Domain restriction

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Abstract

Domain restriction can and should be explained in presuppositional terms. In earlier work we have presented a theory of presupposition which contains the essential ingredients for an explanatory account of domain restriction. Given certain auxiliary assumptions concerning the representation of quantifiers and the interaction between focusing and presupposition, the theory of presupposition predicts that quantifier domains are restricted in at least three ways: through binding, through (intermediate) accommodation, and through focusing.

1 Introduction

The domain of a quantifying NP is underdetermined by the content of its nominal head, and is usually further restricted by pragmatic factors. This much is widely agreed. However, there is a less than perfect consensus on how pragmatic information contributes to domain restriction. In this paper we propose to view domain restriction as a presuppositional phenomenon. In particular, we claim that domain restriction is by and large explained by a theory of presupposition that we have presented elsewhere and that we will refer to in the following as the 'binding theory' of presupposition projection.[1]

The binding theory is an extension of DRT whose central tenet is that presuppositions are the kind of entities that must be bound, just as anaphors must be bound. As a matter of fact, we maintain that anaphors *are* presuppositional expressions. The only difference between anaphors and most (other) varieties of presupposition is that the former must be bound to a given antecedent whereas the latter generally may be interpreted by way of accommodation. In general, if a presupposition cannot be bound, a suitable antecedent will be accommodated, i.e. an antecedent will be set up in some position which is accessible from the DRS in which the presupposition was triggered (its 'home DRS', as we shall say). Accommodation is subject to a number of constraints: accommodation must yield a coherent interpretation and by default a presupposition will be accommodated as closely to the main DRS as is possible while maintaining coherence.

The claim we want to substantiate in the following is that the binding theory, which is amply justified on independent grounds, provides the mechanisms for explaining domain restriction. The only thing we require in addition to these mechanisms is certain assumptions concerning the representation of quantifiers and the interaction between focus and presuppositions. Once

[1] See, in particular, van der Sandt (1992) and Geurts (1995). In the following paragraph, we give only a thumbnail sketch of the theory.

Note to the printer: Underlined material should be printed as it appears here (not in italics).

these are given, the binding theory predicts that quantifier domains are restricted in at least three ways: through binding, through (intermediate) accommodation, and through focusing.

2 Domain restriction through binding

2.1 Quantifiers as presupposition inducers

In the literature on presupposition it is usually assumed as a matter of course that quantifying NPs are presupposition inducing expressions. According to this view, an NP of the form 'Det_Q N', where Det_Q is a quantifying determiner, triggers the presupposition that there is a non-empty set of Ns.[2] This explains, for example, why one tends to infer from an utterance of (1a) or (1b) that the speaker takes (1c) to be true, as well:

(1) a. Most passengers survived the crash.
b. It is likely that most passengers survived the crash.
c. There were passengers.

These inferences, in particular that from (1b) to (1c), cannot be explained in terms of scope. For, the claim that the quantifier in (1b) induces the presupposition that (1c) is true is something quite different from saying that in (1b) the quantifier takes wide scope. The most likely reading by far of this sentence is (2a):

(2) a. it is likely that [most x: passenger x](x survived the crash)
b. [most x: passenger x](it is likely that x survived the crash)

However, the reading on which *most passengers* takes wide scope is hardly plausible for (1b). Similarly, the universal quantifier in (3a) may have narrow or wide scope with respect to the negation operator:

(3) a. All children weren't asleep.
b. ¬[all x: child x](asleep x)
c. [all x: child x]¬(asleep x)

But regardless whether we construe (3a) as (3b) or (3c), it may still (and typically will) be interpreted as presupposing that there is a given set of children. Evidently, presupposition and scope are distinct phenomena (for further discussion of this difference, see Geurts 1997).

If we adopt the binding theory, the observation that quantifiers are presupposition inducers dovetails nicely with another one, viz. that the domain of a quantifier is normally restricted by contextual factors. Combining the two views, we would expect the domain of a quantifier to be the kind of thing that tends to be bound and, if no suitable antecedent is available, will accommodate at the least embedded level in the discourse representation as possible — which is precisely what we find.

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[2] Or that there was or will be such a set. Matters concerning the tense of presuppositions will not be addressed in this paper, but to the best of our knowledge they do not present any problems for the theory advocated here. The view that quantifiers are presupposition inducers was already taken by Strawson (1952), and subsequently adopted by Karttunen (1973), Gazdar (1979), Soames (1982), van der Sandt (1988), and Zeevat (1992), among others.

Semantically speaking, a quantifier is a relation between two sets; for example, ‘most *A*s are *B*s’ says that the majority of *A*s are *B*s. We maintain that, apart from its truth conditional content, a quantifier such as *most* also triggers the presupposition that there are *A*s. Or, to put it differently, a speaker who claims that ‘most *A*s are *B*s’ indicates that the hearer should be in a position to identify the relevant set of *A*s.

(4) a. The airplane carried some passengers, and it is likely that most passengers were killed in the crash.
b. If the airplane carried any passengers, it is likely that most passengers were killed the crash.

