

# Presuppositions as anaphors : towards a full understanding of partial matches

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# Presuppositions as anaphors: Towards a full understanding of partial matches

Emiel Krahmer<sup>1</sup> & Kees van Deemter<sup>2</sup>

## Abstract

Van der Sandt's theory of presuppositions-as-anaphors is widely considered to be the empirically most adequate theory of presupposition projection on the market. One of the main differences between Van der Sandt's approach and its main competitor, the 'contextual satisfaction' approach, lies in the treatment of the so-called *partial match* phenomenon. In this paper, we take a closer look at partial matches. We show that the distinction between partial and full matches should be a central element of any theory of presupposition projection. However, we also argue that Van der Sandt's own formal theory, as it stands, does not offer an adequate treatment of partial matches. We then propose a number of modifications of his formal theory and apply the modified algorithm to definite (and other) NPs. The resulting modified version of the presuppositions-as-anaphors theory is argued to be more general, formally more precise, and empirically more adequate than its predecessor.

## 1 INTRODUCTION

Van der Sandt (1992)'s theory of presuppositions is widely considered to be the empirically most successful theory on this subject available today (see e.g., Beaver 1996:983). The crux of Van der Sandt's approach is the idea that, in many respects, presuppositions behave as anaphors. A consequence of his *presuppositions-as-anaphors* view is that the notorious *projection problem for presuppositions*<sup>3</sup> can be reduced to the problem of resolving anaphoric pronouns. More concretely, Van der Sandt argues that presuppositions can be handled using the same mechanism which resolves anaphoric pronouns in *Discourse Representation Theory* (DRT, Kamp 1981, Kamp & Reyle 1993). There is one important difference between pronouns and 'real' presuppositions: when no suitable, accessible antecedent can be found for a presupposition, and the presupposition has sufficient descriptive content, it can be *accommodated* and, so to speak, create its own antecedent. This flexible combination of resolution and accommodation yields the empirical strength of Van der Sandt's theory.

The main competitor of Van der Sandt's approach might be dubbed the *contextual satisfaction approach to presuppositions*, which has its roots in Karttunen (1974), Stalnaker (1973, 1974), and of which Heim (1983, 1992) and Beaver (1992, 1995) are the modern (i.e., dynamic) hands on the torch. The central idea of this approach is that the presuppositions of a sentence must be entailed by the context of interpretation in order for this context to *admit* the sentence. When Van der Sandt (1992: 349-351) compares his approach to the contextual satisfaction approach, he claims that the

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<sup>3</sup>Langendoen & Savin (1971: 54): "how [are] the presupposition and assertion of a complex sentence (...) related to the presupposition and assertion of the clauses it contains?"

difference between the two approaches comes out most clearly when considering what, following Van der Sandt, might be called *the partial match phenomenon*, and of which (1) is one example (similar examples are discussed in Soames 1982).

- (1) If John has an oriental girlfriend, his girlfriend won't be happy.

Given that *his* will be bound to *John* in this example (there is no alternative), the possessive description *his girlfriend* triggers the presupposition that John has a girlfriend. According to Van der Sandt, this example displays a genuine ambiguity between two readings, depending on whether *his girlfriend* refers to *an oriental girlfriend* or not. The two readings may be paraphrased as (4.a) and (4.b) respectively.<sup>4</sup>

- (4) a. If John has an<sub>i</sub> oriental girlfriend, she<sub>i</sub> won't be happy.  
b. John has a<sub>j</sub> girlfriend and if he has an<sub>i</sub> oriental girlfriend (as well), she<sub>j</sub> won't be happy.

Van der Sandt claims that this is exactly what his theory predicts, while the satisfaction approach *only* gets the first reading; after all having an oriental girlfriend entails having a girlfriend.<sup>5</sup> However, if we apply Van der Sandt's formal theory to examples such as (1), as we will do below, we find that there is a discrepancy between his intuitions about these partial match examples and the predictions made by his formal theory. In this paper we will try to resolve this discrepancy.

Our aim in this paper is *not* to argue for or against the view put forward in Van der Sandt (1989,1992) that presuppositions are anaphors (although we will briefly discuss some problems associated with this view in 5.1). Instead, what we will do is propose a new version of the presuppositions-as-anaphors theory, which we believe (1) is more precise than the original version, (2) does more justice to Van der Sandt's intuitions, especially in the area of partial matches, and (3) is more general than the original version in that it not only applies to identity anaphors.

The outline of the paper is as follows. We will first sketch the presuppositions-as-anaphors approach (section 2). In section 3, we take a more systematic look at the partial match phenomenon and Van der Sandt's predictions. In section 4 we try to solve a number of problems with Van der Sandt's theory by proposing a number of modifications of the presuppositions-as-anaphors approach and argue that the result indeed yields the desired interpretations. In doing so, we will follow a different route from Van der Sandt (1992). Initially, we will explicitly limit our discussion to presuppositions triggered by definite descriptions (section 4.2). After that, we will argue that the presuppositions-as-anaphors paradigm can be applied to a much larger class of NPs. First, we will show how our treatment of definite descriptions carries over to other definite NPs. This includes, primarily, the more obvious cases such as possessives, proper names, and pronouns, but we also argue that a couple of the more notorious phenomena in this area (bridging, epithets) present no unresolvable problems for the current approach. Second, and perhaps more speculatively, we will show how our modified account allows us to propose a completely general *Noun Phrase presupposition scheme* that applies to definite as well as non-definite NPs (section 4.4). After these extensions

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<sup>4</sup>Van der Sandt provides extra evidence for this ambiguity by showing that different continuations can eliminate one of the readings. Thus, continuing (1) with (2) eliminates the (4.a) reading in favor for (4.b).

- (2) She has always been rather jealous. (Van der Sandt 1992: 351)

On the other hand, continuing (1) with (3) will eliminate the (4.b) paraphrase:

- (3) But if he has one from France, ... (Van der Sandt 1992: 350)

<sup>5</sup>This is indeed the case for the straightforward conception of the satisfaction approach. However, Zeevat (1992:387) claims that it depends on the *representation* of the presupposition whether it is entailed or not. Zeevat does not make these ideas more precise (nor, to the best of our knowledge, does anyone else).

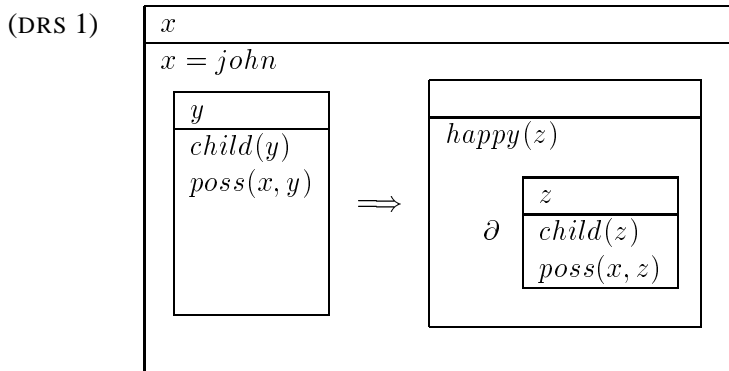
of the framework, we discuss a number of issues related to the context-sensitivity and anaphoricity of presuppositions (section 5). Finally, we sketch how our modified version of the presuppositions-as-anaphors theory can be viewed as a ‘bridge’ between the proposals in Van Deemter (1991,1992) and those in Van der Sandt (1989, 1992). This comparison will also serve to highlight an important element of the presuppositions-as-anaphors theory, namely its emphasis on a preference order between possible interpretations.

## 2 VAN DER SANDT’S PRESUPPOSITIONS-AS-ANAPHORS APPROACH

As has been said above, Van der Sandt proposes to *resolve* presuppositions just like anaphors are resolved in DRT. Thus, when a presupposition is encountered we look for a *suitable* and *accessible* antecedent to which we can ‘bind’ the presupposition. Consider example sentence (5), discussed by Van der Sandt (1992:360/1):

(5) If John has a child, his child is happy.

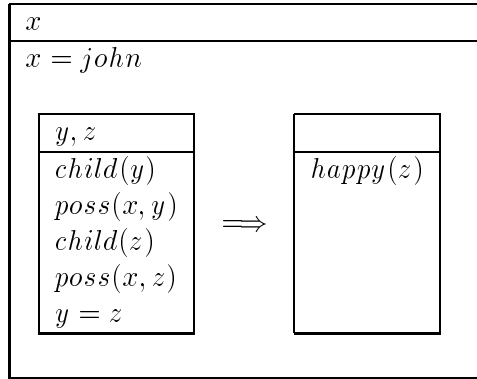
The possessive definite *his child* triggers two presuppositions: that there is a male individual, and that this male individual has a child. For the sake of illustration, we will assume that the presupposition triggered by the pronoun has been resolved as *John*. When this has been done, the Discourse Representation Structure (DRS) for example (5) looks as follows:



The consequent of the conditional contains an embedded DRS, representing the presupposition that John has a child. We mark a DRS as presuppositional by prefixing it with a  $\partial$ . The  $\partial$  operator was introduced in Beaver (1992), but in the present paper it is only used to syntactically distinguish presuppositional DRSs from ordinary, asserional ones. Now Van der Sandt’s presupposition resolution algorithm is applied to this DRS, and starts looking for a suitable and accessible antecedent. Obviously, the discourse referent introduced for *a child* (i.e.,  $y$ ) is the ideal candidate. So, the presupposition can indeed be bound. Binding a presupposition goes as follows: the presuppositional DRS is removed from the DRS where it originates (the *source DRS*, for short), and merged with another DRS (henceforth the *target DRS*), namely the DRS which introduces the antecedent to which the presupposition is bound. Furthermore, this target DRS is extended with an equality condition which equates the referent introduced in the presuppositional DRS with the referent of the antecedent. In this way the anaphor is ‘absorbed’ by the antecedent (Van der Sandt 1992: 349).<sup>6</sup> By binding the presupposition, (DRS 1) is transformed into (DRS 2)

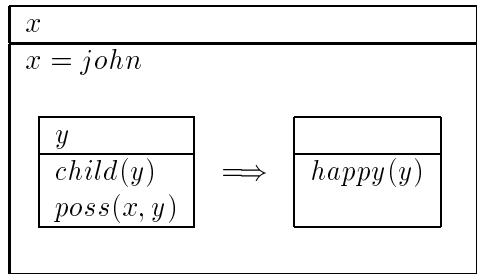
<sup>6</sup>Van der Sandt (1992:357): “In the case of anaphoric binding the resolver puts in equations which link discourse markers and transfer the conditions associated with the anaphoric expression to the binding site”.

(DRS 2)



It is easily seen that (DRS 2) is equivalent with (DRS 3), which is also the DRS which would be used to represent example (6). In fact, the similarity between examples such as (5) and (6) is one of the suggestive facts which Van der Sandt discusses to motivate his presuppositions-as-anaphors approach.

(DRS 3)

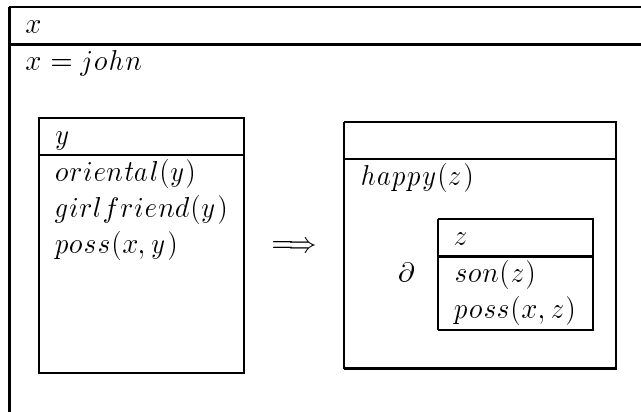


(6) If John has a child, it is happy.

