]_1(\langle F, B\rangle)$ of ϕ as the following proposition:

$$[only]_1(\langle F, B\rangle) = \{w \in W | F(w)(B(w)) \,\&\, \neg\exists v \in W : F(v)(B(v)) \,\&\, v <_B w\}.$$

In contrast with $[only]_{vSt}$, the function $[only]_1$ does not quantify over all possible semantic objects having the same type as B, but only over those extensions that are adopted by B in some world. Still, both approaches to the meaning of 'only' are closely related. As explained in van Rooij & Schulz (submitted), $[only]_{vSt}$ gives rise to exactly the same predictions as $[only]_1$ if we assume that W is the set of all possible worlds/models.

The next question we can ask is whether $[only]_1$ is also a correct description of the *semantic* meaning of this word. Horn (1969, 1996) and others have given convincing evidence that this is not the case. More in particular, certain observations strongly suggest that the claim that John introduced Mary to Sue for example (1) should *not* be part of the semantic meaning of this sentence. Let us review the critical evidence. First, McCawley's (1981, p. 50) observation that 'only' can best be paraphrased by expressions involving two negatives in combinations such as 'No X other than Y', does not suggest suggests very strongly that 'Only ϕ' entails ϕ:

(2) a. John read only the first chapter.
b. John read nothing other than the first chapter.

The second, and more important argument involves negative polarity items (NPIs). NPIs like *any* are appropriate when they occur in the background of a sentence with 'only', as in (3a), but not when they are part of the focus, as in (3b):

(3) a. Only [John]$_F$ has *any money* left.
b. *John only has [*any money*]$_F$ left.

It is well established that NPIs are licensed in assertions only in case they occur in downward entailing contexts. A Context $X - Y$ is downward entailing (DE) iff from the truth

of $X\alpha Y$ and the fact that β entails[1] α we can conclude to the truth of $X\beta Y$. Thus, a context is DE iff an expression occurring in it can be replaced by a semantically stronger expression *salva veritate*. If the semantic meaning of 'only' combines both the $\mathcal{A}$ and the $\mathcal{B}$ contribution discussed above, one cannot account for (3a), because the background is then not predicted to be downward entailing. If only the $\mathcal{A}$ contribution is part of the semantic meaning, however, we can.

A third observation provided by Horn in favor of a more restricted semantic analysis of 'only' is the fact that the appropriateness of the following sentences clearly indicates that in contrast to the inference that nobody but John smokes, the inference that John smokes is *cancelable*. Parts of the semantic meaning of a sentence, however, should not be cancellable.

(4) a. Only $[\text{John}]_F$ smokes, {if even he does/and maybe even he does not.}
b. *Only $[\text{John}]_F$ smokes, {if nobody else does/and maybe somebody else does.}

Furthermore, if both contribution $\mathcal{A}$ and contribution $\mathcal{B}$ together would constitute the semantic meaning of sentences containing 'only', we would predict that the negation of such a sentence conveys that either contribution $\mathcal{A}$ or contribution $\mathcal{B}$ is false. Thus, an example like (5) should have the semantic meaning that either there are other people besides John that smoke, or John does not smoke. Intuitively, however, only the first part of the disjunction is conveyed by (5). Thus, the negation behaves as if only contribution $\mathcal{A}$ and not contribution $\mathcal{B}$ is part of the semantic meaning of 'only'.

(5) Not only $[\text{John}]_F$ smokes.

The same arguments holds for denials of assertions with 'only', as demonstrated with the following type of examples (due to Horn (1969)):

(6) a. Only $[\text{John}]_F$ smokes.
b. No, that's not true. {Mary does as well/ *He does not.}

Finally, Horn (1996) notes that 'only' phrases (with an adverbial, PP, or NP object in focus) trigger inversion. In modern English conversion is (apparently) limited to phrases of negative character. If the semantic meaning of 'only' would include contribution $\mathcal{B}$, however, this this rule would have an important exception.

