May 22nd, 9:00 AM - May 25th, 5:00 PM

# Denying the antecedent and conditional perfection again

Andrei Moldovan
*University of Salamanca, Departmento de Filosofia, Logica y Estética*

# Denying the antecedent and conditional perfection again

ANDREI MOLDOVAN

*Departamento de Filosofia, Logica y Estética*
*University de Salamanca*
*Edificio F.E.S. Campus Miguel de Unamuno*
*37007 Salamanca*
*Spain*
*mandreius@yahoo.com*

ABSTRACT: It has been argued that a fragment of discourse that constitutes a fallacy of denying the antecedent at the level of *what is literally said* may not be a fallacy at the level of *speaker meaning*. The pragmatic phenomenon involved here is known as conditional perfection. I argue that the account of conditional perfection in van der Auwera (1997) and Horn (2000) has several problems, and I discuss several possible alternatives.

KEYWORDS: denying the antecedent, pragmatics, conditional perfection, implicature, fallacy

## 1. INTRODUCTION

The purpose of this paper is to revisit the account of denying the antecedent and conditional perfection I have argued for in Moldovan (2009). I start with a brief presentation of the account, after which I look at a number of criticisms that raised certain problems either for the account or for the explanation of the phenomenon of CP that I have appealed to there. In each case I assess the merits of the criticism and look at ways in which the account could be improved.

The logical fallacy of *denying the antecedent* (DA henceforth) consist in putting forward an argument that has the form: *If p, q. ¬p. Therefore, ¬q*. Arguments with this form are invalid, and, so the classical analysis goes, offer no support for the conclusion, while at the same time having a form that can easily be mistaken for that of a valid argument. In Govier's words denying the antecedent and affirming the consequent are two "invalid kinds of arguments that are relatively common and are deceptive because they are so easily confused with *modus tollens* and *modus ponens*" (Govier, 2001, p. 290, quoted in Stone, 2012, p. 330).

In Moldovan (2009) I have argued that we should be careful in analysing such arguments because there are cases in which the speaker may not be committing the fallacy of DA, although the form of the argument is literally that of DA. I have argued that it is important to keep in mind the distinction between *literal meaning* and *non-literal meaning.* The literal meaning of an utterance of a sentence, or *what is said* by that utterance, is roughly speaking the content literally expressed by the sentence uttered in the context of utterance. Grice characterizes it as being "closely related to the conventional meaning of the words (the sentence) [the speaker] has uttered." (Grice, 1989, p. 25) The non-literal meaning of the utterance of a sentence can be

Mohammed, D., & Lewiński, M. (Eds.). *Virtues of Argumentation. Proceedings of the 10th International Conference of the Ontario Society for the Study of Argumentation (OSSA), 22-26 May 2013.* Windsor, ON: OSSA, pp. 1-10.

used as a name for whatever content is indirectly communicated, the paradigm of such phenomenon being conversational implicatures. The term *what is meant* by an utterance of a sentence is sometimes used to name the literal and non-literal meaning together, that is, the total content that the speaker intends to convey, in as much as a rational and cooperative speaker.

While it is unquestionable that a distinction along these lines has to be made, the debate concerning how exactly to draw it is the debate concerning the dividing line between semantics and pragmatics, and it is still very much alive. I am not interested here in this particular debate, but only in pointing out that this distinction is useful when it comes to interpreting fragments of text of discourse that are alleged instantiations of the fallacy of DA. There is no reason to restrict the interpretation of a text or discourse merely to what is explicitly stated, excluding implicatures or pragmatic presuppositions from the interpretation. I argued in Moldovan (2009) that although utterances may literally express an argument of the form of DA, the argument at the level of the level of *what is meant* (the meaning pragmatically enriched) might be a valid argument *modus ponens*. This is because of the phenomenon of *conditional perfection* (CP henceforth), which consists in treating an utterance of 'If *p* then *q*' as expressing not only that *p* is a sufficient condition for *q*, but also that it is a necessary condition. The implicature that an utterance of the conditional introduces has the content: *if not p then not q*. In other words, in certain contexts the semantic content of 'If *p* then *q*' is pragmatically enriched to *if and only if p then q*, and this is *what is meant* by uttering that sentence in that context. This phenomenon is independent of whether the conditional is asserted as part of an argument or not, and actually it is discussed in the linguistic literature that I mention in what follows without connection to contexts of argumentation.