If ‘most *A*s are *B*s’ induces the domain presupposition that there is a set of *A*s, then at least in outline the binding theory offers a rather plausible construal of examples like these. In (4a) as well as in (4b), the intended domain of *most* is obviously restricted to the set of passengers introduced by the indefinite NP in the first clause. Given an appropriate representation of the presuppositions associated with *most*, *some*, and *any*, the binding theory would actually predict this. In particular it would predict that in (4b) the presupposition will be bound at a subordinate level (in the antecedent of the conditional), and thus account for the fact that, in contradistinction to (4a), (4b) will not normally be taken to imply that there were passengers.

Let us say, following Milsark (1977), that an NP is strong if it is a presupposition inducer, and weak if it is not; if a strong (weak) NP begins with a determiner, than the determiner will be called strong (weak), too. According to this definition, definite NPs (proper names included) are always strong, as are genuinely quantifying NPs.[3] The latter are partitive in the sense that they select a subset of a given domain set; universally quantifying NPs come out as the borderline case in which the domain of the quantifier coincides with the subset it selects. As a rule, this partitive structure can be made explicit (cf. Löbner 1987). For example, compare (4a, b) with:

(4) a.' The airplane carried some passengers, and it is likely that most *of the* passengers were killed in the crash.
b.' If the airplane carried any passengers, it is likely that most *of the* passengers were killed the crash.

The following determiners are always strong:

(5) all, every, each, both, neither, most, ...

But most determiners allow for strong as well as weak construals:

(6) some, *n*, at least *n*, at most *n*, few, several, many, ...

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[3] Quantifying NPs are sometimes read (quasi-) generically, as in

Most men are egoists.

This may be construed as saying something about the species rather than the set. Such construals will be left out of account in this paper.

In (4a), *most* is strong, but *some* in (4a) and *any* in (4b) are weak. Intuitively, *some passengers* in (4a) does not require a contextually given set of passengers, and consequently it cannot be paraphrased with an overt partitive:

(7) The airplane carried some *of the* passengers and it is likely that only few passengers survived the crash.

This represents a possible reading of (4a), on which *some passengers* is construed as a quantifying and, therefore, strong NP, but it is not the first reading to come to mind when we read this sentence. In other words, there is a strong tendency not to take this NP as a presupposition-inducing expression.

The fact that the determiners listed in (6) can be either strong or weak might be explained by assuming that they are lexically ambiguous between these two readings (this appears to be Milsark's position). We are not convinced that this would be right, however, and prefer to view the ambiguity in pragmatic terms. For one thing, we find this ambiguity not only in the determiner system of English but in other languages as well, which is not what one would expect if it were a purely lexical matter. For another, the distinction between weak and strong readings correlates with intonational differences. A strong determiner typically receives a stress accent (which, incidentally, confirms our suspicion that, for the determiners listed in (6), this reading is the marked one). This suggests that the distinction should be accounted for in terms of focusing. We will not pursue this matter further in this paper but refer instead to the contributions of Büring and Jäger to this volume.

How should the distinction between strong and weak plural NPs be represented in a DRT framework? We need a representation format that meets at least the following three requirements. First, it must account for the presuppositions that quantifiers give rise to. For instance, in

(8) If the fire started on the top floor, then most (of the) people in the building will be rescued.

the domain presupposition of the quantifier *most* will have to be represented in such a way that it can be accommodated in the main DRS, since normally this sentence would presuppose that there were people in the building. Secondly, the presupposition triggered by a quantifier must be an object that can be bound to an antecedent, as in:

(9) There are some office workers in the building, but most people will be rescued.

On the most obvious reading of (9), the domain of *most* is the group introduced by the existential NP in the first conjunct, so the presupposition triggered by the quantifier should be able to pick up this object. Thirdly, when a quantifier links up in this way to a prior NP α, the scope of α is in a sense drawn out, as the following example illustrates:

(10) The mayor awarded all firemen a silver medal. Some (of the) men sold it right away.

The most likely reading of this discourse is that each fireman received his own medal (so the universal quantifier has wide scope) and that some of the firemen immediately sold the silver medal they had been given. Intuitively, what happens in this case is that the quantifying NP *some (of the) men* picks up the set of firemen-cum-silver-medals introduced in the first sentence, so that in the scope of *some (of the) men* each man is correlated with a medal, which can therefore be picked up anaphorically.

This telescoping effect is not confined to quantifying NPs, of course. First, it also occurs when a plural object is picked up by a pronoun, as can be seen when we replace the subject of the second sentence in (10) with *they*. Secondly, it is not only NPs that give rise to telescoping: quantifying adverbials, modals, and attitude verbs produce the same effect, as is illustrated by the following selection from Karttunen's seminal paper on 'discourse referents' (first circulated in 1969 and published as Karttunen 1976):

(11) a. Every time Bill comes here, he picks up *a book* and wants to borrow *it*. I never let him take *the book*.
b. Harvey courts *a girl* at every convention. *She* always comes to the banquet with him. *The girl* is usually also very pretty.
c. You must write *a letter* to your parents. *It* has to be sent by airmail.
d. Bill says he saw *a lion* on the street. He claims *the lion* had escaped from the zoo.
e. I wish Mary had *a car*. She would take me to work in *it*.