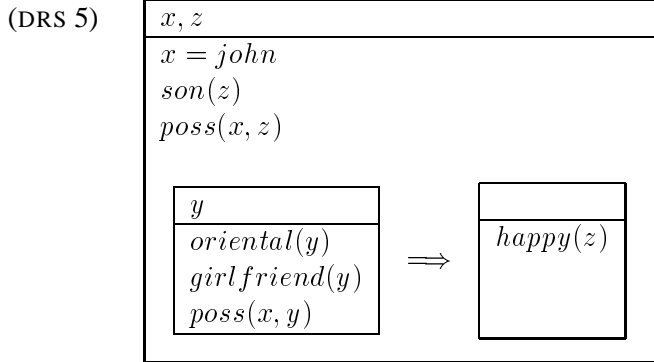
A *difference* between presuppositions and pronouns shows up when there is no suitable and accessible antecedent. In that case, a presupposition can be *accommodated*. Consider the following example with its associated DRS:

(7) If John has an oriental girlfriend, his son is happy.

(DRS 4)



Again, the resolver will look for an accessible and suitable antecedent to bind the presupposition that John has a son. There are two accessible antecedents (John and his oriental girlfriend) but neither can qualify as suitable. Hence we *accommodate* the presuppositional DRS. If certain conditions (to be discussed below) are met, accommodation takes place in the main DRS (see Van der Sandt 1992: 345 for explanation). Technically, accommodating a presuppositional DRS amounts to removing it from the source-DRS and merging it with the target DRS (which —under normal circumstances— is the main DRS). Thus:



This results in a reading which may be paraphrased as *John has a son<sub>i</sub> such that if John has an oriental girlfriend, he<sub>i</sub> is happy*. As this paraphrase indicates, after accommodating the presupposition the resulting DRS entails that John has a son. In general: accommodating the presupposition in the main DRS yields a ‘presupposing’ reading (the presupposition is projected). By contrast, from (DRS 3) it does *not* follow that John has a child; the presupposition is not projected and this produces a ‘non-presupposing’ reading.

An important element of the presuppositions-as-anaphors approach is that the algorithm associates a *set of allowed resolutions* to a DRS containing presuppositional DRSs. For instance, accommodation can in principle take place in every (sub-)DRS which subordinates the DRS containing the presuppositional DRS. The ‘in principle’ restraint refers to the fact that each instance of accommodation should satisfy a number of independently motivated constraints. One of them is called the *Consistency Constraint*. This constraint says that accommodating a presupposition must never lead to an inconsistent DRS. Consider:

- (8) It is not the case that John is besotted with his oriental girlfriend, because John has no girlfriend.

Accommodating the presupposition that John has an oriental girlfriend in the main DRS (and thus not within the scope of the negation) is easily seen to yield a contradiction. Therefore, global accommodation is ruled out, and the presupposition is accommodated *locally* (i.e., within the scope of the negation). The resulting reading can be paraphrased as *It is not the case that John has an oriental girlfriend which he is besotted with, because John has no girlfriend*.

Another constraint is the so-called *Informativity Constraint*, which rules out interpretations that lead to excessive redundancy. Van der Sandt uses this constraint, among other things, to legislate against conditional representations where the information in the antecedent follows from material that is present in an accessible DRS (e.g., the main one). Thus, consider

- (9) If John has children, his children will be rich.

Suppose that the presupposition triggered by *the children* is accommodated in the top of the DRS, thus guaranteeing the existence of John’s children. Then the antecedent of the conditional (*John has children*) violates the Informativity Constraint because it has become redundant given the accommodated information. As a result, this interpretation is ruled out. For more information on the background and formalization of these constraints we refer to Van der Sandt (1992: 367-369).

So, there may be various ways to resolve a presuppositional DRS, and together all these possibilities form the set of allowed resolutions. This brings us to a last, crucial ingredient of Van der Sandt’s theory: the definition of a preference order over permitted interpretations. One could argue that this preference order is what gives the theory content. After all, if all allowed readings were equally preferred, we would get an extremely liberal theory (which one might compare with

a generalization of Russell's theory of descriptions to presuppositions in general). For example, it would mean that for the following example the accommodation reading (which intuitively is highly non-preferred) would be just as 'good' as the obvious binding reading.

(10) Whenever a young cat and an old cat fight over a fish bone, the young cat seizes it.

Notice incidently that assigning preference orders is fairly common with theories dealing with ambiguities, perhaps most prominently by implementations of theories of anaphora resolution (e.g., Sidner 1979), but also by theories of quantifier scope ambiguities (e.g., SRI, Shieber). Van der Sandt defines a preference order based on the following general principles:

DEFINITION 1 (Van der Sandtian preferences)

1. Binding to a suitable antecedent is preferred over accommodation (e.g., Van der Sandt 1992: 357).
2. Accommodation is preferred to occur as 'high' (far away from the source-DRS) as possible (e.g., Van der Sandt 1992: 345).
3. Binding is preferred to occur as 'low' (near the source-DRS) as possible (e.g., Van der Sandt 1992: 357).<sup>7</sup>

In most cases, these preference rules order the set of admissible resolutions in such a way that there is *one* most preferred reading. Following Van der Sandt we will speak of a *genuine ambiguity* when there is *no* single most preferred reading. Examples are cases where there are two possible antecedents for binding which are introduced at the same level. Example (11) would be an illustration of this, where nobody can tell which of the two men mentioned in the first sentence does the talking.

(11) A man was quietly walking down the street, when he was joined by another man. *The man* said: ...

According to Van der Sandt (1992:363) partial match examples also display a genuine ambiguity, and he claims that this is one of the phenomena that his theory can account for, while the satisfaction camp cannot. However, things are somewhat more complicated. So let us now take a closer look at the partial match phenomenon.

### 3 THE PARTIAL MATCH PHENOMENON

The intuitive idea underlying the notion of a partial match can be explained in anaphoric terms. Consider a definite NP, along with a potential anaphoric antecedent. The plausibility of an anaphoric link between the two depends, among other things, on the 'similarity' between the two nouns. This is clear in extreme cases. For example, *the woman* cannot take *a man* as its antecedent. A *full* or *complete* match corresponds with a very high degree of similarity; a *partial match* corresponds with an intermediate degree of similarity; finally, one might speak of a complete *non match* when antecedent and anaphor are incompatible (as in the case *a man; the woman*).

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<sup>7</sup>One could argue that this constraint is of a different order than the first two. Geurts (p.c.) provided us with the following example:

Fred is depressed. Every girl who is courted by a boy scout wants to tell him everything about her love life.

In this example, *him* can refer both to Fred and to the boy scout, and there does not seem to be a preference for either one. However, in this paper we will merely follow Van der Sandt (1992) on this issue.

### 3.1 *The empirical facts*

But let us first take a closer look at what Van der Sandt says about partial matches. Here are the examples put forward by van der Sandt (1992: 350-351).<sup>8</sup>

- (12) a. If John has an oriental girlfriend, his girlfriend won't be happy. (= (1))  
b. If John murdered his wife, he will be glad that she is dead.  
c. If someone at the conference solved the problem, it was John who solved it.

According to Van der Sandt, these examples *display a genuine ambiguity* (Van der Sandt 1992: 350); they have no single, preferred reading and this is due to the fact that the respective presuppositions *may but need not be bound to a potential antecedent* (Van der Sandt, *ibid.*). All cases in (12) display a similar structure. In each case there is, as Soames (1982), observed, *a one-sided entailment between the antecedent and the presupposition of the consequent*.

Of course, this is only one of the possible relations between would-be antecedent and would-be anaphor. It is instructive to take a systematic look at the various possibilities: I. antecedent entails anaphor (but not the other way around), II. anaphor and antecedent are logically independent: neither entails the other, III. anaphor and antecedent are co-extensive: each entails the other, and IV. anaphor entails antecedent (and not *vice versa*).

*I. Antecedent entails anaphor* The examples in (12) are all of this type, and we have discussed one of them in somewhat more detail, namely (12.a). We fully share Van der Sandt's intuitions here, although the intuitions concerning example (12.a) might be a bit blurred due to a kind of lexical ambiguity in the word *girlfriend*. This is especially clear in the paraphrase of the presuppositional reading in which the globally accommodated girlfriend is John's companion in life, while the oriental girlfriend in the antecedent is more like a mistress. However, it is not difficult to find examples that do not suffer from this problem, for instance by looking at plurals.

- (13) If John has sons, his children will watch a lot of football.

This sentence displays the same ambiguity as (12.a). Thus (13) has a presuppositional reading (paraphrasable as *John has children<sub>i</sub>, and if he has sons, then they<sub>i</sub> will watch a lot of football*) and a non-presuppositional reading (*if John has sons<sub>i</sub>, they<sub>i</sub> will watch a lot of football*).<sup>9</sup>

*II. Anaphor and antecedent are logically independent: neither entails the other* The following examples fall in this category:

- (14) a. If John has sons, his young children are happy.  
b. If John talks to some partygoers, the children look at him in a strange way.

Obviously, in both cases the relation between anaphor and antecedent cannot be expressed in terms of an entailment relation in any direction. Nevertheless, these examples are ambiguous in the same way as the partial match examples discussed so far. Thus: example (14.a) is ambiguous between a non-presupposing reading (paraphrasable as *if John has sons, the young ones among them are*

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<sup>8</sup>All the examples discussed in this section should be placed in a 'neutral context', e.g., as answers to the question *tell me something about John*. Thus, they should be uttered with a 'standard' intonation and they are not to be interpreted relative to disambiguating pieces of common knowledge. See the next footnote.

<sup>9</sup>As indicated above, specific background knowledge may cause disambiguation. Suppose the interpreter knows that due to some specific genetic peculiarity John and his partner can never have a *girl*. Given such background knowledge, the example (13) should not be classified in category I, but in III (anaphor and antecedent are co-extensive). This indicates that *hearer's* knowledge should be taken into account.



happy) and a presupposing one (*John has young children<sub>i</sub> and if he has sons, they<sub>i</sub> are happy*). Example (14.b) is ambiguous, in a similar fashion, between a presupposing reading (*there are children<sub>i</sub> and if John meets some partygoers, they<sub>i</sub> look at him in strange way*) and a non-presupposing reading (*if John talks to some partygoers, the children among them look at him in a strange way*).

*III. Anaphor and antecedent are co-extensive: each entails the other* The examples in this category tend not to be genuinely ambiguous and hence they should not be categorized as partial matches.

- (15) a. If Fido catches a cat, the cat must be old.  
b. If Fido catches a cat and a mouse, he will chase the cat and devour the mouse.

The first example is a clear case of a full match. Such examples with full descriptions are slightly marked; a pronoun would sound more natural. However, it is easy to construct natural examples involving fully matching descriptions like (15.b).

*IV. Anaphor entails antecedent* Notice that when an anaphor actually entails its antecedent (and not the other way around), the anaphor is more *informative* than the antecedent; it is a presupposition which presents new information. Consider (16), which is based on an example from Zeevat (1992).

- (16) A man died in a car crash yesterday evening. The 26 year old man that caused the accident was found to have been drinking.

Examples of this kind must also be categorized as partial matches, since they constitute a genuine ambiguity. On the presuppositional reading the presupposition triggered by *the 26 year old man that caused the accident* is accommodated (i.e., the 26 year old man is still alive), and on the non-presupposing reading the presupposition is bound (i.e., he is dead).<sup>10</sup> Both interpretations are roughly equally plausible, as far as we can tell.

However, the distribution of such examples is somewhat limited. For instance, it is difficult to find conditional examples which fall in category IV. Consider the following examples:

- (18) a. If John has a girlfriend, his oriental girlfriend won't be happy.  
b. If John owns a donkey, he will be worried about the purple farmer-eating donkey on the loose. (after Beaver 1995:61)

For both these examples, the presupposing reading seems strongly preferred over the non-presupposing one, which is at best marginal. In other words, these sentences do not seem to be ambiguous in the same way as for instance example (16) is. In Krahmer (1995:165) it is hypothesized that identity anaphora can only *add* information if the antecedent is interpreted specifically. Let us formulate this as the *Informative Anaphors Hypothesis*.<sup>11</sup>

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<sup>10</sup>Thus the partial match phenomenon is really a matter of life and death. Extra evidence of this can be given in the form of disambiguating continuations, e.g.,

- (17) a. The police took the drunk daredevil into custody.  
b. This was confirmed by the pathologist who performed the post-mortem examination.

Continuing (16) with (17.a) eliminates the non-presuppositional reading, while continuing with (17.b) eliminates the presuppositional reading.