Here are some examples of conditionals where CP seems intuitively correct (from Geis & Zwicky, 1971). Consider a father telling his son the sentence in 1. In certain contexts he may legitimately be interpreted as having meant also that if the son does not mow the lawn he will not give him $5. Similar considerations apply to the following sentences.

1. If you mow the lawn, I will give you five dollars.
2. If you heat iron in a fire, it turns red.
3. If Andrew were here, Barbara would be happy.

Going back to the interpretation of argumentative discourse, given CP an argument that instantiates DA at the level of *what is said*, at the level of *what is meant* may be of the form: *If and only if p, then q. ¬p. Therefore, ¬q*. This is a valid argument, and not a logical fallacy. Consider for instance a child arguing as follows:

4. If I finish my homework before 8pm, my dad will let me play basketball. But I will not finish it before 8pm; it's just too difficult. So, he will not let me play basketball.

Abstracting away from details irrelevant to the presented purposes, the argument

literally expressed is of a DA form. But it is intuitively correct to perfect the conditional, and interpret it as a bi-conditional. It is reasonable for the child to think that finishing his homework is not only a sufficient condition among many others, but also a necessary condition for obtaining the permission. So, at the level of the pragmatically enriched meaning, the argument is not at all fallacious.

CP is treated in the literature (Cornulier, 1984; van der Auwera, 1997; Horn, 2000) as a pragmatic phenomenon, and not a semantic one. The assumption behind this is that the correct semantic analysis (that gives us the literal meaning of conditionals) is the classical truth-conditional analysis of 'if', formulated using situation semantics as follows (I use here von Fintel, 2001, p. 2):

> 'if p, q' is true in a possible situation s iff
> $(\forall s')(s' \in C(s)$ & p $\rightarrow$ q is true in s'),
> where C(s) is the set of possible situations relevantly accessible from s.

Given this analysis, CP is not accounted for by the semantics of conditionals, so it needs to be explained pragmatically. The account in Moldovan (2009) is borrowed from van der Auwera (1997), where CP is treated as resulting from a *scalar conversational implicature* that is triggered by the utterance of the conditional. Classical scalar implicatures include the one that an utterance of 'Some F's are G' generates, to the effect that *not all F's are G*. Three assumptions are needed to explain this: first, we need to assume that the speaker is cooperative, and in particular that she observes the maxim of Quantity (Be as informative as required). Second, that it is common knowledge between speaker and audience that the speaker knows about all F's whether they are G or not. Third, the assumption that it is required from the speaker to say of *all* F's whether they are G or not. Now, the speaker uttered 'Some F's are G', but with the same effort she could have uttered 'All F's are G'. Given the above assumptions, the speaker would be violating the maxim of Quantity if she meant only what she said, given that the latter sentence is more informative in the relevant way. The reason the speaker refrained from uttering 'All F's are G' must be that she does not believe that *all F's are G*, but instead (given the second assumption) that *not all F's are G* (following Gazdar, 1979).

Now, in the case of CP, different scalar implicature accounts have been offered. The one in van der Auwera (1997) considers that the following scale of propositions (known as a Horn scale) is involved in deriving the implicature that *if not p, not q*:

> (S) ...
> *if p, q and if r, q and if s, q*
> *if p, q and if r, q*
> *if p, q*

The proposition at the bottom constitutes *what is said* by father's utterance, i.e. it is the proposition that has been literally asserted. The higher propositions in the scale are conditionals whose antecedents express *possible* sufficient conditions for *q* to be

the case. The upper propositions entail the lower ones, and so the upper ones are more informative. Van der Auwera explains the Gricean derivation of the implicature that *if not p, not q* as follows: "Standard scalar implicatures arise as negations of the higher assertions, and this is also what we find here… when one supplies only the one sufficient condition *p*, one conversationally implicates that there is no second—and no third, etc.—sufficient condition." (van der Auwera, 1997, p. 262.)

Given the assumption that the speaker observes Grice's maxim of Quantity (in particular, the first submaxim, which requires that the speaker make his contribution as informative as is needed for purposes of the exchange), and given his utterance of 'if *p*, *q*', the audience is in the position to infer that *r* or *s* are not sufficient conditions for the truth of *q*. If *r* and *s* had been sufficient conditions for *q*, the speaker would have violated the maxim by not mentioning them. In the similar manner it is reasonable to rule out any other possible sufficient condition except *p*, and conclude that *p* is a *necessary* condition. So, the implicature is a negation of higher propositions in the scale. The only sufficient condition becomes also a necessary one, and the conditional is strengthened to a bi-conditional.

