

Pronouns in a Pragmatic Semantics

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Abstract

In this paper we discuss some recent results and insights in the formal theory of interpretation. With the rise of systems of dynamic interpretation it has been suggested that they embrace a completely new notion of meaning. However, we claim that the successes of these systems can be attributed to the sophisticated and systematic way in which they pair an old-fashioned notion of meaning with a pragmatic notion of interpretation. Conceiving of it this way, the results can be relatively easily generalized.

1 Introduction

The treatment of structural semantic relationships in discourse has given rise to several, sometimes deemed major, deviations from classical semantic paradigms. Phenomena like that of presupposition and (inter-sentential) anaphora opposed a formal semantic treatment in classical paradigms, and, as a consequence, the field witnessed the rise of systems of dynamic semantics, which abandoned classical principles like that of compositionality (discourse representation theory, *DRT*, Kamp 1981), or which claimed the need of an enriched notion of meaning (file change semantics, *FCS*, Heim 1982 dynamic predicate logic, *DPL*, Groenendijk and Stokhof 1991).

However, it has turned out that a classical, philosophically motivated notion of meaning, and practical aspirations in the treatment of discourse and dialogue, are not that widely apart. For, for instance, inter-sentential anaphoric relationships are not inconsistent with a classical conception of meaning, if only one pays due attention to the pragmatics of interpretation.

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In this paper we elaborate upon a pragmatic view on the issue like the one sketched in (Stalnaker 1998), and developed more formally in (Dekker 2000a). Although, indeed, a systematic account of the facts does not presuppose a dynamic conception of meaning, it does motivate a dynamic notion of conjunction.

Anaphoric relationships between indefinite noun phrases and pronouns can be established in terms of a classical satisfaction relation if the system of interpretation is extended so as to account for three systematic, and arguably pragmatic, principles. Firstly, one has to pay due attention to the fact that indefinite noun phrases are generally used with referential intentions. Secondly, one has to take to heart the fact that in the conjunction of two assertions, one literally precede the other. Thirdly, one has to account for the specific roles of the interlocutors involved in the making of assertions.

As we will see, not only does this show how semantic and pragmatic principles can be made to interact, it also suggests, very naturally, an extension of the scope of the theory of interpretation with other phenomena. Most of the issues discussed here have been presented in a formal setting in (Dekker forthcoming; Dekker 2000c; Dekker 2000b; Dekker 2000a).

2 Dynamic Interpretation of Donkey Sentences

Peter Geach (Geach 1962) has enriched the semantic tradition with pieces of discourse like the following, the interpretation of which has generated a complete library of books and articles:

- (1) Pedro owns a donkey. He keeps it in his stable.
- (2) If a farmer owns a donkey he beats it.

If, as has been standard practice, indefinite noun phrases correspond to the existential quantifier from predicate logic, then it is a complete mystery how these examples come to mean what they mean. Example (1) states that there exists a donkey which Pedro owns and which he keeps in his stable. The problem here is how the condition “which he keeps in his stable”, expressed by the second sentence of (1), enters the meaning of the first, which is assumed to be existentially closed.

Example (2) can be taken to claim that every farmer beats every donkey he owns. Here, the question is not only how to integrate the anaphoric clause “he beats it” with the meaning of the antecedent of the conditional sentence, as in example (1), but, in addition, what makes the indefinites “a farmer” and “a donkey” get universal force.

Systems of dynamic semantics like *DRT*, *FCS*, and *DPL*, developed in the eighties, have come to grips with examples like (1) and (2). Basically, the idea is that the interpretation of a discourse involves a, step by step, update of a discourse representation, a file, or an information state, which comprehends the information that has been exchanged in the discourse so far. In addition, in this process, indefinite noun phrases are assumed to set up so-called ‘discourse referents’. These discourse referents are formal objects, which stand in for the possible referents of the indefinites, which are ascribed the properties attributed to them, and which are accessible for subsequent anaphoric pronouns.