All five problems suggest that contribution $\mathcal{B}$ is not part of the semantic meaning of 'only'. Therefore, we propose as description of the semantic content the following adapted version of $[only]_1$.

Definition 2 *(The semantic meaning of 'only')*
Let ϕ be a sentence containing 'only' with focus F and background B. We define the semantic meaning $[only]_2(\langle F, B\rangle)$ of ϕ as the following proposition:

[1]Where the notion of entailment is polymorph, applied to multiple types.

$$\begin{aligned}[only]_2(\langle F, B\rangle) &= \{w \in W | \exists v \in W : F(v)(B(v)) \,\&\\ &\qquad [\neg\exists u \in W : F(u)(B(u)) \,\&\, u <_B v] \,\&\\ &\qquad w \leq_B v\}\\ &= \{w \in W | \exists v \in [only]_1(\langle F, B\rangle) : w \leq_B v\}.\end{aligned}$$

Thus, if ϕ has background predicate B, according to this rule 'Only ϕ' is true in worlds where 'B' has a smallest extension such that ϕ is true or an extension that is a subset of such a minimal element. What this rule implements is the idea that contribution $\mathcal{A}$, but not contribution $\mathcal{B}$, constitutes the semantic meaning of 'only'. For instance, 'Only [John]$_F$ smokes' is predicted to be true in all worlds where the extension of 'smoke' is either $\{john\}$ or $\emptyset$. Similarly, the sentence 'Only [men]$_F$ smoke' is true only in case all smokers are men or there are no smokers. Obviously, this rule makes 'only' downward entailing w.r.t. the background predicate B, which accounts for the NPI-distribution.

We believe that $[only]_2$ captures many intuitions we have about the meaning of 'only'. To illustrate the power of this approach let us discuss how it deals with the puzzle of 'only if' constructions. We assume here that these constructions should be analyzed compositionally, in terms of the meaning of 'only' and the meaning of 'if' constructions. It turns out that $[only]_2$ predicts correctly that 'B only if [A]$_F$' is semantically equivalent with 'A if B', given a material implication analysis of 'if'. The latter fact can be seen easily given the following truth-table:

A	B	$A \rightarrow B$	$[only]_1(\langle \lambda P.A \rightarrow P, B\rangle)$	$[only]_2(\langle \lambda P.A \rightarrow P, B\rangle$	$B \rightarrow A$
1	1	1	1	1	1
1	0	0	0	1	1
0	1	1	0	0	0
0	0	1	1	1	1

To derive this truth-table, we have assumed that n-ary predicates have as their extension the set of verifying n-ary sequences. A sentence like 'B' is taken to be a 0-ary predicate whose extension is $\{\langle\rangle\}$ in case B is true, and $\emptyset$ in case B is false. Obviously, $\emptyset \subseteq \{\langle\rangle\}$, but not $\{\langle\rangle\} \subseteq \emptyset$. Thus, $v <_B w$ only if w but not v makes B true.

2 The pragmatics of 'only'

2.1 The pragmatic contribution as a conversational implicature

Of course, we also want to account for the fact that we normally can infer from 'Only ϕ' that ϕ is the case. If we cannot do so in semantics, we have to give a pragmatic explanation. The inference from (7) that John smokes is often proposed to be due to the presuppositions an utterance of the form 'Only ϕ' comes with.

(7) Only [John]$_F$ smokes.

Horn (1969), for instance, claims that 'Only ϕ' presupposes ϕ. An important argument in favor of a presuppositional analysis is that we not only from (7), but also from its negation, (8), typically infer that John smokes.

(8) Not only [John]$_F$ smokes.

Horn himself, however, argued against this presuppositional analysis. Horn (1996) – followed by Geurts & van der Sandt (2004) – proposes, instead, that (7) gives rise to the weaker *existential presupposition* that somebody smokes. But he notes that by combining this proposed presupposition of (7) with the semantic meaning, $\neg\exists x \neq John : Smoke(x)$, we still make the desired prediction that John smokes. Adopting an existential presupposition also seems correct to account for sentences like (9).