(11a–d) illustrate the telescoping effect in adverbial, modal, and attitude contexts. (11e) is a mixed case, in which the hypothetical state of affairs introduced by the attitude verb *wish* is picked up by the modal *would*.

In our opinion, the same mechanism underlies the phenomena illustrated by (10) and (11). That telescoping may occur in all these cases is a reflection of the fact that similar semantic structures are associated with nominal and adverbial quantifiers, modals, and attitude verbs. And although the account presented in this paper is focused on quantification, essentially the same analysis applies to modals and attitude reports, too, as is shown by Geurts (1995, 1997).

2.2 Duplex conditions

In the previous section we discussed three desiderata which an adequate representation of strong and weak plural NPs should satisfy. It has to account for the presuppositions quantified NPs give rise to, these presuppositions should be the kind of object that can be bound to an antecedent, and it has to explain the telescoping effect. In 2.3 we will put forward a proposal which achieves just this, but first we want to briefly discuss an alternative analysis proposed by Kamp and Reyle (1993), which fails to meet these desiderata.[4]

In Kamp and Reyle's version of DRT, NPs are interpreted in one of two ways; their distinction is motivated on quite different grounds, but it is evidently related to the strong/weak distinction we have adopted. According to Kamp and Reyle, a quantifier gives rise to a tripartite structure, which is represented by a so-called 'duplex condition' of the form $\varphi\langle Q\ u\rangle\psi$, where φ and ψ are DRSs, Q is a quantifier, and u is a discourse marker. For instance, (12a) is represented by (12b):

(12) a. Most soldiers surrendered.
b. [: [x: soldier x]⟨most x⟩[: x surrendered]]

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[4]For further discussion we refer to the contribution of Sæbø to this volume, who takes a less critical view of Kamp and Reyle's proposal.

The interpretation of duplex conditions is treated along the following lines. If Q is a quantifier expression, then Q* is the generalized quantifier associated with Q; so Q* is a relation between sets of individuals. Then an embedding function *f* verifies a duplex condition $\varphi\langle Q\ u\rangle\psi$ in a model M iff $\langle A, B\rangle \in$ Q*, where $A = \{g(x) : g$ extends f and g embeds φ in M$\}$ and $B = \{h(x) :$ h extends f and h embeds $\varphi \oplus \psi$ in M$\}$, where $\varphi \oplus \psi$ denotes the merge of φ and ψ.[5] Let us adopt for convenience the standard definition of the generalized quantifier associated with *most*, i.e. most*(A, B) iff $|A \cap B| > |A - B|$. Then (12b) is true in a model M, on the interpretation given by Kamp and Reyle, iff the soldiers in M that surrendered outnumbered those who fought on.

Observe that the interpretation of duplex conditions $\varphi\langle Q\ u\rangle\psi$ is dynamic in the sense that reference markers introduced in φ may be picked up in ψ. Thus the following type of 'donkey anaphora' is accounted for:[6]

(13) a. Most professors who own a Porsche wash it once a week.
b. [: [x, y: professor x, Porsche y, x owns y]⟨most x⟩[: x weekly washes y]]

If an NP is weak, it does not directly give rise to a duplex condition, but to a rather simpler representation, as illustrated by the following:

(14) a. Harry glued together some butterflies.
b. [X: butterflies X, some X, Harry glued X together]

Here the plural reference marker X represents represents a set of butterflies, which Harry treats collectively.[7] This is the default representation for a weak NP; if such an NP is to be construed distributively, a special rule is called upon, which applies in the case of (15a), for example, to yield (15b):

(15) a. Harry dissected some butterflies.
b. [X: butterflies X, some X, [x: x ∈ X]⟨all x⟩[Harry dissected x]]

Since we are not concerned in this paper with collective interpretations this is the only type of structure that is relevant to our purposes. Let us compare, then, Kamp and Reyle's representation of weak NPs as exemplified by (15b) with their representation of strong NPs employed in (13b). Formally, the two representations are rather similar, but there is one salient difference: the former uses, and the latter does not use, a plural reference marker to represent a

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[5] That is to say, $\varphi \oplus \psi = \langle U(\varphi) \cup U(\psi), Con(\varphi) \cup Con(\psi)\rangle$.

[6] This example also to illustrates one minor problem with Kamp and Reyle's proposal. In (13b) only one reference marker is bound by the quantifier, and accordingly it is predicted that (13a) is true iff the set of professors who own a Porsche and wash it once a week contains more than 50% of the professors who own a Porsche. It should be noted that this is only one of the possible readings of (13a). On another possible (though perhaps, in this particular case, less likely) interpretation, (13a) is true iff the set of *pairs* $\langle a, b\rangle$, where a is a professor and b a Porsche owned and weekly washed by a, contains more than 50% of the pairs $\langle a', b'\rangle$, where a' is a professor and b' a Porsche owned by a'. It is, however, not difficult to amplify the representation format used in (13b) so as to take into account this reading, too.