Thus, the first sentence in example (1) is taken to introduce, next to a discourse referent for Pedro, a discourse referent for the donkey, let’s say x . The first sentence ‘dresses’ this discourse referent with the property of being a donkey owned by Pedro, and the next sentence adds the condition that Pedro keeps x in his stable.

Example (2) is interpreted in the following fashion. A conditional sentence “If A then B” is analyzed, roughly, as claiming that upon any way of updating with “A”, “B” will come out true. By the dynamic set up of these systems, this makes (2) state that if we find any farmer and any donkey which the farmer owns, then the former beats the latter. This can only be true if every farmer beats every donkey he owns, as required.

Successful as the dynamic systems of interpretation may be, it seems they focus too rigidly on the interpretation of a discourse in a strictly linear fashion. However, not only is such an underlying dynamic notion of meaning not really necessary for an account of the data, it is also problematic.

Consider the following example, due to Peter Strawson (Strawson 1960):

- (3) *A*: A man just fell over the edge.
B: He didn’t fall, he was pushed.

If we have to account for the pronoun used by *B* by integrating what *B* says with the contents of *A*’s utterance, we obtain a plain contradiction: a man who fell didn’t fall. But of course *B* here does not contradict himself, he contradicts *A*. Notice that *B* even might continue with:

- (4) *B*: Besides, it was a woman.

If he does so, there seems to be no way of integrating what *B* with any part of what is claimed by *A*. Thus, the interpretation of the pronoun is left unaccounted for, and we are basically facing the problem posed by Geach again.

It might be claimed that Strawson's example is a special one, and that it has to be accounted for in a separate way. This may be true, but still there are other examples, which resemble (2) much more closely, and which cannot be accounted for in a simple-minded form of dynamic semantics for basically the same reason as (3). Consider:

- (5) A farmer beats a donkey if he owns it.
- (6) Only if a farmer owns a donkey does he beat it.

If the pronouns "he" and "it" in these examples are interpreted as "a farmer who beats, *cq.* owns, a donkey" and "a donkey which the farmer beats, *cq.* owns," then these sentences must be deemed tautologous, which they are not, intuitively. The problem is that the phrases "A farmer beats a donkey" and "A farmer owns a donkey" are semantically (conditionally) dependent on the phrases "he owns it" and "he beats it," whereas the latter are structurally (anaphorically) dependent on the first. In the mentioned systems of interpretation this leads to a paradox of interpretation.

3 Pragmatic Understanding of Dynamics

We will leave the analysis of (5) and (6) for another occasion, but a further inspection of Strawson's example may serve as a leg up to a more pragmatic interpretation of Geach's examples.

Intuitively, it seems to be clear what is going on in a situation like the one reported by Strawson. Two individuals *A* and *B* are watching a person tumbling down, and *A* asserts of this individual that he fell, *B* that he was pushed. This, of course, is unproblematic. Things get a little bit more involved when we, who overhear the conversation between *A* and *B*, do not know who is tumbling down.

The latter type of case has been discussed in (Stalnaker 1978), where, roughly, the following analysis is proposed. If individual *d* is tumbling down, then the assertions of *A* and *B* are about *d*; if individual *d'* is tumbling down, then the assertions are about *d'*; and so on and so forth. In other words, the interpretation of the two assertions is conditionally dependent on who is falling down, and they can be characterized by two open propositions: functions from individuals *d* to assertions about *d*, for any possibly relevant individual *d*. Pragmatic facts about the utterance situation here may intervene so as to constrain or identify the person who actually was tumbling down, and, thus, aid in determining more specifically which assertions actually are made.

Interestingly, and as emphasized in (Stalnaker 1998), examples like Geach's (1) can be dealt with in basically the same fashion. This analysis rests on the assumption that indefinite noun phrases, like definite ones, are generally used with referential intentions. Here, it is not claimed that a speaker is supposed to know, in every possibly relevant sense, whom he is actually referring to, but he must have the belief that his use of the term is actually about a definite individual. (It can be an individual someone else has intended to refer to on a previous occasion.)