(9) Only [men]$_F$ smoke.

As observed by McCawley (1981, p. 226) and others, what this sentence seems to 'imply' is that at least some men smoke. And this is exactly what we predict on the proposal under consideration.

Whether or not 'only' sentences give rise to an existential presupposition,[2] it is easy to see that in general it cannot be the correct analysis to account for the pragmatic inferences of a sentence of the form 'Only ϕ'. Although the proposed analysis gives rise to pleasing predictions for examples like (7) and (9), for only slightly different examples it fails to make the desired predictions. For instance, for sentences as (10) we would like to predict the inference that John and Peter smoke.

(10) Only [John and Peter]$_F$ smoke.

This will not come out, however, if we assume that (10) only gives rise to the existential presupposition that somebody smokes.

We claim that the inference from (7) 'Only [John]$_F$ smokes' that John smokes; from (10) that John and Peter smoke; from (9) that some men smoke, and from 'B, only if A' to the truth of 'If A, then B' is a conversational implicature (see also McCawley, 1981, and Horn, 1992). This is supported by the observation that these kinds of inferences pass standard tests for conversational implicature such as *'but'*-reinforcement ('Only John smokes, but he does.') and (epistemic) cancellation ('Only John smokes and perhaps even he does not'). In particular, we propose that this kind of inference is one of those conversational implicatures falling under the heading of exhaustive interpretation (cf. van Rooij & Schulz, 2004). As it turns out, by using $[only]_1$ – or $[exh]$ as we will call this interpretation rule from now on – the inference from (7) that John smokes can be derived as due to the exhaustive interpretation of (7). To see this, notice that in sentences like (7), (9) and (10) the background-predicate occurs negatively, i.e., is a downward entailing context. As argued by von Stechow and Zimmermann (1984) and van Rooij & Schulz (2004), in these cases we should interpret exhaustively not with respect to background-predicate B, but rather with respect to the complement of B. Thus, we should interpret (7) as $[exh]([only]_2([\text{John smokes}], S), \bar{S})$. In this way, we predict that the background-predicate 'Smoke' has *at most* John in its extension due to the truth-conditional meaning of (7), and *at least* John because of exhaustive interpretation.[3] By a similar reasoning we can account for the inference from (10) that John and Peter smoke, something that Geurts

[2]Remember that many people have argued against such a position.

[3]This is based on the fact that in general $[exh]([only]_2([\phi], B), \bar{B}) = [exh]([\phi], B)$.

& van der Sandt (2004) cannot.

2.2 The epistemic force of the implicature

In the previous section we have argued that the inference from 'Only [John and Peter]$_F$ smoke' that John and Peter smoke is due to exhaustive interpretation, and we have claimed that exhaustive interpretation should be thought of as a conversational implicature. We needed the extra inference to be a conversational implicature, because we wanted to account for the fact that the inference is cancelable. However, we have not suggested yet why what follows from the exhaustive interpretion of a sentence can be thought of as a conversational implicature, nor how such an implicature can be canceled. With respect to cancelation, the most challenging aspect of our analysis of the inference from 'only ϕ' to ϕ is that we must be able to explain Atlas' (1991, 1993) asymmetry in acceptability between the following sentences:[4]

(11) a. Only [Hillary]$_F$ trusts Bill, if (even) she does.
and perhaps even she does not.
b. *Only [Hillary]$_F$ trusts Bill, and (even) she does not.

