

Epistemic Specificity from a Communication-theoretic Perspective

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Preface

This paper is the result of condensation twice over. The ‘grandmother’ document we put together for a course on indefinites that we offered at the European Summer School in Logic, Language and Information in Helsinki in 2001. These notes cover the range of different uses of indefinites from specificity all the way to those that the literature now often treats as cases of incorporation. The first half of these notes, concerned just with specific indefinites, we subsequently revised and expanded, so much so, that it has grown into a book length manuscript, and is thus no longer suitable as a journal article.

The present paper is a part of the latter manuscript. It contains that part of the book where we present our own proposal for an analysis and formal treatment of what Farkas has termed ‘epistemic specificity’ (Farkas (1996)). The proposal builds on a DRT-based account of propositional attitudes and attitude reports, of which an unpublished manuscript has been circulated since the mid-nineties. A German translation of most of this document can be found in Kamp (2003). A somewhat condensed version, but with additional material on shared attitudes, which is relevant to the proposal in this paper, is part of Genabith, Kamp and Reyle (t.a.). For an early, more informal version of most of the main ideas see Kamp (1990).

1 Introduction

Specific indefinites are marked by one or both of the following properties:

- (i) they are understood as being about some particular referent;
- (ii) they have widest possible scope.

Following Farkas (1996) we refer to these properties as *epistemic* specificity and *scopal* specificity. Epistemic specificity concerns the way in which the use of an indefinite is related to the information state of the speaker who uses it. The notion has close ties to that of the *referential* use of definite descriptions introduced by Donnellan (1966) and of *speaker’s reference* in the sense of Kripke (1977/1990), though these are connections which we will not pursue in this paper. The concept of scopal specificity goes back to the work of Fodor and Sag (1982). Fodor & Sag saw epistemic and scopal specificity as two sides of the same coin; but in the light of subsequent work that equation now seems problematic (e.g. Farkas (1996), von Heusinger (2002a), Schwarzschild (2002)). We discuss this relationship in some detail in the original lecture notes and in the book based on them (Bende-Farkas and Kamp (2001), Bende-Farkas and Kamp (forthcoming)) — in this article we will focus exclusively on epistemic specificity.

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The central aim of this paper is to offer an analysis of epistemic specificity as invoking a special relation between language used in communication and the cognitive states of the participants in the communication. In presenting the analysis we will also discuss arguments related to its underlying assumptions: the separability of scopal and epistemic specificity (at least in principle), and the division of labour between linguistic representations and the representations that involve the cognitive states of language users. The view we will put forward is that while epistemically specific uses of indefinite *NPs* involve the selection of particular individuals as intended ‘referents’ and singular propositions that are obtained when we assign those individuals to the argument slots occupied by those *NPs*, the extra information in terms of which with these individuals are singled out need not be part of the semantic representation, or logical form, of the sentence used. When this information should be treated as part of the semantic representation is, we will argue, a non-trivial question, the answer to which may vary between types of indefinite *NPs* and between the constructions in which particular *NP* types occur. We will address this question briefly in the final part of the paper, where we discuss some of the factors on which the answer may depend.

The structure of the paper is as follows. In Section 1.1 we explore the problem how the notion of an indefinite noun phrase may be defined in non-question-begging terms, so that it can serve as a foundation for an investigation into the concept of specificity along the lines we will follow here. Section 1.2 demarcates epistemic specificity from two other notions of specificity that play an important role in the current literature, scopal and presuppositional specificity. Even though the latter will not be considered further in this paper, a brief discussion of the differences between the three seemed appropriate in the light of what comes later. Section 1.3 gives a brief résumé of the treatment of indefinites in the early representatives of the family of systems of Dynamic Semantics, File Change Semantics and Discourse Representation Theory. While the formalism we will use in our analysis of epistemic specificity is based on DRT, the earlier FCS-DRT treatment of indefinites is not essential to the analysis, something that we have come to see as needing to be explicitly pointed out. The section also contains a brief review of the comparison between the old FCS-DRT account of ‘donkey anaphora’ and the non-dynamic account according to which donkey pronouns should be analysed as E-type pronouns. We argue that those examples which seem to tip the balance in favour of the E-type account involve specificity constraints imposed by the anaphoric pronoun on its indefinite antecedent.

Section 2 presents the extension of DRT upon which the analysis of epistemic specificity, which follows in Section 3, is based. Section 4 addresses the relationship between epistemic specificity and Logical Form. The central part of the paper is Section 3.

1.1 What are indefinites and what are they for?

The first question with which an investigation of the possible uses of indefinites must begin: How should the notion of an indefinite *NP* be defined? This question prompts another one: What if any are the properties common to all indefinites?

Our first answer to this second question is in close agreement with what we take to be the predominant view within the linguistic community.

- (1) Indefinite *NPs* are those phrases which can be used to express existential quantification in simple clauses.

The ‘simple clauses’ referred to in (1) are those in which a typical transitive verb, such as *kill*, combines with a singular definite subject (e.g. a proper name) and an indefinite in direct object position. As (2) shows, each of the indefinites listed above gives rise to an existential proposition when inserted into the object position of such a clause.

- (2) John killed a bird/some bird/one bird/two birds/several birds.

We believe that (1) captures the general concept of an indefinite *NP* that is implicit in most discussions of indefiniteness in the past and current literature and which is rooted in that logical tradition according to which the central goal of a theory of natural language meaning is to capture

the truth conditions of natural language sentences by correlating them with formulae of the predicate calculus. In the unofficial canon for translating natural language into logic which has been part of that tradition, indefinites are translated into existential quantifiers. And it was because *NPs* of certain forms were seen as requiring such a translation that they then came to be classified as *indefinite NPs*.

Let us assume that (1) is to serve as a basis for determining the class of indefinite *NPs* of a given natural language *L*. The problem of accounting for the various uses of each of the different forms of indefinites in this class should then include an explanation why the different *NPs* which make an existential contribution to the truth conditions of simple clauses can also be used to perform the other functions which those particular forms are observed to serve. Since the use options of the different forms of indefinites do not coincide,¹ such an explanatory project might seem doomed from the start. But that would be overly pessimistic. That it isn't doomed outright has to do with an important fact about the nature of natural language semantics to which, we believe, semantic theory has paid insufficient attention until fairly recently: Often the truth conditions of a sentence are little more than symptoms of the intricate ways in which the interpretation of the sentence is guided by syntactic, morphological and lexical features. This consideration seems to apply in particular to the different *NPs* which according to (1) qualify as indefinites. Precisely how the various types of indefinites interact with other parts of the sentences in which they occur varies from type to type. What the rules that govern those different interactions have in common is that they all yield existential truth conditions in the simple clauses to which (1) is intended to apply. Thus, to account for the diverging use profiles of the different forms that qualify as indefinite *NPs* according to (1) is an enterprise that we need not consider impossible *a priori*. But it is one that requires that we look behind the symptom of existential truth conditions, and into the details of the various interpretation processes that are capable of producing it.

Besides the core characterisation (1) there is another property of indefinites which has played an important part in the literature of the past twenty-five years.² This is the *novelty condition*, a version of which is stated in (3):

(3) Indefinite *NPs* serve to introduce new entities into the discourse.

The comparison of (1) and (3) provokes two basic observations. First, (1) and (3) define indefinites in terms of properties which relate to very different theoretical perspectives. (1) is a statement about the contributions of indefinites to logical forms which admit the standard quantifiers of classical logic and therefore presupposes such a notion of logical form; (3) is not about the logical forms of sentences, but about discourse information and about the contributions which individual sentences and their constituents make to it. So it presupposes discourse structure, something that many of the logic-based treatments of sentence semantics ignore.

Correlated with this difference is that between the logical role that (1) and (3) attribute to indefinites. (1) presents indefinites as devices of quantification. (3) suggests that they are more like terms, which stand in some sort of reference relation to the entities which they serve to introduce.

The second observation is that while (1) and (3) are very different in their implications and presuppositions, it is easy to see that they will often go together. If a constituent *NP* of a statement introduces a new entity into the discourse, then the statement must entail that there is something which is of the kind the *NP* describes and which satisfies the predication that the statement expresses with regard to the position which the *NP* occupies in it. Conversely, a statement to the effect that there is something which satisfies certain conditions is naturally construed as making an entity with just those properties available for further reference. Seen in this light, (1) and (3) seem natural, well-nigh inseparable, bedfellows. In fact, their complementarity has come to play a crucial part in our current understanding of the ways in which indefinites work.

We will assume therefore that a phrase type of any natural language *L* qualifies as an indefinite if it satisfies the conjunction of (1) and (3).

¹See e.g. the research initiated by Carlson (1977) on bare nominals, or the well-attested differences between 'plain' indefinites like *a bird* and numerically modified ones, like *at least two birds* or *at most three birds*, investigated, among many others, in Liu (1990).

²See Heim (1982).

1.2 Epistemic, Scopal and Presuppositional Specificity

In the opening paragraph of this paper we distinguished between epistemic and scopal specificity. Here we would like to say a few words about the considerations which led to these two notions. In addition, we briefly mention a third specificity concept, according to which an indefinite *NP* is specific if it is presuppositional. In this section we review these three specificity concepts, so that it will be clear what concept is targeted in the analysis we propose in Section 3, and which are not.

Epistemic Specificity

The earliest discussions of epistemic specificity (Fodor (1970/1979), Ioup (1977)) were concerned with indefinite *NPs* that occur as constituents of the complements of attitude verbs such as *believe*, *know* or *want*. An example is (4):

- (4) Mary believes that her husband is seeing a real estate agent.

This sentence can be interpreted as attributing to Mary a belief about some particular person — viz. that Mary’s husband is seeing this person. In the philosophical literature such attitude attributions are called *de re* (with respect to the constituent in question, here the *NP a real estate agent*) and it is widely assumed that the content of such an attribution is a singular proposition, in which a certain predicate is said to be true of some real individual. *De re* interpretations of indefinite *NPs* such as the one just mentioned — viz *a real estate agent* in (4) — are instances of what many linguists would now describe as *epistemically specific* interpretations (cf. Farkas (1996)), a terminology which we too will make use of.

The *de re* interpretation of (4) is to be distinguished from its *de dicto* interpretation. On its *de dicto* reading (4) attributes an existential belief to Mary, to the effect that there is some real estate agent or other whom her husband is seeing. It should be stressed in this connection that the *de re* interpretation of (4) may be purely existential from the perspective of the speaker: She may be of the opinion that there must exist some person of whom Mary believes that her husband is seeing her, but without herself having any knowledge who this person is (beyond the fact that she is a real estate agent).³

There is an obvious connection between the *de re* and *de dicto* interpretations of (4) on the one hand and, on the other hand, two different ways in which we can interpret the statement (5), made by Mary herself.

- (5) My husband is seeing a real estate agent.

(5) can be understood as expressing Mary’s belief that there is some real estate agent or other whom her husband is seeing, while she herself is in the dark about that person’s identity. This interpretation correlates with the *de dicto* interpretation of (4). But (5) can also be taken as the expression of a *de re* belief, a belief which attributes to some particular real estate agent the property that Mary’s husband is seeing her; this interpretation resembles the *de re* interpretation of (4), and it is tempting to regard it as involving a way of interpreting the indefinite which is specific in a sense quite similar to the specificity of *de re* interpretations of indefinite *NPs* in the complements of attitude verbs.