Thus, if one utters "Pedro owns a donkey," one may intend to refer to a particular donkey which one has seen in Pedro's stable, or to a donkey one has been told about. In either case, if d is that donkey, then the assertion can be understood to be about d . By the same token, the second sentence of (1) can then be taken to be about d , too. Here, as in the previous case, a hearer, but a speaker as well, may not know in every possibly relevant sense, which donkey the assertions actually are about. This does not hamper interpretation, because, as in Strawson's case, the two sentences can be interpreted as functions, from possibly intended referents to linguistic contents: for any sentence S a function f such that for any possibly intended referent d , $f(d)$ is the content of S if the intended referent actually were d .

Not unsurprisingly, tools developed in dynamic semantics, like discourse representation structures or information states, are precisely the kind of entities to model this type of information. The difference between the pragmatic picture sketched here and the one adopted in classical systems of dynamic semantics resides in the fact that the meaning of a sentence is not invariably integrated with the contents of previous discourse. According to our view, both sentences in (1) are associated with an open proposition, like the sentences in (3). The two open propositions can be understood independently. But of course we can combine or compare the two. For (1) an appropriate combination of the two assertions is a function specifying for any individual d , whatever the first sentence asserts were d the intended referent in conjunction with what the second sentence asserts were d the intended referent again. Thus, if the first sentence is understood to be about a certain donkey, then the pronoun in the second sentence can be taken to refer back to *that* donkey.

Essentially the same goes for Strawson's example. If A 's assertion is about some individual d , then B 's assertion is about d , too. In that case, what B asserts about d will be seen to contradict what A asserts about d . Nevertheless, what each of A and B say is consistent by itself. Both assertions cannot be true together, but each of them can, by itself.

It may be noticed that we can account for anaphoric relationships along the lines sketched, as well as for a dynamic interpretation of discourse, under what can be called a classical meaning assignment. What is different from previous, non-dynamic accounts, is not so much the use of open propositions, but the idea that indefinite noun phrases induce open places, too. The dynamics of discourse then can be accounted for, as in standard systems of dynamic semantics, by (i) keeping track of which open places are induced by indefinite noun phrases, and (ii) allowing these to be equated with open places induced by pronouns in subsequent sentences. The dynamics of interpretation can, thus, be located entirely in a dynamic notion of conjunction. A formal implementation of these ideas has been given in the papers mentioned at the end of the introduction.

4 Update and Assertability

One of the morals of the previous section may be not to focus, too narrowly, upon the updates which assertions may bring about in the information state of a hearer or interpreter. Sometimes we have to evaluate the contents of assertions separately, as, for instance, in the case from Strawson. Besides, it also pays off to investigate the information which a speaker can be said or required to have to support his assertions. (In (Dekker forthcoming) we have spelled out separate calculi characterizing the contents of, update with, and support for assertions made with sentences of a first order language. These calculi have been shown to be interdefinable, and logically well-behaved.)

In this context an account of some of the conversational principles of (Grice 1975) becomes relevant. According to Grice's principles a cooperative speaker is supposed to have evidence for what he says (quality), and to provide no more, nor less information than can be considered relevant at some point in a conversation (quantity).

Interestingly, these principles already provide a clue to an often disputed feature of the classical logical analysis of conditionals in terms of material implication. According to its logical analysis, a sentence of the form "If A then B" can only be false if the antecedent "A" is true and the consequent "B" is false. Being two-valued, such a conditional sentence is deemed true otherwise. As a consequence, "If A then B" is already true if "A" is false, and also if "B" is true. People have often felt there must be more to the interpretation of conditionals, something like some more intrinsic connection

between what is expressed by the two clauses “A” and “B”.

