

## NON-DYNAMIC ANALYSES OF ANAPHORIC PRONOUNS: DO THINGS LOOK BETTER IN 2-D?\*

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### Abstract

This paper compares pragmatic accounts of anaphoric relations between indefinites and pronouns. We argue that Stalnaker's (1998) account which exploits features of his two dimensional framework for representing context and content is too weak. We suggest that the definiteness of anaphoric pronouns can be captured only if we consider them E-type.

### 1 Introduction

This paper is concerned with discourses of the form in (1), focussing on the anaphoric dependence between the pronouns in the second sentence and indefinites in the first.

- (1) a. A man walked in the park. He whistled.  
b. I predicted that a woman will nominated for President in 2004. Furthermore, I predict she will win.

The various analyses of such discourses can be classified as being either dynamic or not. Among the non-dynamic analyses, there are what will be called 'linguistic' and 'pragmatic'. A major concern of the first part of this paper will be to show that among non-dynamic approaches, there is good reason to think that some kind of pragmatic account might be on the right track. Though we aim to present some strong positive evidence for the pragmatic account which is also very problematic for dynamic approaches to meaning and discourse, we will not explicitly examine the question about the preferability of dynamic vs pragmatic accounts here.<sup>1</sup> Instead, we shall be interested in scrutinising the virtues of two different pragmatic accounts. The first involves the E-type analysis of pronouns first proposed in Cooper (1979). The second, found in Stalnaker (1998), involves an analysis of pronouns as simply variable terms of direct reference. It also crucially involves the pragmatic process of diagonalisation. In the second part we will argue that Stalnaker's pragmatic account is, in an interesting way, too weak. We will consider and reject alternative, stronger proposals that could be made within the two dimensional framework. We conclude, among other things, that only if pronouns can be considered to be E-type do we capture their definiteness.

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<sup>1</sup> The case against dynamic accounts of these kinds of examples is made in more detail in Breheny (2001). More general discussion of dynamic treatments of meaning and content is contained in Breheny (2002).

## 2 Non-dynamic accounts.

Among non-dynamic approaches to (1) we can distinguish between those which assume that the pronoun in the second sentence is bound by the indefinite in the first and those which do not. Among the latter, E-type accounts assume that the pronoun in the second sentence goes proxy for a definite description. E-type approaches in turn can be distinguished according to whether they treat the relation between indefinite and pronoun as mediated by linguistic rule.

### 2.1 Static binding

In terms of the traditional framework of semantic description, the only analysis according to which anaphoric pronouns such as in (1) are treated as variables has thus far been to assume that they are bound cross-sententially. The binding approach is motivated by the generally accepted intuition that (1) is understood according to the gloss in (2)a or according to the analysis in (2)b. This is the reading upon which Geach (1962) basis his proposals. It should be emphasised that it is not thought that there would necessarily be a uniqueness implication in such cases according to which just one man walked in the park:

- (2) a. A man who walked in the park whistled.  
b.  $\exists x[\textit{man}'(x) \wedge \textit{walked\_in\_the\_park}'(x) \wedge \textit{whistled}'(x)]$ .

The idea that our understanding of such anaphoric relations is due to binding is further motivated by the apparent fact that pronouns which derive their interpretation from previous discourse are judged to be inappropriate where there is no proper antecedent. The infamous marble discourse, due to Barbara Partee, typically illustrates the point. (3)a below is judged infelicitous in spite of the fact that the pronoun in the final sentence is clearly meant to refer to the missing marble. Given that the antecedent sentences in (3)a and (3)b make available the same information, the contrast in acceptability suggests that there is something about the manner in which the information is presented which is the source of the unacceptability. Given the ancillary assumption that deictic pronouns are only properly used in the physical presence of their referent, there is a straightforward account of this given the binding approach: there is nothing to bind the pronoun in question, so it cannot receive an interpretation.

- (3) a. I had ten marbles but dropped them. I found nine. ?It had rolled under the sofa.  
b. I had ten marbles but dropped them. I found all but one of them. It had rolled under the sofa.