³In this respect there is a superficial similarity between the *de re* interpretation and the *de dicto* interpretation. For it is clear that the *de dicto* interpretation doesn’t entail either that the speaker has any particular real estate agent in mind. If anything it suggests the opposite. But the similarity is only superficial. For one thing, the *de dicto* interpretation is compatible with the speaker thinking that Mary’s belief is a figment of her imagination. So, on the *de dicto* interpretation the speaker is not even committed to the existence of real estate agents (though this may be implausible for independent and irrelevant reasons). For the *de re* interpretation this is not so. This interpretation entails that a real estate agent exists. Also, as many philosophers have stressed, the *de re* interpretation allows for the possibility that Mary does not know that the person to whom she attributes the property of being seen by her husband is a real estate agent; it is enough if the speaker has this information. Of course it is also possible to interpret (4) *de re* and yet to take Mary to also know of the person in question that she is a real estate agent. Indeed, in many cases where a speaker intends an attitude attribution as *de re*, she will also intend this further implication (i.e. that the bearer of the attitude is aware that the descriptive information in the specifically interpreted *NP* applies to the *res*).

The distinction between the “specific” and “non-specific” interpretations of the indefinite *NP* in (5) seems to mirror that between the *de re* and *de dicto* interpretations of the indefinite in (4). This suggests that at bottom it may be the same distinction that we are dealing with in either case and that only one notion of specificity is involved. One central point of this paper is that in an important sense this intuition is right. But nevertheless there are also significant differences between the occurrences of indefinites in attitude attributions and those in simple sentences like (5), which suggest that the two cases should be analysed in different ways. The similarity between the two types of occurrence lies at the heart of our analysis of epistemic specificity. The differences are connected with the theme of Section 4.

Scopal Specificity

According to the logical tradition of which we spoke in Section 1.1 quantifying *NPs* are those whose translation into logical form requires the use of quantifiers. Such a quantificational translation necessarily assigns a scope to the quantifier (or quantifiers) used. It thereby also assigns, indirectly, scope to the translated *NP*. This scope assignment must accord with the semantic intuitions that speakers associate with the sentence in which the quantifying *NP* occurs. That is, the scope of the translating quantifier must agree with the scope constraints that speakers take to apply to the *NP* it is used to translate.

Quantifying *NPs* — among which figure prominently those English *NPs* which begin with *every*, *no* or *most* — are notoriously subject to “island constraints” (Ross (1967)): For instance, a quantifying *NP* has to obey the Complex *NP* constraint: if it occurs within a relative clause it cannot outscope the *NP* that governs this clause. Thus, in (6a) the quantifying *NPs* *every student of mine/no student of mine/most students of mine* cannot be understood as having scope over the *NP* *exam questions* (and, *mutatis mutandis*, over the subject *NP* *three colleagues*).⁴

- (6) a. Three colleagues contributed exam questions that every student of mine/no student of mine/most students of mine answered.
- b. Three colleagues contributed exam questions that a student of mine answered.

In contrast, for (6b), in which the direct object position is filled by an indefinite *NP*, a “wide scope” interpretation seems possible: “There is some student of mine such that three colleagues contributed questions which this student answered.” (Of course, a narrow scope interpretation, according to which three colleagues contributed questions each of which was answered by at least one student of mine, is also possible in this case. As a rule when an indefinite allows for a non-narrow scope reading, the narrow scope reading is also possible, and the sentence is ambiguous.) Over the years there has been a growing awareness that many island constraints are not as robust as was apparently thought at first. This is true also for quantifying noun phrases beginning with *every*, which sometimes have wider scope readings than the original island constraints permit. Nevertheless, the contrast between (6a) and (6b) appears to be real enough and it points towards an important difference between indefinites and “true” quantifying *NPs* like those beginning with *every* or *no*. It is this difference that finds articulation in the term *scopal specificity*. As we propose to use the term, an indefinite *NP* is given a *scopally specific* interpretation if it is interpreted as having a scope that is wider than the one indicated by the syntactic position of the indefinite *NP* and one that is at the same time wider than would be possible for a true quantifying *NP* in that same position.

As we have described them epistemic and scopal specificity appear as notions of quite different kinds. But one might wonder nonetheless whether there aren’t systematic correlations between them.

This is very much the picture that is suggested in Fodor and Sag (1982), a paper which holds a place of prime importance in the literature on specificity. Fodor and Sag proposed to account for contrasts like that between (6a) and (6b) by assuming that indefinite *NPs* are ambiguous: Occurrences of an indefinite function either (*i*) as quantifying *NPs* with standard scope properties, or

⁴That is — focusing on the *NP* *every student of mine* — the sentence cannot mean that for each of my students there were questions which that student answered and which three colleagues contributed, where the colleagues vary from student to student.

(ii) as singular terms, which designate some referent and thereby display the position-independent wide scope behaviour familiar from proper names and many other definite *NPs*. The latter occurrences are called *specific*.

On this account the epistemic aspect of specificity and its scopal effects are two sides of the same phenomenon. In order to use an indefinite *NP* specifically — i.e. as a singular term — the speaker must be in a position to use it as referring to some particular individual, and presumably this requires that she be in possession of uniquely identifying information about that individual. At the same time, since specific *NPs* function as singular terms, any sentence in which they occur must be construed as expressing a property of the referent, irrespective of the position that the *NP* occupies within it. If on the other hand an indefinite is interpreted as a quantifying phrase, then it will obey the constraints that govern all quantifiers.

Unfortunately this proposal doesn't do justice to the full range of relevant data. Sentence (7) allows for a number of distinct interpretations which differ from each other as regards the scope relations between the different *NPs*. ((7) is a variant of a sentence from Chierchia (2002); see also Farkas (1981) and Abusch (1994).)

- (7) Every linguist has looked at all solutions that have been proposed in the literature for some linguistic problem.

One of these interpretations is that for every linguist there is some linguistic problem such that that linguist has looked at all proposed solutions for that problem. On this reading the indefinite *some linguistic problem* (a) has scope extending beyond the relative clause in which it occurs, while (b) its scope is not maximal, since it is within that of the subject *NP* of the main clause. (a) implies that the indefinite does not behave like a standard quantifying *NP*, (b) that it doesn't behave like a referring term. We take this matter up at greater length in Bende-Farkas and Kamp (forthcoming)

There is also another problem with the proposal of Fodor and Sag. F&S seem to see the specificity of an indefinite *NP* very much from a speaker's perspective: The speaker uses the *NP* to refer to some particular individual. This is reminiscent of what we said about (5): Mary can use this sentence to give vent to a suspicion directed at some particular person, and if this is what she does, then, presumably, she uses the *NP a real estate agent* as a specific indefinite in F&S's sense. But, assuming that this is right, what are we to say about the *de re* interpretation of (4) as we described it in our first discussion of that sentence? According to that description, the speaker assumes that Mary has a particular real estate agent in mind, but the speaker herself has no idea which individual that is. This interpretation fails to fit the F&S account on two grounds. First, since by assumption the *NP* is not specific in the speaker's sense, it must, according to F&S's proposal, be a quantificational *NP* and thus obey the usual scope constraints for quantifying *NPs*. However, in the interpretation at issue the *NP* is assigned a wider scope than a standard quantifier should have. (Remember that the *NP a real estate agent* is part of the *that*-clause which describes the attributed belief.) But apart from this scope problem there is also a more conceptual difficulty. In Section 1.2 we drew attention to the intuitive similarity between a "specific" construal of (5) and a *de re* interpretation of (4): In either case what seems to be involved is a uniquely identifying representation of some individual in the mind of Mary, and a construal of the indefinite *NP* as related to this representation in some way. As it stands, however, F&S's proposal doesn't account for this role of the *NP* when the mind in question is not that of the speaker. Thus it fails to explain the intuitive similarity between specificity construals and *de re* interpretations of attitude reports.

The F&S account encounters similar but arguably even more dramatic difficulties with sentences which quantify over the attributees of propositional attitudes. One example is the following variant (8) of (4):

- (8) Every woman in the street believes that her husband is seeing a real estate agent.

One possible interpretation of his sentence is that for each of the women in the street there is some particular real estate agent of whom the woman holds the *de re* opinion that she is going out with her husband. This reading too is different from a *de dicto* reading which attributes a purely existential belief to each of the women in the street. And it is also very clearly distinct from a

specific reading in F&S’s sense, since not just one real estate agent is involved but possibly as many as there are women in the street. So again F&S’s proposal cannot capture this reading.

Another potential problem for the F&S proposal is illustrated by a much discussed example from Hintikka (1986):

- (9) Every Englishman admires a certain woman.

It has been argued that this sentence can be used to express a proposition involving a certain functional concept, e.g. the one which associates with each Englishman that Englishman’s mother.⁵ Such interpretations seem to share some of the features of specific interpretations of sentences like (5), and a theory of specificity ought to have something to say about them. But to make the F&S proposal applicable to specificity of this sort one would have to account for some way in which functions can be the referents of indefinite *NPs*. Admittedly, the problem of functional denotations for noun phrases is a difficult one generally. It isn’t restricted to indefinites and it hasn’t to our knowledge been satisfactorily solved.⁶ But it is an issue that often interferes with other questions which come up in debates about indefinite *NPs*. So it seems right to draw attention to it here.

The problem presented by (9) and those we encountered in connection with (4) join forces in a sentence like (10).

- (10) Every Englishman believes that all his personal problems are due to a certain woman.

(10) can be construed as saying that each Englishman has a *de re* belief concerning a certain woman and where, moreover, the women are assumed to stand to the believers in some systematic relation (e.g. that of being their respective mothers).

This is only the beginning of a progression of sentences in which quantification, *de re* attributions and functional *NP* interpretations interact in increasingly complex ways. The analytic tools offered by Fodor and Sag are insufficient to deal with these even from the start. But on this particular point the more recent literature does not seem to have made too much progress either, even if it has gone well beyond F&S in paying close attention to the intermediate scope readings which F&S dismissed as non-existent. Although we do not discuss ‘distributed *de re*’ readings for sentences like (8) in this paper, it will be plain from the proposal that we make in Section 3 that it can be adapted to deal with such readings.

Presuppositional Specificity and Partitive Indefinites

One type of indefinite *NP* that has been prominent in discussions of specificity is that of the partitive indefinites. A *partitive* indefinite is an indefinite *NP* whose possible values are restricted to some given set. Examples of English partitives are the phrases in (11):⁷

- (11) One/some/three of the girls

The preposition *of* occurring as part of such partitive *NPs* always stands for set membership or set inclusion — depending on whether the *NP* itself denotes an individual or a set — of the *NP*’s ‘denotation’ within the set *X*.⁸ It should be noted that such an interpretation, which includes the

⁵In this and the next example the presence of *certain* (or some equivalent word such as *particular*) seems essential. Some attention to the difference between *a* and *a certain* is paid in many disquisitions on indefinite *NPs*, though as far as we know no exhaustive treatment of the semantic and pragmatic effects of *a* (*certain*) seems to exist as yet. A few remarks on the issue can be found in Bende-Farkas and Kamp (forthcoming).

⁶But see Egli and von Stechow (1995), Egli and von Stechow (1997), Reinhart (1997), Winter (1997), Kratzer (1998), Chierchia (2002), and, for a unified analysis of the functional readings of non-narrowest scope indefinites and *NPs* in identificational sentences, Winter (2004).

⁷In a mereological treatment of the denotations of singular and plural *NPs* the meaning of the preposition *of* in a partitive will be simply that of being a proper mereological part. For the ‘proper’ in *proper mereological part* see the subsequent remarks.

⁸We are using ‘denote’ here as a shorthand for ‘has for its semantic value’. In the case of definite partitives the denotation will be simply the referent of the *NP*, in the case of indefinite or quantifying partitives the ‘denotations’ will be any values for the variables (or discourse referents) introduced by the *NP* which satisfy the constraints imposed by the *NP*.

requirement that the denotation be included within some set X , is not unique to overt partitives like those in (11). Indefinite NPs without *of-PPs* sometimes get such an interpretation too, except that in their case the set X is implicit and must be recovered from the context. An example is (12), where the NP *two women* is naturally understood as denoting a pair of women from among the people who had gathered in front of the church.

