Conditional Strengthening

$\Big[$**A Case Study in Implicature**$\Big]$

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Introduction

Hearers can extract from an asserted sentence a good amount of information that goes beyond the grammatically encoded truth-conditions of the sentence. There are inferences of at least two kinds:

(i) <u>Inferences from the (assumed) truth of the asserted sentence</u>. Hearers may have conditional beliefs (*if p, q*) and upon hearing *p* asserted they can infer *q* by Modus Ponens (with suitable caveats about the reliability of their initial conditional belief and the new information that *p*).

(ii) <u>Inferences from the fact that the sentence was asserted</u>. Hearers may have conditional beliefs of the following nature: *if q were the case, p would not have been asserted*. This together with the information that *p* was in fact asserted leads via Modus Tollens to the conclusion that *q* cannot have been the case.

For both of these kinds of inferences, we can ask whether the speaker bears (some) responsibility for them. If the speaker is (or should be) well aware of the relevant conditional beliefs on the part of the hearer, he or she may be partly responsible for the inference. Many authors argue that such inferences are part of the utterance meaning if the underlying assumptions are mutual beliefs of speaker and hearer. It may often be much easier to decide whether speaker bears some responsibility for an inference than to decide whether the inference is part of the meaning of the utterance. I will not worry about these issues of responsibility.

What interests me here is how non-semantic inferences of the second kind can strengthen the understanding of conditional sentences. In the course of this, I will draw attention to some underappreciated aspects of the mechanisms behind such inferences.

Conditional Perfection

We will study an inference pattern that was first described by Geis & Zwicky (1971) as the invited inference of <u>conditional perfection</u>, illustrated by the following example:

(1)   If you mow the lawn, I'll give you five dollars.

They say that (1) "invites the inference" that the five dollars will not be forthcoming if the lawn is not mown. After all, that's the whole point of the utterance: getting the addressee to mow the lawn by offering an incentive conditional on the completion of the task. They give further examples where the same kind of inference is invited:

(2)   If John leans out of that window any further, he'll fall.
(3)   If you disturb me tonight, I won't let you go to the movies tomorrow.
(4)   If you heat iron in a fire, it turns red.

All of these sentences are claimed to convey not just *if p, q* but also *if not p, not q*, or even *if and only if p, q*. As Geis & Zwicky put it, there is a tendency to "perfect" the interpretation of a conditional.

Background Assumptions on Conditionals

We will assume a treatment of a conditional *if p,* q as restricted universal quantification over a contextually supplied relevant domain of situations, resulting in a meaning roughly paraphraseable as "all relevant *p*-situations are *q*-situations" . I take it that at a very superficial level this treatment is uncontroversial. Here is a concise formulation:

(5)   *if p, q* is true in a possible situation s iff

$\forall s': s' \in C(s)$ & p is true in s' $\rightarrow$ q is true in s'

where C(s) is the set of possible situations relevantly accessible from s.

Different flavors of conditionals arise from different ways relevant situations are supplied. When C(s) is the set of possible situations that are compatible with what is known in s, we get an epistemic conditionals. When C(s) is the set of possible situations compatible with the speaker's plans, we get a bouletic conditional (a couple of Geis & Zwicky's examples probably fall under this category).

This semantics obviously gives conditionals truth-conditions that are not perfect in the sense of Geis & Zwicky. *If p, q* is true iff all relevant *p*-situations are *q*-situations. A perfected conditional conveys that <u>all and only</u> the relevant *p*-situations are *q*-situations. There are no *q*-situations that are not *p*-situations. So, conditional perfection must be a non-semantic inference.

What is Conditional Perfection?

There has been much discussion of what kind of non-semantic inference conditional perfection is, with the most popular position being that it is some sort of conversational implicature (Grice, 1989). There has been less discussion about the empirical truth of Geis & Zwicky's observation. We will address both issues. This paper is a follow-up on some recent work by van der Auwera (1997a,b) and Horn (2000), where one can find much interesting background material. Horn (2000) ends his paper: "I can only close by asserting without the slightest justification – or better yet by presupposing – that the last words on conditional perfection have now been spoken". I refute him thus.

Not So Perfect After All

We begin by questioning whether Geis & Zwicky were even observationally right about the examples they gave. In early critiques, which mainly dealt with the issue of the theoretical status of the inference, we find some clear counterexamples where perfection does not arise:

(6)　　If it doesn't say 'Goodyear', it isn't Polyglas.

(7)　　If this cactus grows native to Idaho, then it's not an *Astrophytum*.

(8)　　If you scratch on the eight-ball, then you lost the game.

(9)   If the axioms aren't consistent with each other, then every WFF in the system is a theorem.