<sup>11</sup>There do exist some potential counter-examples to the generalization proposed in the IAH. Consider, for example the following '*politically correct*' usage of the female pronoun.

- (19) If the reader has studied example (19), she might come to the conclusion that it constitutes a counterexample to

### INFORMATIVE ANAPHORS HYPOTHESIS (IAH)

A potential antecedent with a non-specific interpretation, which is less informative than the anaphor under consideration, does not qualify as a *suitable* antecedent for the anaphor, provided that the relation between anaphor and potential antecedent is one of identity.

Thus: an (identity) anaphor can only *add* information about its antecedent when the antecedent has a specific interpretation, and this would account for the fact that the examples in (18) defy categorization as partial matches. Notice incidentally that it would also partially explain why examples such (16) occur so frequently in newspaper articles, in which indefinites tend to refer to specific objects. The IAH explicitly excludes non-identity anaphors, because it seems possible for these anaphors to add information about a *subset* of the antecedent.

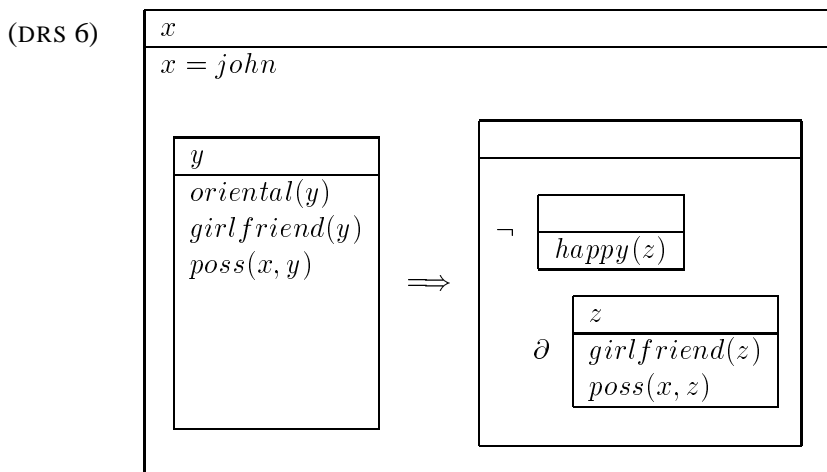
(20) If Barney owns cows, then he will feel sorry for the mad cows.

This example indeed displays a partial match ambiguity between a non-presupposing reading (paraphrasable as *if Barney owns cows, then he will feel sorry for the mad cows he owns*) and a presupposing one (*there are mad cows<sub>i</sub>, and if Barney owns cows, then he will feel sorry for them<sub>i</sub>*). Summarizing, examples of type IV also display a partial match ambiguity, like types I and II, but factors like the IAH and the Informativity Constraint complicate the picture somewhat.

### 3.2 Van der Sandt's predictions

Above we have looked at the partial match examples discussed in Van der Sandt (1992), and saw that they were part of a wider range of examples. After examining four possible relations between antecedent and anaphor, it seems safe to confirm that the degree to which two descriptions 'match' plays a role in determining the likelihood of an anaphoric link between them, and that when the match is 'partial', a genuine ambiguity results. However, if we apply the formal theory (i.e., the algorithm) of Van der Sandt (1992) to the three kinds of partial matches that were distinguished in the previous section, we encounter a number of problems.

*I. antecedent entails anaphor* Let us reconsider Van der Sandt's own (12.a) again, and let us construct a DRS for this example.<sup>12</sup>



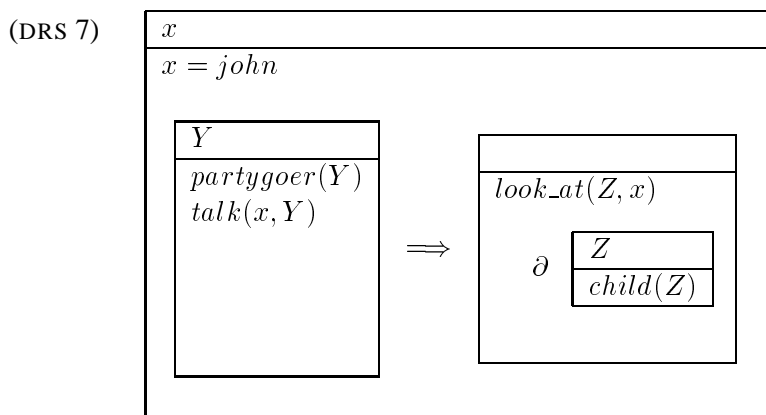
the IAH.

However, we are unsure whether examples such as (19) are real counterexamples to the IAH. For instance, it has been argued by various people that pronouns are essentially devoid of semantic content (by Van der Sandt 1992 to give but one example), so to what extent can they *add* information?

<sup>12</sup>As before, we assume that *his* has already been resolved as John's.

If we feed (DRS 6) to Van der Sandt’s resolution algorithm, it will first start looking for an accessible and suitable antecedent for the presuppositional DRS: it will seek a discourse referent which is accessible and which satisfies the conditions of being a girlfriend, and standing in the possessive relation with John. But such a referent is easily found:  $y$  meets all the conditions. As we saw in section 2, definition 1, binding a presupposition to a suitable antecedent is preferred over accommodating. In the DRS we are currently discussing, it seems that  $y$  is a perfectly suitable and accessible antecedent, so it is unclear how Van der Sandt (1992)’s formalism can avoid binding the presupposition, which would make the non-presupposing reading (given in (4.a)) the primary reading of (12.a) and hence would predict that this example is not truly ambiguous after all. It is conceivable that binding is defined in such a way that  $y$  is no longer a suitable antecedent, but then binding is precluded and accommodation is the only option. Consequently, no ambiguity between binding and accommodation is predicted either. Hence, one might say that Van der Sandt’s formal theory does not fully implement the intuitions sketched in the first part of Van der Sandt (1992).<sup>13</sup>

*II. anaphor and antecedent are incomparable* The same problem applies as in category I, and other problems apply in addition. For example, consider (14.b). Here is the Van der Sandtian DRS for this example.<sup>14</sup>



If we feed (DRS 7) to the algorithm, it will look for an accessible, suitable antecedent for the presupposition triggered by *the children*. It is unclear to us whether *some partygoers* is a suitable antecedent for *the children* according to Van der Sandt’s algorithm, but it yields undesired results either way.

Suppose the algorithm decides that  $Y$  (the partygoers) is *not* a suitable antecedent for  $Z$  (the presupposed children). In that case, the Van der Sandtian preference order given in definition 1 tells us that the presupposing reading, achieved by accommodating the presupposition, is the single most preferred reading for (14.b). In other words, (14.b) does not display a ‘genuine ambiguity’ as

<sup>13</sup>One might argue that the preference constraints should be weakened a little bit, saying, for example that binding is *ceteris paribus* preferred over accommodation. Subsequently one might construct a Gricean reasoning like the following: why does the speaker use *his girlfriend* instead of *she*? Because *she* would refer to *an oriental girlfriend* and apparently that is not what the speaker wants. Hence, the accommodation reading should be preferred over the binding one. However, this move will not solve the problem: even *if* such a Gricean reasoning can always be constructed (which seems very difficult for examples like, say, (14.b)), it would still mean that no ‘genuine ambiguity’ (as argued for by Van der Sandt 1992:363) is predicted.

<sup>14</sup>Here we follow the notation for plurals used by Van der Sandt (1992: 370), where he explains how an example similar to our (14.a) should be dealt with. The capitals are discourse referents standing for sets of objects. All predicates in this paper are ‘strictly distributive’ in the sense of Kamp & Reyle (1993, 407). E.g.,  $child(X)$  has the intuitive interpretation that all elements of  $X$  are children. In Kamp & Reyle (1993) this is denoted as  $child^*(X)$ . We will omit the \* superscript where this can be done without creating confusion.

partial match examples should do. If, by contrast, *Y* (the partygoers) *is* a suitable antecedent for *Z* (the children), binding is preferred and, as before, no ambiguity results.

In the latter case, there is an additional problem, which has nothing to do with preferences between interpretations. If the presupposition gets bound, it is ‘absorbed by the antecedent’, and this results in a reading which may be paraphrased as *if John meets some partygoing children, they look at him in a strange way*.<sup>15</sup> This reading seems wrong. Binding should appear *in situ*, that is: the presupposition to be bound should not be merged with the target DRS, but with the source DRS.<sup>16</sup> Summarizing, we think that the binding reading of (14.b) should be *if John talks to some partygoers, the children among them look at him in a strange way*. The situation in which all the children happen to be partygoers can be viewed as a special case, which is typically marked by the lack of an accent on *children* (cf. Van Deemter 1991, 1992).

*IV. anaphor entails antecedent* The reader may easily verify that the same problems are encountered here as in case II: Van der Sandt’s algorithm fails to predict the genuine ambiguity of the sentences in this category and binding is defined in a way that yields incorrect interpretations.

The findings in this section necessitate a number of modifications in the presupposition as anaphors theory which will be presented in the remainder of the paper.

#### 4 MODIFYING THE PRESUPPOSITIONS-AS-ANAPHORS APPROACH

In the previous section (3.1) we argued that an anaphor and an antecedent stand in a *partial match relation* if the two are *not* co-extensive. Moreover, on the partial match interpretation, a sentence is ambiguous between a presupposing and a non-presupposing reading (although we have seen that certain independent factors may cause disambiguation). In other words, we support the *intuition* sketched in Van der Sandt (1992:349-351). However, if we apply the *formal theory* (i.e., the presupposition resolution algorithm) of Van der Sandt (1992) to the partial match examples (as done in 3.2), we encounter two problems: (i) the algorithm does *not* generate the required genuine ambiguity in the case of a partial match, and (ii) not all the binding readings are correct. In this section, we will propose a reformulation of Van der Sandt’s approach to solve these problems.

We propose a modified version of Van der Sandt’s resolution mechanism. One central ingredient is the use of so-called *context variables*. *Binding* will be viewed as contextually restricted quantification, where the relevant context is provided by the anaphoric antecedent. *Accommodation* will be a contextually restricted variant of the usual accommodation procedure. To arrive at all the different possible (binding or accommodation) interpretations of a given sentence containing a presupposition, we exploit Van der Sandt’s resolution mechanism, with its use of unresolved representations. However, we make some modifications to the resolution mechanism as such, taking the notion of partial match given in section 3.1 into account by paying more attention to proper-

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<sup>15</sup>To avoid a possible confusion: we are aware of the fact that paraphrasing DRSs in natural language is not always an easy matter. Both Geurts (p.c.) and Van der Sandt (p.c.) objected to this paraphrase by saying that it blurs the distinction between asserted material (partygoing) and presupposed material (children). That is true. However, (i) in the theory presented in Van der Sandt(1992) no distinction is made between asserted and presupposed material in the resolved DRS. And (ii) the main point of our paraphrase is to indicate that the presuppositional material ends up in *antecedent* of the conditional.

<sup>16</sup> Consider another example:

(21) If John has children, he’ll spoil the little bastards.

We are well-aware of the fact that epithets like *little bastards* have some peculiar properties. Nevertheless, they serve nicely to further illustrate the point about binding mentioned in the main text. If we bind the presupposition triggered by the definite description in Van der Sandt’s way, we end up with a reading which may be paraphrased as *if John has children and they are little bastards, then he’ll spoil them*. That is: the children are only spoiled if they are little bastards. In our opinion, the right reading is something like *if John has children, they’ll be little bastards and he’ll spoil them*.

ties of potential antecedents. When antecedent and anaphor stand in a partial match relation, the algorithm will generate a real ambiguity. This entails that our modification of the algorithm yields a modified, *partial* preference order between possible interpretations.

One of the attractive features of Van der Sandt (1992) is that it aims at developing a *uniform* mechanism treating all presupposition triggers in exactly the same way, namely as anaphors looking for an antecedent. A disadvantage of this *birds-eye view* on presuppositions, is that a number of details (such as the issues we are concerned with in this paper) are not sufficiently spelled out. We take it that this is one of the factors which has led to a certain confusion of tongues on the partial match phenomenon in the first place. Therefore we opt for a *frog perspective* on presupposition projection at first, focussing on one kind of presupposition triggers: definite descriptions. In the sections thereafter, we will slowly broaden our horizon by taking *all* noun phrases into consideration. In the conclusion we briefly discuss presuppositions that are not triggered by noun phrases. To start, however, we have to do some formal groundwork.