(12) A small crowd had gathered in front of the church. Two women were crying.

It is this semantic property — of receiving a partitive interpretation, according to which the denotation of the NP is included within some independently identifiable set X — which is most directly relevant to the discussion of this section. It will be convenient, however, to focus on ‘overt’ partitives, which include a partitive *of-PP* and thus get partitive interpretations as a matter of necessity.

Overt partitive NPs permit both non-specific and specific interpretations. These options exist because the set X , while placing a constraint on what the denotation of the NP can be, never fixes it completely. That such ‘looseness of fit’ of the denotation within the set X is part of the way partitives function is indicated by the fact that the *of-NP* of a partitive must always be plural (and thus denote a set of cardinality ≥ 2); this is so even in the case where the partitive NP is in the singular and its denotation, a single individual, could therefore fit within X even if X were a singleton set. The singular NP **one of the woman* is just as ungrammatical as the plural NPs **two of the woman*, **three of the woman* etc. Furthermore, the ungrammaticality of **one of the woman* is mirrored by the behaviour of grammatical partitives like those in (11), in which the *of-NP* is in the plural and does denote a set of ≥ 2 elements. When the cardinality of the set X denoted by a definite NP such as *the women* is n and the speaker knows this, then *n of the women* is normally not felicitous. For instance, suppose that both speaker and hearer know that there were three women. Then using *three of the women* is peculiar — appropriate would have been *all three of the women*, or *the three women*.

We conclude from these observations that it is an intrinsic part of the grammar of partitive NPs that the set X *properly* includes the denotation of the NP . It is because of this that partitive indefinites permit non-specific uses as a matter of principle (as well as, for the by now familiar reasons, specific ones). Even if speaker and hearer can both identify the set X , neither needs to know exactly where within X the denotation of the partitive NP is located. Non-specificity results when neither knows, specificity when the speaker knows but the hearer doesn’t or isn’t supposed to.

To sum up this first part of the section: partitive NPs can be used either non-specifically or specifically. In this regard they are like other indefinite NPs . Partitivity is thus orthogonal to the specific–non-specific distinction; this applies both to the overt partitives and to the case of non-overtly partitive NPs which are assigned partitive interpretations.

It has become a widely accepted view that all definite NPs come with presuppositions to the effect that their referents can be fixed or identified independently of the predication in which the definite NP occupies an argument position. These presuppositions vary with regard to the method of referent identification, but what they all have in common is the requirement that application of the methods they specify should lead to identification of the referent. One of these identification methods, different versions of which are associated with pronouns and definite descriptions, is referent identification via anaphora resolution. This option is available in particular for the *of-NPs* of overt partitives.

An example is (13), where *the women* can be understood as referring to the set of those students who are mentioned in the preceding sentence as having come to see the speaker the day before the utterance and who, moreover, are also women.⁹

(13) Some students came to see me yesterday. One of the women came back this morning.

⁹As pointed out and explained in the work of Van Deemter (cf. van Deemter (1992), van Deemter (1993)) the noun *women* will get stress iff some but not all of the students referred to in the first sentence were women; if all of them were women, then *women* will be unstressed.

It is, we said, a widely accepted view that definite *NPs* trigger identification presuppositions. It is equally widely accepted that indefinite *NPs* do not. On the contrary, by using an indefinite the speaker signals to the addressee that she does not expect him to be in a position to identify the *NP*'s denotation. And this is so whether or not she herself uses the indefinite specifically or non-specifically. The partitive *one of the women* of (13) can serve as an illustration: Given the content of (13) it is a plausible assumption that the speaker used the *NP* specifically — *she* knows which woman came back that morning; but by using an indefinite *NP* she implies that she doesn't assume her interlocutor to have this knowledge. (It is also possible, even if that is not the first possibility that comes to mind, to imagine an utterance situation for (13) in which the speaker merely knows that one of the women came back, but not which one. In that case she would have used the indefinite non-specifically; but the signal to the addressee that he isn't expected to have identifying knowledge about the denotation is there just the same.)

From the observations we have made about partitive indefinites it can be seen that they combine interpretational features of both indefinite and definite *NPs*. On the one hand they are like indefinites in that they imply that the recipient need not be able to identify their denotation. On the other their denotation is confined to a set *X* of which it is expected that the recipient can identify it; and in many cases the limits imposed by *X* go beyond what follows from the purely descriptive content of the partitive *NP*. This second, definite-like aspect of partitive *NPs* may be responsible for the fact that in a number of languages partitive *NPs* pattern morpho-syntactically with definite *NPs*, rather than with non-partitive indefinites. This phenomenon is superficially similar to another one which is also fairly common: In some languages specific indefinite *NPs* can or must be morpho-syntactically distinguished from non-specific ones, and by a form of morpho-syntactic marking which they share with the definite *NPs*. (See Section 4 for a brief discussion of one example of this, the Romanian direct object marker *pe*.)

No general semantic or pragmatic principles can be firmly inferred from such morpho-syntactic facts. But they are nevertheless suggestive. In particular, they may encourage the temptation to perceive a close connection between specific indefinites and partitives: Partitives, according to this view, come in varying degrees of 'specificity' — the smaller the confining set *X* that is involved in the partitive interpretation of an indefinite *NP*, the more 'specific' the interpretation. The limiting case is that where *X* is so small that it fully coincides with the denotation of the *NP* included in it, and thereby fixes the denotation completely. And that — still according to this same view — is just what is found in the case of specific indefinites. In this way specificity appears as the limiting case of the more general phenomenon of partitive interpretation.

Such a view — an example is Portner and Yabushita (1998)¹⁰ — suggests that the nature of specificity is *presuppositional*: what in the case of an overt partitive is the presupposition associated with the definite *of-NP* becomes in the limiting case of specificity a presupposition that there is a way of identifying a set which fixes the denotation completely, and thus that it is possible to identify the denotation itself.

This idea may seem appealing. But we do not think it can be right. A first point which speaks against it is the fact about partitive *NPs* we noted above: the confining set *X* should *not* fix the denotation of the partitive *NP* completely. This means that the effect of the specific interpretation of indefinites — that of complete identification of the *NP*-denotation via the confining set — can never be achieved by using an explicit partitive in its stead. If specific interpretation were the limiting case this would be surprising and call for a special explanation. We find it hard to see what such an explanation could be.

But there is also a more fundamental difficulty. It is connected with what we said about epistemic specificity in Section 1.2 (and more closely with the analysis we will present in Section 3). To interpret an indefinite *NP* specifically is to assume that the speaker used it to talk about a particular individual she has in mind. It is true that this assumption has one of the salient characteristics of a presupposition: If it is not justified, then the interpretation of the indefinite *NP* is defective, and with it that of the sentential utterance to which the *NP* belongs; the speaker has expressed herself inappropriately in that case (rather than having spoken felicitously but falsely). But even if this

¹⁰But see also Breheny (2003), Cresti (1995), van Geenhoven (1998), Geurts (t.a.), Jäger (2004), Schwarzschild (2002) or Yeom (1998).

were enough to qualify the assumption as a presupposition, it would nonetheless be a presupposition that is clearly different from the presuppositions connected with definite *NPs* of which we spoke above. The presupposition associated with a definite *NP* is to the effect that the *interpreter* should be able to identify the *NP*'s referent. The assumption implicit in the specific interpretation of an indefinite, on the other hand, places such a requirement on the *speaker*; it is she who is supposed to have identificational knowledge of the *NP*'s denotation, not the interpreter.

Whether the assumption implicit in the specific interpretation of indefinites is to be seen as a case of presupposition depends on how exactly the concept of ‘presupposition’ is defined. This is a difficult and complex matter about which the last word has not yet been said. But in whatever way this matter may be resolved eventually, we do well to keep the difference — between the assumptions connected with specific interpretation and the presuppositions associated with definite *NPs* — firmly in mind.

1.3 Indefinites in Dynamic Semantics

The framework that is presupposed in much of what will be discussed in the next sections is Discourse Representation Theory (DRT). The central assumptions that are made in DRT about the semantics of indefinites are built into its standard formulations and in the use we make of DRT here they will for the most part be left implicit. In view of this it seems appropriate to devote a few words of this introductory part to the DR-theoretic analysis of indefinite *NPs*. There is also a more fundamental reason for doing this. Not only is the DRT-analysis of indefinites one that in its essentials is common to all versions of Dynamic Semantics (of which DRT is one), it is also one that has received attention in discussions transcending the confines of Dynamic Semantics as such. And it differs in important and interesting ways from other views about how indefinites work, in particular, from the traditional view which equates indefinites with existential quantifiers.

A third reason for reviewing the original DRT account of indefinites is directly related to the topic of this paper. From the beginning the dynamic account of indefinites has been subject to a serious objection, which is not easy to refute and which we believe may well have been at the bottom of a widespread skepticism vis-à-vis the dynamic approach to natural language generally. We will argue in this section that those cases of the use of indefinites to which the objection points and with which the dynamic theories seem unable to deal, should be seen as cases of specificity. Therefore, since the original dynamic theories weren't designed to account for specificity, they were in no position to account for these examples either. But this is no longer so when a treatment of specificity is added to them. This is so in particular for any version of DRT which includes the account of specificity which we will present below.

The central feature of the dynamic approach to semantics is that the meanings of individual sentences are analysed in terms of the semantic contributions that sentences make to the texts and conversations containing them. This general conception is intimately connected with the dynamic view of indefinites, and both are related to a certain solution to the so called “donkey” problem. It was this solution, first formulated around 1980, which did much to promote the cause of dynamic theories in their early days.¹¹

Standard illustrations of this problem are given in (14).

- (14) a. Bill owns a donkey. He beats it.
 b. If Bill owns a donkey, then he beats it.

The occurrences of *it* in the second sentence of (14a) and in the consequent of (14b) are understood as anaphoric to the occurrences of the indefinite *NP a donkey* in the first sentence of (14a) and in the antecedent of the conditional in (14b). These anaphoric connections are hard to account for on the assumption that indefinite *NPs* are existential quantifiers. In (14a) there is the problem how an existential quantifier in the first sentence can bind the pronoun in the second sentence. A similar problem affects (14b): if we assume that the *NP a donkey* in the antecedent of the conditional is

¹¹We are referring here to File Change Semantics (Heim (1982)) and Discourse Representation Theory (Kamp (1981)).

an existential quantifier whose scope is restricted to the antecedent, then the pronoun *it* cannot be bound by it; if we take the quantifier to have scope over the conditional as a whole we get the wrong truth-conditions.

Part of the dynamic solution to this puzzle is the assumption that indefinite *NPs* behave in a manner that is as reminiscent of referring terms as it is of quantifying phrases — indefinites combine, so to speak, referential and quantificational features. In DRT this idea is implemented in the following manner: Indefinite *NPs* introduce quasi-referential elements — so-called *discourse referents* — into the semantic representations of the sentences and discourses in which the *NPs* occur. Representation-internally discourse referents act much like referents in a traditional sense. In particular, they can serve as antecedents to anaphoric pronouns in much the same way that this had previously been assumed for the referents of definite *NPs* like proper names, demonstratives or definite descriptions. The quantificational dimension of discourse referents comes into play only when the representations of which they are part are evaluated for truth — i.e. when they are related to the subject matter of which the represented sentence or discourse purports to speak. For example, the DR-theoretic representation (DRS) of (14a) is as in (15), with the discourse referents *b* and *y* and the conditions *Bill(b)*, *donkey(y)* and *own(b,y)* coming from the first sentence and the three remaining conditions from the second.