Without going into formal details, however, it is not difficult to be convinced that the binding approach suffers from a lack of generality. If the indefinite is treated as some kind of quantificational expression and the pronoun as a variable-like element, then one would assume that if cross-sentential binding can occur in the case of (1)a, it should occur in the case of other quantificational expressions. But this is not the case. Consider that (4)a cannot be understood as (4)b as we would expect if cross-sentential binding were a general phenomenon:

- (4) a. Every boy left school early. ?He went to the beach.  
b. Every boy left school early and went to the beach.

A more telling consideration involves certain quantificational antecedents as in (5). Here, the binding account predicts (5)a to be equivalent to (5)b and misses the fact that (5)a entails that just one boy left school early:

- (5) a. Exactly one boy left school early. He went to the beach.  
 b. Exactly one boy left school early and went to the beach.

The E-type approach assumes that anaphoric relations as in (1) can result from the pronoun being understood as if it were a definite description. As Evans (1977) points out, the E-type approach correctly predicts our intuitions about (4) and (5), assuming that binding is only intra-sentential.

## 2.2 Linguistic vs Pragmatic E-type Approaches

Linguistic E-type approaches assume that the description in question is recovered by linguistic rule. With some proposals, the rule makes reference to the actual linguistic material in the antecedent sentence (see Evans 1977, Heim 1990). With others, the rule makes reference to the semantic interpretation of the antecedent expressions (see Neale 1990). Neale's proposal for a semantic rule is given in (6):

- (6) “(P5) If  $x$  is a pronoun that is anaphoric on, but not c-commanded by '[Dx: Fx]' that occurs in an antecedent clause '[Dx: Fx](Gx)', then  $x$  is interpreted as the most "impoverished" definite description directly recoverable from the antecedent clause that denotes everything that is both  $F$  and  $G$ .” (Neale 1990, p182)

The alternative is to have no rule constraining which description the pronoun goes proxy for, leaving this matter to pragmatics - i.e. to general principles of discourse plus particular facts about the context (Cooper 1979). Both approaches face problems.

## 2.3 Problems with Uniqueness, Contradictions and Accessibility

The nub of the problem for the linguistic E-type approaches can be illustrated with the case of the missing uniqueness implications. The kind of syntactic rule for recovering the E-type interpretation which Evans proposes predicts that the discourse in (1) entails that just one man walked in the park. Similar problems arise for the semantic rules proposed by Neale. According to this rule, the pronoun in (1)a would be understood as in (7)b - contrary to intuition:

- (7) a. He whistled.  
 b.  $[\text{the}_{\text{sing}} x: \text{man}'(x) \wedge \text{walked}'(x)](\text{whistled}'(x))$   
 c.  $[\text{the}_{\text{sing}} x: F(x)](G(x))$  is true iff  $|F-G| = 0$  &  $|F| = 1$

One diagnosis of the problem is that in these cases where there is no uniqueness implication, a speaker's referent of some sort is being introduced in the first part of the discourse and subsequently being made reference to with the second part.

One way to resolve this problem might be to suppose that the indefinite in the first sentence is implicitly contextually restricted in such a way that this speaker's referent can be picked up in some way by the E-type description in the second. To illustrate how this proposal might work, suppose that  $sg_u$  expresses the property of being the individual which a speaker who makes an utterance  $u$  of an indefinite has 'in mind'. We can think of a speaker's referent as instantiating this property. What having an individual in mind amounts to in the general case is perhaps slightly problematic, but for the purposes of this paper we will assume that in factual utterances  $sg_u$  expresses the property of being the actual causal source of the intention underlying the speaker's utterance. Note also, we assume that it is in the nature of  $sg_u$  that it be uniquely instantiated, if at all. The proposal would then be that the first sentence in (1)a is understood as in (8):

(8)  $[\text{an } x: \text{man}(x) \wedge \text{sg}_u(x)](\text{walked\_in\_the\_park}(x))$

As such, subsequent E-type pronouns could be used to make reference to this speaker's referent. This would be possible on Neale's semantic approach to recovering the E-type interpretation, if not on Evans' syntactic approach.