[7] Actually, in Kamp and Reyle's system plural reference markers denote groups, not sets, but this distinction is irrelevant here.

set object. Without further provisions it is predicted, therefore, that the anaphoric potential of (15b) is greater than that of (13b). This is false: it is true that a plural pronoun, for example, might be used to refer back to *some butterflies* in (15b), but the same holds for *most professors* in (13b). To circumvent this problem, Kamp and Reyle introduce an 'abstraction rule' which, given a duplex condition of the form φ⟨Q *u*⟩ψ, generates a plural reference marker which stands for the set of individuals *v* that satisfy φ as well as ψ, where *v* is a reference marker that is introduced in φ. When applied to (13b), this rule yields, abstracting over x:

(16) [X: X = ∑x[x, y: professor x, Porsche y, x owns y, x weekly washes y],
[x, y: professor x, Porsche y, x owns y]⟨most x⟩[: x weekly washes y]]

Here a plural reference marker has been created which represents the set of professors that own a Porsche and wash it once a week.

The DRS in (16) provides a suitable object to be picked up by a plural pronoun, but this is not yet sufficient to account for the telescoping phenomenon. Suppose, for instance, that the discourse in (13a) is continued with (17a):

(17) a. ... and they allow nobody else to drive in *it*.
b. [X, Z: X = ∑x[x, y: professor x, Porsche y, x owns y, x weekly washes y],
[x, y: professor x, Porsche y, x owns y]⟨most x⟩[: x weekly washes y],
Z = X, [z: z ∈ Z]⟨all z⟩[: z allow nobody else to drive in <u>u</u>]]

Corresponding to the plural pronoun in (17a), the DRS in (17b) features a plural reference marker, Z, which picks up X, i.e. the set of professors that own a Porsche and wash it once a week. Since, obviously, *they* is to be read distributively, the distribution rule applies, which produces a duplex condition that quantifies over Z, and the reference marker correlated with *it* in (17a), i.e. u, is in the nuclear scope of this duplex condition. Now the problem is that there is no suitable antecedent accessible to u:[8] despite the fact that Z = X, there is nothing in either the formal or informal semantics of (17b) to guarantee that the reference marker y that is in the scope of the abstraction operator is accessible to the reference marker u that is in the scope of the duplex condition quantifying over Z. More generally speaking, in a DRS of the form

(18) [X, Y: X = ∑xφ, X = Y, [y: y ∈ Y]⟨Q z⟩ψ]

φ is not accessible from ψ, and therefore reference markers occurring in ψ can never be 'bound' in φ.

Kamp and Reyle propose to deal with this problem by allowing the material in φ to be copied into ψ whenever a configuration like (18) arises. This solution is quite clearly ad hoc. In the original version of DRT there is a match between the interpretation of DRSs on the one hand and the notion of accessibility on the other (a match that is akin to, though not quite the same as, the correspondence between the semantics of, say, predicate logic and the meta-logical notion of variable binding). Roughly speaking, if a DRS φ is accessible from ψ, then ψ carries

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[8] We use the term 'accessibility' in two related ways, viz. as denoting relations between DRSs and between reference markers. These two ways are distinguished by the prepositions subcategorized for by the predicate. Given a pair of (not necessarily distinct) DRSs φ and ψ, φ is accessible *from* ψ iff all reference markers in φ are accessible *to* any reference marker occurring in ψ.

at least as much information as φ does, and as a rule the converse holds as well. To illustrate, consider a DRS of the form,

(19) $[: \varphi_1 \Rightarrow \varphi_2, \psi_1 \Rightarrow \psi_2]$

In (19), φ_2 and ψ_2 contain at least as much information as φ_1 and ψ_1, respectively, and accordingly φ_1 is accessible from φ_2 and ψ_1 is accessible from ψ_2. A marginal case occurs if φ_1 and ψ_1 are (type-) identical, for then we are forced to admit that φ_2 is at least as informative as ψ_1 and that ψ_2 is at least as informative as ψ_1, although φ_1 isn't accessible from ψ_2 and ψ_1 isn't accessible from φ_2. But save for such coincidences, accessibility may be taken to coincide with an information ordering on DRSs.

In Kamp and Reyle's version of DRT, this correspondence is forsaken. In their system, the relation between φ and ψ in (18) is the same as that between φ_1 and ψ_2 (or ψ_1 and φ_2) in (19) in the marginal case in which $\varphi_1 = \psi_1$ happens to hold: in (18) ψ augments the information in φ, but φ is not accessible from ψ. This leads one to expect that it is an accident that φ is more informative than ψ, just as it is accident if in (19) ψ_2 is more informative than φ_1. But of course such a comparison would be quite inappropriate. And this is not just a technical matter. Intuitively, too, we should expect that, in a constellation like (18), φ is accessible from ψ because the latter serves to select part of the set specified by the former, and it is precisely this property which Kamp and Reyle call upon to justify their copying rule. In our view, however, their solution cures the symptoms but not the disease, for it does nothing to repair the mismatch between the notion of accessibility and the interpretation of structures like (18).