	<i>b</i>	<i>y</i>	<i>u</i>	<i>v</i>
(15)	<i>Bill(b)</i>	<i>donkey(y)</i>	<i>u = b</i>	<i>v = y</i>
	<i>own(b, u)</i>		<i>beat(u, v)</i>	

Both *b* and *y* function discourse-internally as “referents” and can serve as antecedents for the pronouns *he* and *it*. But when (15) is evaluated for truth conditions, these same discourse referents function as quantified variables: The DRS (15) is true in a given situation or world if this world or situation contains *some* entities corresponding to the discourse referents of the DRS which satisfy the DRS conditions. For the case of the discourse (14a) this amounts to the truth conditions given in (16a) or, equivalently, in (16b):¹²¹³

- (16) a. $(\exists b)(\exists y)(\exists u)(\exists v)(Bill(b) \ \& \ donkey(y) \ \& \ own(b, y) \ \& \ u = b \ \& \ v = y \ \& \ beat(u, v))$
 b. $(\exists b)(\exists y)(Bill(b) \ \& \ donkey(y) \ \& \ own(b, y) \ \& \ beat(b, y))$

To repeat: the central characteristic of the dynamic conception of indefiniteness is the combination of a kind of representation-internal referentiality on the one hand with a representation-external quantificational behaviour on the other.

The objection against the dynamic account to which we alluded above concerns examples like (14a), repeated here as (17a). DRT and other dynamic theories assign (17a) the same interpretation that they assign to (17b) and (17c). This seems wrong, for speakers do not interpret (17a) and (17b–c) in the same way. Speakers show a strong bias towards seeing the pronoun–antecedent relation in (17a) as imposing a uniqueness constraint on the referential conditions expressed by its indefinite antecedent, but they tend to find no such uniqueness implications in (17b) or (17c). Dynamic theories, which assign the same representation to all three, fail to account for the uniqueness constraint which sets (17a) apart from the other two. This point had been made by Gareth Evans even before the first dynamic theories were explicitly stated (Evans (1977)). Evans saw examples like

¹²One of the features of (14b) which led semanticists to see this sentence as a challenge is the apparent universal force of *a donkey*: (14b) can be read as entailing that if Bill has several donkeys, he beats them all. In DRT this “universal quantifier effect” falls out from the general principles for the evaluation of discourse referents together with the semantics to the conditional. See Kamp and Reyle (1993) or any other introduction to DRT.

¹³The existential binding of *b* in (16) is combined with the uniquely identifying condition *Bill(b)* which requires of the value for *b* that it be the bearer of the given use of the name *Bill*. Truth-conditionally this is of course equivalent to what one gets when the existentially bound variable is replaced by an individual constant which refers to the unique satisfier of the condition.

(14) as strong evidence for the theory of pronominal anaphora he developed and which has become known as the ‘E-type Theory’.¹⁴

- (17) a. Bill owns a donkey. He beats it.
 b. Bill owns a donkey which he beats.
 c. Bill owns a donkey. (In fact,) he owns a donkey which he beats.

To see how the E-type approach deals with examples like the ones in (14) we must briefly review its main features.

The E-type Theory’s approach to the donkey problem is very different from that of the dynamic theories and is closer to the logical and semantic traditions that prevailed at the time when these different approaches were formulated. In particular, it adopts the classical view that indefinites are existential quantifiers. Pronouns are treated as ambiguous between those which function as bound variables — an example would be *him* in *Every man loves a woman who dislikes him* — and ‘E-type pronouns’. The latter, of which the occurrences of *it* in (14a–b) are examples, are analysed as concealed definite descriptions, which establish coreference with their anaphoric antecedents on the strength of their descriptive content. One of the central tasks for such a theory is to provide the general principles for determining the descriptions via which E-type pronouns are interpreted. Different versions of the E-type theory vary in the recipes they offer for description construction. One, very strict, version of the theory has it that when an E-type pronoun is interpreted as anaphoric to an indefinite *NP* α , then the descriptive content of the description is the conjunction of the descriptive content of α and the predication which contains α as argument. In the case of (14a–b) this yields the description *the x such that x is a donkey and x is owned by Bill* — or, more succinctly, *the donkey that Bill owns*. So the logical forms for (14a–b), in which the pronoun has been replaced by the description, will be as in (18):

- (18) a. $(\exists y)(\text{donkey}(y) \ \& \ \text{own}(b, y)) \ \& \ \text{beat}(b, \iota y)(\text{donkey}(y) \ \& \ \text{own}(b, y))$
 b. $(\exists y)(\text{donkey}(y) \ \& \ \text{own}(b, y)) \rightarrow \text{beat}(b, \iota y)(\text{donkey}(y) \ \& \ \text{own}(b, y))$

(Here ι is the iota-operator, used in classical formalisations of singular definite descriptions, and b is now an individual constant.)

In relation to cases like (14b), where the anaphoric pronoun and its indefinite antecedent belong to the same sentence, the dynamic account seems to us to have the edge over the E-type approach, even if it is true that a fully satisfactory account of such cases may need elements from both (and more besides. For a detailed discussion of the issues involved see Heim (1990).) For transsentential donkey anaphora, however, the chips seem to be reversed. The definite description which the E-type theory inserts for the pronoun comes with the presupposition that its descriptive content is satisfied uniquely. For the case of (14a) this implies that if there is more than one donkey which Bill owns, the presupposition fails and the discourse becomes uninterpretable. In (17b–c), where there is no anaphoric reference to *a donkey*, there is no uniqueness presupposition either, and so no constraint is imposed on the number of donkeys Bill owns. These conclusions seem to agree with speakers’ intuitions.

Yet, when we look at examples involving anaphoric links between indefinites and pronouns more closely, the advantages of the E-type approach to transsentential anaphora appear more dubious. Consider for instance the following case. Someone has paid a visit to Bill on his farm and has seen him beat the one donkey that he keeps in the paddock right next to the farm-house. When this person utters (17a) as part of a report of her visit, there need be no implication that the donkey she is talking about is the only one Bill owns. The speaker need not even believe that it is Bill’s only donkey. All that does matter is that there is some particular donkey that she has in mind and that she is talking about.

The problem which such cases present for an E-type account is this. A hard-headed version of the theory ought to provide a general method for obtaining an explicit description which will yield the

¹⁴Evans’s own E-type account is not the only one of its kind. Another E-type account roughly contemporaneous with that of Evans is Cooper (1979). A careful comparison of E-type accounts and dynamic accounts can be found Heim (1990).

intuitively right interpretation for the anaphorically linked sentences when it is substituted for the anaphoric pronoun. For the case we are discussing this description must capture which individual the speaker had in mind when she used the *NP a donkey*. But how could a general prescription yield such a description in this case? Neither the sentences of (17a) nor the context in which they are uttered reveal how the speaker is thinking about the donkey she is talking about or how she would describe it. In fact, it isn't even necessary for a felicitous use of (17a) that the speaker have a description at the ready. All a felicitous use of (17a) requires is that she could produce an identification if pressed. The only way in which the prescription could succeed, it seems, is to specify the description in the same way we just did, viz as 'the entity that the speaker had in mind and used α to talk about', where α is the indefinite *NP* in question.

It is this very condition — that the speaker has some particular individual in mind, which she should be in a position to describe uniquely when asked — which we see as the hallmark of the epistemically specific use of indefinite *NPs*. (The analysis of epistemic specificity presented in Section 3 rests on a version of this idea.) Given this equation we can state the felicity conditions for trans-sentential pronominal anaphora to indefinites as in (19):

- (19) In order that a speaker can legitimately use a singular pronoun to refer anaphorically to an indefinite *NP* in a preceding sentence she must have made a(n epistemically) specific use of that indefinite.

Whether proponents of the E-type account would accept (19) as a vindication of their theory will depend on what methods for finding the pronoun-replacing descriptions they are committed to. (We suspect that (19) wouldn't make all advocates of the theory equally happy.) But in any case it should be stressed that as it stands (19) only applies to cases where indefinite and pronoun are used to talk about things in the real world. (The proposal of Section 3 also deals only with cases of this kind.) But of course, talk about the real world isn't the only type of discourse in which trans-sentential anaphora to indefinite antecedents is found. For instance, it is just as common and natural in fiction (cf. Kamp (1999)), and fiction is only one among a range of discourse types where this is so. If in these types of discourse trans-sentential anaphora to indefinites involves specificity as well, it is specificity in a different sense from what we will define in this paper. Our present analysis of specificity thus falls short of providing a general account of trans-sentential anaphora, which covers all the discourse types in which anaphora of this kind is found. At present we do not know what form such a general account could take.¹⁵

Once we commit ourselves to the position that the constraints on trans-sentential anaphora should be stated in terms of specificity we have to confront a further question: at what level of analysis should a principle such as (19) be assumed to operate? As a preliminary to the discussions of this issue in Section 4 we conclude our review of donkey anaphora with the two examples in (20).

- (20) a. There is a donkey Bill owns. He beats it.
 b. There is a doctor in London. He is Welsh.

((20b) is a variant of an example from Evans (1980); it is discussed in Heim (1982).)

These examples demonstrate that the indefinite *NPs* of *there*-insertion constructions can be given a specific construal in the sense of specificity required by (19), just as this is possible for indefinites appearing in other syntactic configurations (such as e.g. *a donkey* in (14a)). This is a point worth noting because *there*-insertion constructions are highly selective with regard to the *NPs* which can appear in the position occupied by the indefinite *NPs* *a donkey* in (20a) and *a doctor* in (20b). Most notably, definite singular *NPs* like proper names, pronouns or demonstratives are excluded from this position (Milsark (1977)). We see this constraint as implying that the status of indefinites

¹⁵Our own hope is to find a general notion of 'unique identifiability' which is applicable to arbitrary discourse types, correlates with the possibility of anaphora in subsequent sentences, and which manifests itself as specificity in the sense of this paper when language is used to talk about the actual world.

in *there*-insertion contexts is crucially different from that of referring terms. An indefinite in a *there*-insertion context behaves as an expression which introduces a variable that the *there is* constituent, which acts as a variable binder, needs as bindee.¹⁶ But if this is so, then interpreting the indefinites in (20) as specific, and thus as standing for some particular referent, must be a process that occurs at some other level of interpretation.¹⁷

2 Specificity and *de Re* Belief

In Section 1.1 we pointed out that a speaker can use the indefinite *NP a real estate agent* in (5) either non-specifically or specifically; her utterance may be backed merely by existential knowledge — that there is some person or other whom her husband is seeing and who works in the real estate business — or she may have some particular real estate agent in mind and believe that her husband is seeing that person.

(21) (= 5) My husband is seeing a real estate agent.

It should be stressed that uses of indefinites which are specific in this sense are extremely common. In fact for many utterances of indefinites it is hard or impossible to imagine that they could have been used otherwise. One type of example of this we encountered in Section 1.3, where we noted that pronominal anaphora to an indefinite in a preceding sentence in sentence sequences like (14a) are felicitous only if the indefinite was used specifically.

(22) (= (14a)) Bill owns a donkey. He beats it.

In other cases it is the content of what is said and the circumstances in which it is said that suggest or imply that an indefinite must have been used as specific. An example is (23). Suppose Professor *A* says to her colleague *B*:

(23) A student was looking for you this morning.

on the strength of this student having approached *A* with the question where she might be able to find *B*. Then *A*'s use of *a student* will derive from her concept of the student who approached her, and the thought that has led her to the statement she has made will have been that that particular student was looking for *B*. Moreover, it is likely that *B* will, when *A* says (23) to him, interpret her words in this spirit: Presumably *A* is talking about some particular student who asked her where she could find *B*. In other words, *B* is likely to take *A* to have made a specific use of *a student*, and it is reasonable to assume that this will be reflected in the over-all representation that his interpretation of the utterance gives rise to.

It is these aspects of specificity — the link that exists in such examples between the use of an indefinite and an individuating concept in the mind of the user and the reflection of his assumption that such a link exists in the mind of the interpreter — which are the target of the analysis of specificity we develop in this and the next section.