As a matter of fact, Grice’s principles seem to require precisely such a stronger connection, even if we assume a material implication analysis of conditionals. Consider an utterance of the following sentence:

(7) If John comes to the party, then Mary will be upset.

Grice’s maxim of quality requires the speaker to have evidence supporting the truth of this sentence. However, the evidence can not, sensibly, consist in the speaker’s belief or knowledge that Mary will be upset. For if the speaker had that kind of information, the maxim of quality would have forced him to express this logically stronger fact. For the very same reason, the maxim of quality rules out that the speaker has evidence that John is not going to come. The quality principles thus rule out that a speaker’s evidence for a conditional sentence come from his evidence against the condition stated in the antecedent, or evidence for what is expressed in the consequent.

Still the fact remains that the speaker must have evidence supporting the (material truth) of the conditional. This, it can be argued, can only be the case if the speaker knows of a more intrinsic relation between the constituents of the conditional. The speaker does not know whether John comes, and whether Mary will be upset. Maybe, John indeed does not come, and then an utterance of (7) does not entail anything about Mary’s state of mind. But it is also conceivable that John does come, in which case it is claimed that Mary is going to be upset. So, although various courses of events are conceived possible by the speaker, his utterance of (7) commits him to the claim that those courses of events in which John comes to the party, are ones in which Mary is going to be upset. And, although the example does not explicitly say which connection there is between the two possibilities, it is, thus, seen to express one. The interesting point in this observation is that the suggested connection between the two possibilities does not at all depend on an interpretation of “If A then B” other than that as a material implication, but on a sophisticated interaction between semantic and pragmatic information.

Spelling out a Gricean notion of support is slightly more complicated when we consider utterances made with referential intentions. Like we said, terms like indefinites can be used with referential intentions even though the speaker may fail to know who the referent actually is in every possibly relevant sense. For this reason support for utterances with indefinite terms (as with definite ones, by the way) must come from evidence concerning what are called a speaker’s ‘subjects’. Information about subjects is here understood as a

technical notion, capturing the information which a speaker has about an individual which he assumes to be uniquely determined—even if the speaker is mistaken in this.

Support for an assertion of Geach's sequence (1) can now be spelled out as follows. For a proper assertion of the first sentence of (1) a speaker is required to have a subject in mind, for which he has evidence it concerns a donkey owned by Pedro. For a proper assertion of the second sentence the speaker is required to have the same subject in mind, and to have evidence that it is kept in Pedro's stable. Thus, the evidence which is required for making each of the two assertions separately guarantees that the speaker also has evidence supporting the conjunction of the two sentences, naturally understood. Notice that this is a welcome result, although not at all trivial. (For motivation, and formal details the reader is referred to Dekker forthcoming.)

The kind of information which a speaker can be required to have to support an assertion with indefinites may also serve to solve a "puzzle" due to Charles Sanders Peirce (Peirce 1906; "puzzle" in quotes, since Peirce' himself has given a solution to the puzzle, which, by the way, covers the same phenomena as the one advocated in this paper). Peirce' puzzle concerns the following two sentences:

- (8) Some married woman will commit suicide if all married men fail in business.
- (9) There is some married woman who will commit suicide in case her husband fails in business.

Intuitively these are quite distinct sentences, the first seems to be much weaker than the second. However, on a standard interpretation of these sentences in the language of (modal) predicate logic the two sentences are provably equivalent. Some authors have taken this as an argument showing that (modal) predicate logic is not the right tool for analyzing natural language (recently, e.g., by Read 1992). However, we believe this conclusion is drawn too hastily.

For even if we take the (modal) predicate logic interpretations of the sentences as basic, we still can take the second to convey more, given that an assertion of such a sentence must be supported by the speaker's information. For a proper assertion of the first sentence the speaker is required to have information to the effect that on all possible courses of events upon which all married men fail in business, we find some woman who then commits suicide. Support for the second requires much more than that. For a proper assertion

of this sentence the speaker must have a subject in mind about which she has the following information. It is a married woman, and on all courses of events in which her husband fails in business, she commits suicide. Clearly this is a stronger requirement. Again we witness an interesting interplay between semantic and pragmatic information.