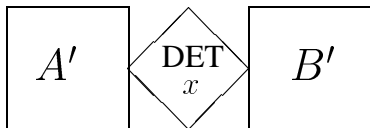
#### 4.1 Preliminaries

Van der Sandt (1992) is mostly based on the DRT fragment as it was defined in Kamp (1981). The kind of examples we are interested in, and the treatment we have in mind for them, calls for two extensions of this basic DRT fragment.

##### 4.1.1 Plurality and quantification in DRT

The issue of plural quantification is known to be complex, and combining it with the dynamic interpretation underlying DRT only increases the number of complications. In the following, we adopt the basic treatment of plurality and quantification outlined in Kamp & Reyle (1993, ch. 4). Kamp & Reyle use an algebraic ‘Link-style’ interpretation of plurality, in which the domains contain atomic as well as non-atomic entities. Following the convention of Kamp & Reyle (1993), we use bold-face lowercaps variables ( $\mathbf{x}, \mathbf{y}, \mathbf{z}, \dots$ ) to range over both individual (or *atomic*) referents *and* plural (*non-atomic*) referents. Lowercase variables ( $x, y, z, \dots$ ) are used for individual referents, and uppercase variables ( $X, Y, Z, \dots$ ) for plural referents. This convention entails that general definitions contain boldface referents, and actual examples do not.

We also adopt the treatment of generalized quantifiers in Kamp & Reyle (1993, ch. 4) in terms of *duplex conditions*. In general, a generalized quantifier (which we shall denote as DET) is a relation between two sets of (atomic) entities, say  $A$  and  $B$ , and is represented by Kamp & Reyle as a condition of the following form, where  $A'$  is a DRS representing  $A$ , and  $B'$  a DRS representing  $B$ .



The leftmost DRS of this duplex-condition is called the *restrictor* and the rightmost DRS the *scope*, the capsized box in the middle is the *quantifier*. The DET gets its usual interpretation as known from *generalized quantifier theory* (GQT, Barwise & Cooper 1981, see also Van der Does *this volume*; for technical details on quantifiers in DRT we refer to Kamp & Reyle 1993:425-427). For example, here are GQT-style definitions of singular and plural *the* (with  $d$  and  $d'$  atomic):<sup>17</sup>

<sup>17</sup>Here and elsewhere we assume that a model  $M$  is a 2-tuple of the form  $\langle D_M, I_M \rangle$ , where  $D_M$  is the ‘domain of discourse’.  $D_M$  consists of a set of atomic entities  $D$  and an associated partial ordering  $\subset$ , together forming an atomic, free, complete upper semi-lattice with zero, cf. Kamp & Reyle (1993:425).  $I_M$  is an interpretation function (combining  $\text{Name}_M$  and  $\text{Pred}_M$ , Kamp & Reyle *passim.*). We will drop the  $M$  subscripts on domain and interpretation function where this can be done without creating confusion.

$the^{sg}(A)(B)$  is true with respect to a model  $M$  iff  
 $\exists d \in D : d \in A \ \& \ \forall d' \in D (d' \in A \Rightarrow d' = d) \ \& \ d \in B$   
 $the^{pl}(A)(B)$  is true with respect to a model  $M$  iff  
 $\exists d \in D : d \in A \ \& \ \forall d' \in D (d' \in A \Rightarrow d' \in B)$

It is worth pointing out that Kamp & Reyle still distinguish *indefinites* from truly quantificational determiners (like *five*, *all*), and we will follow this practice, as we have done so far. Concretely, this means that indefinite NPs of the form DET CN, where DET is either *a(n)*, *some* or empty (in the case of bare plurals) introduce a fresh discourse referent in the current DRS.

#### 4.1.2 Context variables

In Westerståhl (1985) the notion of contextually restricted quantification is introduced, motivated by examples such as the following:

(22) The children were having a lot of fun.

Clearly this is not a statement about all the children in the universe. According to Westerståhl, the definite determiner acts as a ‘*context indicator which signals the presence of a context set  $C$* ’ (Westerståhl 1985:60) in such a way that *the children* denotes  $C \cap child$ , i.e., a contextually restricted subset of the set of all children. Westerståhl himself immediately noted that there is a strong connection between discourse referents and context variables (Westerståhl 1985:70).

In our revision of the presuppositions-as-anaphors theory, we will use context variables, which we will represent as  $C, C', \dots$ . These context sets are just discourse referents. Below, we let every NP introduce an ordinary discourse referent and a fresh context set and our modified presupposition resolution algorithm explicitly operates on these context sets. In this paper, a context set  $C$  will either be equated with a previously introduced discourse referent, or with the entire domain of discourse. We have made this simplifying assumption in order to stick as closely as possible to Van der Sandt (1992). We will return to this assumption in section 5.2. In any case, the output of our presupposition resolution algorithm is a DRS from which the context set  $C$  can be eliminated. Thus, the use of context sets merely facilitates the resolution process.

Besides introducing contextual variables, we also employ ‘contextually restricted’ predicates. That is, we use conditions like  $man^C(john)$  which have as intuitive interpretation: *john* is a *man* and an element of the context set  $C$ . Formally, if  $\eta$  is a noun representation:<sup>18</sup>

$$\begin{aligned}
 M \models_f \eta^C(x) & \text{ iff } f(x) \in I_M(\eta) \cap f(C) \\
 M \models_f \eta^{*C}(X) & \text{ iff } f(X) \in I_M(\eta^*) \cap f(C)
 \end{aligned}$$

#### 4.2 Definite descriptions and the presuppositions they trigger

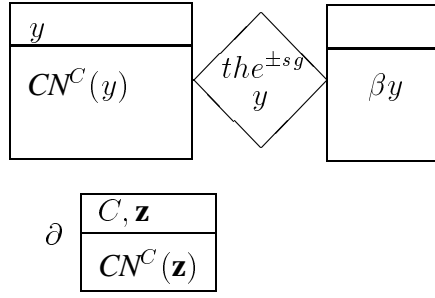
Definite descriptions, phrases of the form [*the* CN] (where CN is a possibly complex common noun phrase), are generally assumed to trigger an *existence presupposition*, that is: the CN denotation is presupposed to be non-empty. We model this as follows: a definite description presupposes that there is some context set  $C$  which has a non-empty intersection with the CN denotation. When the construction algorithm encounters a definite description, the following rule (temporary version) is activated.<sup>19</sup>

<sup>18</sup>These clauses are variants of cause (ii:g:i) of definition 4.3.7 of Kamp & Reyle (1993:426). Recall our remark that in this paper all predicates applied to plural (non-atomic) discourse referents are strictly distributive (see footnote 14).

<sup>19</sup>This rule is an instance of CR.NP [Quant = +], Kamp & Reyle (1993: 318, 347). Below it will be replaced by a more general rule. The referent  $\mathbf{z}$  will be an atomic referent when the CN is [+ sg] and a non-atomic referent when the CN is [- sg]. In other words: we assume that *the child* presupposes the existence of at least one child and that *the children* presuppose the existence of at least two children. Nothing hinges on this assumption. Suppose for instance that one wants the existence presupposition always to be ‘at least one’, in that case  $\mathbf{z}$  should always be an atomic referent.

**[DET CN] Rule, for DET = *the***

Upon encountering an S of the form  $\alpha\beta$  or a VP of the form  $\beta\alpha$ , with  $\alpha$  a definite description (of the form *the* CN[ $\pm$  sg]), replace S or VP with the following presuppositional DRS and duplex condition, where  $y$  and  $z$  are fresh discourse referents and  $C$  is a fresh context variable.

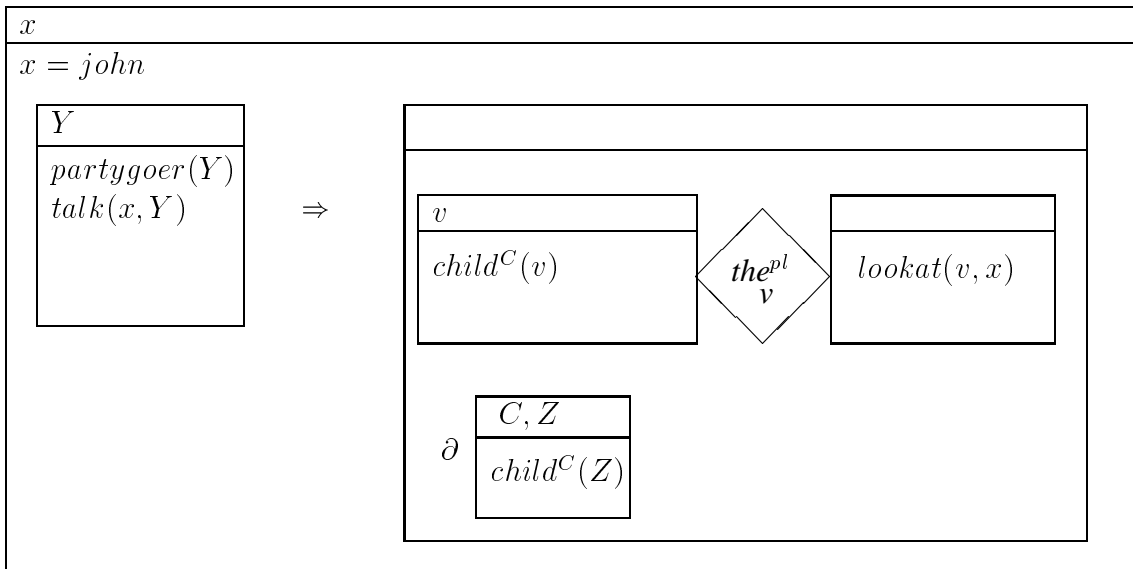


Where  $CN$  is the representation of CN (in singular form), and  $z$  is  $z$  or  $Z$  depending on the number of the CN.<sup>20</sup> To illustrate this rule, consider example (14.b) again, here repeated as (23).

(23) If John talks to some partygoers, the children look at him in a strange way.

This sentence is represented by (DRS 8). The determiner *some* is indefinite: it introduces a fresh (non-atomic) discourse referent  $Y$ . *The children* is handled by our definite descriptions rule: it introduces a presuppositional DRS, with the intuitive interpretation that there is some context set  $C$  which contains children, and a duplex condition, which expresses that all children in this context set  $C$  look at John in a strange way.

(DRS 8)



The resulting DRS can only be interpreted after the presuppositional DRS contained in it has been resolved.

<sup>20</sup>Needless to say,  $CN(Z)$  and  $CN^C(Z)$  should be read as  $CN^*(Z)$  and  $CN^{*C}(Z)$  respectively.

### 4.3 The modified presupposition resolution algorithm

When Van der Sandt's resolution algorithm encounters a presuppositional DRS it will first try to bind this presupposition to an antecedent, and our modified algorithm will do the same. This immediately raises a question: what qualifies as an antecedent? The answer of Van der Sandt (1992) is simple: every suitable discourse referent which is accessible from the DRS containing the presuppositional DRS is a potential antecedent. Van der Sandt does not specify what makes a referent suitable. In our opinion, the main factor in determining the suitability of a discourse referent is the phrase which leads to the introduction of the referent in the first place. It is difficult to find examples where factors like discourse structure and focus-ground partitions etc. are neutralized, but here is an attempt.

- (24) a. Yesterday, an<sub>1</sub> uncle of mine bumped into a<sub>2</sub> man. The<sub>i</sub> man fell to the ground.  
b. Yesterday, a<sub>2</sub> man bumped into an<sub>1</sub> uncle of mine. The<sub>i</sub> man fell to the ground.

We contend that in both (24.a) and (24.b), the definite *the man* is strongly preferred to be coindexed with *a man* (i.e.,  $i = 2$ ), even though obviously both 1 and 2 are male persons. This is due to the fact that 1 is introduced as a *man*, while 2 is introduced as an *uncle*. Another illustration of our claim that the phrase which leads to the introduction of a discourse referent is the main factor in determining suitability, is the following minimal pair.