While overcoming the uniqueness problem, this proposal is not viable since it makes the truth of the proposition expressed by the utterance of the first sentence dependent on how things stand with this speaker's referent regarding being a man and walking. It is well known that this is intuitively the incorrect analysis, for even if the speaker mistakes a woman for a man and thinks of that person as a man walking in the park at the time in question, then the proposition expressed by their utterance of the first sentence would still be true so long as there were men walking in the park at the time.

A related problem for the linguistic E-type approaches has to do with contradictions using pronouns. We note that a speaker (B in (9)) can coherently contradict another speaker (A) if they think the person they have in mind does not have the property used to describe them with an indefinite. However on any kind of linguistic E-type approach, it is part of what is expressed by B that the individual being made reference to with the pronoun has this property which the rest of the utterance denies they have. So one should find B's utterance contradictory, if this kind of E-type account were correct.

(9) A: Last night I met a Cabinet minister.  
B: She was not a Cabinet minister.

Of course we could suppose that when a speaker utters the first sentence in (1)a, some assumption about her grounds is communicated *implicitly* while the proposition expressed by the utterance does not depend for its truth on how things stand with the speaker's referent:

(10) What is said:  $\exists x[\text{man}'(x) \wedge \text{walked\_in\_the\_park}'(x)]$   
Implicitly communicated:  $\exists x[\text{sg}_u(x) \wedge \text{Bel}(\text{sp}, \text{man}'(x) \wedge \text{walked\_in\_the\_park}'(x))]$

According to the pragmatic approach, such information could be exploited, resulting in an understanding of the second sentence in (1)a as in (11). According to the linguistic E-type approach, this is not possible:

(11)  $\exists x[\text{sg}_u(x) \wedge \text{whistled}'(x)]$

As we will see presently, (11) is in fact a fair representation our understanding of what the speaker expresses with the second sentence in (1)a. It is also clear that the cases where there is contradiction would not be problematic for the pragmatic approach as the description according to which we understand the pronoun would just involve  $\text{sg}_u$ .

While the pragmatic account does not suffer from the uniqueness problem and the related contradiction problem, it would be obliged to give an account for why the appropriate description can be recovered from implicit information in the case of (1)a but not in the marble discourse. This problem is quite severe since, if E-type pronouns are just like definite descriptions, then one would expect these pronouns to be acceptable in all cases where implicit information has to be

exploited. That is, one would expect them to be understood via so-called bridging cross-reference - just as the descriptions are in (12):

- (12) a. I had ten marbles but dropped them. I found nine. The missing one had rolled under the sofa.  
b. Mary checked the picnic supplies and found that the beer was warm.

It is natural to think that there is something about the use of the indefinite that makes this speaker's referent suitably salient or the relevant information about the speaker's grounds suitably accessible. However, not very much has been offered in the way of defining what is or isn't salient or accessible for a pronoun. Indeed, the severity of this problem has led many to think that the anaphoric relation between the indefinite and the pronoun is maintained in virtue of some kind of linguistic rule and not pragmatic inference.

To sum up, linguistic E-type accounts suffer from the uniqueness and contradictions problems but not the accessibility problem. By contrast, while pragmatic E-type approaches do not suffer from the uniqueness and contradictions problems, they are of questionable value unless a coherent story about salience or accessibility is provided. Indeed, this latter diagnosis applies to Stalnaker's *non-E-type*, pragmatic approach which we will review shortly. As the main purpose of this paper is to compare pragmatic approaches to such cases of anaphora, we will say little about the accessibility issue here. In Breheny (2001a), a situation theoretic approach to pragmatics and discourse is outlined according to which the appropriate distinction between types of implicit information can be made. This distinction does not involve any notion of (relative) salience. Within that framework it is possible to specify a presupposition for pronouns according to which the speaker's referent in (1)a is available for pronominal reference, but the missing marble in (3)a is not. We leave this matter here, but, in order to motivate some interest in choosing between pragmatic accounts, the next section will review some positive evidence for the pragmatic accounts generally - evidence which is problematic for linguistic E-type and/or dynamic accounts.