In Section 1.2 we drew attention to the parallel between the specific–non-specific distinction and the *de re–de dicto* distinction: The difference between the specific and the non-specific use of *a real estate agent* in (5) resembles that between the *de re* and the *de dicto* interpretation of *a real estate agent* in the belief attribution (4).

(24) (= (4)) Mary believes that her husband is seeing a real estate agent.

¹⁶That *there*-insertion involves quantification is a hypothesis that goes back to Milsark (1977). We present arguments and empirical evidence for this hypothesis in Bende-Farkas (2002) and Bende-Farkas and Kamp (2001).

¹⁷In particular, our assumption about the nature of *there*-insertion is clearly incompatible with a straightforward explication of specificity of indefinites in *there*-insertion contexts along the lines of Fodor & Sag: obviously the indefinite cannot be an individual constant and a variable bound by *there is* at the same time.

The extensive literature on the *de re–de dicto* distinction has led many — linguists as well as philosophers — to regard this difference as a genuine ambiguity. This view has been supported by the use, ever since the early days of formal semantics, of formalisms which are able to express the distinction. For instance, if *believe* is analysed as a 2-place predicate *BEL* which relates individuals to propositions, and proposition-denoting terms are formed by attaching the intensional abstraction operator \wedge to formulas, then the two interpretations of (4) can be expressed as in (25).

- (25) a. $BEL(m, \wedge(\exists y)(REA(y) \ \& \ SEE(Husb(m), y)))$ (*de dicto* belief)
 b. $(\exists y)(REA(y) \ \& \ BEL(m, \wedge SEE(Husb(m), y)))$ (*de re* belief)

Quine stressed the very different commitments that these two forms make and drew attention to the problems connected with “quantifying into opaque contexts” (as he put it — (Quine 1966a)) which is involved in (25b) but not in (25a). (25b) attributes to Mary a belief which is *de re* (‘about the thing itself’) with respect to the person that, according to Mary, her husband is seeing. (25b) represents this attribution in the form of a 3-place relation between (i) Mary, (ii) another individual (the real estate agent in question), and (iii) a property which Mary attributes to that individual. In contrast, (25a) simply attributes to Mary the existential proposition that there is some real estate agent her husband is seeing. Here a 2-place relation between believers and propositions suffices.

There has been much discussion over the question what conditions must be fulfilled in order that an agent can have a *de re* belief (or other attitude) with respect to some other person or thing. It has often been said that the agent must be “acquainted” with the entity at issue. Paradigmatic are cases where the subject is directly perceiving the entity, e.g. is looking at it under conditions where he can clearly see it. But it is difficult to know where to draw the line between cases where the *de re* use is permitted and those cases where it is not. Some philosophers have drawn the line extremely liberally, so that any information which enables the subject to individuate the individual uniquely will be good enough (cf. Chisholm (1976)) Others have proposed to draw it more narrowly. But in any case, the debate over where the line should be drawn is not one that directly concerns the linguist. What is important for our present purposes is that at least in some situations people are able to entertain thoughts that are *about* particular people, things or places, etc, and that there are linguistic forms which they can use to give expression to such thoughts.¹⁸

Our analysis of the *de re–de dicto* distinction is the same in spirit as this more traditional analysis, if somewhat different in form. We assume that entity-related thoughts always involve a separate representation for the entity that the thought is about (i.e. the entity with respect to which the thought is *de re*), and that this representation of the entity is *anchored*.¹⁹ Such a theory requires a general formal framework for representing anchored and unanchored thoughts. The remainder of this section will be devoted to the presentation of that framework. However, and here our approach differs from the many discussions in the literature which deal only with the logic and semantics of attitude attributing sentences, we use the representations which this framework makes available not just for the semantic analysis of sentences which take the explicit form of attitude attributions, but also to analyse the relationship between thoughts and the utterances to which they lead. It is one particular aspect of this relationship, viz. the relation between individuating entity concepts and (epistemically) specific uses of indefinites, that forms the central topic of this paper, and which is to be presented in Section 3.

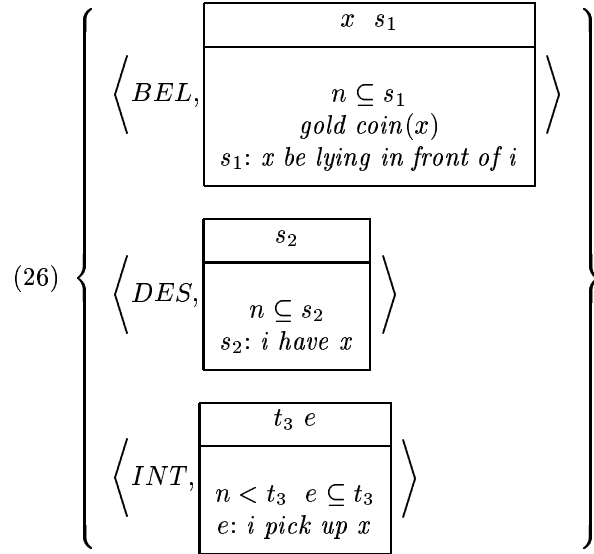
The formalism that provides the basis for our account of specificity uses DRSs to represent the contents of attitudes. But we are interested not only in the representation of single attitudes (beliefs, hopes, intentions, doubts, etc), but more generally in attitudinal states which consist of several attitudes at once. It is an important feature of such complex attitudinal states that different component attitudes often purport to be about the same things, and this even in cases where these ‘things’ do not exist in reality but only in the mind of the one who is in the given state. To capture these ‘internal referential’ links between different attitudes that are part of the same attitudinal

¹⁸Quine observed that belief sentences with ‘exported existential quantifiers’ unequivocally express *de re* attributions. For instance, *There is someone whom Mary believes her husband is seeing* only has the interpretation given in (25b) but not that in (25a). The focus in this paper is on occurrences of indefinites in the complement clauses of attitude verbs — like that of *a real estate agent* in (24) — which allow for both a *de re* and a *de dicto* attribution.

¹⁹For an explicit discussion of anchors in DRT see Kamp (2003) and Genabith et al. (t.a.).

state we describe such states as sets of attitude representations which may share discourse referents between them. Such ‘mental discourse referents’ stand for entities immanent to the mental world of the agent; they may, but need not, correspond to entities in the real world. We adopt the convention that the attitude representations that are explicitly given as members of the description of the given state are in general only a subset — and usually a very small subset — of those which make up the mental state as a whole. Each individual attitude is represented as a pair consisting of (i) a DRS identifying the content of the attitude and (ii) a *mode indicator*, which determines what kind of attitude (belief, desire, intention, doubt, etc.) we are dealing with.

(26) is a first shot at a representation of (the relevant part of) the mental state of someone who sees a gold coin in the middle of the road, forms the desire to possess it and the intention to pick it up, as a way of making the desire come true.



(N.B. n represents the psychological “now” of the subject: at any time t at which the subject is in a state characterised by the representation the occurrences of n in the representation represent t . i represents the self; it is that representation of the self which gives rise to the subject’s use of the word I . Because of their special “indexical” status these two discourse referents can be assumed to be present in all mental state representations. Since this is a general assumption, there is no need to make it explicit on every single occasion. So we will refrain from including these two discourse referents in the universes of DRSs that serve to describe mental states.²⁰)

(26) illustrates what we just said about different attitudes ‘being about the same thing’ in that the desire and the intention share the discourse referent x with the belief. In this case the sharing of x between desire and belief is a natural consequence of the way in which the desire arises out of the belief, and the sharing of x between these and the intention is a reflection of how belief and desire jointly lead to the intention.

In (26) there is no question yet of anchors. However, the case which it is meant to describe is one which requires an anchor: In the circumstances we have described, the subject will have an anchored representation for the coin she sees. A representation in which the anchoring of the discourse referent that represents the coin is made explicit is given in (27).

²⁰We have represented the desire as having for its content that a state consisting in the subject being in possession of the coin obtains at the time, represented as n , when the subject has the desire. This may seem odd to someone who thinks of desires as essentially future-oriented. The intuition which has guided us in representing the content of the desire as a condition obtaining at n is that desires of the kind in question consist in registering a discrepancy between the state one is in and the state one would like to be in (the latter being the content of the desire). Perhaps ‘conscious want’ is a better name for this kind of attitude. But whatever term we use, such ‘now-directed desires’ must be distinguished from desires that are genuinely future-oriented, like the desire to go to the theatre tomorrow night or the desire to be on holiday in August. The contents of such desires should be represented as states or events located at some time after n .

$$(27) \left\{ \begin{array}{l} \left\langle [ANCH, x], \begin{array}{|l} x \ s \ s_1 \\ \hline n \subseteq s \quad n \subseteq s_1 \\ s: i \ see \ x \\ s_1: x \ be \ lying \ ifo \ i \end{array} \right\rangle \\ \left\langle BEL, \begin{array}{|l} \\ \hline gold \ coin(x) \end{array} \right\rangle \\ \left\langle DES, \begin{array}{|l} s_2 \\ \hline n \subseteq s_2 \\ s_2: i \ have \ x \end{array} \right\rangle \\ \left\langle INT, \begin{array}{|l} t_3 \ e \\ \hline n < t_3 \ e \subseteq t_3 \\ e: i \ pick \ up \ x \end{array} \right\rangle \end{array} \right\}$$

As shown in (27), the anchor for x consists of a certain mode indicator, *ANCH*, which indicates that the state component in question is an entity representation of a certain kind, in which the associated discourse referent x represents the entity in question. (Anchors are components of attitudinal states, but they are not *propositional* attitudes.) The second part of the anchor gives the causal relation in which the agent takes herself to stand to the represented entity and through which she takes the given anchored representation to have arisen. In the present case this relation consists in the subject seeing the thing at the time when she is in the represented state. Moreover, as the conditions on the anchor indicate, the agent sees the thing *as* something lying in front of her. In (27) the anchored discourse referent x is ‘reused’ by each of the three other components of the state — the belief, the desire and the intention — which the representation displays. Thus x is shared between these attitudes, just as it is in (26).

What if the subject is radically mistaken in her perception of the coin? Not just that the object she sees isn’t a gold coin, there really isn’t any object she is seeing at all. There just happened to be some misleading reflection of the light which produced the optical illusion that there was an object where she thought she saw one. In this case there is nothing that x stands for. Does that mean x cannot be anchored? Yes and no. Of course it will be true in this case that neither the subject nor her representation x are anchored to an external object. Nevertheless, from the psychological point of view, the situation need not differ in any way to the subject herself from one in which there really is a object which she is seeing. We do justice both to what distinguishes the two cases and to what they have in common by saying that in both cases the subject has an *internal anchor*, but that only in the case where there is an actual object which she does observe is there in addition a corresponding *external anchor*.