- (25) a. If John has [CN children], who like to play basketball, then his children are fortunate.  
b. If John has [CN children that like to play basketball], then his children are fortunate.

In both (25.a) and (25.b) the indefinite bare plural in the antecedent leads to the introduction of a fresh discourse referent. In other words, the set of discourse referents accessible for the presupposition triggered by *his children* is the same in both examples. The only difference between the two examples is that in (25.a) the referent is introduced by *children* while in (25.b) it is introduced by *children that like to play basketball*. Now, example (25.b) is ambiguous and (25.a) is not. The latter only has a non-presupposing reading; we cannot continue this example with (26) (where *they* refers to John's children).

- (26) They are all crack players just like John.

Example (25.b), on the other hand, displays a partial match ambiguity between a presupposing and a non-presupposing reading. This example *can* be followed by (26) and this continuation disambiguates (25.b) in favor of the presupposing reading. This shows that the resolution algorithm should not only take discourse referents into account, but also properties of the phrase which lead to the introduction of the referent.<sup>21</sup> In particular, we are interested in the possible values which a discourse referent can have according to the denotation of the phrase with which the referent is associated. For this purpose, we will use *value sets*. For the examples in (25) it is the CN which determines the relevant value set. But for other phrases which lead to the introduction of a referent (e.g., proper names) this may be different. In general: suppose that a phrase  $\alpha$  leads to the introduction of a (atomic or non-atomic) discourse referent  $\mathbf{x}$ . The value set of  $\mathbf{x}$  with respect to  $\Phi$ , where  $\Phi$  is the DRS which results from  $\alpha$ , is defined as follows:<sup>22</sup>

<sup>21</sup>This means that an interpreter has to remember *how* an object was introduced. Levelt (1989:121) discusses some relevant psycholinguistic evidence in this respect. Jarvella & Herman (1972) have shown that listeners are very good in recalling the last sentence they heard, but that recall of less recent material soon declines to 'nearly chance level'. Interestingly, Bates, Masling and Kintsch (1978) have shown that when the function of an utterance is to *introduce new referents* literal memory improves.

<sup>22</sup>The embedding function  $f$  is only needed when  $\Phi$  is not a *proper* DRS, i.e., when some condition in  $\Phi$  contains a discourse referent that is not introduced in  $\Phi$ . This would happen if the  $\eta$  phrase contains a pronoun (e.g., *the man that saw him*).



$$\hat{\mathbf{x}}.\llbracket\Phi\rrbracket_{M,f} =_{\text{def}} \{d \in D \mid M \models_{f \cup \langle \mathbf{x}, d \rangle} \Phi\}$$

For example, consider the indefinite description *a man with a hat*, and suppose that it triggers the introduction of a discourse referent  $y$ . Then the value set of  $y$  is given by:

$$\hat{y}.\llbracket [y, z \mid \text{man}(y), \text{hat}(z), \text{with}(y, z)] \rrbracket_{M,f} = \\ \{d \in D \mid d \in I(\text{man}) \ \& \ \exists d' \in D : d' \in I(\text{hat}) \ \& \ \langle d, d' \rangle \in I(\text{with})\}$$

In words: the value set of  $y$  is the set of men with a hat. Notice that in the case of atomic predicates  $P$ , the value set  $\hat{\mathbf{x}}.\llbracket P(\mathbf{x}) \rrbracket$  equals the predicate denotation  $\llbracket P \rrbracket$ . In those cases, we will use the predicate denotation as value set. Below we will consider pairs  $\langle \mathbf{x}, \hat{\mathbf{x}}.\llbracket \Upsilon \rrbracket \rangle$  consisting of a discourse referent and a corresponding value set as antecedents.

We are now in the position to sketch our modified resolution algorithm. It has been noted in section 3 (footnote 9) that the hearer's background knowledge may cause disambiguation. This was illustrated by example (13), repeated here as (27).

(27) If John has sons, his children will watch a lot of football.

We argued that this example displays a partial match ambiguity. However, if the interpreter knows that John and his better half do *not* have *daughters*, this example only has a non-presupposing reading. Therefore, our algorithm will not quantify over all possible models, but rather over all models which are in accordance with the interpreter's knowledge state. For this case, the interpreter's *H-models* (H for hearer) will not include models in which John has daughters. In what follows, specific hearer knowledge will not be taken into account, unless noted otherwise.

The input of the algorithm is an underspecified DRS containing at least one unresolved presuppositional DRS. As we have seen, for definite descriptions this presuppositional DRS will be of the form:

$$\text{(DRS 9)} \quad \partial \quad \begin{array}{|c|} \hline C, \mathbf{y} \\ \hline CN^C(\mathbf{y}) \\ \hline \end{array}$$

When a DRS contains several (unrelated) presuppositional DRSs, it does not matter which one is resolved first. But in the case of *embedded* presuppositional DRSs (i.e., one presuppositional DRS subordinates a second presuppositional DRS) the algorithm should first be applied to the most deeply embedded one, as is the case with Van der Sandt's original algorithm. For each presuppositional DRS there is a list of potential antecedents, and as argued above this is a list of accessible referents and their respective value sets. This list is ordered by *nearness* to the presuppositional DRS, i.e., the first element on the list is the nearest referent and the last element is the one farthest away. In general, this list will look as follows:<sup>23</sup>

$$\text{LIST OF POTENTIAL ANTECEDENTS:} \\ \text{PA} = \langle \langle \mathbf{x}_1, \hat{\mathbf{x}}_1.\llbracket \Upsilon_1 \rrbracket \rangle, \dots, \langle \mathbf{x}_i, \hat{\mathbf{x}}_i.\llbracket \Upsilon_i \rrbracket \rangle, \dots, \langle \mathbf{x}_n, \hat{\mathbf{x}}_n.\llbracket \Upsilon_n \rrbracket \rangle \rangle$$

The modified resolution algorithm is now going to try and bind the presuppositional (DRS 9), triggered by the definite description, to an element of the list of potential antecedents. We use  $\text{PRES}_M$  to denote the value set of the referent associated with the phrase which triggers the presupposition.

<sup>23</sup>Nearness is formally defined in terms of subordination. Thus:  $a$  is nearer to a DRS  $\Phi$  than  $b$  iff (i)  $a$  and  $b$  are introduced in different DRSs, (ii) the DRS in which  $b$  is introduced subordinates the DRS in which  $a$  is introduced, and (iii) the latter DRS subordinates  $\Phi$ .  $a$  and  $b$  are equally near to  $\Phi$  if neither  $a$  nor  $b$  is nearer to  $\Phi$  than the other. Moreover, instead of a list, PA should be a partial order (because several discourse referents may be introduced at the same level and these are 'equally far away' from the source-DRS), but we will ignore this here.

In the case of definite descriptions (as in (DRS 9)),  $PRES_M = \hat{y}.\llbracket [y|CN(y)] \rrbracket_M$ .<sup>24</sup> In general, PRES equals  $\hat{y}.\llbracket \Upsilon \rrbracket$ , where  $\Upsilon$  is the DRS representing the phrase which has led to the introduction of  $y$ . Similarly, we use  $ANT_M^i$  as an abbreviation of  $\hat{x}_i.\llbracket \Upsilon_i \rrbracket_M$ , for some  $\langle x_i, \hat{x}_i.\llbracket \Upsilon_i \rrbracket_M \rangle \in PA$ .

**IF**  $\exists i(PRES_M = ANT_M^i, \text{ in all H-models } M)$   
**THEN** BIND  
**ELSE IF**  $\forall i(PRES_M \cap ANT_M^i = \emptyset, \text{ in all H-models } M)$   
**THEN** ACCOMMODATE  
**ELSE** (Partial Match!)  
 BIND **OR** ACCOMMODATE

In words: the algorithm first checks if there is a potential antecedent with the *same* denotation as the presupposition in all H-models. If it finds one, it is a *full match* and the presupposition will be bound (both the BIND and the ACCOMMODATE operation will be defined below). As in Van der Sandt (1992): if there is more than one fully matching antecedent, then the presupposition will be bound to the closest one; if there are two or more equally near fully matching antecedents, an unresolvable ambiguity results (cf. example 11). If the value set of the presupposition is *disjoint* with the value sets of all potential antecedents, the presupposition is accommodated. The other cases are partial matches: there is no antecedent with the same value set as the presupposition, but there *is* an antecedent which matches partially, i.e., has a non-empty intersection with the presupposition in some H-model, then the presupposition can either be accommodated or bound to this partially matching antecedent.

Before we can return to our example, we have to define the notions BIND and ACCOMMODATE. To begin with the former, it follows from the algorithm that we BIND the presuppositional (DRS 9) if an antecedent  $\langle x_i, ANT^i \rangle \in PA$  has been found such that  $ANT^i$  is either coextensive with the value set PRES (full match), or has a non-empty intersection with it (partial match).

DEFINITION 2 (BIND)

$\langle x_i, ANT^i \rangle$  is the nearest antecedent in PA:

1. merge the presuppositional DRS with the source DRS, and
2. add a condition  $C = x_i$  to the source DRS

In other words: binding is *in situ* (the presuppositional DRS is *not* moved to the target DRS (where  $x_i$  was introduced) as in Van der Sandt 1992).<sup>25</sup> Moreover, it generalizes to non-identity anaphors

<sup>24</sup>The value set is a technical means of determining the total set of possible values for a given phrase. Contextual restrictions should not play a role here. Therefore, the context variables are not taken into account.

<sup>25</sup>The situation is somewhat more difficult when presuppositions interact with intensional operators like *might* or *believe*. Sometimes presuppositions appear to be bound *outside* the scope of a given intensional operator. Consider, for example, the following variant of the example discussed in footnote 16:

(28) If John has children, his mother believes that he'll spoil the little bastards.

In our opinion, the preferred reading of this sentence is *If John has children, they'll be little bastards and his mother believes that he'll spoil them* (and not, as Van der Sandt (1992) predicts, *If John has children and they are little bastards, his mother believes that he'll spoil them*). Of course, it is well known that intensional contexts give rise to *de re / de dicto* ambiguities. We think that the preferred reading of (28) comes about via a *de re* construction of the presupposition trigger with respect to *believe* and that this presupposition is subsequently bound *in situ*. Of course there is also a *de dicto* reading, but somehow this reading is less preferred for the current example, probably because the description *the*

since only the *context set* is equated with a set of objects, as will be illustrated for example (23) below. ACCOMMODATE is defined as follows:

DEFINITION 3 (ACCOMMODATE)

The main DRS is the (initial) target DRS:

1. remove the presuppositional DRS from the source DRS and merge it with the target DRS,
2. add a condition  $C = \mathbf{D}$  to the target DRS<sup>26</sup>
3. check whether the result satisfies the Stalnaker/Van der Sandt conditions (consistency, informativity &c). If not, redo 1-3 with a new target DRS: the one immediately subordinated by the old target DRS.

The second clause states that the context variable  $C$  is equal to the domain of discourse, thereby neutralizing the effect of  $C$ . It is worth emphasizing that this is done to keep the differences with Van der Sandt to a minimum: it entails that our ACCOMMODATE amounts to the same operation as Van der Sandt (1992)'s accommodation. We will return to this issue in section 5.2. As in Van der Sandt (1992), the target DRS is preferably the main DRS, but if this results in an unacceptable DRS (inconsistent, uninformative, ...), accommodation may occur in target DRSs closer to the source DRS.

The modified algorithm implies the following *partial* preference order between interpretations, which splits clause 1 from Definition 1 up into clauses 1 and 2 in Definition 4.

DEFINITION 4 (Modified partial preferences)

1. Binding to a fully matching antecedent is preferred over accommodation.
2. Binding to a fully matching antecedent is preferred over binding to a non-fully matching antecedent.
3. Accommodation is preferred to occur as 'high' (far away from the source DRS) as possible (e.g., Van der Sandt 1992: 345).
4. Binding is preferred to occur as 'low' (near the source-DRS) as possible (e.g., Van der Sandt 1992: 357).

Let us go back to our example (23) and its associated (DRS 8), both repeated below for the sake of convenience.