### 3 A closer look at anaphoric relations.

The parade examples which motivate linguistic accounts of pronominal anaphora tend to involve just one kind of language use: continuous, joined-up monologue. Turning away from such cases, it is a relatively straightforward matter to construct examples which parallel the marble discourse but where there is no infelicity - as in (13):

- (13) When John came into the room, he found Mary holding a bag of marbles and staring intently at the floor. "What's up?", asked John. "I had ten marbles in this bag, but I dropped them." replied Mary, lifting up the rug. "How many have you found?". "Nine". "Bummer". Now both John and Mary began searching the nooks and crannies of the room. After half an hour's searching, John turned to Mary, "Do you think it could have rolled into the next room?"...

Note, however, that it is not the dialogic nature of the discourse that makes such antecedentless reference possible - as (14) demonstrates:

- (14) John (manning a cake stall at a church fête, standing behind a lone cake):  
       I baked six cakes and have already sold five of them.  
 Mary (facing John with the lone cake between them, not looking down):  
       \*? It's my favourite kind. How much is it?

The generalisation has to do with what the conversational participants are paying attention to. As pronouns contain no descriptive material, it would be unreasonable to refer to something with a pronoun that wasn't already in the focus of attention. Thus, the use of the pronoun pragmatically presupposes that what is being referred to is in the current focus of the audience's attention. In joined up, planned monologue, the speaker draws the audience's attention to one thing after another. In such cases, the speaker controls the focus of attention and it is up to her to ensure that the referents of pronouns are contained in what the audience is currently attending to. With indefinites, the linguistic meaning only characterises a general type of situation. However, a speaker can indirectly indicate how they relate to a situation they are describing. Such indirect indications do not have a bearing on propositional content but they are part of the situation indicated. Such indirect indications can involve the speaker's grounds for what they say. See Breheny (2001) for a formal account of accessibility built on these ideas.

It is well known that where antecedent discourse contains utterances with quantificational expressions, say a sentence of the form,  $[[det[A]][B]]$ , then pronominal reference can be made to members of the restrictor and intersective sets (i.e.  $\{x: A(x)\}$  and  $\{x: A(x) \wedge B(x)\}$ ) but not  $\{x: B(x) \wedge \neg A(x)\}$ . This is illustrated in (15) where the second sentence cannot be construed as being about Clinton's non-supporters, despite the fact that world knowledge would push one to interpret it that way, if it was allowed.

- (15) During the Lewinsky affair, most Democrats in Congress still publicly supported Clinton.  
       Of course they represented more fundamentalist electorates.

This is really another accessibility fact which has either been passed over in dynamic treatments or dealt with in an ad hoc manner (cf Kamp & Reyle 1993). What has not really been acknowledged before is that even in the case where a singular indefinite is used to introduce a speaker's referent, the members of the intersective and restrictor set are still available for reference as well. Consider (16)a where the pronoun refers to riot policemen at the demonstration who cracked protesters' skulls; and (16)b where reference is to riot policemen at the demonstration.

- (16) a. At the Seattle demonstration, I saw a riot policeman crack a protester's skull for absolutely no reason. They all seemed to be under orders to club people at will.  
       b. At the Seattle demonstration, I saw a riot policeman crack a protester's skull for absolutely no reason. They should have been prosecuted for doing that.

This is entirely to be expected on the pragmatic account sketched above since it is assumed there that indefinites are just quantificational expressions and, as such, make these individuals available for pronominal reference - even where indefinites are used to introduce a speaker's referent implicitly. We can bring this point home by considering that the discourse in (17) is coherent but where reference is made both to members of one of these sets and to the speaker's referent

- (17) At the Seattle demonstration, I saw a riot policeman crack a protestor's skull. He just did it for no reason! They seemed to be under orders to club people at will./They should have been prosecuted for that.

This is all to be expected on the pragmatic E-type account sketched above. This approach however does need to make some comment about cases, such as in (18), where pronominal anaphora is unacceptable with quantified antecedents.

- (18) a. Every boy left school early. #He wanted to go swimming.  
b. No boy left school early. #He was conscientious.