5 On Blocking Effects

In our discussion of Peirce' puzzle we have, deliberately, neglected one point. In the way we have stated it the indefinite "some married woman" in an utterance of (8) is not assumed to be associated with referential intentions, whereas in an utterance of (9) it is. Actually, this relates to a point, often taken for granted in the literature, but which, upon reflection, has never been understood very well.

Under the pragmatic perspective adopted in this paper, it is no mystery why indefinites and pronouns interact in the dynamic way they do. Like definite noun phrases, indefinites noun phrases are used with referential intentions, and anaphoric pronouns pick up the possible referents associated with their antecedents. But if this is so, then why do these referential intentions, and the possibility of anaphoric take up, vanish when indefinites figure in certain constructions: under a negation, in the antecedent of conditionals, in the restriction of quantifiers, etc. At least, this is what is suggested to happen in virtually all systems of dynamic semantics.

Consider the following two examples, the first one after an example by (Kamp and Reyle 1993):

- (10) Farly doesn't run a sushi bar. ?It's in Soho.
- (11) If a client comes in, I'll give her a ticket. ?She's rich.

In the first example the indefinite noun phrase "a sushi bar" is in the scope of a negation, and the subsequent pronoun cannot refer back to it. Intuitively, this sentence is not about a particular sushi bar, or, in our terms, in an assertion of the sentence the indefinite is normally not used with referential intentions. Example (11) is slightly more involved. The indefinite "a client" is used in the antecedent of this conditional sentence, and it can be picked up by a pronoun when we process the consequent clause. However, after having processed the conditional sentence as a whole, this 'client' is no longer accessible. Intuitively, the sentence is not about a particular client, but about any possible client. (As Geach's (2) is not about a particular farmer and a particular donkey, but about donkey owning farmers and owned donkeys in

general.) Although, as we will see below, these observations are not fully general, they obviously require some explanation.

We think the answer to this question must come from the typical role of the relevant constructions (negations, implications, and so forth) in discourse and dialogue.

Typically, but not inflexibly, a negation “Not S” may serve to answer the issue—raised explicitly or implicitly—whether “S” is true or not. An utterance of (10) may serve to state—possibly in answer to the question whether Farly runs a sushi bar—that he doesn’t, that is, that there is no such bar which Farly runs. (Alternative interpretations are easily made available, of course by emphasizing, e.g., “Farly”, or “run”. We here assume the utterance to carry what may be called a neutral intonation.) Generally, then, a speaker need not have a particular sushi bar in mind when uttering (10), and the reason may be that, intuitively, the existence of such a sushi bar is not part of what the speaker claims to have evidence for. Rather, the existence of such a bar appears to be part of the issue which the speaker addresses—negatively in utterance of (10)—, or even part of what the hearer might have claimed just before. So actually, when somebody utters (10), she is normally not coming up with a sushi bar herself, but she is claiming to have evidence against the existence of such a bar, were anybody else thinking of the possibility of there being one.

This conception of the use of negation naturally fits in with current theories of focus and information structure. Coherent discourse and dialogues generally consist of assertions which have an (explicit or implicit) ‘background’ or ‘topic’ part, and an (explicit) ‘focus’. Typically—that is, if context or intonation have no interfering effects—one can say that e.g., the contents of negated sentences, but also the antecedents of conditional sentences, and the restrictions on quantifiers, constitute a background or topic, which the speaker is not supposed to support, but which he is supposed to react upon. It is the focus part of his utterance which he can be required to have support for.