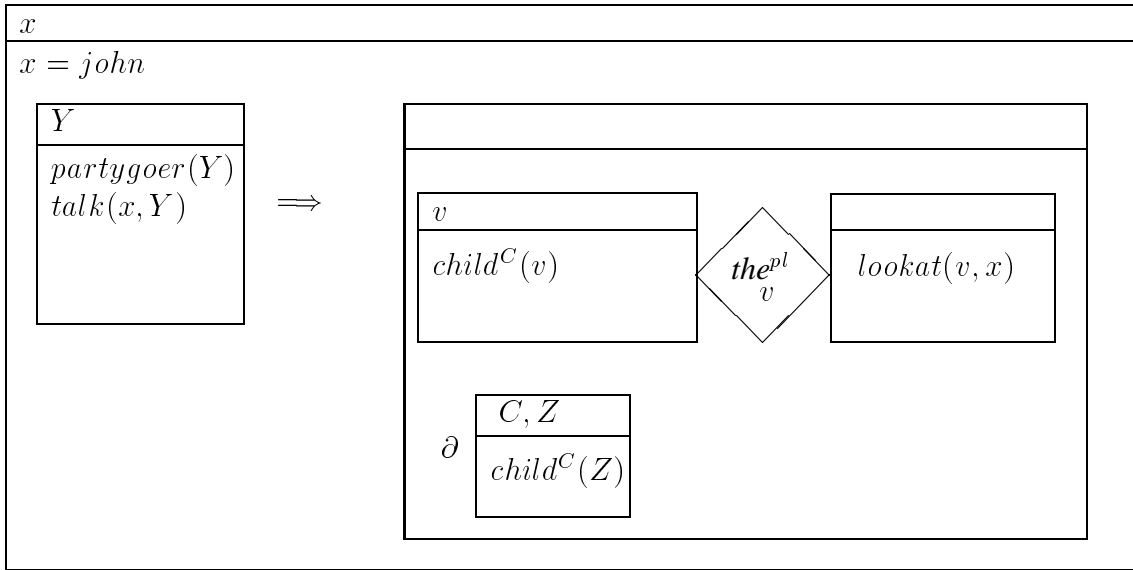
(29) If John talks to some partygoers, the children look at him in a strange way.

---

*little bastards* is the 'responsibility' of the speaker (in the sense of Quine-Kaplan-Lewis) and not of John's mother. Heim (1992) follows a similar line of argumentation, but for different purposes. In our opinion, Heim tries to defend a claim which is too strong, namely that for each presupposition trigger, a *de re* reading is *always* preferred over a *de dicto* reading. We think that, at least for the presupposition triggers under discussion here, there is a systematic *de re/de dicto* ambiguity, where other factors (plausibility, world knowledge, 'who is responsible for which description') may sometimes indicate a preference for one or the other.

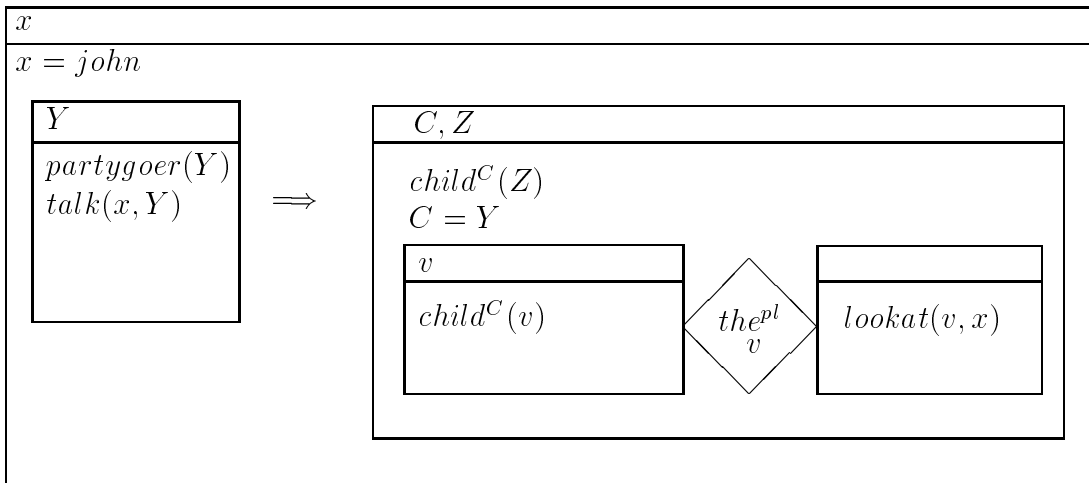
<sup>26</sup>The constant  $\mathbf{D}$  refers to the domain of discourse:  $[\mathbf{D}]_M = I_M(\mathbf{D}) = D_M$ .

(DRS 10)



(DRS 10) is the input for our modified resolution algorithm. The list of potential antecedents for the presuppositional DRS looks as follows:<sup>27</sup>  $\langle\langle Y, \llbracket partygoer \rrbracket, \langle x, \{john\} \rangle \rangle\rangle$ . Let us assume that there is no specific hearer knowledge. Then there will be an H-model  $M$  such that  $\llbracket partygoer \rrbracket_M \neq \llbracket child \rrbracket_M$ . In other words: there is no full match between *some partygoers* and *the children*.<sup>28</sup> However, there will also be an H-model  $M$  in which  $\llbracket partygoer \rrbracket_M \cap \llbracket child \rrbracket_M \neq \emptyset$  (after all, children can be partygoers). In other words: the algorithm predicts that this is a partial match, and a genuine ambiguity between a binding and an accommodation reading ensues. (DRS 11) results when we BIND the presuppositional DRS.

(DRS 11)



<sup>27</sup>Since,  $\hat{Y} \cdot \llbracket [Y | partygoer(Y)] \rrbracket$  is equal to  $\llbracket partygoer \rrbracket$ , and  $\hat{x} \cdot \llbracket [x | x = john] \rrbracket$  is equal to  $\{john\}$ , we opt for the more simple notation.

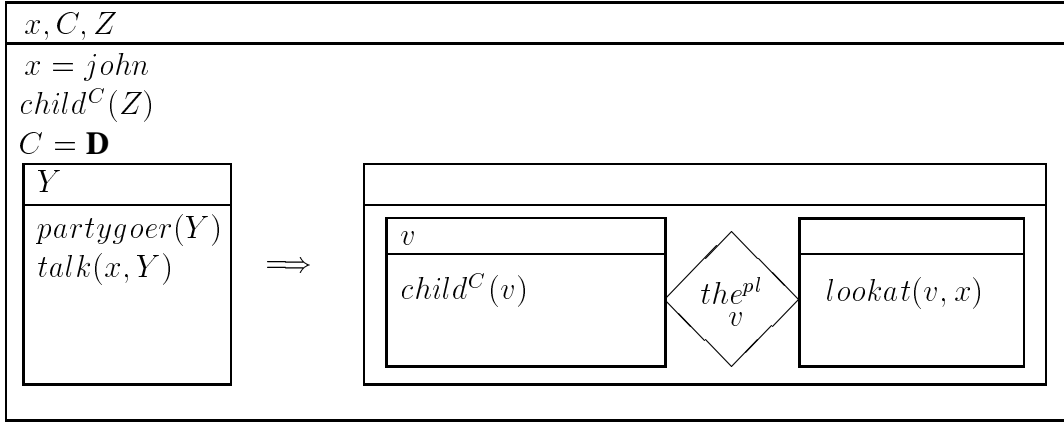
<sup>28</sup>There is obviously no match between *the children* and *John* (the presupposition is looking for a plural, non-atomic antecedent).

This DRS can be paraphrased as (30) and, as argued above, this is the correct binding interpretation.

- (30) If John talks to some<sub>*i*</sub> partygoers, then there are children<sub>*j*</sub> among them<sub>*i*</sub>, and all of the children among the<sub>*i*</sub> partygoers look at him in a strange way.

The second reading comes about via a global application of ACCOMMODATE. The result is (DRS 12).

(DRS 12)



This interpretation can be glossed as follows:<sup>29</sup>

- (31) There are some<sub>*i*</sub> children, and if John talks to some partygoers, all these<sub>*i*</sub> children look at him in a strange way.

Summarizing, if we feed the representation of example (23), (DRS 10), to the modified resolution algorithm, it decides that there is a partial match between the presupposition triggered by the description *the children* and its antecedent *some partygoers*. The corresponding ambiguity is between (DRS 11) and (DRS 12) for the non-presupposing/binding and presupposing/accommodation interpretation respectively.<sup>30</sup>

### Discussion: bridging and epithets

In this section we have discussed a refined and modified version of Van der Sandt's presupposition resolution mechanism, and applied it to presuppositions triggered by definite descriptions. We have assumed that definite descriptions trigger an existence presupposition, more precisely: *the* CN presupposes that the intersection of the CN denotation with a given context set is not empty. Compared with the resolution algorithm of Van der Sandt (1992), our version is different in three respects: (i)

<sup>29</sup>This paraphrase serves to indicate that the presupposition triggered by the description *the children* is not bound ('cancelled'), but accommodated ('projected'). Of course, the content of this presupposition is not very informative. Perhaps, the accommodation reading of this example should amount to something like *there is some; contextually salient group of children, and if John talks to some partygoers, all these<sub>*i*</sub> children look at him in a strange way*. In section 5.2 we will return to this issue.

<sup>30</sup>Here we assumed that there is a partial match between *partygoer* and *children*. But suppose that according to the hearer only children can be partygoers, that is: in all H-models  $M$ ,  $\llbracket \text{partygoer} \rrbracket_M \subseteq \llbracket \text{child} \rrbracket_M$ . In that case, we have a full match, the presupposition will be bound and no genuine ambiguity is predicted. The result of BINDING the presupposition can be paraphrased as: *If John talks to some partygoers, they look at him in a strange way*. Notice that the speaker would typically indicate that she has this identity reading in mind by de-accenting *children* (cf. Van Deemter 1994).

it is more explicit in what counts as a potential antecedent (namely a pair consisting of a discourse referent and its value set), (ii) it is more explicit about the relation between presupposition and potential antecedent, explicitly distinguishing full match, no match and partial match, and generating the required ambiguity in the latter case, and (iii) binding is a different operation, defined using contextual quantification: it generalizes to non-identity cases and the presuppositional DRS remains in the DRS where it originated. Two well-known ‘difficult’ phenomena often associated with definite descriptions are the notorious bridging cases and the epithets. How do these fit in with our proposals?

*Bridging* Consider the following example:

(32) If John buys a car, he checks the motor first.

The definite description *the motor* presupposes the existence of a motor. Schematically, the set of potential antecedents for this presupposition looks as follows:

$$\langle \langle d_1, \llbracket car \rrbracket \rangle, \langle d_2, \llbracket john \rrbracket \rangle \rangle$$

Clearly, the presupposition triggered by *the motor* does not even match *partially* with an element on this list. Hence, (global) accommodation of the presupposition is predicted. The fact that cars have motors is not taken into account at all. In Krahmer & Piwek (1997a, 1997b) it is shown how Van der Sandt’s presuppositions-as-anaphors theory can be combined with a constructive inference system, which allows for a formal interaction between presupposition resolution and world knowledge. What is relevant for our purpose here, is that a piece of world knowledge stating that cars have motors can be used to *extend* the list of potential antecedents with an *implied* antecedent (the underlined motor of car  $d_1$ ):

$$\langle \langle d_1, \llbracket car \rrbracket \rangle, \langle \underline{d_3}, \llbracket motor \rrbracket \rangle, \langle d_2, \llbracket john \rrbracket \rangle \rangle$$

Now the presupposition triggered by *the motor* fully matches the implied antecedent. As one would expect, presuppositions can either match fully or partially with implied antecedents. Moreover, there might be an interesting connection between partial matches and bridging. The more ‘difficult’ cases of bridging are examples like (33), from Haviland & Clark (1974: 514-515),

(33) Mary got some picnic supplies out of the car. The beer was warm.

Even though the approach to world knowledge advocated by Krahmer & Piwek is explicitly *subjective*, it is unlikely that the interpreter has a piece of world knowledge to her disposal to the effect that picnic supplies include beer. In general, world knowledge will allow the interpreter to infer food and beverage. Hence the presupposed *beer* will only match partially with the implied beverage.