A further problem with Kamp and Reyle's proposal, as it stands, is that it doesn't take into account the presuppositions triggered by quantifying NPs.[9] We saw that a strong NP induces a domain presupposition, which means that, for example, (20a) (=(12a)) presupposes that there is a (salient) set of soldiers. However, this set is not represented in the DRS associated with (20a).

(20) a. Most soldiers surrendered.
 b. [X: X = ∑x[x: soldier x, x surrendered], [x: soldier x]⟨most x⟩[: x surrendered]]

(20b) is the result of applying the abstraction rule to the sentential DRS correlated with (20a) (i.e. (12b)). The resulting object is the set of soldiers who surrendered, which corresponds with the second argument of the quantifier. However, its first argument is not represented by a reference marker, and therefore this representation does not provide a suitable object for the projection algoritm to apply to: the domain argument of the quantifier is represented in such a way that it cannot be detached and moved about. It might seem that this defect can be remedied in a straightforward manner: one could introduce a second abstraction rule which is restricted to the domain of a quantifier. In the example above this rule would license the following extension of (20b):

(20) c. [X, Y: X = ∑x[x: soldier x, surrendered x], Y = ∑x[x: soldier x],
 [x: soldier x]⟨most x⟩[: surrendered x]]

[9] But see Sæbø (this volume) who develops an analysis based upon Kamp and Reyle's proposal.

However, apart from the general problem with Kamp and Reyle's notion of abstraction, this does not yield a suitable representation of presupposed domains, because of the way the abstraction operator is defined. In general, $\sum u\varphi$ denotes the set of all *u*s in the model that satisfy φ, and thus the semantic value of Y in (20c) is the set of all soldiers in the model. Normally speaking this set will be too large, as Y must be able to denote a contextually restricted set of military, and therefore the new abstraction rule will have to generate a different type of object.

We will not pursue this line of argument any further because what we have said suffices for our purposes. The foregoing discussion did not purport to demonstrate that there is no way Kamp and Reyle's version of DRT can be made to account for the presuppositions of quantifiers. What it meant to show, rather, is that if one undertakes to make the required revisions the theory tends to become quite unwieldy: one will have to add new rules which produce new kinds of structure. This prospect and our qualms about Kamp and Reyle's use of abstraction lead us to propose an alternative theory, which we will outline in the remainder of this section. This account is based on Geurts (1996b), to which we refer for a more detailed exposition.

2.3 Propositional reference markers

Traditionally, the semantics of the DRS language is specified by stating what it means for a function to embed a DRS in a model. Given this notion, we may say that, relative to an embedding function *f*, each DRS denotes a set of functions *g* which extend *f* and which embed φ in a given model. For instance, $\|[\text{x: pumpkin x}]\|_f$ (the denotation of the DRS [x: pumpkin x] relative to the function *f*) is the set of functions which extend *f*, whose domain is {x}, and which map x onto a pumpkin.[10] We now introduce into the DRS language a new type of reference markers, which, just like DRSs, denote sets of embedding functions; we call these new objects 'propositional reference markers'. If *p* is a propositional reference marker and φ is a DRS, then *p*+φ is a (complex) propositional term. Intuitively, the content of *p*+φ consists of the content of *p* plus the information in φ. Formally, $\|p+\varphi\|_f$ denotes the set of embedding functions *h* which extend some $g \in \|p+\varphi\|_f$ and verify φ. If it so happens that $p = p+\varphi$, then φ doesn't add anything new to the content of *p*; in this case we say that *p* 'supports' φ, which we abbreviate as '$p \vdash \varphi$':

(21) $p \vdash \varphi =_{def} p = p+\varphi$

With the help of propositional terms, a sentence like (22a) is represented as in (22b), assuming that *two raisins* receives a weak construal:

(22) a. There are two raisins in the pudding.
b. [p: p ⊢ [x: raisin x, x is in the pudding], two_x p]

Informally, this may be read as saying that p supports the proposition that there are raisins in the pudding and that there are two individuals that make p true when assigned to x.[11] Formally,

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[10] All of this is relative to a given model, of course, which we prefer to leave implicit.

[11] Propositional terms denote sets of embedding functions, but we will sometimes allow ourselves to speak sloppily and pretend as if they denoted sets of individuals. For instance, we

p denotes a set of embedding functions σ, all of which are defined for x, and the condition 'two_x p' requires that the set $\{f(x) : f \in \sigma\}$ contains two elements. That is, for each individual reference marker *u* there is a relational constant 'two_u', which is interpreted as follows:

(23) If I is an interpretation function, then $I(\text{two}_u)(\sigma)$ iff $|\sum u\sigma| = 2$, where $\sum u\sigma = \{f(u) : f \in \sigma \;\&\; u \in \text{dom}(f)\}$

A strong quantifier like *most* in (20a) requires that two propositional reference markers be set up:

(24) [p, q: p ⊢ [x: soldier x], q = p+[: x surrendered], most_x p q]

The representation of the first argument of *most* parallels that of the weak NP in (22): it is correlated with a reference marker, p, which supports the proposition that there is at least one x who is a soldier. The quantifier's second argument is represented by the reference marker q, which contains the information in p plus the information that x surrendered. The interpretation of 'most_u' is as follows:

(25) If I is an interpretation function, then $I(\text{most}_u)(\sigma, \sigma')$ iff $|\sum u\sigma'| > |\sum u\sigma - \sum u\sigma'|$, with '$\sum u\sigma$' as in (23)

And thus (24) says that more than half of the individuals in p are in q, as well.