In what follows I discuss a number of objections and problems for this account of CP and DA, and I look at different ways in which they could be addressed.

## 2. PROBLEMS AND OBJECTIONS

*Objection 1.* A first objection that I want to discuss comes from Stone (2012). The author considers a number of strategies of reconstructing arguments of the DA form as valid arguments and ultimately rejects them. Stone looks at the following argument:

1. If Smith were honest then he would be a good candidate for governor.
   But he is not honest. Therefore, he isn't a good candidate for governor.

Stone argues that reconstructing this argument as a valid one by adding the inverse of the conditional does not make it any more rational. He adds: "Its weakness as an argument stems from the possibility that there are other reasons for judging that Smith would be a good candidate, his economic expertise or his ability to work with members of both political parties… Here the evidential considerations that reveal the weakness of this reconstructed argument are the same used to demonstrate the weakness of the invalid argument denying the antecedent. If this reconstructed argument is weakened by the same considerations that are used to criticize denying the antecedent as an invalid argument, strengthening the conditional does not do the logical work that these interpreters think that it does." (Stone, 2012, pp. 336-7) These considerations may very well apply to reconstructive strategies that treat the assertion of the conditional as having the force of a bi-conditional for charity reasons, as in Burke (1994). I am not sure whether Stone takes this as an objection to the account I have defended as well. I think it is not, because I am not arguing that we should reconstruct DA as a valid argument just for the reason of avoiding to attribute a fallacy to the speaker, but rather that there are contexts in which the

conditional is perfected for reasons that are independent of argumentative purposes. It is reasonable in those contexts to analyse the argument as a valid one at the level of what the speaker means given the phenomenon of CP, which occurs, when it does occur, independently of any charity considerations. If the argument is valid at the level of what is meant, then that is how we should take it to be. I come back later to this question concerning whether argument in 5 a case of CP or not.

As a side point, I disagree with Stone that a reconstruction along the lines of Burke (1994), which avoids attributing to the speaker an invalid argument for charity reasons, only shifts the problem with the argument, from a problem with the validity of the inference to a problem with the additional premise, but does not make it "any more rational". I disagree. When observing that an argument is of the DA form, and so invalid, the discussion comes to an end. The premises do not offer any support for the conclusion and this is the end of the story for an invalid deductive argument.[1] By adding the premise that makes it a valid argument we open up a space of discussion concerning the acceptability of the added premise. So I think the reconstructive strategy does have a certain dialectical appeal. It makes the argument look more rational, in as much as it does not simply dismiss it for being an invalid move that has the appearance of a valid one.

*Objection 2.* I turn now to a discussion of certain problems that affect the particular account of CP that presented above. A problem for this account seems to be the following: even if we are justified in inferring that there are no other sufficient conditions for *q* to obtain, apart from *p*, this does not mean that *p* is a necessary condition. It simply does not follow from there being just one sufficient condition that it is a necessary condition. It may very well be the case that there are no necessary conditions. Consider an utterance of 'If it rains, 2 +2 = 4.' This is true, which means that the antecedent establishes a sufficient condition for the truth of the consequent. But there are no necessary conditions for the consequent to obtain (at least none that I can think of).

Fortunately, this objection is not as damaging as it may appear at first sight, because of a different implicature generated by assertions of conditions to the effect that there are necessary conditions. As Kai von Fintel (2001, pp. 7-9) argues, while CP is not such a common phenomenon, there is a different phenomenon that is widespread with conditionals. Conditionals typically trigger a *strengthening inference* that *q is not true no matter what*. An utterance of 'If I finish my homework before 8pm, my dad will let me play basketball' generates the implicature that his dad will not let him play basketball no matter what. This strengthening implicature can be modelled as a scalar implicature, and it is generated independently of whether there is CP or not. The relevant Horn scale in this case is the following:

*q no matter what*
*if p, q*

[1] In the second part of his paper, Stone (2012, p. 350) argues that we should not treat DA as a deductively invalid argument, but rather as an inductive argument of the form *if p, then q. ¬p. Therefore, probably ¬q.*'