(10)   If John quits, he will be replaced.

The examples in (6)-(9) are from Lilje (1972), the one in (10) is Boër & Lycan's (1973). It seems obvious that none of them "invite the inference" that *if not p, not q.* But of course, that just shows that Geis & Zwicky's inference isn't associated with <u>all</u> conditionals. There might be a good explanation for why it arises in Geis & Zwicky's examples but not in the counterexamples.

What is perhaps more troublesome is that once we think about it, even the cases given by Geis & Zwicky become suspect. The empirical point is already well put in Lilje's squib:

> A person to whom [(1)] is addressed could well ask whether there might not be some other way he could earn five dollars, by cleaning up the garage or whatever. That is, if he does want the five dollars, and does not want to mow the lawn, he need not simply conclude that he's out of luck. Nor need the person who utters [(1)] intend to suggest that. [(1)] could well be the first item on a list of responses to the question, 'How can I earn five dollars?'.

Keep the last sentence in this quote in mind for later.

Lilje's response seems just right to me. Someone who offers someone $5 for mowing the lawn does <u>not</u> reliably implicate that there is no other way of earning the $5.

But I do think that there is a weaker strengthening implicature: the speaker implicates that the $5 are not free for the taking. Some chore or other will have to be done for the money to be forthcoming. Lilje's and Boër & Lycan's counterexamples seem to show at least this kind of strengthening as well. In (6) the object isn't necessarily not Polyglas, in (7) the cactus may be an *Astrophylum*, in (8) it is not settled that the person lost the game, and in (9) not in any case is every WFF a theorem. In (10), it is not settled that John will be replaced.

One more example along these lines. Imagine the following uttered by the wealthy aunt of an uninspired C-average high school student:

(11)   If you get a "B" on your next history test, I will give you $5.

Does this student have to actively avoid getting an "A"? He would have to if this conditional were understood with perfection. But what clearly is conveyed here is that the $5 will not come if the student merely gets another "C".

Not True No Matter What

Quantity Implicatures

How can we explain the strengthening inference we just observed? The hope would be that this is indeed an instance of the kind of pragmatic inference that Grice called "conversational implicature". Here is a very much pre-Gricean formulation of the line of reasoning we would be looking for (this is John Stuart Mill writing in response to Sir William Hamilton of Edinburgh's claim that *some* means 'some only, some but not all', a quote found in Horn 2000):

> No shadow of justification is shown … for adopting into a logic a mere sous-entendu of common conversation in its most unprecise form. If I say to any one, "I saw some of your children today", he might be justified in inferring that I did not see them all, not because the words mean it, but because, if I had seen them all, it is most likely that I should have said so: even though this cannot be presumed unless it is presupposed that I must have known whether the children I saw were all or not.
>
> (Mill, 1867: 501)

Mill is calculating here what is now known as a quantity implicature or scalar implicature. Under the (somewhat controversial) assumption that *I saw all of your children today* entails (asymmetrically) *I saw some of your children today*, the listener reasons that if the speaker had been convinced that he saw all of the children, he should have said so, simply because this would have conveyed more of the relevant information. Since the speaker did not make that stronger statement, the listener concludes that the speaker is not convinced that he saw all the children. With the additional assumption that the speaker knows enough about the children, one can go on to conclude that the speaker is convinced that he did not see all the children.

We will adopt a formalization of the reasoning behind quantity implicatures that is found in the Gamut textbook on semantics and logic:[1]

GAMUT (1991, pp. 205f.)

"We will reformulate Grice's maxims as conditions under which statements can be made correctly. [...]

(12)   A speaker S makes correct use of a sentence *A* in order to make a statement before a listener L just in case:

(i)   S believes that *A* is true;
(ii)   S believes that *A* is relevant to the subject of the conversation;
(iii)   For all sentences *B* of which *A* is a logical consequence (and which are not equivalent to *A*), (i) and (ii) do not both hold with respect to *B*. [...]

(13)   A sentence *B* is a *conversational implicature* of a sentence *A* iff *B* is a logical consequence of the conditions under which *A* can be correctly used."

This can be straightforwardly applied to Mill's example. *A = I saw some of your children today. B = I saw all of your children today.* Humor us by assuming that *B* has *A* as a logical consequence (and not vice versa). Also assume that *B* would be relevant to the subject of the conversation. So, if S made correct use of *A,* then it is not the case that S believes that *B* is true. Assuming further that S has an opinion as to whether *B* is true, S must believe that *B* is false.