The DRT formalism we use therefore distinguishes internal from external anchors. And to capture that the information represented by an external anchor is not accessible to the subject himself we place external anchors in a component of the representation which is separate from the one which contains the information that is psychologically real. We specify external anchors in the form of ordered pairs consisting of (i) the internally anchored discourse referent and (ii) a term referring to the object to which this discourse referent is anchored. Thus in (28) we have the external anchor $\langle x, \mathbf{x} \rangle$, where ‘ \mathbf{x} ’ is the term denoting the perceived coin. We also call \mathbf{x} the *external anchor for x* in this case. Furthermore, external anchors are *presupposed* by the corresponding internal anchors: When there is an external anchor for an internally anchored discourse referent, then that is the

thing for which the discourse referent stands; but if there is no external anchor for the internally anchored x , then the internal anchor is deficient; in that case x suffers from reference failure and all the representations in which x occurs fail to determine a well-defined propositional content.

$$(28) \left\{ \begin{array}{l} \left\langle [ANCH, x], \begin{array}{|l} x \ s \ s_1 \\ \hline n \subseteq s \quad n \subseteq s_1 \\ s: i \text{ see } x \\ s_1: x \text{ be lying ifo } i \end{array} \right\rangle \\ \left\langle BEL, \begin{array}{|l} \\ \hline gold \ coin(x) \end{array} \right\rangle \\ \left\langle DES, \begin{array}{|l} s_2 \\ \hline n \subseteq s_2 \\ s_2: i \text{ have } x \end{array} \right\rangle \\ \left\langle INT, \begin{array}{|l} t_3 \ e \\ \hline n < t_3 \ e \subseteq t_3 \\ e: i \text{ pick up } x \end{array} \right\rangle \end{array} \right\} \langle x, \mathbf{x} \rangle$$

Statements to the effect that a person is at some given time in a mental state with certain attitudinal components are represented with the help of the state-attributing predicate *Att*. For instance the statement that at t_0 Fred (believed that he) saw something lying in the road, believed it to be a gold coin, desired to have it and intended to pick it up can be represented as in (29).

$$\begin{array}{c}
\begin{array}{c}
t_0 \quad s_0 \quad f \\
\hline
t_0 < n \quad t_0 \subseteq s_0 \quad Fred(f) \\
\left. \begin{array}{l}
\left\langle [ANCH, x], \begin{array}{c} x \ s \ s_1 \\ n \subseteq s \quad n \subseteq s_1 \\ s: i \ see \ x \\ s_1: x \ be \ lying \ ifo \ i \end{array} \right\rangle \\
\left\langle BEL, \begin{array}{c} \\ gold \ coin(x) \end{array} \right\rangle \\
\left\langle DES, \begin{array}{c} s_2 \\ n \subseteq s_2 \\ s_2: i \ have \ x \end{array} \right\rangle \\
\left\langle INT, \begin{array}{c} t_3 \ e \\ n < t_3 \ e \subseteq t_3 \\ e: i \ pick \ up \ x \end{array} \right\rangle
\end{array} \right\} s_0: Att \left(f, \right)
\end{array}
\end{array}
\end{array}$$

(29) represents the statement that at the past time t_0 there was a state s_0 to the effect that Fred's mental state at that time included the attitudes which make up the second argument of *Att*. We also make use of a 3-place version of *Att*, in which its third argument is a set of external anchors, each one corresponding to an internal anchor occurring in the second argument (so that the set of external anchors always corresponds to a subset of the set of internal anchors). For instance, a person b who ascribes to Fred the mental state represented in (27) may make it a part of his ascription that the internally anchored discourse referent x is externally anchored to some individual x' . Such ascriptions are possible whether or not b can himself identify this individual. If he cannot, then all he will be able to do is claim that such an individual exists. In this case x' functions as an existentially quantified variable at the level of the ascription:

$$(30) \quad s_0: Att \left(f, \left\{ \begin{array}{l} \left\langle [ANCH, x], \begin{array}{|c|} \hline x \quad s \quad s_1 \\ \hline n \subseteq s \quad n \subseteq s_1 \\ s: i \text{ see } x \\ s_1: x \text{ be lying ifo } i \\ \hline \end{array} \right\rangle \\ \left\langle BEL, \begin{array}{|c|} \hline \\ \hline gold \text{ coin}(x) \\ \hline \end{array} \right\rangle \\ \left\langle DES, \begin{array}{|c|} \hline s_2 \\ \hline n \subseteq s_2 \\ s_2: i \text{ have } x \\ \hline \end{array} \right\rangle \\ \left\langle INT, \begin{array}{|c|} \hline t_3 \quad e \\ \hline n < t_3 \quad e \subseteq t_3 \\ e: i \text{ pick up } x \\ \hline \end{array} \right\rangle \end{array} \right\} , \{ \langle x, x' \rangle \} \right)$$

Using this representation formalism we can represent the two belief attributions in (25i) and (25ii) as in (31i) and (31ii).

$$(31) \quad (i) \quad s_0: Att \left(m, \left\langle BEL, \begin{array}{|c|} \hline n \subseteq s_0 \quad Mary(m) \\ \hline x \quad s_1 \\ \hline n \subseteq s_1 \\ rea(x) \quad s_1: see(husb(i), x) \\ \hline \end{array} \right\rangle \right)$$

$$(ii) \quad s_0: Att \left(m, \left\{ \begin{array}{l} \left\langle [ANCH, x], \begin{array}{|c|} \hline x \\ \hline \end{array} \right\rangle \\ \left\langle BEL, \begin{array}{|c|} \hline s_1 \\ \hline n \subseteq s_1 \\ s_1: see(husb(i), x) \\ \hline \end{array} \right\rangle \end{array} \right\} , \{ \langle x, x' \rangle \} \right)$$

N.B. The internal anchor which is part of the content of the state attributed to Mary specifies no conditions stating how Mary takes herself to be causally linked to the object represented by her discourse referent x . This should not be understood as attributing to Mary a “blank” internal anchor, which consists in a discourse referent without any conditions attached to it. Rather, the representation should be read as being neutral on the question what the anchoring information she has might be like. The point here is a very general one: It is part of the semantics of the formalism we are describing that a DRS used to characterise the content of an attributed attitude captures part but not necessarily all of the content — that is, the attribution is correct provided the attributee has an attitude of the specified mode whose content entails the characterising DRS.²¹

The representations in (29)–(31*ii*) can all be regarded as representations of the contents of mental state attributions. But when such an attribution occurs in thought, then it will be itself a propositional attitude, with an attitudinal mode as well as a content. For instance, Fred could believe that Mary has the belief represented in (31*i*), but he could also doubt this, or wonder whether she does, or wish that she would. These are four possible attitudes with the same content but different modes. Representing in the manner of (26)–(28) Fred’s belief that Mary has the belief represented in, say, (31*i*), will take the form of a singleton set $\{\langle BEL, (31i) \rangle\}$, and analogously for the other three possible attitudes mentioned. And of course these attitude representations could in their turn be components of the representation of a complex mental state of Fred, in which they would occur jointly with other attitude representations. For instance, they might occur in conjunction with a representation of Fred’s own belief that Mary’s husband is seeing someone. And, going one step further, such state representations can in their turn be attributed to Fred by some other person and these attributions can then be represented once more using the predicate *Att*.²²

3 Specific Use and Specific Interpretation

The formalism we presented in the last section is designed, we saw, to serve (*i*) the representation of propositional attitudes and complex attitudinal states, and (*ii*) the semantic representation of attitude attributions. After what we have said about the formalism and the examples we have given of its use, it should not be hard to guess the plot for the centrepiece of this paper, our account of epistemic specificity.

The account consists of two parts:

- (*i*) For a speaker to use an indefinite specifically is to use the *NP* to talk about an entity for which she has an anchored entity representation.
- (*ii*) To interpret an indefinite as specific is to take the speaker to have used it to talk about one of her anchored representations.

We start with (*i*). As a preliminary step towards the definition of what it is to use an indefinite *NP* specifically, we first introduce the more general notion of a speaker using an *NP* to *verbally represent* an entity-type constituent of a thought she is expressing in words. This is a concept which we do not think can be reduced to simpler or more familiar terms and we treat it as a primitive. It is meant to

²¹For details see Kamp (2003). The version of the formalism presented in Kamp (2003) has no way of expressing that a DRS provides the complete content of the attitude it represents. It is not difficult to extend the formalism so that it can express this too. But there will be no need for this here.

²²A case of special interest is that where this second attributor is Mary — perhaps she has just said (5) to Fred and infers from his reaction that he believes what she has told him. In such situations of face-to-face communication it is natural for speaker and hearer to reflect on what information the other will have extracted from the fact that a given statement has been made and received. (In fact, as a rule, such reflections are an almost automatic and largely subconscious feature of face-to-face communication.) Potentially this leads to increasingly complex attributions of the form *You know that I know that you know that ... p*, where *p* is the proposition the speaker has asserted. In our formalism these attributions involve chains of nested occurrences of ‘*Att*’, with the ‘subjects’ of successive ‘*Att*’-occurrences alternating between speaker and hearer. The sequences of attributions of increasing complexity which arise in this way have been identified as the basis of what is usually described as ‘shared knowledge’ (or ‘shared belief’) between the participants of a conversation. (Lewis (1969), Schiffer (1972).) When represented in the formalism just outlined attributions of this kind manifest themselves as clusters of connected but distinguishable thoughts. Often these are referentially connected, in the sense that their respective representations share discourse referents. See also representation (33) in Section 3 and the remarks in the Conclusion.

capture the following intuition. Often (if not necessarily always) when a person expresses a thought in words, she had the thought, in some form, prior to the moment she chooses the words in which she expresses it; and often in such cases her prior representation of the thought will involve mental entity representations (in our terms, discourse referents) as constituents.²³ In such cases the sentence or sentences produced will contain noun phrases which ‘translate’ these discourse referents, in the sense that the roles they play in the sentence or sentences match the contributions of the corresponding discourse referents to the representation of the thought. We symbolise this relationship — between an occurrence α of an *NP* in a sentence S produced by a speaker A and a discourse referent d that occurs as a constituent of the thought that A uses S to verbally express — as $REP(\alpha, d)$.

Given the relation REP , we can now state our analysis of epistemic specificity as the use of an indefinite to represent an internally anchored discourse referent. Formally:²⁴

- (32) **Definition 1.** Let $\langle [ANCH, d], K' \rangle$ be a constituent of the mental state of speaker A , let $\langle MOD, K \rangle$ be another constituent of this mental state such that d occurs in K , let S be a sentence which A produces to express the thought represented in $\langle MOD, K \rangle$ and let α be an *NP* occurring in S , such that $REP(\alpha, d)$. Then we say that A uses α specifically in S .

The notion of the *interpretation* of an *NP* as used specifically by the speaker is derivative from the notion given in **Definition 1**. Informally, an interpreter B is said to *interpret*, or *take*, an indefinite *NP* α occurring in a sentence S uttered by a speaker A as used specifically iff

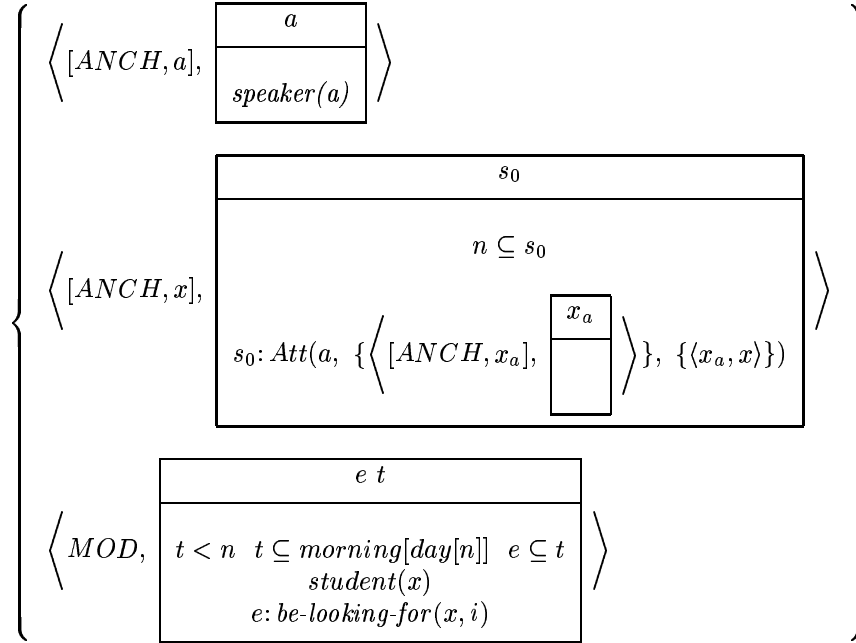
- (i) B represents α , as part of his representation of the content of S , by means of an internally anchored discourse referent x , and where
- (ii) according to the content of B 's internal anchor, x represents the external anchor of the discourse referent x_a in the mind of A of which B assumes that A used α to represent it.