A crucial feature of the representation in (24) is that the first embedded DRS in this structure is accessible from the second, and that, therefore, the reference marker in [: x surrendered] is in effect bound in [x: soldier x]. Thus the accessibility relation is in line with the interpretation of the DRS language, and that, we have argued, is as it should be. This is one respect in which the present proposal diverges from Kamp and Reyle's. Another is that the two arguments of a quantifier enjoy the same status: both are explicitly represented by reference markers, and don't have to be derived by some sort of abstraction rule, and since both arguments are correlated with reference markers, they may be linked up to other reference markers. Furthermore, if two propositional reference markers are thus linked, the telescoping phenomenon is automatically accounted for. To elucidate this point, let us consider the example in (26). On the reading of (26a) that we are interested here, this sentence reports that two sailors each ordered a hamburger, and that each ingested his or her hamburger within a few seconds (cf. the pair (13a)–(17a) discussed above):

(26) a. Two sailors ordered a hamburger. They gobbled it up in a couple of seconds.
b. [p: p ⊢ [$_A$ x, y: sailor x, hamburger y, x ordered y], two_x p]
c. [<u>r</u>, q: <u>r</u> ⊢ [$_B$ <u>u</u>:], q = r+[$_C$ <u>z</u>: u quickly ate z], all_u r q]
d. [p, r, q: r = p,
p ⊢ [$_A$ x, y, u, z: u = x, z = y, sailor x, hamburger y, x ordered y], two_x p,
r ⊢ [$_B$:], q = r+[$_C$: u quickly ate z], all_u r q]
e. [p, q: p ⊢ [x, y: sailor x, hamburger y, x ordered y], two_x p,

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might say that in (22b) the reference marker p represents a set of raisins. This is strictly speaking wrong, but it is conveniently short and we trust that this abuse is less confusing than the correct terminology.

q = p+[: x quickly ate y], all_x p q]

The first sentence in (26a) is represented by (26b), the second by (26c). We have labeled the sub-DRSs of (26b-d) for ease of reference. In (26c), there are three anaphoric reference markers, which are underlined. We assume that the plural pronoun *they* is interpreted distributively, and therefore it is correlated in (26c) with two reference markers: the propositional marker r and the individual marker u.[12] The only restriction that is imposed upon the former is that it support the empty DRS *B*; this reflects the fact that the pronoun *they* is semantically inane. After the DRSs in (26b) and (26c) have been merged, r is equated with its antecedent p, and thus the two DRSs supported by p and r, that is *A* and *B*, are mutually accessible: in general, if $p \vdash \varphi$, $q \vdash \psi$, and $p = q$, then evidently φ should be accessible from ψ and vice versa. So now u can be linked up to x. Furthermore, DRS *B* is accessible from *C* (in general, if $p \vdash \varphi$ and $q = p+\psi$, then φ is accessible from ψ), and since *A* and *B* are mutually accessible, *A* is accessible from *C*. Thus y is a potential antecedent for z. Once all suitable equations have been made, the resulting interpretation of (26a) is (26d), which is equivalent to (26e).

Of course, the analysis we propose for the plural pronoun in (26a) applies to the presuppositions triggered by strong quantifiers, too. There are no relevant differences between (26a) and the following discourse, for example:

(27) a. The mayor awarded all firemen a silver medal. Some (of the) men sold it right away. (=(10))
b. [$\underline{\text{p}}$, p', $\underline{\text{q}}$, q': $\underline{\text{p}} \vdash$ [$\underline{\text{x}}$: $\underline{\text{fireman}}$ $\underline{\text{x}}$], p' = p+[y: medal y, x got y], all_x p p',
$\underline{\text{q}} \vdash$ [$\underline{\text{u}}$: $\underline{\text{man}}$ $\underline{\text{u}}$], q' = q+[$\underline{\text{z}}$: u sold z], some_u q q']
c. [p, p', q, q': q = p', p $\vdash$ [x, u: u = x, fireman x, man u],
p' = p+[y, z: z = y, medal y, x got y], all_x p p',
q $\vdash$ [:], q' = q+[: u sold z], some_u q q']
d. [p, q, q': p $\vdash$ [x: fireman x, man x], q = p+[y: medal y, x got y], all_x p q,
q' = q+[: x sold y], some_x q q']

The initial representation of (27a) is (27b). In this DRS, the domains of the quantifiers *all* and *some* are represented by the reference markers p and q, respectively. The first of these cannot be bound to a suitable antecedent, so it is accommodated. The second can be bound, and is equated with p', as a result of which the individual reference markers u and z obtain access to their antecedents, i.e. x and y. The resulting DRS is (27c), which is equivalent to (27d).