Note that in Mill's reasoning and in Gamut's formalization, the actually asserted sentence is compared with alternative sentences. In most of the work on implicatures (including in the quote from Mill), it is assumed that if the stronger alternative is believed to be true, what the speaker should have done is to assert <u>it</u> instead of the actually asserted weaker statement. But this is in fact not a consequence of Gamut's formulation, which is why I prefer it. Gamut more neutrally derives that if the stronger alternative is believed to be true, the weaker one should not be asserted. The system is neutral on what the speaker should do instead: perhaps, he should assert the stronger alternative, but then again, maybe he should remain silent or change the topic.

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[1] I have further simplified Gamut's already stripped down schema. [Discussion upon request.]

Back to Conditionals

With this background in place, let me present my proposal for how to derive the conditional strengthening we observed. The central question is what stronger statement is relevant to the assessment of whether the conditional *if p, q* was correctly asserted. My proposal is that the stronger statement is the claim that *q no matter what*.[2] By the Grice/Gamut mechanism, we conclude that it is not the case that the speaker believes that q is true no matter what. Assuming the speaker has a definite opinion on the matter, we further conclude that the speaker believes that it is not the case that q is true no matter what. I will suggest that this conclusion is exactly what we reliably observed with all the conditionals we encountered in the introduction.

The import of "no matter what"

To get a firmer grip on the reasoning, we need to establish the logical relations between the simple conditional *if p, q* and the competitor *q no matter what*.

The idea we will pursue about the import of "no matter what" is that it involves universal quantification over possible antecedents: "all possible antecedents *r* are such that all relevant *r*-situations are *q*-situations".[3] Negating a *no matter what* claim would then amount to saying that there is a possible antecedent *r* such that *if r, q* is false. Since the conditional structure below the *no matter what* involves universal quantification, negating the "no matter what" claim then amounts to saying that there is at least one possible antecedent *r* such that some relevant *r*-situations are not *q*-situations, which in simpler terms would say that there are relevant situations which are not *q*-situations.

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[2] According to van der Auwera, one can read Ducrot as having made such a proposal. Horn also discusses such an analysis as a plausible quantity-based derivation of conditional strengthening. Both Horn and Ducrot apparently had the incorrect notion that this analysis will derive perfection. It doesn't in the general case.

[3] Note the (at least) two ways of making an unconditional claim: (i) *whether p or not-p*, (ii) *whatever the case/no matter what*. There is a short terminological remark in a footnote in van der Auwera (1997a: Fn. 5, p. 185), who reports that Haspelmath and König (1994) call the first form an "alternative concessive conditional" and the second one a "universal concessive conditional". Van der Auwera says that there does not seem to be truth-conditional difference between these forms. I am not so sure that there is no difference. In any case, I will just use the universal concessive here.

(14)	*q no matter what* is true in a possible situation s iff

$\forall$r: $\forall$s': s' $\in$ C(s) & r is true in s' $\rightarrow$ q is true in s'

(15)	Negating *q no matter what:*
$\neg\forall$r: $\forall$s': s' $\in$ C(s) & r is true in s' $\rightarrow$ q is true in s' , which is equivalent to
$\exists$r: $\neg\forall$s': s' $\in$ C(s) & r is true in s' $\rightarrow$ q is true in s' , which is equivalent to
$\exists$r: $\exists$s': s' $\in$ C(s) & r is true in s' & $\neg(q$ is true in s'$)$, which is tantamount to
$\exists$s': s' $\in$ C(s) & q is false in s' .

Horn (2000) seems to think that an analysis along these lines will derive perfection, whereas I have suggested that it derives a much weaker implicature. Obviously, I think that Horn is wrong.[4] There is a big difference between the claim that the consequent is not unconditionally true and the claim that the antecedent is both a sufficient and a necessary condition. Saying that *q* is not unconditionally true simply means that there are propositions that are not sufficient conditions for *q*. It does not mean that *p* is the only sufficient condition and thereby a necessary condition.

Exercise

Show that the negation of *q no matter what* captures the non-semantic inference we observed in (1)-(4) and (6)-(11). [Left to the reader.]

The Grounds for the Inference

We have derived that if the speaker believed that *q* is true no matter what, the speaker should not have asserted *if p, q*. What should the speaker have done instead? As we saw, the Gamut formulation remains neutral on this. The obvious answer would be that the

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[4] If van der Auwera (1997a: p. 172) is right, Ducrot (who van der Auwera reconstructs as having appealed to an unconditional scale) also made this mistake. As van der Auwera puts the point, on the basis of the unconditional scale, by asserting the Geis & Zwicky conditional in (1), "we merely implicate the negation of *whatever may be the case, I will give you five dollars*, which does not rule out that there are conditions other than the addressee's mowing the lawn that the transfer of the five dollars could be made to depend on". In van der Auwera's eyes, this makes the analysis incorrect. It certainly is insufficient if we want to derive conditional perfection, but it is just right for deriving a weaker strengthening of the conditional, which is all we want at this point.

speaker should have asserted that q is true no matter what. At least one of the examples we have encountered does seem to work like that:

(7)   If this cactus grows native to Idaho, then it's not an *Astrophytum*.