In the case of (10) the speaker simply says “no” to the ex- or implicitly suggested possibility of Farly owning a sushi bar, thereby denying any commitment to the existence of such a bar. For an utterance of (11) things are slightly more complicated. With an assertion of the first sentence in that example the speaker addresses the possibility of a client coming in, and commits himself to giving a ticket to any such client. Thus, were any client to come in, the speaker claims to supply that client with a ticket, maybe a

ticket specific for that client. However, by means of such an utterance, the speaker does not make a statement about any particular client which actually comes in. Therefore a continuation with the second sentence appears to be odd, indeed.

6 Functional Readings and Specificity

In the previous section we claimed that a speaker is not in general supposed to support the information expressed in the background of his assertions (as in the assumed ‘topical’ antecedent clauses of conditional sentences, or in the restrictions of quantified constructions). But we assumed speakers are supposed to support the focal part of these utterances (the consequents of the conditionals, and the ‘nuclear scope’ of the quantified constructions). This type of support must be qualified in one, but quite an intuitive way. The focal type of information can only be supposed to be supported in functional dependence upon the information expressed in the background, upon which it reacts. This suggests that a speaker also may have functional support for indefinites in focus, which, therefore, can be referred back to by (functional) pronouns. And indeed, various examples discussed in the literature provide motivation for precisely this phenomenon.

Consider the following examples, the first after one by Irene Heim (Heim 1990), the second from Lauri Karttunen (Karttunen May 1968; Karttunen 1976), and the third from Gabriel Sandu (Sandu 1997):

- (12) If a book is printed with Kluwer it has an index. It can always be found at the end.
- (13) Harvey courts a girl at every convention. She always comes to the banquet with him.
- (14) Most men had a gun, but only a few used it.

Example (12) is clearly about books, more in particular about books printed with Kluwer. With an assertion of the first sentence of this example a speaker claims to have evidence which, for any such book, gives him an index. Such evidence can be taken to consist in a so-called ‘witness’ function f , assigning indices to books printed with Kluwer. If the speaker has such a function in mind, then he may refer back to it with a pronoun when he subsequently utters the second sentence. Clearly, the second sentence is also about books printed with Kluwer, and it can be taken to claim that, always, if b is a book printed with Kluwer, then the index $f(b)$ of that book can be found at the end of b .

Something essentially similar goes for the other examples. Support for the utterance of the first sentence of (13) may consist in a function g , which associates girls which Harvey courts with the conventions he visits; and again we see that such a witness function can be picked up later. With an utterance of the second sentence, which also quantifies over Harvey's convention visits, it is claimed that for most of these conventions c , the girl $g(c)$ which Harvey dates accompanies him to the banquet of c . Finally, example (14) can be understood to claim there to be a function associating the men under discussion with a gun they own, and to claim in addition that for only few of the men it holds they used that gun, i.e., the gun associated with them.

All three examples can be naturally, and successfully, analyzed along the lines we suggested above. The relevant indefinites occur, arguably, in focal position, and they can be assumed to be supported by subjects. However, since these indefinites are used against a background, the supporting subjects must be functional, on the relevant books, conventions and men, respectively. In any case, if the same type of domain is discussed in a subsequent sentence, as it is in all three examples, the subject can be picked up by a pronoun. Needless to say that a functional reading of a pronoun is technically more complicated than a non-functional one, and that it imposes very specific demands on possible contexts of use. It is, thus, to be expected that functional readings are much more marginal than non-functional ones. (The same goes, *mutatis mutandis*, for the functional readings of (in)definites and *Wh*-items, as discussed by Jacobson, among many others, cf., e.g., Jacobson 1999, and the references in that paper.)

Before we conclude this paper, we have to qualify the picture we sketched in the last two sections in one more way. We have had it that indefinites in the background do not require supporting subjects. However, this is not unconditionally true. As has often been observed in the literature, indefinites may 'escape' from so-called 'scope islands'. Consider the following two examples (the first, attributed to Elan Dresher by Robin Cooper Cooper 1979, the second from Tanya Reinhart Reinhart 1997):

- (15) Mary dates every man who knows a producer I know.
- (16) If a certain linguist shows up, we are supposed to be particularly polite, but do you remember who?