It should be noted that (27d) is weaker than the intuitive interpretation of (27a), because this DRS imposes no constraints on the propositional reference marker p, save for the fact that it is extended by q: as it stands, (27d) is verified by *any* non-empty set of firemen who received a medal and sold it. That is to say, the actual truth conditions of (27a) are underdetermined by (27d). We don’t think that this is a defect of our analysis, but there is admittedly a problem

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[12] Strictly speaking, this treatment of *they* implies that plural pronouns are ambiguous between a collective and a distributive reading. This, however, is just a consequence of the fact that in this paper we don’t want to take collective readings into account. If we had chosen to do so, we would have adopted essentially the same approach as Kamp and Reyle, with a single lexical entry for *they* and an optional distribution rule.

here, which is caused by the fact that our concept of accommodation is an idealized one, because it captures (and is intended to capture) only part of what actually happens when a presupposition cannot be bound.

Technically speaking, accommodation is a very simple affair: accommodating a presupposition just means that it is inserted in some suitable DRS. But obviously, this is not intended as anything like a full account of what happens when a presupposition is accommodated. Accommodation is by no means an automatic process (cf. Heim 1982, Geurts 1995, van der Sandt 1995). Even if the resulting DRS is guaranteed to be well formed and coherent, a presupposition is practically *never* accommodated without further ado. Presupposed information is supposed to be unremarkable and, therefore, is expected to cohere with the context in which it occurs (for, clearly, an incoherent presupposition would not be unremarkable). However, in order to establish coherence it is often necessary to go beyond the information explicitly conveyed by the speaker. This is what happens, for instance, when the hearer imports 'bridging information' into his interpretation of the discourse. The term is due to Haviland and Clark (1974), of course, as is the following well-known illustration of the phenomenon:

(28) Mary got some picnic supplies out of the car. The beer was warm. (Haviland and Clark 1974: 514-515)

On the strategy adopted here the presupposition triggered by the definite NP *the beer* must be interpreted by way of accommodation, for the simple reason that there is no suitable antecedent available. But it is evident that just accommodating a discourse marker *u* along with a restriction to the effect that *u* is a six-pack of beers (say), will not suffice to do full justice to our ordinary understanding of this discourse. Clearly, someone processing (28) would normally assume that, according to the speaker, the beer was part of the picnic supplies, and not flown in by an obliging fairy, for example. Equally clearly, this assumption is made on the basis of extralinguistic knowledge the hearer has at his disposal. But, crucially, it is only by bringing this extralinguistic knowledge to bear upon the interpretation of *the beer* that the hearer can ascertain that the presupposition he is expected to accommodate is, indeed, unremarkable.

So *in order to* secure the presumption that the presupposition triggered by *the beer* is unremarkable, the hearer has to make further assumptions, uncontroversial though they may be, about the situation described by the speaker. Much of this story is itself uncontroversial, but an important aspect of it is not: it is the division of labour between accommodation on the one hand and world knowledge on the other. We prefer to distinguish accommodation from other factors involved in the interpretation of presuppositions that cannot be bound, but there doesn't seem to be a consensus that this is the right way to go.[13] In the next section we will expatiate on our concept of accommodation.

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[13] It is of course possible to analyse bridging as a form of binding — specifically, binding to a non-overt but implied antecedent (see, for example, Bos et al. 1995, Geurts 1995, Krahmer and Piwek 1996). The difference between this type of analysis and the view adopted here is at least in part terminological. In both cases world knowledge is called upon to provide a bridge between discourse entities; the basic difference is that according to the binding analysis bridges are brought into play before presuppositions are handled, whereas on the accommodation view

To return to our analysis in (27), there are two possible reasons why (27d) fails to completely specify the truth conditional content of (27a). This sentence will normally be uttered in a situation in which the audience will be able to figure out which firemen are being referred to. This can mean either of two things. On the one hand, the intended antecedent of *all firemen* may have been mentioned explicitly, in which case the presupposition is bound. On the other hand, the hearer may have to accommodate the presupposition that there were firemen, but in that case he will have to make additional plausibility inferences about these firemen. Either way, the interpretation of (27a) as given by (27d) will be further restricted. So, although this analysis is incomplete as it stands, it is correct as far as it goes.

3 Domain restriction through intermediate accommodation

In the foregoing section we discussed one way in which, according to the binding theory, the domain of a quantifier may be restricted. In an example like (27) the quantificational domain is restricted due to the fact a domain presupposition is bound to a given object in the discourse representation. In this section we are concerned with another way in which domain restriction may occur. The binding theory predicts that the domain of a quantifier may also be restricted through intermediate accommodation, when a presupposition triggered in the quantifier's nuclear scope is accommodated in the restrictor. It has been claimed by Beaver (1994) and von Fintel (1994), among others, that this prediction is wrong, and in the following we want to refute this objection.

According to the binding theory, presupposition projection is constrained by a number of principles, three of which are listed below:[14]

(29) *Well-formedness*
A presupposition must be resolved in such a way that the resulting DRS is a proper one (i.e. it may not contain any free reference markers).