We naturally imagine this kind of sentence to be occurring in an information-seeking dialogue. The question under discussion is whether this cactus is an Astrophytum, perhaps as a sub-question to the overriding concern of finding out what species this cactus is. In such a context, any participant who knew that the cactus is not an Astrophytum would in fact be under the obligation of informing the other truth-seekers involved. In as much as all the participants have no interfering ulterior motives, they can be assumed to be cooperative.

One wrinkle. One can in fact hear (7) uttered by a speaker who has just been informed that this cactus grows native to Idaho. From this information, the speaker concludes that the cactus is not an Astrophytum. Why does s/he not make the simple assertion? In a context in which the information that this cactus grows native to Idaho has just been entered, (7) may actually be more informative than the bald assertion that the cactus is not an Astrophytum. It not only informs everyone of the conclusion, but also shows how the conclusion was arrived at. The bald assertion would in fact convey that the source of the speaker's conviction is something other than the most recent piece of information.[5]

Consider now the lawn-mowing example. I do think that the hearer legitimately concludes that the $5 are not forthcoming no matter what, no matter whether a chore gets done. But is that really because if the latter were the case, the cooperative speaker would have said so? The speaker wants a chore done. The speaker will chose as an incentive some event that is under his or her control and which can be made contingent on the chore getting done. If s/he is going the give the hearer $5 no matter what, s/he is under no obligation to say so but s/he will have to chose a different incentive.

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[5] This kind of consideration has been largely unexplored. There are several relevant meditations in recent work by Groenendijk & Stokhof and their associates, cf. e.g. Groenendijk et.al. (1997).

The Road to True Perfection

We have argued against Geis & Zwicky that conditional perfection doesn't in fact routinely arise with conditional statements, we have seen that a weaker strengthening inference does arise in many cases, and we have provided the justification for that inference (as a quantity implicature). Now, we turn to cases where it seems that conditional perfection does arise after all.

We find a plausible case of true perfection gift-wrapped with an intriguing analysis in a short paper by Cornulier (1983):[6]

> We can suppose, very roughly, that in *One is allowed to sit in this seat if one is disabled or one is older than 70* the word *if* keeps its merely sufficient condition meaning, and that the utterance situation suggests that if other sufficient conditions (allowing to sit there) did exist, they would have been mentioned, so that the only mentioned property (to be disabled or older than 70) is the only property which gives the right to sit there (presumption of exhaustivity). (Cornulier, 1983: 247)

Cornulier's formulation of the reasoning is somewhat idiosyncratic. Let us distill from this what we need to fit this into the Grice/Gamut formulation of quantity implicatures. The stronger statements that *if p, q* is compared to are of the form *if p or r, q*. Let us quickly verify that such pairs stand in the correct logical relation. The point is that from the assumption that every *p or r*-situation is a *q*-situation, it follows logically that every *p*-situation is a *q*-situation. This is simply because of the downward monotonicity of universal quantification.

Now, if (!) we can assume that in the relevant context of the conversation *if p or r, q* would be relevant, we can conclude by Gamut that it is not the case that the speaker believes that *if p or r, q* is true. Assuming further that the speaker has a definite opinion on the matter, we conclude that the speaker believes that *if p or r, q* is false. This will mean that while every *p*-situation is a *q*-situation, not every *p or r*-situation is a *q*-situation. In other words, at least some *r*-situations are not *q*-situations.

We are not done. The preceding calculations is not simply performed for some particular given antecedent proposition r. Cornulier says that for any proposition r other than p, we derive that it is not the case that *if p or r, q*. Cornulier notes that one needs to assume "that the utterance situation suggests that if other sufficient conditions did exist, they would have been mentioned".

Let's tackle the justification issue first. Why would one be justified in assuming that the speaker would have mentioned "other sufficient conditions"? For Cornulier's particular example, one can easily imagine a satisfying ad hoc explanation. The "speaker" of the example is in charge of conveying the conditions under which someone is allowed to sit in a particularly accessible seat on some form of public transportation. Since there will be no chance of elaborating or supplementing the statement, it is reasonable to expect that an exhaustive list of conditions will be given. Since it can be assumed that the speaker knows exactly what the conditions are, one can infer that the conditions listed are the only ones.[7]

Is there something more general to be said? At least one author, van der Auwera (1997a,b), has suggested that we are dealing with a quantity implicature. But this is not immediately apparent from Cornulier's account. It is usually assumed that quantity implicatures are based on so-called Horn-scales, scales made up of progressively stronger statements. If a statement below the top of the scale is asserted, there will (if everything else works right) be a quantity implicature that the speaker is not in a position to assert any of the stronger elements on the scale. Can Cornulier's account be seen as based on a

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[6] I have made a change in this quote to avoid a certain kind of distraction. [Discussion upon request. Footnote to be expanded in a later version].