By asserting *if p, q* the speaker is implicating that he does not believe the upper level proposition that *q no matter what*. The proposition negated is equivalent to *all possible antecedents r are such that all relevant r-situations are q-situations*. The negation of this claim is equivalent to the claim that there is an antecedent *r* for which is a situation s'∈ C(s) such that *r* is true in s' and it is not the case that *q* is true in s'. This is tantamount to saying that *there is a situation in which q is false* (von Fintel 2001: 8), which is to say that there are necessary conditions for *q* to be the case. The content of this implicature (*q* is not true no matter what), plus the content of the scalar implicature that van der Auwera predicts in cases of CP (*p* is the only sufficient condition), entails that *p* is also a necessary condition. So, we get the implicature generated in cases of CP with the content *if ¬p, ¬q*.

*Objection 3*: A more interesting objection to van der Auwera's account of CP concerns the scale S of propositions which is essential in deriving the implicature that *p* is the only sufficient condition. To make the scale work, von Fintel writes, "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*." (von Fintel, 2001, p. 12) It is difficult to see how we could provide values for *r*, *s* etc., as it is implausible to suppose that the hearer is aware of the alternative choices to *p*. As a result, the derivation scheme of the implicature loses any psychological adequacy. Von Fintel attributes to Laurence Horn a criticism of van der Auwera's account along these lines. He adds that it can be easily avoided, as the alternative conditions do not explicitly figure in the reasoning that leads to the conclusion. von Fintel adopts Cornulier's 1984 version of quantity implicature in which there is no explicit mentioning of alternative possible sufficient conditions. Cornulier notes simply that "that the utterance situation suggests that if other sufficient conditions did exist, they would have been mentioned". As von Fintel puts it, "The hearer is simply reasoning that *if there were* 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)." (2001, p. 12-13)

The problem with the Cornulier-von Fintel account is that they do not tell us how we should think of the Horn scale of possible assertions, where each one is more informative than the ones below. I think the solution is to amend van der Auwera's account. The amendment that I propose consists in replacing *r*, *s*, *t*, which are meant to explicitly name sufficient conditions for *q* to be the case, with propositional variables $\alpha$, $\beta$, $\delta$, that stand for possible sufficient conditions. The new scale of assertions would then be the following:

(S')…
*if p, q and if* $\alpha$*, q and if* $\beta$*, q*
*if p, q and if* $\alpha$*, q*
*if p, q*

Given that $\alpha$, $\beta$, $\delta$ are variables, we also need to postulate valuation functions that assign a value to each variable. In first order logic, a *valuation* (or *assignment function*) is defined as a function $v$ that assigns a member of the domain of individuals to each variable, which is called its *denotation*. In our case, $\alpha$, $\beta$, $\delta$ are propositional variables, so the valuation function must assign to the variables propositions. Moreover, the assignment must fulfil a number of conditions: $v(\alpha) \neq p$, $v(\beta) \neq v(\alpha)$ and $v(\beta) \neq p$ etc.

What we gain by this move is that the derivation of the implicature no longer relies on positing specific sufficient conditions in a Horn scale. The interpreter reasons as follows: if there is a valuation $v$ such that $v(\alpha) \neq p$ and which makes true *if p, q and if* $\alpha$, *q*, then the speaker should have asserted *if p, q and if* $v(\alpha)$, *q.* The speaker did not assert the latter, therefore there is no valuation $v$ such that $v(\alpha) \neq p$ and which makes true *if p, q and if* $\alpha$, *q*. That is to say the speaker does not believe that there is a second sufficient condition. That is, *p* is the only sufficient condition. Given the strengthening of the conditional to the effect that *q is not true no matter what*, the only sufficient condition must be a necessary condition as well. Hence, *if and only if p, q*.

Now, the above scale can only be used for deriving the implicature that there is no *second* sufficient condition, when *if p, q* is the content asserted. So, for the case of an assertion of the form *if p, q* we do not need an infinitely long scale of conjunctions, because the reasoning rules out that there is *any* valuation $v$ that makes *if* $\alpha$, *q* true. So we can reduce the Horn scale to the following:

*if p, q and if* $\alpha$, *q*
*if p, q*

For the case where the assertion is *if p, q and if r, q* this scale cannot be used to derive the corresponding implicature that there is no third sufficient condition. Here we have two options. Either the Horn scale is the following:

*if p, q and if r, q and if* $\alpha$, *q*
*if p, q and if r, q*

Or we use the former Horn scale and treat *if p, q and if r, q* as *if p or r, q*, to which it is equivalent.