This is rather a mouthful, and it isn't even fully precise. But an example should help. (33) is the representation which, according to the present proposal, results in the mind of B when he interprets the indefinite *a student* in A 's utterance of (23) as having been used specifically by A .

²³Since for the remainder of the paper we will be speaking of epistemic specificity (and not about scopal or presuppositional specificity), we will from now on drop the qualification ‘epistemic’.

²⁴According to DRT semantic representations K are obtained from (syntactic analyses of) natural language sentences S by an algorithmic procedure which stepwise converts the syntactic tree of S into K . In this process *NPs* from S introduce discourse referents d_i into K (where they represent the “referents” of these *NPs*). If one assumes that the mental representations of thoughts prior to the actual production of the sentences used to express them take the form of DRSs, then the production process is (roughly) the converse of the DRS construction process, and the links established between discourse referents occurring as constituents of the thought expressed and the *NPs* used to represent these are mirrored by those between an *NP* and the discourse referent introduced for it into the DRS that is constructed during interpretation. This similarity takes on an additional significance when we see interpretation as an attempt to reconstruct as closely as possible not only the content of the thought expressed but also its form — in our terms: as an attempt to construct a DRS which resembles the one which the speaker put into words as closely as possible. It is this intuition which lies behind the notion of interpreting an indefinite as used specifically that is given below in Definition 2.

- (33) (Recipient B 's representation of the content of (23) on a specific interpretation of the indefinite a student)



Legenda: 1. The content which B has assigned to the utterance is represented in the DRS following the unspecified modality indicator MOD (MOD leaves it open whether or not B 's interpretation of A 's utterance leads to a belief — i.e. whether B accepts what A tells him as true). 2. The condition $\text{morning}[\text{day}[n]]$ stands for the morning of the day of the time n at which the representation is being entertained (for current purposes, where we are talking about face-to-face communication in which utterances get interpreted more or less the moment they are made, this time can be identified with the utterance time).

What matters about (33) is the general form of the internal anchor for the discourse referent x which B introduces to represent the specifically interpreted indefinite α . The anchor specifies x as representing the external anchor of the anchored discourse referent x_a of which B assumes that it is part of A 's mental state and that A used α to represent it. Such anchors, which link their discourse referents to the external anchors of entity representations in the mind of someone else, are called *vicarious anchors*.²⁵

It is perfectly compatible with B 's having a vicarious anchor for an individual d that B doesn't know which object d is. It is enough that B assumes there to be some d to which x_a is anchored. In this respect B 's representation is similar to the one given in (31) for sentence (4) — recall that (31) represents the situation where the speaker of (4) takes the subject Mary to have an anchored representation for the discourse referent corresponding to the indefinite *a real estate agent*, but without the speaker herself necessarily knowing who this person is.

Generalising from this example we can define the notion of *interpreting* an indefinite *as used specifically* as follows.²⁶

²⁵Note that no conditions have been specified as part of the internal anchor which B attributes to A . This reflects the fact that the content of the represented sentence provides no explicit information about the nature or content of A 's internal anchor. See the comments on the internal anchor of (31*ii*).

²⁶Sometimes an interpreter will represent an indefinite NP α by means of an anchored representation even though he doesn't assume the speaker to have made a specific use of α . These are cases where the interpreter takes himself to have identifying knowledge of the entity that satisfies the argument slot which α occupies in the given utterance. E. g. A says: *Last week Fred got himself a wife at last*. B , who knows that Fred has been courting Esmeralda for years and recently proposed to her, swearing that if she would turn him down he would remain single forever, is in a position to provide an anchored representation for the NP *a wife*. In fact, this is possible in this case even if B

- (34) **Definition 2.** Suppose that a speaker A utters a sentence S containing an indefinite NP α . An interpreter B of this utterance *interprets α as having been used specifically by A* iff
- (i) B represents α , as part of his representation of the content of S , by means of an anchored discourse referent x ; and
 - (ii) according to this anchor x represents the external anchor \mathbf{d} of the anchored discourse referent of which B assumes that A used α to represent it. (For details of the form of such ‘vicarious’ anchors see (33).)

Between them **Definition 1** and **Definition 2** contain the substance of our analysis of specificity. To conclude this section we repeat once more what we see as the main distinctive feature of this analysis. Unlike any other treatment of specificity that we are aware of, it distinguishes explicitly between the perspective of the speaker and that of the hearer. Using an indefinite specifically and taking it to have been specifically used are two different relations. The first relates the indefinite to the mind of the speaker, the second to the mind of the interpreter. Normally these relations will guarantee sameness of propositional content: when an indefinite that is part of an uttered sentence S stands in both relations to, respectively, speaker and interpreter, then the thought which the interpreter associates with S will express the same proposition as the thought which led the speaker to her utterance of S . But nevertheless the thoughts will — even in the best of cases — be different in form; and because of this difference in form they will often differ in cognitive significance.

In the following section we focus exclusively on the perspective of the hearer. The question we will address has to do with the fine structure of semantic processing: At what stage of the interpretation process does taking an NP to have been used specifically make its impact on the interpreter’s representation?

4 Interpretation and Semantic Representation

It follows from the proposals of the previous section that when an indefinite NP is used specifically the final representation constructed by the interpreter B will in general be significantly different from the one which the speaker A cast in the words that B has interpreted. In fact, a discrepancy arises not only in case the interpreter fails to interpret the indefinite as used specifically although the speaker did use it so, but also when speaker and interpreter are ‘in sync’ in that the first uses the indefinite specifically and the second takes her to have done so. For even then B ’s anchor for the discourse referent x_b which he employs to represent the indefinite will tend to differ significantly from the anchor for the corresponding discourse referent x_a in the mind of A which she used in order to represent the indefinite. For instance, A ’s anchor could be a perceptual one, based on A ’s physical encounter with the referent and identifying the represented object as the discourse referent’s perceptual cause, while B ’s anchor will (like any other vicarious anchor) identify the object represented by its discourse referent as the external anchor for the internally anchored discourse referent in the mind of someone else (and often without containing further information about the content of that other internal anchor). Normally, this difference between the respective anchors of A and B will have no repercussions at the level of truth conditions: A ’s internal anchor for x_a and B ’s internal anchor for x will link these discourse referents to the same external anchor. So (assuming that B didn’t misunderstand the words A used in any other respect) the representations that A and B have of the content of the uttered sentence to which the indefinite belongs will determine the same (singular) proposition. But, as we noted at the end of Section 3, the two representations are different nevertheless, and in certain situations this difference can be important in that the two representations license different inferences in the presence of certain sorts of collateral information.

doesn’t take A ’s use of the indefinite to have been specific.

The difference between such cases and those covered by Definition 2, in which the recipient interprets the indefinite as having been used specifically by the speaker, should be clear from what we said about (33): Specific interpretation in the sense of Definition 2 yields vicarious anchors; the internal anchor that results in the special case described in this footnote will not be a vicarious one.

Both questions are reminiscent of issues that are prominent in discussions about the relationship between semantics and pragmatics. Perhaps the most basic and also the most persistent intuition about that relationship is that ‘semantics must come before pragmatics’: The mechanisms of pragmatics operate on content, so semantics must already have performed its task of identifying what the content of a sentence is before these mechanisms can come into action. In current work on formal semantics and pragmatics this principle is visible in theories of language interpretation which propose two or more successive representation stages and certain meaning-related operations that mediate between them.²⁷ One implicit moral of much of this work is that a sharp and principled division of the levels and operations postulated by such proposals into ‘semantic’ and ‘pragmatic’ is not always possible. But on the whole the view that semantics must precede pragmatics has been confirmed. In particular, the first in a cascade of representations of the sort postulated by such multi-level theories of interpretation, which is obtained by applying syntax-semantics interface principles to an underlying syntactic representation, qualifies as ‘semantic’ given that (as is widely assumed in current work) these principles do not refer to any aspects of the context of use. On the other hand, by the time the last representation of the chain which reflects the full interpretation has been reached, context-dependent factors will as a rule have come into play; to the extent that they do, this representation level deserves to be regarded as ‘pragmatic’.

Let us simplify the following discussion by assuming that the interpretation process involves just two levels, a first, semantic level and a second, pragmatic level. (We see this assumption of just two representation levels as unrealistic, but the simplification is harmless for the points to be discussed.)

For any multi-level theory of interpretation the question can be raised at what level the decision is made whether an indefinite *NP* should be interpreted as epistemically specific or not. Given our simplifying assumption this reduces to the question: is this decision made in the course of constructing the first (‘semantic’) or as part of the second (‘pragmatic’) representation? The answer to this question may seem plain: Since interpreting an indefinite as specific involves assumptions about the speaker, it involves pragmatic factors and thus can be made only during the transition to the second representation. This conclusion seems especially compelling in connection with *there*-insertion sentences like (35):²⁸

(35) There was a student who was looking for you this morning.

When (35) is used in the context we have been assuming for (23) it will convey to the addressee the same overall information as (23): that there was some particular student that the speaker *A* is thinking about, of whom *A* asserts that he was looking for *B*. In the case of (35), however, there is a special reason why the epistemic specificity of *a student* should be represented only at the second level. As we suggested at the end of Section 1.3, the indefinite subject of a *there*-insertion sentence should be seen as contributing a variable that is bound by the existential operator expressed by *there be*. In DRT terms this means that a representation which results directly from this interface principle should have the form (36).^{29,30}

²⁷Early representatives of this paradigm are Gazdar (1979) and van der Sandt (1992), who explicitly assume different content representation levels and focus on the interface(s) between them (even if they have little to say about how first level representations are obtained from syntactic structures). But the issue is raised, in one form or another, by all work in formal pragmatics. It has been prominent, in particular, in recent work within DRT-based frameworks, such as U(nderspecified)DRT (Reyle (1993), Reyle, Roßdeutscher and Kamp (forthcoming)) and S(egmented)DRT (Asher and Lascarides (2003)). A further, more recent example is the L(ayered)DRT of Geurts and Maier (2003).

²⁸Recall also the remarks we made at the end of Section 1.3.

²⁹On the analysis of *there*-sentences in DRT see also Bende-Farkas and Kamp (2001) or Bende-Farkas (2002).

³⁰One objection against (36) as a user-neutral representation of (35) is the presence of the self-representing discourse referent *i* to represent the addressee *B*. In a *user-neutral* representation *B* ought rather to be represented by an ordinary, non-indexical discourse referent, say, *b*, perhaps with an internal anchor that links *b* to *B* as its external anchor. This complication arises in connection with the interpretation of any sentence containing the pronoun *you*, and has nothing to do with specificity or indefinites. Since the matter is orthogonal to our present concerns we set it aside.

$t e x$
$t < n \quad t \subseteq \text{morning}[\text{day}[n]] \quad e \subseteq t$
$\text{student}(x)$
$e: \text{be-looking-for}(x, i)$

(36)

(36) differs from (33) in that x is existentially bound, whereas in (33) it is anchored. These two possibilities exclude each other, so we need both representations, with (36) as first level and (33) as second level representation.³¹

So far our considerations point towards a late appearance of epistemic specificity in the course of the interpretation process. But not all cases of specificity are like the ones discussed so far. In many languages specificity is explicitly marked. We give just one example of this, the marking of indefinites in Romanian by means of the Accusative particle *pe*. On the one hand *pe* must appear in front of definite NPs such as demonstratives or proper names, as in (37a). In such cases it might be said to be pleonastic or a mere agreement marker: its presence only confirms what such definites convey in any case, viz that what is at issue is a particular, uniquely identifiable referent. But *pe* can also occur in front of indefinites. Here it is optional, and when present it is not pleonastic.