As Evans (1977) has observed, an E-type account correctly predicts the inappropriateness of (18)b as there is nothing for the description to quantify over. Regarding (18)a, Neale (1990) makes the observation that even if the pronoun were E-type, an utterance of this discourse would be inappropriate as it would violate the manner maxim enjoining clarity. The reasoning behind this is that the use of the pronoun implies there is just one school boy. If this is the case, and given that a more appropriate form of words (Eg 'The school boy' or 'The only school boy') was freely available, the utterance is confusing as it either sends mixed signals about the number of boys or the pronoun has another, unknown referent. This kind of account gains independent support from cases where the maxim is flouted in order to make a joke - as in the case of (19) below, where Mandelson is a politician who is almost universally unpopular:

- (19) Every Mandelson supporter was at the rally; but he was pretty lonely.

The pragmatic E-type account (and pragmatic accounts in general) says that where a discourse of the form, "An F Gs. It Hs." is understood as  $\exists x[Fx \wedge Gx \wedge Hx]$  then this is due to the presence of a kind of implicature through which the speaker's referent is made available for the pronoun to refer to. There are a number of consequences that follow from this. Firstly, we can ask what happens if, for some reason, there is no such implicit assumption? In that case, the E-type account predicts that the discourse would be understood to imply that just one F G-ed since this interpretive option is still available via what is explicitly expressed via the utterance of the antecedent sentence. To test this prediction, we need to consider cases where an indefinite is used but where we cannot reasonably assume that the speaker is implicitly communicating the relevant assumption about his grounds for using the indefinite. Two kinds of case come to mind. One is where the speaker just doesn't have specific grounds for an utterance involving an indefinite. The other is where, although the speaker may have specific grounds for what she says, this fact is not relevant or, more generally, not part of what the speaker can reasonably be assumed to be intending to communicate with the use of an indefinite. The latter kind of case can be illustrated with an adversarial discourse where, it is assumed, the speaker only gives away as much as is necessary. In (20) below, we have discussion between A & B about speed limits. We see that B's use of the indefinite does not imply he is thinking about any particular accident.

- (20) A: If you'd ever witnessed a high-speed motorway accident, you wouldn't oppose the introduction of a speed limit.  
B: I've spent half of my working life driving on motorways, so, in fact, I have witnessed a high-speed motorway accident. But I still think that one should be allowed to drive as fast as one wants.

If B were to follow up the general claim in this context with a statement using an anaphoric pronoun, then we would expect there to be a uniqueness implication (that he had witnessed just one such accident) since there is no implicature introducing a speaker's referent and so no option for the audience to understand the pronoun as referring to some particular accident the speaker has in mind. Considering (21), we find that this is the understanding we get:

- (21) B: I've spent half of my working life driving on motorways, so, in fact, I have witnessed a high-speed motorway accident. It was fatal. But I still think that one should be allowed to drive as fast as one wants.

It is worth noting that one would assume that if someone spends a lot of time on motorways, then they would most likely have witnessed a good number of these accidents. This suggests that one is not free to interpret such discourses as if the to interpretive options were a matter of some kind of linguistic ambiguity (as van Rooy 2001 seems to suggest). It is the rhetorical properties of the preceding discourse which determine whether a speaker's referent is available. Further examples of this are already available in the literature. (22) is adapted from Geurts (1997). Here the first part of the discourse contradicts some stance of the audience. What kind of grounds the speaker has for this act is not all that relevant to this purpose and so it is unlikely that there is any implicature involving grounds. So, when a pronoun is used in the next assertion, we once again are bound to use only the general quantificational information as a resource for constructing an interpretation for the pronoun - resulting in a surprising uniqueness implication:

- (22) It is ludicrous to pretend that there has never been an accident on this motorway. We both witnessed it, remember?

When predictions involving indefinites are made, we often understand the speaker to have no specific grounds. Stalnaker (1998) uses the prediction in (1)b (repeated below in (23)a) to make this basic point. To get the force of the example, we are supposed to be assuming that the speaker has no particular woman in mind in making the prediction. Intuitions may be sharper with the variant in (23)b:

- (23) a. I predict that a woman will be nominated for President in 2004. I also predict she will win.  
b. I predict a woman will finish in the top twenty in this year's marathon. But I predict she won't win it.