*Epithets* Epithets (briefly mentioned in footnote 16) are definite descriptions like *the poor woman*, *the bastards*, etc. They differ from ordinary descriptions in that they have a very strong preference for being bound. In particular, they will not give rise to partial match ambiguities. Consider:<sup>31</sup>

(34) If John has an oriental girlfriend, then we feel very sorry for the poor woman.

Example (34) does not display a partial match ambiguity; it only has a non-presupposing/binding reading. We claim that this is due to the fact that epithets essentially behave like pronouns, and as

<sup>31</sup>It is conceivable that the description *the poor woman* is read in a literal way, i.e., as referring to a woman who is short on cash. However, this is not the reading we are interested in here.

noted in the introduction, pronouns cannot be accommodated (we will discuss this property below in more detail). One could say that epithets are pronouns that are *emotionally dressed up* by the speaker, i.e., express something of the speaker's attitude towards the designated referent. To back up this claim, consider the following example, which is Geurts' (1995:47) variant of Karttunen (1969)'s *paycheck* sentence.

- (35) The man who fed his German shepherd on tandoori chicken was beaten by the man who restricted {its/the poor animal's/his dog's} diet to broccoli.

Focussing on the sloppy identity reading, Geurts notes that the pronoun *it* and the epithet *the poor animal* can be read as *his German shepherd*, but that such a reading is not available for the phrase *his dog*; in that case the breed of dog owned by the second man is left open. This, admittedly circumstantial, evidence indicates that epithets should be analyzed as pronouns rather than as full definite descriptions. Consequently, we will assume that they will always be bound.

#### 4.4 Noun phrases in general and the presuppositions they trigger

In the previous section we have outlined a modified version of the presuppositions-as-anaphors algorithm and applied it to definite descriptions. There seem to be few impediments to extending the resulting theory in several ways. For one thing, we would like to believe that the treatment of definite descriptions carries over to definite NPs in general. It is common practice to analyse *possessives* as definite descriptions, thus *John's oriental girlfriend* is seen as shorthand for *the oriental girlfriend of John*. Moreover, various people have argued that proper names too can be seen as definite descriptions of the form *the individual named such and such*.<sup>32</sup> Thus, the proper name *John* can be understood as *the individual named 'John'*. It has been observed (e.g., by Van der Sandt 1992:375) that such a presuppositional analysis of proper names improves upon the standard DRT treatment, in which proper names are always inserted in the main DRS, in that it allows proper names to be 'bound' occasionally. Consider the following example, which does not have a presupposing reading.

- (36) If parents decide to name their child 'Barf', we know in advance that Barf will have a hard time in school.

Notice that even though proper names can be bound, they do not seem to give rise to partial match ambiguities. Take example (37).

- (37) If a man enters the room, Bill whistles.

Intuitively, example (37) only has a presupposing reading. The presupposition triggered by *Bill* cannot be bound to *a man*, even though the value sets for *Bill* and *man* stand in a partial match relation (since *Bill* is typically a masculine name). We contend that this is due to our Informative Anaphors Hypothesis, which stated that an antecedent which is less informative than the anaphor does not qualify as a suitable antecedent. Finally, we adopt the fairly common treatment of pronouns as *lightweight* descriptions. Thus, a pronoun like *he* is analysed as *the male individual* (cf. e.g., Geurts 1995:23). Interestingly, just like proper names, pronouns do not seem to give rise to partial match ambiguities. Consider:

- (38) If a doctor enters the room, he whistles.

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<sup>32</sup>E.g., Russell (1919:174) and Kneale (1962). This proposal was criticized by Kripke (1980: 68-73). Cresswell (1985) and Bach (1987) refuted Kripke's criticism. See Geurts (1995:23) for some discussion.

Here the situation is precisely the inverse of the proper name situation. Even though according to our criteria, the value sets associated with *doctor* and *he* (that is: *male individual*) stand in a partial match relation (both men and women can be doctors), the presupposition associated with the pronoun cannot be accommodated. This follows from Van der Sandt's claim that pronouns and 'other kinds of semantically less loaded anaphors' cannot be accommodated, since they do not carry sufficient descriptive content (Van der Sandt 1992:344-345). Van der Sandt founds his claim on pairs such as (39).

- (39) a. Jack's dog is bald.  
b. It is bald.

According to Van der Sandt the presupposition that Jack has a dog is accommodated in (39.a) and hence this sentence receives a normal interpretation. Example (39.b), however, does not get an interpretation because the pronoun does not have an antecedent. We agree with Van der Sandt's claim, and take it that this explains why the partial match in (38) is disambiguated in favor of the non-presupposing/binding reading. We believe that this claim should be placed in a wider perspective. For example, it seems to us that *both* (40.a) and (40.b) are not interpretable without context, even though only the latter contains a pronoun.

- (40) a. The man is bald.  
b. He is bald.

In our opinion, this illustrates that Van der Sandt's claim should be related to semantic content, rather than form. One might argue that definites presuppose existence and salience.<sup>33</sup> This would explain why the examples in (40) are marginal without context: there simply is no salient male individual to which *the man* or *he* can be bound.

These observations indicate that the specific behavior of pronouns and proper names provides no obstacles for a generalization of the analysis of definite descriptions from the previous subsection to definite NPs in general. Let us now investigate the possibility of generalizing the treatment of definite description to *all* NPs.<sup>34</sup> As was explained in section 4.2, our proposed treatment of definite NPs rests on the use of contextual restrictions on both the assertional part and the presuppositional part of what is expressed by a definite NP. The first results in contextually restricted duplex conditions, representing restricted quantification; the second results in a presuppositional DRS of the form  $[C, \mathbf{y} \mid CN^C(\mathbf{y})]$ . Moving from definite to non-definite NPs, it seems plausible enough that our treatment of the *assertion* (i.e., the contextually restricted duplex conditions) may be re-used. However, in this section we would like to argue that the parallels between definite and non-definite NPs go even further than this, extending into the *presuppositional* part of what the NP expresses. Based on an extensive literature, we will make a rather strong assumption: that a non-definite NP can express exactly the same (existential) presupposition as a definite NP. This assumption will be exploited to arrive at an analysis of non-definite NPs along exactly analogous lines as the analysis of definite NPs that was presented in the previous section.

In our opinion, an NP can trigger a presupposition in two cases: namely when the determiner is *strong* or if it is *weak but accented*. This is formulated in the following NP presupposition scheme.

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<sup>33</sup>Lewis (1979:348-350), see Krahmer (1995:167) for a formalization in DRT terms.

<sup>34</sup>Extensions outside the domain of the NP are possible as well, but these will not be discussed, except for some sketchy remarks in section 6.



NP PRESUPPOSITION SCHEME

Suppose an NP is of the form [DET CN] and  $C$  is some context variable.

If DET is strong or accented, then the NP triggers the presupposition that the intersection of the respective denotations of  $C$  and CN is not empty.

The distinction between *strong* and *weak* determiners is due to Milsark (1977), and is based on the observation that the former, but not the latter, can occur in postverbal position in *there* sentences. Thus, *most* is a strong determiner, while *some* is a weak one:

- (41) a. \* There are most politicians in this hotel.  
b. There are some politicians in this hotel.

It is worth noticing that no definite NPs are allowed in postverbal *there* position. For this reason, the phenomenon in (41) is also referred to as the *definiteness effect*. De Jong (1987:276) and Zucchi (1995), among others, have argued that *all* strong NPs trigger an existence presupposition.

In certain situations weak NPs can also trigger an existence presupposition, namely when the determiner is accented (Van der Sandt p.c.). Consider the following example (small caps indicate stress):<sup>35</sup>

- (42) If a new teacher is hired, there are NO/FEW girls in this class who immediately have a crush on him. In fact, they are only interested in the Backstreet Boys.

Here the weak NP NO/FEW *girls in this class* triggers an existence presupposition. Intuitively, the presupposition is projected and this explains why the pronoun *they* in the second sentence succeeds in finding an antecedent.<sup>36</sup>

Summarizing: the NP presupposition scheme leads to a generalization of the DRT construction rule for definite descriptions in section 4.2, applying to all NPs of the form DET CN where the DET is strong or accented.

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<sup>35</sup>It is difficult to illustrate the presence of a presupposition with the usual negation test:

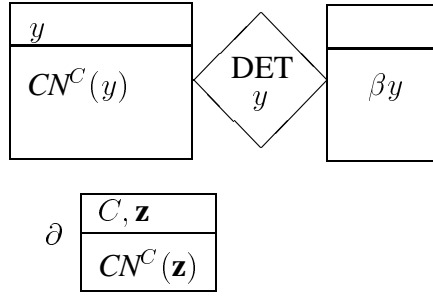
It is not the case that TWO girls have a crush on the new teacher.

This sentence is most naturally uttered after someone else has claimed that two girls have a crush on the new teacher; the negation phrase seems to act as an *echo negation* (Van der Sandt 1991, ms.), and presuppositions in their scope are known to display unpredictable behaviour.

<sup>36</sup>Note that the proposed treatment of weak/accented determiners might be viewed as an explanation of the often-noted phenomena of complement and CN anaphora, where the denotation of the common noun is taken up for anaphoric reference.

**DET CN Rule, for DET = strong or DET = weak but accented**

Upon encountering an *S* of the form  $\alpha\beta$ , or a *VP* of the form  $\beta\alpha$ , where  $\alpha$  is of the form DET CN[ $\pm$  sg] and DET is either strong or weak but accented, replace *S* or *VP* with the following presuppositional DRS and duplex condition, where  $y$  and  $\mathbf{z}$  are fresh discourse referents and  $C$  is a fresh context variable.



As in the previous version of this rule, aimed at definite descriptions, *CN* is the representation of CN, and  $\mathbf{z}$  is  $z$  or  $Z$  depending on the number of the CN. Note that NPs with a determiner that is either strong or accented (or both) can give rise to the expected partial match ambiguities.

- (43) a. If the new teacher lectures some pupils, most girls immediately have a crush on him.  
 b. If the new teacher lectures some pupils, at least THREE girls immediately have a crush on him.

The respective DRSs for (43.a) and (43.b) are structurally similar: both have a presuppositional DRS in the consequent presupposing the existence of girls. There are two potential antecedents for this presupposition in the antecedent of which the new teacher is ruled out on the basis of number. If we assume that there is no relevant hearer knowledge, then there will be no full match between *girls* and *pupils*. However, there will be an H-model  $M$  in which  $\llbracket girl \rrbracket_M \cap \llbracket pupil \rrbracket_M \neq \emptyset$ . In other words: our modified algorithm predicts that the examples in (43) display a partial match, and a genuine ambiguity between a binding and an accommodation reading is predicted. The binding reading for (43.a/b) can be paraphrased as (44).

- (44) If the<sub>*i*</sub> new teacher lectures some<sub>*j*</sub> pupils, there are girls<sub>*k*</sub> among them<sub>*j*</sub> and { most/at least three } of them<sub>*k*</sub> have a crush on him<sub>*i*</sub>.

When we accommodate the presuppositional DRS in Van der Sandtian style, this yields a DRS paraphrasable as (45).

- (45) There are some<sub>*k*</sub> girls and if the<sub>*i*</sub> new teacher lectures some<sub>*j*</sub> pupils, { most/at least three } of them<sub>*k*</sub> have a crush on him<sub>*i*</sub>.

These predictions accord well with our intuitions.

## 5 DISCUSSION

In this section, we make one comparison and raise two issues for future research. The comparison is between the proposals in this paper and those in Van Deemter (1991, 1992) (section 5.3). Both issues for future research are generalizations of the modified presuppositions-as-anaphors approach. One generalization relates to the use of context sets (section 5.2). The second generalization relates to the presuppositions triggered by other parts of speech than the noun phrase (section 5.1).