[7] Some smart thinkers have pointed out to me that someone who in an empty bus sits down in a seat that has Cornulier's sign above it doesn't really seem to have done anything wrong. So, perhaps even this is not a case of conditional perfection. I disagree. Such a person does violate the rule but does so knowing that nobody will care. The situation is different and the rule can be felt in its full force if we imagine a scenario where one can't know whether someone will care. Irene Heim (pc) suggested a sign *One is allowed to park in this spot if one is disabled or if one is older than 70* posted in a busy supermarket parking lot.

Horn-scale? In van der Auwera's papers we find the proposal that conditional perfection is based on the following kind of scale:

(16)   if p, q and if r, q and if s, q
          if p, q and if r, q
       ↑if p, q

To make this work, one has to assume that at the top of this scale is a very long (infinitely long?) conjunction containing for each possible antecedent *r* the conditional *if r, q*. Then, someone who utters *if p, q* thereby signals that *p* is the only sufficient condition, otherwise some stronger conjunctive statement higher on the scale would have been uttered.

There is an immediate problem with this account, noticed by Horn. This account, in distinction from Cornulier's account, explicitly refers to specific hypothetical states of affairs to be excluded - the alternatives *r* and *s* and so on- "although these conditions never seem to figure directly in the reasoning that takes us from *if p then q* to *if not-p then not-q*". The usual appeals to scales involve scales containing items from a closed set (*hot - warm*, *all - some*, etc.) where it is reasonable to suppose that speaker and hearer are well aware of the available choices. This does not seem to be the case here. Horn's objection does not really apply to Cornulier's original suggestion (although he doesn't point that out): Cornulier doesn't construct an explicit scale but simply let's the utterance situation suggest that if there were other sufficient conditions, they would have been mentioned, and since none were mentioned, it is implicated that none exist. There is no appeal in this version to any specific alternatives the way it happens in van der Auwera's reconstruction.[8]

It may be better then to stick closer to Cornulier's original proposal. The hearer is not reasoning about a long (or infinite) list of possible antecedents. The hearer is simply

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[8] Neither van der Auwera nor Horn cite Hirschberg (1985), who uses scales like the one given by van der Auwera to calculate quantity implicatures in cases like this: *Which Iberian languages do you speak? I speak Ladino*. Here too, we conclude that the speaker is signaling that she doesn't speak Spanish, Portuguese, etc. Again, we may imagine two slightly different accounts: one using scales mentioning conjunctions of specific languages, and another with a presumption of exhaustivity, a closure condition.

reasoning that <u>if there were</u> an antecedent *r* (other than *p*) such that *if r, q* were true, the speaker would have added this conditional to the assertion. But we can appeal to quantity at this point: the reason why the speaker would have added such a conditional to the one actually asserted is that the conjunction would have been a statement that should have been asserted (because it gives more of the required information).

There is another problem, which affects both Cornulier's original proposal and van der Auwera's variant. The scale in (16) may not be the appropriate kind of scale for triggering a quantity implicature. It is often assumed that scales are required to be such that the relevant stronger statement is not of a more complex form than the weak statement actually made. Scales violating this condition would not appear to be conducive to a quantity implicature because the speaker may well have chosen the weaker statement simply to be brief. This constraint on Horn scales is used by Atlas & Levinson (1981) to rule out a wildly inadequate quantity implicature:

(1)   if and only if p, q
         ↑ if p, q

One might be tempted to reason as follows: the speaker has said *if p, q* instead of the relevantly stronger *if and only if p, q*, therefore the speaker is implicating either that *p* is in fact or might well be a merely sufficient condition. This reasoning would of course go completely against the natural interpretation. Atlas & Levinson are therefore glad to posit that this problematic scale is ill-formed, since *if and only if* is more complex than *if*. But now, as Horn points out, the greater complexity of the stronger statement in van der Auwera's scale should make that scale unavailable for calculating a quantity implicature.[9] And the same objection would undermine Cornulier's account, because the reason why the speaker did not mention other sufficient conditions may just have been that s/he wanted to be brief.

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[9]Note that this objection would again also threaten Hirschberg's quantity scale-based account of the exhaustivity implicature in exchanges like the one mentioned in the previous footnote.