*Objection 4:* A last objection to the above account (Josep Macià, p.c., also discussed in von Fintel (2001, p. 13-4)) is immediately related to the question of the scope of the account of CP offered here. The idea is the following: there may be a very simple reason why the speaker has not asserted a sentence of the form *if p, q and if* $\alpha$, *q,* even if she believes that there are other sufficient conditions apart from *p*. A submaxim of Manner, called Brevity reads: *Be brief (avoid unnecessary prolixity)*. It is usually assumed that in order for a scalar implicature to be generated the assertions that the speaker did not make, but could have made, and which are more informative than the one actually made, should be at most as complex as the one made. Otherwise, given the submaxim of Brevity the speaker may be saving breath

or time. For this reason Horn (2000) rejects any scale made by adding conjuncts to the content asserted as not a legitimate one to derive scalar implicatures. In reply to this objection, von Fintel draws on Matsumoto (1995, p. 44), who argues as follows:

> If 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. This observation is in fact consistent with the nature of the Maxim of Brevity. The Maxim of Brevity states that the speaker chooses a briefer expression over a more prolix one if they are roughly synonymous. That is, the Maxim of Brevity governs only the formal complexity of the expression used, not the amount of information conveyed; as Grice states, "[w]hile the maxim of quantity concerns how much you say, brevity concerns how much you take to say it".

The maxim of Brevity does not affect the choice of information to be conveyed, but only the choice of words. So the hypothesis concerning the Horn scale van der Auwera proposes and the modified version I have proposed are not misguided after all. The objection was easily rejected, but now one may ask: what determines exactly how much one is required to say? I address this question in the next section.

## 3. WHEN TO EXPECT CP?

A problem for the account of CP in van der Auwera is that it does not say under what conditions we should expect CP to obtain. That is crucial for the account of arguments that are of DA form at the level of *what is said* but still valid arguments at the level of *what is meant*. Compare the following two cases.

Suppose I ask someone at a bus station 'Where can I get a bus ticket?' and I get the reply 'If you turn right at that corner over there you will find a small shop where you can get bus tickets.' Here clearly there is no CP, that is, no implicature to the effect that finding that particular shop is also a necessary condition to get a bus ticket. At least not if we are in a big town where there are plenty of places where one can buy bus tickets.

Now consider this other example from Cornulier (1983, p. 247): a sign on a bus reads 'One is allowed to sit in this seat if one is disabled or older than 70.' In this case we are clearly invited to perfect the conditional: it is not that the sufficient conditions mentioned are two among many others, but rather that it is necessary that either one of them be the case for the consequent to obtain.

So when does a conditional perfect? The answer to this question is related to the maxim of Quantity, the first submaxim, which reads: Make your contribution as informative as is required. But the question is: exactly how much one is required to say? The obvious answer is: that depends on the context. According to von Fintel, CP obtains "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." (von Fintel 2001, p. 17) This is similar to what Cornulier calls a "presumption of exhaustivity" (Cornulier, 1983, p. 247). A contribution to a conversation made under the presumption of exhaustivity is one that is made in answer to an explicit or

implicit request for an exhaustive list of conditions, or a mention-all question, as opposed to a mention-some question (von Fintel, 2001, p. 17). Only when there is a presumption of exhaustivity is there a basis for CP. In those situations the speaker is required to assert *all* the conditions that are sufficient, given the maxim of Quantity. A cooperative speaker can be assumed to observe this maxim and to provide all the conditions, if that is what is required for the purpose of the conversation.

So let us now try to answer the question: in what conditions CP is *not* possible? One first class of cases is that of conditionals that are not meant to provide conditions at all. Horn (2000) mentions a number of such cases, which he calls *unperfectable conditionals*. I mention only some such conditionals: first, 'Austinian' conditionals, such as 'If you're thirsty, there's some beer in the fridge'. The point is not that this sentence cannot be used under any circumstances to express a sufficient condition, but that the Austinian *use* of conditionals is such that they do not express conditions for the consequent to obtain. A second class are 'even if' conditionals, which do not get perfected because again they do not express sufficient conditions: 'Even if the U.S. halts the bombing, North Vietnam will (still) not agree to negotiate.' Horn (2000) also includes in the class of unperfectable conditionals those where the antecedent entails the consequent, such as: 'If that's a cat, it's a mammal'. In normal contexts the antecedent cannot be a necessary condition for the consequent, as it conveys more information.