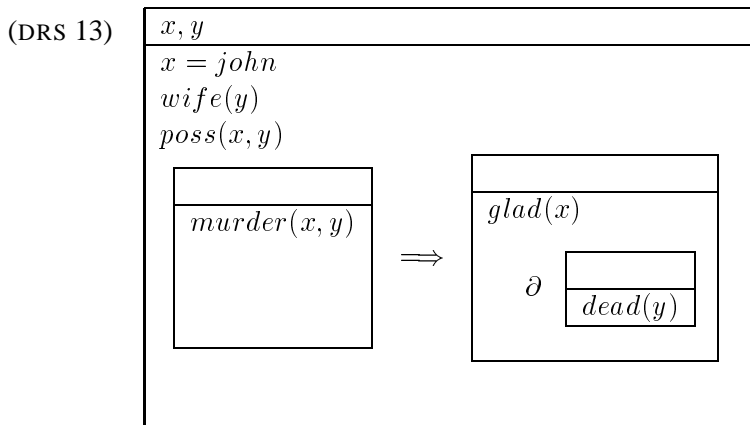
### 5.1 Are presuppositions anaphors?

We have taken a *bottom-up* approach in modifying Van der Sandt's algorithm: that is, we have first worked out the details for definite descriptions, and subsequently argued that the same analysis carries over to NPs in general. Van der Sandt (1992) follows a *top-down* approach: he claims that *all* presuppositions should be treated as anaphors. Geurts (1995:47) writes: *Van der Sandt (1992:341) claims that all presuppositions are anaphors, and in doing so inflates the traditional concept of anaphora beyond recognition.* In a sense, this is merely a terminological issue. Still, several authors (e.g., Zeevat 1991, 1992) have expressed their doubts about the anaphoricity of certain presupposition triggers, most notably factive and lexical presuppositions.

So let us look at some partial matches outside the NP domain. Van der Sandt (1992) gives two such examples, (12.b/c), repeated below.

- (46) a. If John murdered his wife, he will be glad that she is dead.  
 b. If someone at the conference solved the problem, it was John who solved it.

Intuitively, it is clear why these two sentences display a partial match ambiguity. In (46.a) the verb *be glad that* triggers a presupposition that John's wife is dead. Since 'being murdered' entails 'being dead' but not vice versa, this would be a partial match of type I. Similarly, the cleft construction in (46.b) triggers the presupposition that someone solved the problem, and since 'solving the problem at the conference' entails 'solving the problem' but not the other way round, this is also a partial match of type I. But if we want to make this idea more precise, various problems present themselves. Consider example (46.a). It is instructive to construct a DRS for this sentence. Let us assume that the presuppositions in the antecedent have been resolved (and accommodated in the main DRS), and that the pronouns *he* and *she* in the consequent have been resolved as John and his wife respectively. Furthermore, we use  $glad(x)$  as the simplified representation of the assertion of the consequent (i.e., we omit the reason for John's gladness). The resulting DRS would look as follows:



The first problem we encounter when attempting to resolve the presuppositional DRS is that the list of potential antecedents consists of two discourse referents: one for John and one for his wife. Neither of these is a suitable antecedent for the presupposition. Of course this was to be expected. *If* propositional presuppositions are anaphoric at all, they will not refer to individuals but to other propositions. How can we solve this problem? Let us assume, for the moment, that the list of propositions which might serve as an 'antecedent' for the presupposition that John's wife is dead can be constructed; in the case of (DRS 13) it will consist of one element, the proposition that John murdered his wife. Moreover, let us assume that the algorithm is indeed able to classify the relation between these two propositions as a partial match. Then the algorithm would predict an ambiguity between a presupposing and a non-presupposing reading. The first reading is achieved by

accommodating the presupposition. This is unproblematic: the presuppositional DRS is removed from the source DRS and merged with the initial target DRS (the main DRS). The result is paraphrasable as *John's wife is dead, and if he murdered her, he will be glad that she is dead*. The second, ‘anaphoric’ reading is more problematic though: how to BIND this presupposition, in general: what does it mean to *bind* a proposition? It seems we are pushing against the limits of the presuppositions-as-anaphors analogy here. We see two options at this point. If we take the idea that all presuppositions behave as anaphors seriously, then we probably need to introduce discourse referents for propositions. This would call for an extension of standard DRT (maybe along the lines of Asher 1993). Given this extension, it has to be defined when one proposition serves as an antecedent for another, and how propositions can be bound. The other option would be to argue that some presupposition triggers are more like anaphors than others. This is the position defended by Zeevat (1992:396ff). Zeevat distinguishes *referential* presupposition triggers from others. He writes: ‘*Like anaphora, presupposition triggers set up relations between different parts of text. But given this anaphoric character of presupposition triggers, there is still a group of triggers that is even more anaphoric in the sense that their primary function is —like anaphora— to collect entities from the environment in order to say new things of them.*’ (Zeevat 1992:397). No matter which of these options one prefers, it seems to us that the issue of partial matches outside the NP domain cannot be tackled before the general problems mentioned in this paragraph are solved.

## 5.2 *The context-sensitivity of interpretation*

One way of looking at our present endeavour is as a reconstruction of Van der Sandt’s theory of presuppositions, and one of the things we used for that purpose are context variables. Another way of looking at it is as part of a wider research programme on the context-sensitivity of interpretation, in the spirit of Westerståhl (1985), Partee (1984), Van Deemter (1991), and many others. This research programme entails trying to make use of as many as possible of the mechanisms that are known to govern the interpretation of anaphora for the analysis of other expressions, and more specifically noun phrases. For example, we would like to add a construction rule for weak and unaccented NPs to the DRS construction algorithm, which is very similar to the rule for strong or accented ones given above. The only difference between the two would be that the former does not trigger an existence presupposition, whereas the latter does. In particular, both construction rules involve contextually restricted quantification.

In this paper, we have been very conservative in the use of context variables: they mainly serve to create the right binding readings for non-identity anaphora. In our definition of accommodation we explicitly neutralized the effect of context sets by equating them with the domain. This was done to guarantee that our notion of accommodation is the same as the one used in Van der Sandt (1992). We have seen that this sometimes leads to slightly awkward interpretations. For example, the DRS corresponding to the ‘accommodation reading’ for (23), repeated here as (47.a), was paraphrased as (31), repeated here as (47.b).

- (47) a. If John talks to some partygoers, the children look at him in a strange way.  
 b. There are some<sub>*i*</sub> children, and if John talks to some partygoers, all these<sub>*i*</sub> children look at him in a strange way.

We already pointed out that a better reading would be something like:

- (48) There is some<sub>*i*</sub> contextually salient group of children, and if John talks to some partygoers, all these<sub>*i*</sub> children look at him in a strange way.

With this observation in the back of our minds, we would like to explore the following alternative. Suppose we modify ACCOMMODATE, by replacing the second clause in definition 3 (‘add a condition  $C = \mathbf{D}$  to the target DRS’) by:

2'. add a condition  $C = \chi$  to the target DRS,

where  $\chi$  can be any contextually salient group of individuals.  $\chi$  *can* be the entire domain of discourse  $\mathbf{D}$ , but it doesn't have to be. Given this version of ACCOMMODATE, the resulting DRS indeed is paraphrasable as (48). A problem arises if the context is not able to provide a salient group of individuals that contains children, in which case the resulting DRS should be rejected as a case of presupposition failure. For this alternative approach to work properly, two things are needed. First, we have to be able to *reject* DRSs in which failing presuppositions are accommodated. With Van der Sandt's approach this is not possible: DRSs which are the result of accommodating failing presuppositions are just *false*. In Krahmer (1995,1996) this problem is tackled: presuppositional DRSs are accommodated *as presuppositional DRSs*. This calls for an extension of the DRT language with presuppositional DRSs. The resulting DRT language is given a partial interpretation, and the interpretation of DRSs with accommodated failing presuppositions is undefined. Second, and much more difficult, we have to be able to determine what constitutes a contextually salient set  $\chi$ . Given the fact that the context sensitivity of natural language interpretation is by no means restricted to presupposition triggers, it seems reasonable to assume that some independent mechanism should be held responsible for determining the relevant contextual restriction of the entire domain of discourse. The description of this mechanism is clearly beyond the scope of this paper.

### 5.3 Van Deemter: generalization of anaphora

The revised theory proposed here has much in common with an earlier proposal that one of us has made some time ago (Van Deemter 1991, 1992). In particular, both theories take a DRT-based approach to anaphora and extend it to cover the context dependent interpretation of NPs of all major syntactic/semantic categories (for example, indefinites, quantifiers, etc.). Also, both theories use Westerståhl-style context sets as one of their basic mechanisms. Yet, there are a number of vital differences, most of which derive directly from the work of Van der Sandt. A relatively superficial difference lies in the fact that the present proposal is embedded in Kamp & Reyle's theory of plurals, rather than in that of Van Eijck (1983).<sup>37</sup> A much more substantial difference, however, lies in the fact that we use Van der Sandt's unresolved representations (plus, of course, a version of his resolution mechanism) to make predictions about interpretive preferences. Context variables play an essential role in this mechanism. In Van Deemter (1992), it was assumed that a given NP could take any suitable and accessible reference marker as its anaphoric antecedent. The choice between possible antecedents, and the choice between an anaphoric or a non-anaphoric interpretation, was not modeled by the theory. Instead, it gave a set of possible interpretations, all except one of which involved Westerståhl-style restricted quantification. In the account of the present paper, by contrast, two stages can be distinguished. The first stage results in an unresolved (i.e., underspecified) representation, containing unresolved context variables (i.e., context variables that have not yet been equated to the domain of discourse or some previously-established reference marker). The second stage delivers a partially-ordered set of possible interpretations resulting (roughly speaking) from the different possible resolutions of the context variables, subject to the new rules governing interpretive preferences.

Interpretive preferences play a very important role in the presuppositions-as-anaphors theory, as we have seen in section 2. We have to stress, however, that the preference order must be viewed as subject to all the usual constraints on interpretation. These include Van der Sandt's Consistency and Informativity, but other constraints as well. For example, consider the following sentence.

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<sup>37</sup>Another nontrivial difference between the present account and that in Van Deemter (1992) lies in the use of the Milsark-Partee perspective on weak/accented DETs, which allows us to treat nondefinite NPs in the same way as definite NPs. See section 4.4 for details.

(49) Often when I talk to a doctor, the doctor disagrees with him.

In this case, the binding interpretation (according to which the two occurrences of *doctor* corefer) is ruled out because of the implausibility of the resulting reading, which can be glossed as *Often when I talk to a doctor, he disagrees with himself*. Note that there is nothing *inconsistent* in this statement, but its implausibility seems sufficient reason to prefer an ‘accommodating’ interpretation saying, roughly, that *there is some<sub>1</sub> contextually salient doctor, and often when I talk to a<sub>2</sub> doctor, he<sub>1</sub> disagrees with him<sub>2</sub>*.

In earlier sections of the present paper we have seen that other factors can cause interpretations to be ruled out, including, for example, continuations, the IAH, and accenting. Our understanding of the interpretive preferences predicted by the presuppositions-as-anaphors theory is that these preferences serve to choose among those interpretations that remain when these other factors have done their constraining work.

## 6 CONCLUSION

Let us take stock. We have seen (section 3.2) that the otherwise successful formal theory of Van der Sandt (1992) does not always make the right predictions in cases where there is a partial match between the NP in which a presupposition originates and a possible antecedent of this NP. Beaver (1995:61-62), discussing some problems related to the partial match phenomenon, supposes that these problems will be solved when the theory matures.<sup>38</sup> We indeed think that the problems with partial matches can be solved by refining and extending Van der Sandt’s algorithm, and we have tried to offer such a refinement in the present paper. The resulting version of the presuppositions-as-anaphors theory differs from the original proposal (Van der Sandt 1992) mainly in the following respects: (1) The new version contains a precise definition of the ‘partial match’ phenomenon; (2) we have modified the resolution algorithm in such a way that — in accordance with Van der Sandt’s intuitions — partial match sentences come out as genuine ambiguities; and (3) binding is redefined in such a way (*in situ*) that non-identity anaphors receive adequate interpretations. After our exposition of the revised theory we have shown how it may be generalized to account for context-dependent interpretations of other classes of NPs than those discussed by Van der Sandt.

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<sup>38</sup>In fact, we think that Beaver’s examples are not problematic for Van der Sandt theory *as such*. The phenomena discussed by Beaver (an example is (18.b)) all fall in category IV (anaphor entails antecedent), and we have seen that these are often marked for independent reasons.

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