The response one would have to pursue is that the complexity condition on Horn-scales is in fact not real. Matsumoto (1995) argues that there is no such complexity or brevity condition (see his section §2.3.2). He concludes that "[i]f a stronger item is regarded as carrying necessary information, that expression is expected to be used even if it is prolix. That is, one cannot reduce lengthiness at the cost of necessary information." To rule out the dangerous scale in (1), Matsumoto proposes a "monotonicity" condition on Horn-scales: they cannot mix items of differing monotonicity behavior. This is in fact an observation that goes back to Horn (1989: Section 4.4 "Scalar Predication and Subcontrariety II, pp. 231-252), who writes:

> Positive and negative quantifiers, modals, and related operators must be represented on distinct, though related, scales. There can be no single scale on which operators like *some* and *not all*, or *possible* and *unlikely*, can be plotted. Rather, there is one scale defined by the positive operators and one by their negative counterparts.
> [p. 235]

One piece of independent evidence for this monotonicity condition comes from acceptability judgments about patterns like *not only α but β*, which seem to rely precisely on Horn-scales:

(17)   not only <u>warm</u> but <u>hot</u>
        not only <u>some</u> but <u>all</u>
        not only <u>John</u> but <u>John and Mary</u>

        #not only <u>some</u> but <u>some and not all</u>
        #not only <u>John</u> but <u>only John</u>
        #not only <u>John</u> but <u>John and not Mary</u>

I will assume that Matsumoto is correct. Quantity implicatures work with scales that are not subject to complexity restrictions but are subject to a monotonicity condition.

Horn presents one more objection to a Cornulier-type account of conditional perfection. Basically, he complains that we don't observe a parallel kind of perfection with singular statements: "a singular statement (*Bill is corrupt*) does not implicate anything about the character of, say, Newt". The problem in a nutshell is that we don't really seem to reason that *Bill is corrupt* is in competition with *Bill and Newt are corrupt*. So, conjunctive

scales appear to be no more than "*dei ex machina* to assure a successful scalar account" of conditional perfection.

We respond by reminding ourselves that Cornulier's calculation only applies when "the utterance situation suggests that if other sufficient conditions did exist, they would have been mentioned". And in a parallel fashion, we would only reason from Bill to Newt if the utterance situation suggests that if other corrupt people existed, they would have been mentioned.

We conclude that Cornulier's proposal can be based on quantity. What we must figure out is when an utterance situation makes it required that all conditions are to be mentioned. We saw earlier that there are plenty of examples where this is apparently not required and where we therefore only get a much weaker strengthening of the conditional meaning. We need a theory of what a discourse requires, if we are to go beyond ad hoc judgments.

What is Required

Exhaustivity in Question/Answer Dialogues

At this point, I would like to add to the mix some work on exhaustivity that has not been taken into account in the recent literature on conditional perfection. Groenendijk & Stokhof in their dissertation (1984) show that in the normal case unadorned answers to questions are interpreted as supplying an exhaustive answer to the question:[10]

(2) Q: Who left the party early?
  A: Robin and Hilary left the party early.

  Q: What did Sandy eat for lunch?
  A: Sandy ate a tossed salad for lunch.

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[10]By writing in smaller letters material that is common to the question and a complete sentential answer, I indicate that the answer might just as well be a constituent answer with the rest understood. With Groenendijk & Stokhof, I assume that there is no significant difference between sentential answers and constituent answers with respect to conveyed exhaustivity.

In both of these examples, the answer will be interpreted as being intended to give an exhaustive answer. Robin and Hilary but nobody else left the party early. Sandy ate a tossed salad and nothing else for lunch.

Now, Groenendijk & Stokhof (1984: pp. 320-328) suggest that the exhaustivity signaled by answers is the source for the natural language phenomenon of conditionals being understood as biconditionals, i.e. just what we have been concerned with.[11] The technicalities of their analysis are perhaps unnecessary at this point but the idea is simply this. An answer to a question is read as if it contained a silent *only* with focus on the questioned constituent. Thus, consider:

(3)   Q: Will Robin come to the party?
        A: If there is vegetarian food Robin will come to the party.

Again, the answer is understood exhaustively. This has the effect of strengthening the meaning conveyed by the conditional in the context of the question asked.

The exchange discussed by Groenendijk & Stokhof is actually kind of puzzling at first sight. The question is a yes/no-question, which should receive a yes/no-answer. Instead, a conditional answer is given. In Groenendijk & Stokhof's system this works out fine since they treat *if*-clauses very conservatively as truth-value functions. But of course, the material conditional analysis of conditionals is not generally applicable whereas the strengthening of conditionals occurs quite generally.