The second observation we can make about the pragmatic approach is that it makes the correct predictions with regard to what is explicit and what is implicit in discourses such as in (1)a. For these discourses, the prominent understanding is one which would be glossed, 'An F which Gs Hs'. According to the pragmatic E-type approach, the first sentence uttered expresses the general proposition involving the co-instantiation of F-ness and G-ness. While the claim about the second sentence is that it makes reference to the individual the speaker has in mind and says of it that it Hs. If that is the case, then the prominent understanding would have to be in some sense implicit. Can that be correct? To demonstrate that it is, consider the scenario in (24)a - adapted from Stalnaker (1998). Suppose also that, in reporting on the events, John utters (24)b:

- (24) a. John is politically naive and is introduced by a practical joking host to a tabloid journalist as a cabinet minister and at the same time to a real cabinet minister as a journalist. In the ensuing (sincere) conversation, the real cabinet minister comes across as pro-Europe while the fake minister comes across as anti-Europe.
- b. Last night I met a member of the Cabinet. He was anti-Europe.

While it would be appropriate for us to respond with (25)a below, we clearly could not respond with (25)b or c. So while it is clear that John is unwittingly misleading us into thinking that he met a member of the Cabinet who was anti-Europe - nothing he actually says can be denied.

- (25) a. He wasn't a member of the Cabinet.
- b. You didn't meet a member of the Cabinet last night.
- c. He wasn't anti-Europe.

It is important to note about (25)a and c that it is the speaker's intentions in introducing the referent into the discourse and not those of whoever uses the pronoun that determines the referent of subsequent pronouns. This point is illustrated in Stalnaker (1998) with (26). Here we find that A can coherently contradict what B says. If B were able to determine the referent of the pronoun, this would not have been possible:

- (26) A: A man jumped off the cliff.  
 B: He didn't jump, he was pushed.  
 A: No not that guy, I know he was pushed. I was talking about another guy.

To sum up this survey of data, it seems that there is a quite robust generalisation that with a discourse, "An F Gs. It Hs.", the 'Geachian' understanding only arises in cases where the audience antecedently understands the speaker to be implicitly communicating something of her grounds. Where this is not the case, there is a uniqueness implication. All of this is predicted by the pragmatic E-type account. It is also correctly predicted by the pragmatic E-type account that the 'Geachian' understanding is itself some kind of implicature. A fuller discussion of the pragmatics involved in these discourses and how other accounts, particularly dynamic ones, measure up when the full range of types of discourse are considered can be found in Breheny (2001). In this paper, we are interested in comparing pragmatic accounts. In the next section, we look closely at Stalnaker's two-dimensional pragmatic treatment which arguably handles the data discussed so far but with a more elegant and parsimonious analysis of pronouns.

#### **4 A Non-E-type, pragmatic account.**

According to Stalnaker (1998) it is possible that we could make do without the E-type analysis and account for all of the facts enumerated above. The analysis makes crucial use of the speaker presupposition framework, employing sets of possibilities to represent both context and content. The suggestion is that in Stalnaker's speaker presupposition framework, it would suffice to assume that the pronouns in (1)a and (1)b are both understood simply as a variable term of direct reference. This being the case, it is clear that, on one level, we do not recover what proposition is actually expressed by the utterance of the second sentence in either case - as this would be a singular proposition depending on the same individual for its truth in each possible world in the context. As we have just seen, our understanding the utterance of the second sentence is a descriptive proposition which depends for its truth on the individual which is the value of a

function from contexts to individuals. In the case of (1)a, that function maps possibilities onto the individual the speaker has in mind in that possibility. In (1)b, it maps possibilities onto the unique woman nominee in that possibility. The claim is that we arrive at this understanding through a pragmatic process which involves what Stalnaker has elsewhere referred to as diagonalisation.

An outline of the reasoning behind our understanding of (1)a goes as follows:

- (I) The assertion of the first sentence reduces the context set by eliminating worlds in which no man walked in the park. This effect is due to the conventional meaning of the first sentence uttered.
- (II) After the first assertion is accepted, it is presupposed that in each live possibility there is an individual uniquely available for reference. This individual is that which the speaker had in mind in uttering the indefinite in the first sentence and this individual is a man who walked in the park.
- (III) Then, in each possibility, when the second utterance takes place, the pronoun refers to that individual which is uniquely salient. Thus, in each possibility in the resulting context set, a man who walked in the park whistled.