Thus, the challenge we are faced with – as indeed is any proposal that seeks to account for the inference from 'Only ϕ' to ϕ pragmatically – is that, although the inference might be cancellable, it is only cancellable in certain ways. Notice that the important difference between (11a) and (11b) is that while the former only seems to cancel the implicature that the speaker *knows* that Hillary trusts Bill, the latter even wants to cancel the inference that the speaker takes it to be *possible* that Hillary trusts Bill. Thus, it seems that a sentence like 'Only [Hillary]$_F$ trusts Bill' gives rise to two kinds of implicatures: an uncancelable one with *weak epistemic force* saying that the speaker takes it to be possible that Hillary trusts Bill, and a cancelable one with *strong epistemic force* saying that the speaker knows that Hillary trusts Bill. Notice that only the second one entails the implicature we ended up with in the previous section: that Hillary *in fact* trusts Bill. So, the task ahead of us is to take into account that implicatures can come with different epistemic force, and to show that an inference due to exhaustive interpretation can be thought of as a conversational implicature in the first place.

In the previous section we have assumed that the conversational implicature relevant for the analysis of 'only' is one of exhaustive interpretation. The interpretation rule $[exh]$, however, makes very strong predictions. For (12), for instance, it predicts that no-one (of the relevant persons) other than John actually smokes.

(12) Ann: Who smokes?
Bob: John.

[4]These examples motivated Atlas to adopt for (7) a 'conjunctive' analysis according to which both the $\mathcal{A}$ and $\mathcal{B}$ contributions discussed at the beginning of section 2 are taken to be semantically entailed by the 'only'-sentence. The examples also convinced Horn (2002) to give up his earlier analyses (Horn, 1969, 1992, 1996) of 'only' where the inference from 'Only Hillary trusts Bill' that Hillary trusts Bill is taken to be due to a presupposition or conversational implicature.

A complaint often heard against interpretation rules like $[exh]$ has it that all we can conclude by standard Gricean reasoning is that the speaker *only knows* of John that he smokes, leaving it open that he does not know of anyone other than John *whether* he or she smokes. The strengthening from *not know* to *know that not* is then mostly contributed to the extra assumption that the speaker knows who smokes. We fully agree with this intuition, and we have shown in van Rooij & Schulz (2004) how to make it precise. In this section we give a quick and somewhat informal review of this work.[5]

In order to take the knowledge state of speakers into account, we make use of the tools provided by modal logic. We interpret sentences with respect to states that also represent what the speaker knows (assuming a designated speaker). In order to do so, we first extend the language with one modal operator, $\mathbf{K}$, where $\mathbf{K}\phi$ espresses that the speaker knows that ϕ is the case. The formula of the enriched language are interpreted with respect to *pointed models* of the form $\langle M, w\rangle = \langle W_M, R_M, w\rangle$, where W denotes a set of possible worlds, R is a reflexive, transitive, and symmetric accessibility relation between those worlds that represents what the speaker knows, and w is a designated element of W that represents the actual world. We assume that worlds themselves also serve as interpretation functions from predicates (or atomic propositions) to their denotations. All sentences are interpreted in the standard way with respect to pointed models, where the modal component is only relevant for sentences of the form $\mathbf{K}\phi$. As usual, such a sentence is counted as true in $\langle M, w\rangle$ if and only if ϕ is true in all worlds in W_M accessible from w according to R_M.

The semantic meaning of a sentence consists as always of the set of its verifying states. Having pointed models as verifying states means that the semantic meaning of a sentence consists of a set of such pointed model. Thus, we define for each sentence ϕ its semantic meaning $[\phi]$ as $\{\langle M, w\rangle : \langle M, w\rangle \models \phi\}$. Now we want to formalize what it means to take the speaker to obey the Gricean maxims of Quality and the first subclause of the maxim of Quantity.

Formalizing tht the speaker obeys Quality is not that difficult: If our designated speaker utters ϕ, we simply assume that the actual pointed model is one that verifies $\mathbf{K}\phi$. Thus, it is one of the following: $\{\langle M, w\rangle | \langle M, w\rangle \models \mathbf{K}\phi\}$. To account for the Gricean first subclause of the maxim of Quantity (and Relevance) which demands speakers to convey all (relevant) information they posses, we are going to define an ordering relation between pointed models defined in terms of sets of alternative propositions the speaker knows. We are selecting pointed models where the speaker knows at least as possible relevant facts besides that her utterance is true. In order to do so we need an order comparing *how much* the speaker knows. This is provided by definition 3, which makes use of a set of alternatives to ϕ, $Alt(\phi)$, defined in terms of background predicate B.[6]