We have been assuming that run-of-the-mill conditionals involve an *if*-clause restricting a (more often than not implicit) universal quantifier over possible worlds or possible situations. The kind of question that would elicit an exhaustive list of sufficient conditions would have to look like this: *What are all the antecedents p such that in all p-worlds/p-situations the consequent q is true?* Natural language is of course not quite that clumsy. We might ask: *Under which conditions will Robin come to the party?* And we may quite often run into exchanges like the one given by Groenendijk & Stokhof: the

initial question asks whether Robin will come to the party. The answerer however knows that this depends and could say so: *That depends*. The quick follow-up question then would be: *On what?* And then the answer would have to give the conditions under which Robin will come to the party. One can see Groenendijk & Stokhof's example as shortcutting the intermediate steps.

Recall now the problems we had with making Cornulier's work for us. The problem that Groenendijk & Stokhof's ideas can help us with is the issue of when perfection arises and when it doesn't. Cornulier owed us an account of when exactly "the utterance situation suggests that if other sufficient conditions did exist, they would have been mentioned". The idea that we can now explore is that perfection will be triggered if the conditional is asserted as an answer to a question eliciting an exhaustive list of sufficient conditions for the consequent. This may appear be a very narrow set of circumstances. But the applicability of this account is widened somewhat by allowing conversation to be abounding with implicit questions.

If this idea is on the right track, we now also know how to find examples where perfection will not arise. Not every conditional will be asserted as an answer to a question which requires p in *if p, q* to be an exhaustive specification of the cases in which q arises. There are other reasons why a conditional might be uttered. In fact, there is a typology of "counter-examples" to perfection emerging from this account.

Yes/No Conditional Questions

The question under discussion may be whether p is a sufficient condition for q, no more. Asserting *if p, q* in such a context will simply be a yes-answer to this question. Exhaustivity applies vacuously to *yes*, as Groenendijk & Stokhof show. We do not expect perfection, and it seems clear that we don't get it:

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[11]Simultaneously, they also develop such an account for the phenomenon of disjunction understood exclusively.

(4)   Q: Will you give me $5 if I mow the lawn for you?
        A: Sure. (I will give you $5 if you mow the lawn).

        Q: Will the TV work if it is humid?
        A: Yes. (The TV will work if it is humid).

It seems clear that the person who asserts the conditional is not implicating perfection. This by the way is the one circumstance mentioned explicitly by Groenendijk & Stokhof where a conditional does not get perfected to a biconditionals. But there are other such cases predicted by this analysis, as we will see.

Questions about the Consequences of an Antecedent

The question under discussion may be what follows from a particular antecedent. That would put the focus on the consequent, eliciting an exhaustive list of consequences. Of course, the answer may select consequences that are currently of particular importance. In any case, we do not expect perfection in this kind of dialogue. And again that seems right.

(5)   A: John is in Amherst today.

        ($Q_{implicit}$: What (of current interest) follows from John's being in Amherst today?)

        B: If he is in Amherst, he'll be home late tonight.

There is no natural implicature that the only circumstance in which John comes home late is if he went to Amherst. Imagine that he is always home late when he goes on any kind of trip.

Mention-Some Questions Asking about Antecedents

Groenendijk & Stokhof admit that not all questions require exhaustive answers. Sometimes it is clear that a partial answer is all that is needed. Then, exhaustivity will not be claimed by the answer. An example:

(6)   Q: Where around here can I buy Italian newspapers?
        A: You can get them at Out of Town News in Harvard Square.

The questioner doesn't need an exhaustive list, one place, hopefully convenient, would be enough, thank you very much.

Much would have to be said about how to tell apart "mention-all" questions from "mention-some" questions. But we can't get into that here. Suffice it to say that there clearly are "mention-some" questions with focus on the antecedent of a conditional. In such cases we do not expect perfection. Recall the end of the quote from Lilje given earlier on Page 4. A teenager may ask "How can I earn five dollars?" An exhaustive list would not be required. One item might be enough if it is acceptable to both parties. So we say: "I'll give you five dollars if you mow the lawn". No perfection arises.[12]

Relativized Perfection

Assume that we know that there are circumstances under which one can legitimately infer from the assertion of *if p, q* that there is no antecedent *r* (other than *p*) such that *if r, q* is true. Does this in fact derive perfection?

First, we need to figure out what *other than p* means when *p* is a proposition. I assume that it should pick out at most any proposition that does not entail *p*. It cannot pick out propositions that entail *p*: if *r* entails *p* then there would be a contradiction between saying that all relevant *p*-situations are *q*-situations and saying that not all relevant *r*-situations (all of which by assumption are *p*-situations) are *q*-situations.