- (37)
- a Ion a angajat-o *pe* Lucia.
“Ion has hired Lucia.”
 - b Ion a angajat o secretară.
“Ion has hired a secretary.”
(= he has hired someone in the capacity of secretary.)
 - c Ion a angajat-o *pe* o secretară.
“Ion has hired a secretary.”
(= he has hired someone who was a secretary in some capacity or other)
 - d Ion iubește un agent imobiliar.
“Ion loves a real estate agent.”
(The speaker doesn’t have any particular real estate agent in mind.)
 - e Ion iubește *pe* un agent imobiliar.
“Ion loves a real estate agent.”
(There is some particular real estate agent that Ion loves.)

Thus, (37b) means that Ion hired someone or other to be his secretary. (Maybe the person was a syntactician by profession, but with the job market being what it is, becoming Ion’s secretary was the best one could hope for.) In contrast, in (37c) the person hired must have been a secretary before, and it isn’t implied that it was in order to be his secretary that Ion is said to have hired her — her new function could be that of Ion’s cook or one of his gardeners. That is, *a angaja* ‘to hire’ can have a so-called resultative reading (cf. (Moltmann 1997)), where the event of hiring causes the referent of the direct object noun phrase to have the property *secretary*. Only, in Romanian this reading is missing if the indefinite direct object is marked with *pe*.

(37 d–e) are the pair of immediate concern to us. They correspond to the two interpretations of (4) identified in (25a) and (25b). (37d) is non-specific, while (37e), in which the indefinite is preceded by *pe*, only has the specific interpretation. Since Romanian specific indefinite direct objects are overtly marked by *pe*, the representation of their specificity should be the result of applying the syntax-semantics interface rules — if, as we assume, in line with most treatments of the syntax-semantics interface, importing the lexical meaning of words and morphemes into the representation is part of their application — and so it should be part of the initial semantic representation. Since in our judgement the import of *pe* is that the indefinites it marks are epistemically specific, this

³¹With the assumption that (36) is the initial representation constructed by the recipient of (35) and (33) the final representation comes the question how one gets from the first to the second. In a formally explicit theory of specificity (for some suitable fragment of English, say) the articulation of this transition will of course be a crucial part. But this is a task for another paper.

means that representations of the sort exemplified by (33) are already available at that level.³²

The difference between Romanian *pe*-indefinites and English indefinites beginning with *a* or *some* is in no way exceptional: Often when we compare different languages, or even different constructions in the same language, we find that what is explicitly expressed in the one case will be left to context-dependent inference in the other. In all such cases it is possible to describe the difference by saying that what manifests itself in the first case at the syntax–semantics interface is in the second case ‘left to pragmatics’ and thus becomes manifest only at a later, pragmatic interpretation level. When we put the difference in these terms, however, it is well to keep in mind that the distinction between semantics and pragmatics it presupposes is orthogonal to another one, according to which the pragmatic aspects of an interpretation are those that relate, in some way or other, to the communicational situation in which the interpreted utterance occurs. In this second sense of ‘pragmatic’, the representations of Romanian sentences with *pe*-indefinites *are* pragmatic representations because *pe* refers to a certain feature of the speaker’s mind that relates to the use she has made of the *pe*-marked indefinite. This is so in spite of the fact that no ‘pragmatic’ interpretation mechanisms are involved in obtaining these representations.

In this respect, Romanian indefinite direct object NPs with *pe* differ not only from the English indefinite NPs we have discussed, but also from other indefinite NPs in Romanian. Romanian *pe* only applies to direct object NPs, but not to argument NPs with non-accusative case marking. The specificity behaviour of Romanian NPs which are not direct objects is much the same as that of English indefinites beginning with *a* or *some*. In light of what we said à propos (23) this means that a Romanian sentence with a *pe*-marked indefinite direct object and a (non-marked) indefinite subject may have a first level representation in which the direct object is represented as a specific NP, while the specific representation of the subject NP will manifest itself only at the second level.³³

The special specificity features of direct objects in Romanian instantiate a general pattern, according to which grammatical specificity marking is restricted to direct objects. This generalisation is reflected in the term ‘D(ifferential) O(bject) M(arking)’ which is used to describe this phenomenon. DOM is found in a considerable variety of languages, though it does not always serve to mark specificity (Aissen (2003), Enç (1991) or von Stechow (2002b)). In those languages where differentially marked indefinites must be interpreted as specific and unmarked indefinite direct objects as unspecific, one finds the same complexity as in Romanian, with some cases of specificity marked morphologically, while others (e.g. subjects) are not. In fact, this is not a feature that is restricted to languages with DOM. Many languages have other devices to make the specificity of indefinite NPs explicit. A much discussed example is English *a certain*. Other adjectives with a similar import are *particular* and (not surprisingly!) *specific*, as in a sentence like *I am looking for a particular/specific book*.³⁴

³²If one insists on distinguishing between representations like (33) and ‘mere propositional content’ representations like (36), in which the indefinite is treated as an existential quantifier, then one would have to assume that both representations are constructed at the first level. It is not obvious, however, that sentences with *pe* should be assumed to have a purely existential content. So, arguably no representation like (36) occurs anywhere in the course of interpreting sentences like (37e).

³³Like the subject NPs of many other languages Romanian subject NPs are subject to a ‘soft’ specificity constraint having to do with word order: pre-verbal indefinite subjects tend to be interpreted as specific, post-verbal subjects as non-specific. Something similar is found in Dutch (cf. Rullmann (1989)): Clause-initial indefinite subjects tend to be understood as specific. To allow for a non-specific interpretation the indefinite subject must be part of a *there be* construction (Dutch *er is/zijn*). A similar difference between clause-initial subjects and nominative NPs in *there*-insertion constructions can also be observed in English, though the effect seems to be less pronounced there. Similar observations have been made for many other languages.

³⁴There are subtle differences between these English words, which merit a closer investigation. Possibly this will lead to a more refined analysis of the notion of specificity itself.

Another question which requires further investigation is whether the specificity expressed by *pe* corresponds exactly to the epistemic specificity we have described or whether it is something more general. In the latter case there might still be a difference between the representation of *pe*-marked indefinites at the first level and a possible second-level representation for them along the lines of (33). Similar questions will arise for all other cases of morphological, lexical or syntactic specificity marking. The interpretation of *pe* in ‘embedded’ positions, e.g. when the phrase it is part of is in the semantic scope of some other quantifying phrase, or when it occurs in the complement clauses of attitude attributions, is quite different from what we find in the matrix clauses exemplified in (37). Comparable distinctions seem to apply also to embedded and non-embedded occurrences of *a certain*, *a particular* and such-like expressions of English and other languages. There is much work that remains to be done on the semantics of such expressions.

Given the case of English *there*-insertion sentences on the one hand and Romanian *pe*-indefinites on the other, what can we say about occurrences of English *a*-indefinites like the one in sentence (23), which do not occur in the company of an existential binder like *there be*? Our discussion of (23) seems to point clearly to one conclusion: When an indefinite like that in (23) is given an epistemically specific interpretation, then this is something which takes place after the initial semantic representation, that provides the interpreter with a first gloss on the content of the utterance, has been constructed. In other words, interpretation of such indefinites proceeds in the same way as that in which (we have argued) it must proceed for indefinites in *there*-insertion contexts.

But this is not an inescapable conclusion. For instance, nothing we have said in this paper categorically excludes the possibility that English indefinites are syntactically ambiguous and that this ambiguity must therefore be resolved at the syntax–semantics interface. In fact, now that we have found reasons for assuming that some indefinites are assigned specific interpretations right away whereas for others this happens only at a later stage, it seems anything but clear how one could settle the question at which point specificity enters the interpretation process in cases where neither the form of the indefinite nor the syntactic environment in which it occurs settle this matter in the comparatively straightforward way it is in cases like *there*-insertion and Romanian *pe*. If answers to this question can be found at all, then only against the background of a much more comprehensive, refined and explicit theory of the interaction between semantic and pragmatic aspects of interpretation than is currently available.

To wind up this section, a brief comment on two treatments of specificity, Schwarzschild (2002) and Breheny (2003), with which our proposal shares a good deal in over-all spirit. Both Breheny and Schwarzschild advocate a unified treatment of specific and non-specific indefinites as existential quantifiers with contextually sensitive domain restrictions, in which the specific indefinites are those whose domains are singletons. And one way in which singleton domains for indefinites can arise is when the speaker focuses on a single individual when using the indefinite. As we read these proposals, they finesse a number of those issues which are central to the account proposed in this paper: They do not distinguish between using an indefinite specifically and taking it to have been used specifically, they do not distinguish between levels or stages of interpretation, and they do not address the question how speaker and hearer represent the domain restriction that according to their theories renders the indefinite specific. Some will argue that such abstinence is a virtue — that the issues that play a prominent part in our approach have no place in linguistic analysis. But we beg to differ. In our view these issues need to be addressed if one wants to arrive at a better understanding of the ways in which aspects of linguistic form interact with the pragmatics of expression and interpretation in communicative situations.

Conclusion

The aim of this paper has been to present a communication-based interpretation of the concept of epistemic specificity of indefinite noun phrases. The account distinguishes between two aspects of epistemic specificity, the speaker-related aspect of *using an indefinite specifically* and the hearer-related aspect of *taking the speaker to have made a specific use of an indefinite*. The account makes use of a DRT-based theory of the content of propositional attitudes and attitudinal states. Two features of this theory are essential to the account. The first is the analysis which it offers, in terms of the constructs of *internal* and *external anchor*, of the agent-internal and agent-external aspects of direct reference, in thought and, derivatively, also in linguistic expression. The second feature has to do with the modelling of complex states which consist of two or more attitudes whose contents are referentially connected.

The representation of complex attitudinal states with coreference links between their components has many applications in semantics and the philosophy of mind. Of special importance to linguistics is the use that can be made of the formalism in the analysis of what happens in conversation. The interpretation of a complex utterance typically involves much more than mere identification of the content of the uttered proposition by the recipient. Part of the process of interpretation is also that one is aware that the speaker used the words she did use, and that she presumably attaches to them

the same meaning in the given context as the interpreter does himself; in addition, when the utterance is a statement, the recipient will have to make up his mind whether to accept the statement as true, and also whether the speaker herself takes the utterance to be true, i.e. whether the utterance was sincere. (Similar issues arise for speech acts that are not assertions.) In this way interpreters tend to form complex sets of attitudes, and often there are referential connections between these attitudes, of the sort that can represent as sharing of discourse referents. Furthermore, as we already observed in footnote 22 at the end of Section 2, in face-to-face situations the speaker may take the addressee's reactions as indications of the attitudes the addressee has formed on account of what she has said; and mutual awareness of these options opens up the possibility of even more complex attitudinal clusters. A detailed analysis along these lines of the epistemic effects of utterances on discourse participants can, we believe, clarify many important issues in the theory of verbal communication and bring other hitherto unknown ones to our attention. The issue addressed in this paper, the specific use and interpretation of indefinites, should be seen as part of the much bigger project of developing an explicit theory of verbal communication along these lines. This is one of two long-range projects to which the discussions in this paper point. The other is the development of an integrated account of the 'semantic' and 'pragmatic' aspects of interpretation. As we have suggested, such a theory will almost certainly have to postulate different levels of meaning representation, but beyond that there is little that can be asserted with confidence at this time, the steady progress in both semantics and pragmatics of the past decades notwithstanding: how many levels will be needed *in toto*, what information belongs to which levels and how it is represented, how interpretation proceeds from one level to the next, and how individual languages differ on any or all of these points.

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