Definition 3 *(Ordering knowledge states)*

$$\langle M, w\rangle <^{\mathbf{K}}_{Alt(\phi)} \langle M', w'\rangle \textit{ iff } \{\psi \in Alt(\phi) | \langle M, w\rangle \models \mathbf{K}\psi\} \subset \{\psi \in Alt(\phi) | \langle M, w\rangle \models \mathbf{K}\psi\}.$$

Now, we can say what it means to take the speaker to obey the Gricean maxims of Quantity and the first subclause of the maxim of Quantity: she has to know ϕ and to be in a

[5]The work of Benjamin Spector (2003) is closely related, although not based on the standard non-monotonic theory of 'only-knowing' due to Halpern & Moses (1985) that we make use of.

[6]We will assume that $Alt(\phi)$ is a set of sentences, thus not a set of propositions. This is not essential, but it simplifies the presentation.

minimal knowledge state such that this is true.

Definition 4 *(A Gricean Interpretation)*

$$[Grice](\phi, Alt(\phi)) = \{\langle M, w\rangle \in [\mathbf{K}\phi] | \neg\exists\langle M', w'\rangle \in [\mathbf{K}\phi] : \langle M', w'\rangle <^{\mathbf{K}}_{Alt(\phi)} \langle M, w\rangle\}.$$

Thus, if the speaker utters '[John]$_F$ smokes' we conclude that the speaker knows that John smokes, but not that Mary smokes, and if she utters '[John or Mary]$_F$ smoke' we conclude that the speaker does not know of anybody else that he or she smokes. This is a nice result, but, as suggested in the previous section, in many cases we conclude something stronger: in the first example that Mary, Bill, and all the other relevant individuals *don't* smoke, and the same for the second example, except that now this is not true anymore for Mary. How do we account for this extra inference in terms of our richer modal-logical setting?

In van Rooij & Schulz (2004) we show that this can be accounted for by assuming that, in addition to the Gricean maxims, speakers are *maximally competent* (as far as this is consistent with $[Grice]$). This can be described by selecting among those states where the speaker obeys Grice, i.e., the elements of $[Grice](\phi, Alt(\phi)$, those where the competence of the speaker is maximal. To account for this we need a new order to compare the competence of the speaker. We do this in definition 5.

Definition 5 *(Ordering by possibility statements)*

$$\langle M, w\rangle <^{\mathbf{P}}_{Alt(\phi)} \langle M', w'\rangle \textit{ if and only if } \quad \{\psi \in Alt(\phi) : \langle M, w\rangle \models \mathbf{P}\psi\} \subset \{\psi \in Alt(\phi) : \langle M', w'\rangle \models \mathbf{P}\psi\}.$$

Note that the minimal models in this ordering are those states where the speaker knows *most* about the alternatives. Now, finally, we define $Comp$ by selecting the minimal elements in $[Grice](\phi, Alt(\phi))$ according to the ordering $<^{\mathbf{P}}_{Alt(\phi)}$:

Definition 6 *(Maximizing competence)*

$$Comp([Grice](\phi, Alt(\phi)), Alt(\phi)) = \{\langle M, w\rangle \in [Grice](\phi, Alt(\phi)) | \neg\exists\langle M', w'\rangle \in [Grice](\phi, Alt(\phi)) : \langle M', w'\rangle <^{\mathbf{P}}_{Alt(\phi)} \langle M, w\rangle\}.$$

The basic technical result of van Rooij & Schulz (2004) is the proof that as far as all non-modal sentences is concerned, $[exh]([\phi], B)$ gives rise to exactly the same inferences as $[Grice]_C(\phi, Alt(\phi))$, at least if definitions 3 and 5 would be slightly changed such that knowledge of 'irrelevant' items remains the same.[7]

Fact 1 *(Exhaustivity and Gricean reasoning)*
For all non-modal sentences ϕ *and* ψ : $[exh]([\phi], B) \models \psi$ *iff* $[Grice]_C(\phi, Alt(\phi)) \models \psi$.