Assuming that the conditional has universal force, we have the following implicature:

(7)   Any proposition *r* (which does not entail *p*) is such that it is false that all relevant *r*-situations are *q*-situations.

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[12] Horn suggests that perfection is natural, but that seems wrong despite the conviction displayed by the people who asked the following rhetorical questions: "By stipulating P as a <u>sufficient</u> condition for Q, we implicitly suggest that P is a <u>necessary</u> condition as well - else, why mention it?" (Horn, 1973: 212) and "What would be the point of stating a condition if it was not a necessary condition?" (Karttunen, 1971: 568). In fact, these rhetorical questions have an answer unexpected by these authors: the point of mentioning a sufficient condition is that it is one of the possible sufficient conditions for something that is not unconditionally true.

As long as we are allowed to choose any logically conceivable proposition this will amount to saying that outside of the *p*-situations there are no relevant situations that are *q*-situations. That is perfection.

But if we are in a context where we are looking for an exhaustive list of sufficient conditions from a more narrow set, we would not get full perfection. Here is a quite natural example:[13]

> (18) Q: Will you be upset if I call you at home tonight?
>   A: I will be upset if you call me after midnight.

Implicitly, what the answerer is supposed to supply is a list of calling times that would be sufficient to make her upset. The questioner will justifiably conclude that if he calls her before midnight, she will not be upset about the time of the call. But we don't have true perfection because it is not excluded that she will get upset if he insults her during the phone call even if it is before midnight.

Implicature or Hard-wired Exhaustivity?

We could plug Groenendijk & Stokhof's theory of questions (as requiring exhaustive answers - at least in the normal case) into an implicature account at a very particular point. Grice's formulation of quantity is this: "Make your contribution as informative as is required (for the current purposes of the exchange)". Quantity implicatures (suggesting the possible falsity of the stronger statement) should only arise when the speaker would be <u>required</u> to assert the stronger statement if the speaker knew it was true. Groenendijk & Stokhof's theory would supply a framework specifying what is required at a particular stage of a conversation.[14],[15]

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[13] This is modeled after an example given to me by Irene Heim (pc), which played a similar role in my paper on *only if*-conditionals (von Fintel, 1997).

[14] With Green (1995), I am convinced that to make sense of the circumstances in which quantity implicatures arise one needs a good account of what a conversation requires. This is not the same as identifying what would be <u>relevant</u> at a particular point. Green argues that implicatures are not controlled by what is relevant but only by what is required.

But we should acknowledge that Groenendijk & Stokhof themselves actually saw the exhaustive interpretation of answers not as derived by quantity implicature. They in fact build exhaustivity into the <u>semantics</u> of question-answer pairs. They discuss the issue of whether one might be able to derive exhaustivity as a Gricean implicature, but they decide one couldn't (pp. 368-372). They ask "Why then didn't we take this grand route over the summits of Gricean reasoning, where the air is thin, but the view so much clearer?" The answer they give is a little hard to understand, but I think there are two worries, both of which I think can be answered satisfactorily.

The answers that are interpreted exhaustively are not explicitly marked as exhaustive (or so it appears). Now, one might think that quantity should compare such non-exhaustive statements with ones that are explicitly marked as exhaustive: in answer to the question *Who came to the party*? we compare the answers *Robin and Hilary* and *Only Robin and Hilary*. Choosing the overtly non-exhaustive answer should implicate the negation of the stronger exhaustive-marked answer. But this would derive the opposite of what we want to use the implicature mechanism for. We already answered this concern: we adopted Matsumoto's monotonicity restriction on quantity calculations.

The other worry is that an implicature account would not derive exhaustivity but merely an epistemically weakened implicature that the speaker does not know positively of other cases. In *Who came to the party? Robin and Hilary*, we would derive the implicature that the speaker doesn't know of others that they did attend the party. This could be because they didn't attend the party or because the speaker's knowledge is incomplete. The problem is that the unadorned answer is interpreted as laying claim to complete knowledge.[16] This concern may be able to be answered as well. One needs to appeal to implicit claims to complete relevant knowledge that are made by entering into a question/answer exchange. The questioner by asking the question of someone may signal that they will assume that any information given will be complete and trustworthy. If the

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[15]An analysis that quite closely ties all kinds of scalar implicatures to the question-answer structure of a conversation can be found in van Kuppevelt (1996). The idea is also found more or less in Green (1995).

answerer flatly answers the question without signaling lack of knowledge, s/he may thereby lay claim to complete knowledge. That's just the contract that question/answer dialogues implicitly involve.

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[16]In Footnote no. 61 on pp. 424f, Groenendijk & Stokhof point out analogous problems with Gazdar's attempt (Gazdar, 1979) to explain exclusive readings of disjunctions as derived via quantity implicature.

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