Clearly, for this account to be acceptable, step II needs to be fleshed out. Stalnaker, in fact does not go in to all that much detail, assuming, as seems natural, that the details are largely self evident. However it is worthwhile considering what is supposed to be going on in these cases in somewhat more detail as such effort will reveal a certain weakness in the account.

Supposing that pronouns are variable terms of direct reference, Stalnaker plausibly argues that such terms, when used, carry a pragmatic presupposition that there is an individual uniquely available for reference (see Stalnaker 1999:107). It is important to note that in the 2-D framework, if we assume that this presupposition is the only one which attaches to pronouns, it is not necessary that it is presupposed which individual the pronoun refers to in order to satisfy it (but only that in each possibility in the context an individual is uniquely available for reference). The idea is that we can reach an understanding of the discourse without identifying what is said. Rather, context (including pragmatic principles) determines a function from possibilities in the context to individuals - and this function corresponds to our descriptive understanding.

Note that this presupposition is quite weak. If it is accommodated without any further contextual reduction, we would get an understanding of the discourse in (1)a along the lines of, "A man walked in the park. Some male whistled." So the question arises: How does context determine the descriptive understanding in question? The answer is that those possibilities where the individual available for reference is not the individual the speaker had in mind are ruled out on general pragmatic grounds. In this case and others, a principle of relevance or coherence (it amounts to the same thing in this kind of case) does the job. This is so since in those possibilities where the speaker's referent is not the referent of the pronoun, the speaker would - in the typical case - be failing to be relevant (or coherent).

We should note that step III involves a quality maxim inference where we presuppose what the speaker believes (i.e. that her referent was in fact a man walking in the park).

We get an account of cases such as in (1)b, where we cannot presuppose the speaker has an individual in mind via similar reasoning. In these cases, the only way for the pragmatic presupposition associated with pronouns to be satisfied is if, in each possibility in the context set, there is a unique F which G-ed - hence the implication.

The elegance and parsimony of the linguistic analysis here is gained at the expense of slightly more complicated pragmatic reasoning. For note that this diagonalisation account not only assumes that with discourses such as in (1) speakers do not say what they mean; in cases such as (1)b, they do not even mean what they say. Diagonalisation comes into play here where the speaker flouts a kind of maxim of conversation which says that the audience should be able to recover the proposition which the sentence uttered expresses in the context. From Stalnaker's 2-D perspective, however, diagonalisation is a natural strategy given that what is being updated includes information about the discourse as well as what the discourse is about. So, it is because the speaker is speaking, making reference etc in each possibility of the context, that in cases like these, we make sense of the speakers actions in the way we do in spite of the fact we may not be able to recover what they say.

There are, however, problems for this kind of account since it seems that context (including relevance/coherence principles) do not always do the work that they are meant to do. The problems arise with discourses where there is infelicity due to a kind of unresolvable ambiguity. At this stage it will make matters clearer if we distinguish between cases where the unacceptable indeterminacy arises because one cannot decide what the speaker intended as the source of relevance/coherence, and those where it is clear what the source of relevance would be (or how the segment is meant to cohere with preceding discourse). Infelicities of the former kind are illustrated in (27). Infelicities where the source of relevance is clear are illustrated in (28):

- (27) a. Mary swore at Sue and she hit her.  
b. A strong gust of wind blew the top of Mary's ice-cream onto Sue's dress. But she didn't notice.
- (28) a. Mary's Hollywood dream was slowly turning into a nightmare of drugs and prostitution. She discussed her problems with Father Smith and Father Jones. ?\* He wisely advised her to go back to her family's farm in Iowa and that's what she did.  
b. ?\* Two boys were playing cricket next door and he hit a shot which smashed my window.