[7] See van Rooij & Schulz (2004, submitted) for more discussion. In fact, this relation was not proved with respect to the set of alternatives $Alt(\phi)$ but a background predicate B. The proof would go very similar, however. There is one important difference, though. To prove the equivalence now, it is crucial to assume that the set of alternatives – or at least the one used in $[Grice]_C(\cdot, \cdot)$ – is closed under conjunction. If we would not assume that, the exclusive reading of the disjunction in the answer 'John or Mary smoke' to the question 'Who smoke?' is derived from $[exh](\cdot, \cdot)$, but not from $[Grice]_C(\cdot, \cdot)$

This means that as far as these non-modal sentences is concerned, exhaustive interpretation can be given a natural Gricean justification. Better, perhaps, it means that if we assume that the speaker is maximally competent, we can take interpretation rule $[exh]$ to be a natural implementation of the Gricean maxims of Quality and Quantity$_1$. But what will be important for us now is that by the use of our modal framework (i) we make better predictions concerning implicatures of modal (and interrogative) sentences, and (ii) we actually can say that exhaustive interpretation by itself gives rise only to *weak readings* (triggered by definition 4 and not definition 7), which can be strengthened only in case we assume the speaker to be competent about the subject matter of the discourse.

Now let us consider examples (11a) and (11b) again:

(11a) Only [Hillary]$_F$ trusts Bill, if (even) she does.
and perhaps even she does.

(11b) *Only [Hillary]$_F$ trusts Bill, and (even) she does not.

In the beginning of this section we have suggested that the first conjunct of (11a) gives rise to two conversational implicatures: the *uncancelable* implicature that the speaker takes it to be possible that Hillary trusts Bill, and the *cancelable* one that the speaker knows that Hillary trusts Bill. In the previous section we have assumed that if a sentence of the form 'Only ϕ' contains background property B, we should interpret the sentence pragmatically as $[exh]([only]_2([\phi], B), \overline{B})$. If we want to interpret exhaustively with respect to a set of alternatives instead of a background-predicate, we should consider the set of alternatives $\overline{Alt(\phi)} \equiv \{\neg\psi | \psi \in Alt(\phi)\}$. Thus, if we represent the embedded clause of the first conjunct of (11a) by ϕ, this first conjunct should be interpreted pragmatically as $[Grice]([only]_2(\phi, Alt(\phi)), \overline{Alt(\phi)})$. This gives rise to the inference that the speaker takes it to be possible that Hillary trusts Bill. If the speaker is taken to be competent on which of the elements of $Alt(\phi)$ are true, the first conjunct of (11a) is pragmatically interpreted as $[Grice]_C([only]_2(\phi, Alt(\phi)), \overline{Alt(\phi)})$. This gives rise to the inference that the speaker knows that Hillary trusts Bill. The second conjunct of (11a) cancels the extra inference due to the assumption of competence. This is indeed a quite reasonable ground for canceling a pragmatic inference. What the second conjunct of (11b) wants to do, instead, is to cancel the inference based on the Gricean maxim of Quality and his first submaxim of Quantity. The fact that this gives rise to an inappropriate sentence strongly suggests (to us) that one cannot cancel inferences based on these maxims. In any case, once we make this latter assumption, we can explain Atlas' (1991, 1993) asymmetry between (11a) and (11b).

3 Conclusion

In the first part of this paper we argued to make a systematic distinction between the semantic and the pragmatic contribution of an 'only' sentence, and we provided a minimal model analysis of the semantic part, based on Groenendijk & Stokhof's (1984) rule of exhaustive interpretation. We showed that the resulting analysis makes some appealing predictions. In the last substantial section of this paper we argued that the pragmatic inference from 'Only ϕ' to ϕ should be thought of as a conversational implicature, and

we have given a precise implementation of the Gricean maxims of Quality and Quantity$_1$ to account for this.