The indefinites 'a producer I know' and 'a certain linguist' occur in the restriction of a quantifier and the antecedent of a conditional sentence. Now although it is common wisdom that quantifiers may not escape from these

contexts, these indefinites apparently do. The first sentence is naturally read as stating that the speaker knows a certain producer, such that Mary dates every man who knows him; the second that there is a certain linguist such that if he shows up, we are supposed to be polite. Of course, a natural explanation of this can be given if a speaker can be assumed to use these indefinites with a definite subject in mind, even if, as in example (16), the speaker is not completely informed about the identity of the linguist at issue.

Interestingly, the same may happen with functional indefinites. The following example is from Dorit Abusch (Abusch 1994):

(17) Every one of them moved to Stuttgart because a woman lived there.

This sentence can be used to claim, not necessarily that the presence of a certain woman in Stuttgart made every one of them move there, but that for each of them there was a certain woman, whose living in Stuttgart constituted reason for him to move there, too. This reading is easily obtained if the speaker can be assumed to use the indefinite “a woman” with a functional subject in mind.

An intriguing example, finally, has been presented by Philippe Schlenker (Schlenker 1999):

(18) If each student improves in two subjects, then noone will fail the exam.

Schlenker discusses the example in a context in which all students do badly in two subjects, not necessarily the same two subjects for each student, and in which each student succeeds if he improves in the two subjects in which he is doing bad. In this case, (18) can be judged true, but not by simply assigning the indefinite “two subjects” wide scope (since the students are not all doing badly in the same two subjects), nor by assigning it narrow scope (since a student will not succeed if he only improves in subjects in which he is already doing good). As Schlenker proposes, a natural reading comes off if “two subjects” is given a functional interpretation, associating each student with the subjects in which he is doing badly. Observe that this reading, too, naturally fits in the proposal we have sketched in this paper.

A final remark concerns the examples (16) and (18) in which an indefinite is read with wide scope, functional or not. Such an interpretation runs the danger of being completely trivial, if, for instance, the indefinite in (16) is associated with a linguist which we already know will not show up anyway, or if the indefinite in (18) associates at least one student with two subjects in which he certainly is not going to improve. (For instance, because he is excellent in these subjects already.) However, upon the pragmatic approach advocated in this paper such readings are excluded. For, firstly, if someone

utters these sentences, he is assumed to utter the indefinites with a certain subject in mind, and, secondly, Gricean principles preclude this subject to render his utterance trivial. A sensible interpretation of these examples thus can be given, again, by combining semantic and pragmatic information.

7 Conclusion

In this paper we have discussed a number of phenomena where semantic and pragmatic information appears to interact in a systematic way. First, the interpretation of pronouns with an indefinite antecedent can be explained by assuming that these antecedents are generally used with referential intentions. Second, a strong interpretation of conditional sentences automatically comes off if a speaker is supposed to observe Gricean maxims, and behave rational and cooperative. Third, the precedings two points together help to explain what is going on in Peirce' puzzle. Fourth, it is generally felt that indefinites in certain contexts tend to be inaccessible for pronouns outside of them. For as far as this is correct, this phenomenon can be explained in terms of the typical role of these contexts in discourse and dialogue. Finally, we have seen that the emerging picture is naturally extended with an analysis of functional pronouns and specific indefinites in island constructions.

For most of the discussed phenomena a formal account has already been given. Three, however, have not yet been dealt with fully satisfactorily. First, "if"- and "only if"-sentences like (5) and (6) stand in need of further investigation. Second, it is not yet clear how exactly the domain of quantification of a sentence with a functional pronoun gets established. Third, it is not a settled matter how to model the contribution of specific indefinites in island constructions. A proper, formal treatment of these three phenomena most probably will require us to take information structure into account more seriously. We hope to report on these issues on another occasion, in the close future.

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