The problem for the 2-D account is that one should be able to get a perfectly acceptable understanding of the pronouns in (28) as "one of them...". To see this, consider (28)a. Before the final sentence is asserted, in order to satisfy our expectations of relevance/coherence as well as the presupposition which attaches to the pronoun, all we need to do is to reduce the context set so that in some possibilities Father Jones is available for reference and Father Smith is in the others.

We could consider trying to strengthen the presupposition associated with pronouns so that it involves a notion of unique, maximal salience. However, it won't do to suppose that it is presupposed that the speaker is referring with a pronoun to the unique, maximally salient individual in the context, since it is clear that this is the wrong analysis. Consider the following

examples:

- (29) a. John can open Bill's safe. He knows the combination.  
b. John can open Bill's safe. He'll have to change the combination.  
c. Bill has a safe which John can open. He knows the combination.  
d. Bill has a safe which John can open. He'll have to change the combination.

Experimental evidence suggests that, if anything, individuals referred to with the grammatical subject of an antecedent sentence are 'more salient' than those referred to by other arguments (see Gordon, Grosz & Gilliom 1993 i.a.). But this does not preclude ambiguous pronouns from referring to less salient individuals in the context.

Moreover, even if the presupposition attaching to pronouns were that there is an individual uniquely available for reference and this individual is the maximally salient one, that still isn't strong enough. After all, in (28)a, we could presuppose the one priest is maximally salient in some possibilities while the other is in the others. In so doing we would still reach a quite sensible understanding consistent with the principles or maxims of discourse.

One might suppose that pronouns presuppose an identifiability criterion to the effect that the audience can recover what Perry (2001) calls an identifying condition satisfied by the referent. Note that something like this presupposition arguably attaches to descriptions and E-type pronouns. But a moment's reflection would reveal that this is still too weak to rule out (28), given that we always have the option of diagonalisation.

It may not have gone unnoticed that the diagonalisation strategy is not really necessary for cases like (1)a, as the interpretation of the pronoun could just as well be understood rigidly to be the individual at the end of the causal chain standing behind the speaker's intention. But, of course, this does not work in many other cases including ones such as in (1)b. An analytical move to consider at this stage might involve pronouns being ambiguous between directly referential terms and descriptions (functions from possibilities to individuals) - cf Stalnaker (1972) for such an account of descriptions. But this will only relieve the problem if diagonalisation is not an option. Even then it is less desirable than the unitary descriptive (E-type) account which handles all cases alone. Curiously, van Rooy (2001) does take up the ambiguity option while maintaining that the strategy of diagonalisation lies behind (1)a. That account is only saved from the problems (28) poses by re-analysing what are clearly pragmatic phenomena as linguistic. One cost of this move is the loss of any account of why the contextually odd uniqueness readings arise in the adversarial discourses discussed above.

Suppose we were to assume that pronouns are descriptive. In that case, of course, all of the data discussed in this paper would be treated in a satisfactory way without the need for the extra pragmatic inference involving diagonalisation, just as an E-type advocate argues. However, if in addition we were to assume that diagonalisation were a general strategy available to participants anyway, then there does not seem any reason why it could not apply in cases like (28). In that case, although the pronoun's interpretation - a function from possibilities to individuals - could not be recovered by the audience, a quite reasonable understanding of at least (28)a could be obtained by assuming that the description in question is either, 'the individual who is Father Jones' or 'the individual who is Father Smith', and diagonalising.

## 5 Conclusion

There is quite strong evidence that pragmatic accounts of anaphoric relations between indefinites and pronouns are on the right track. In terms of the traditional framework for semantic description, the only analytical option available is to say that pronouns are E-type. Stalnaker has demonstrated that viewing discourse from the 2-D perspective opens up another analytical possibility given that what goes on in discourses like (1) makes diagonalisation an obvious strategy to adopt. We have seen, however, that if diagonalisation were a strategy we actually adopt, then we should be able to use discourses such as in (28) to coherently and succinctly convey existential information. Instead, it seems that pronouns do require the kind of strong identifiability which is incompatible with diagonalisation being an openly available option. If that is so, and there is no other way to account for the unacceptability of (28), then we would have to say that pronouns must be E-type after all. Perhaps more seriously, it may be that diagonalisation needs to be reconsidered, unless this kind of problem can be solved adequately.

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