In the last part of this paper we made crucial use of the assumption that what can pragmatically be inferred from Grice's maxims of Quantity and Quantity$_1$, i.e., those inferences due to $[Grice]$, cannot be cancelled. This assumption, however, might sound counterintuitive. Is it not the case that *all* pragmatic inferences can be cancelled? For instance, we, together with many others, propose that the inference from '[John]$_F$ smokes' to the fact that the speaker does not know that Mary smokes is due to the above mentioned Gricean maxims. It seems obvious, however, that this is an inference that can be cancelled easily.

(13) Paula: [John]$_F$ smokes. *In fact*, Mary does too.

We believe, however, that such examples do not really constitute counterexamples to our assumption. We think that (13) is appropriate only in case it is used in a context in which Mary's smoking is not at issue, for instance because Paula answered the question who of John and Bill smoke. It seems exactly the function of 'in fact' – and perhaps also of 'too' – to change, or accommodate, the topic of conversation such that Mary's smoking becomes relevant as well. This argument does not prove that our assumption is correct, although it does suggest that it is not as 'wild' as it might seem at first. Whether it makes sense in general, we have to leave to future investigations.

References

Atlas, J. D.: 1991, Topic/comment, presupposition, logical form and focus stress implicatures: The case of focal particles *only* and *also*, *Journal of Semantics*.

Atlas, J. D.: 1993, The importance of being 'only': Testing the neo-Gricean versus neo-entailment paradigms, *Journal of Semantics*.

Beaver, D.: 2004, Five *only* pieces, *Theoretical Linguistics*.

Gazdar, G.: 1979, *Pragmatics*, Academic Press, London.

Geurts, B. and van der Sandt, R.: 2004, Interpreting focus, *Theoretical Linguistics*.

Grice, P.: 1989, *Studies in the Way of Words*, Harvard University Press, Cambridge.

Groenendijk, J. and Stokhof, M.: 1984, *Studies in the Semantics of Questions and the Pragmatics of Answers*, PhD thesis, University of Amsterdam.

Halpern, J. Y. and Moses, Y.: 1984, Towards a theory of knowledge and ignorance, *Proceedings 1984 Non-monotonic reasoning workshop*, American Association for Artificial Intelligence, New Paltz, NY.

Horn, L.: 1969, A presuppositional analysis of *only* and *even*, *CLS 5*.

Horn, L.: 1992, The said and the unsaid, *SALT II*.

Horn, L.: 1996, Exclusive company: *Only* and the dynamics of vertical inference, *Journal of Semantics*.

Horn, L.: 2002, Assertoric inertia and NPI licencing, *CLS*.

Karttunen, L. and Peters, S.: 1979, Conventional implicature, *in* C. Oh and D. Dinneen (eds), *Syntax and Semantics, Presupposition*, Vol. 11, Academic Press, New York.

McCarty, J.: 1980, Circumscription - a form of non-monotonic reasoning, *Artificial Intelligence*.

McCawley, J.: 1981, *Everything that linguists always wanted to know about Logic**, University of Chicago Press, Chicago.

Spector, B.: 2003, Scalar implicatures: Exhaustivity and Gricean reasoning?, *in* B. ten Cate (ed.), *Proceedings of the ESSLLI 2003 Student session*, Vienna.

van Rooij, R. and Schulz, K.: 2004, Exhaustive interpretation of complex sentences, *Journal of Logic, Language, and Information*.

van Rooij, R. and Schulz, K.: submitted, Pragmatic meaning and non-monotonic reasoning: The case of exhaustive interpretation.

von Stechow, A.: 1991, Focusing and background operators, *in* W. Araba (ed.), *Discourse Particles*, John Benjamins, Amsterdam.

von Stechow, A. and Zimmermann, T. E.: 1984, Term answers and contextual change, *Linguistics*.