The rest of the conditionals are susceptible of CP when there is a presumption of exhaustivity. They do not get perfected when, in von Fintel's terms, the implicit or explicit question is a mention-some and not a mention-all question. The bus ticket example above is one such case, as it is more reasonable to interpret the question as an explicit mention-some question, given the common knowledge of speaker and hearer that there are many places where one can get a bus ticket, and given the purpose of the conversation. The speaker is not expected to give a full list of places where one can get a bus ticket in town, but only to mention some. On the other hand, Cornulier's bus sign example is such that the sign should be taken as an answer to a mention-all question: all the sufficient conditions are relevant, not just some of them.

Stone's example of DA about Smith the politician is a more difficult case. Consider the sentence 'If Smith were honest then he would be a good candidate for governor'. Is it given in answer to an implicit or explicit mention-some or mention-all question? If it is a mention-some question then the argument is fallacious, if it is a mention-all question, then it is valid. It is not possible to determine this without information about the details of the context of utterance. On the other hand, if it is a common belief of the conversationalists that honesty is a necessary condition for any good candidate for governor, then this belief may be taken as a missing premise of the argument. However, the decision to reconstruct the argument in this way is not dependent on a CP mechanism.

A third kind of cases where we should not expect CP is when there is a presumption of exhaustivity, and so Quantity requires that the speaker give all the sufficient conditions, but Quantity conflicts with some other maxim. We have seen that Quantity does not conflict with Brevity, but Quantity may conflict with Quality (Do not say what you believe to be false), and in that case the latter wins. Suppose

the professor asks a student during an oral examination: 'What are the three ways to obtain the volume of an object?' The answer comes: 'You obtain the volume of an object if you multiply the length, height and width of the amount of water displaced by submerging the object in water.' We get no CP here, although there is a presumption of exhaustivity. Assuming a cooperative speaker, the reason must be that the student does not know any other method to calculate the volume of an object apart from the one mentioned. So she did not mention any other method because she does not know any, that is, because she is observing the maxim of Quality.

Summing up, there are three necessary conditions that need to be fulfilled in order to expect that a conditional will be perfected: first, the conditional must be used to express a sufficient condition; second, the context must be such that the conditional is asserted under a presumption of exhaustivity; and finally, there must be no conflict of Quantity with Quality. If these three conditions are fulfilled then we should expect CP. The relevance of this prediction to argument analysis is straightforward: when a conditional is perfected, an argument that instantiates DA at the level of *what is said* instantiates a valid argument form at the level of *what is meant*.

ACKNOWLEDGEMENTS: The research for this paper has been partly supported by the AGAUR of the Generalitat de Catalunya (2009SGR-1077).

REFERENCES

Auwera, J van der. (1997). Pragmatics in the last quarter century: The case of conditional perfection. *Journal of Pragmatics*, *27*, 261-274

Burke, M. B. (1994). Denying the antecedent: A common fallacy? *Informal Logic*, *16*(1), 23-30.

Cornulier, B de. (1983). If and the Presumption of Exhaustivity. *Journal of Pragmatics,* 7:247-249.

Horn, Laurence R. (2000). From if to iff: Conditional perfection as pragmatic strengthening. *Journal of Pragmatics, 32*, 289-326.

Fintel, K von. (2001). Conditional strengthening a case study in implicature, Unpublished manuscript, MIT. (retrieved at 15/10/2012 from http://kaivonfintel.org/work).

Gazdar, G. (1979). *Pragmatics: Implicature, Presupposition and Logical Form*. NewYork: Academic Press.

Geis, M L. & Zwicky, A. M. (1971). On invited inferences. *Linguistic Inquiry,* 2, 561-566.

Govier, T. (2001). *A Practical Study of Argument* (5th ed.). Stanford, CT: Wadsworth, Thomson Learning.

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

Matsumoto, Y. (1995). The Conversational Condition on Horn Scales. *Linguistics and Philosophy, 18*, 21-60.

Moldovan, A. (2009). Pragmatic considerations in the interpretation of denying the antecedent. *Informal Logic*, 29(3), 309-326.

Stone, M. (2012). Denying the Antecedent Its Effective Use in Argumentation *Informal Logic*, *32*(3), 327-356.