(30) *Coherence*
A presupposition must be resolved in such a way that the resulting interpretation is a coherent one.

(31) *Maximality*
If a presupposition cannot be bound it must be accommodated as closely to the main DRS as is possible (in view of other constraints on projection).

These constraints entail that accommodation is not guaranteed to succeed. If no way of accommodating a presupposition will yield an interpretation that is well formed and coherent, then the discourse will be infelicitous. It is a matter of debate whether, in such cases, accommodation fails altogether or succeeds but fosters a weird interpretation. The difference

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they enter the stage afterwards. It should be noted, however, that a binding analysis of bridging doesn't obviate the notion of accommodation, since not all instances of accommodation involve bridging.

[14] See van der Sandt (1992) and Geurts (1995) for further discussion of these constraints.

between these two views is not crucial, however, because either way the resulting discourse is predicted to be awkward.

Maximality implies that, all things being equal, accommodation will be *global*: by default, a presupposition is accommodated in the principal DRS. However, all things may not be equal, and a presupposition may be forced to accommodate either in a DRS that lies between the principal DRS and the presupposition's home DRS or, as a last resort, in the home DRS itself. In the former case, we speak of *intermediate*, in the latter of *local* accommodation.[15] Thus all three varieties of accommodation (global, intermediate, and local) are governed by the maximality principle. In the following we will concentrate our attention on the notion of intermediate accommodation.

The following examples show that intermediate accommodation is not a spurious option.

(32) a. Maybe Wilma believes that her husband is deceiving her.
 b. Either Wilma isn't married or she believes that her husband is deceiving her.

These are two examples in which an intermediate accommodation reading is at least possible; in (32b) it is even the most likely one. In (32a), the definite NP *her husband* induces the presupposition that Wilma has a husband; this presupposition is triggered within a belief context that, in its turn, is embedded under a modal operator. Maximality predicts that in the absence of a suitable antecedent this presupposition will by default be accommodated in the main DRS, which yields a reading that may be paraphrased as follows: 'Mary has a husband$_i$ and maybe she believes that he$_i$ is deceiving her.' If for some reason this reading is dispreferred, then the second option is intermediate accommodation, which results in the following: 'Maybe Mary has a husband$_i$ and believes that he$_i$ is deceiving her' (we leave it to the reader to construct a context in which this interpretation would be preferred). Analogous remarks apply to (32b), but there is an important difference between this case and the previous one. For reasons we have discussed elsewhere (van der Sandt 1992, Geurts 1995), a global accommodation reading is not possible in (32b), and therefore we predict that intermediate accommodation is preferred, which gives the following paraphrase: 'Either Wilma isn't married or she has a husband$_i$ and believes that he$_i$ is deceiving her.' This prediction is clearly correct.

The variety of intermediate accommodation we are interested in here occurs whenever a presupposition α is triggered in the scope of a quantifying expression β and α contains a reference marker bound by β. The binding theory predicts that in such an event global accommodation is excluded (well-formedness) and ceteris paribus a reading is preferred on which α restricts β's domain (maximality). The following is a case in point:

(33) a. Every German is proud of his car.
 b. Every German who owns a car is proud of it.

The presupposition triggered by *his car* in (33a) contains a reference marker that is bound by the quantifier, and therefore the presupposition cannot be accommodated globally. Hence we predict that, by default, it will be accommodated one level down, i.e. in the quantifier's

[15] While Beaver adopts this terminology, too, von Fintel doesn't distinguish between local and intermediate accommodation, calling both 'local'. This usage is potentially misleading, however, because it is specifically the notion of intermediate (and not local) accommodation that is at issue.

restrictor. The reading thus obtained is roughly (but *only* roughly, as we will see) paraphrased by (33b). We believe that this is a gratifying result, but it has been argued by Beaver and von Fintel that this prediction is false.[16] Beaver's objection is based upon the mistaken assumption that, according to the binding theory, there is no relevant difference at all between (33a) and (33b).

The following are slightly simplified versions of Beaver's examples:[17]

(34) a. Few of the team members can drive, but every team member will come to the match in her car.

b. Few of the team members can drive, but every team member who owns a car will come to the match in her car.

Beaver reasons as follows. The binding theory predicts that (34a) will give rise to a reading which is paraphrased by (34b): the presupposition triggered by *her car* cannot be bound to a suitable antecedent, global accommodation is not possible because this would violate the well-formedness constraint, and so the presupposition is accommodated in the restrictor of *few*. However, (34b) is a perfectly acceptable sentence, and if our analysis is correct, then (34a) should be equally acceptable. But it isn't. Hence, the prediction that a presuppositional expression in the scope of a quantifier can give rise to domain restriction is wrong.

In order to see what is wrong with Beaver's objection, let us go through the interpretation of (34a) step by step, starting out from the following representation:

(35) $[p,\ q,\ \underline{p'},\ q'\text{: } p \vdash [x\text{: team member } x],\ q = p+[\text{: } x \text{ can drive}],\ \text{few}_x\ p\ q,$
$\underline{p' \vdash [z\text{: team member } z]},$
$q' = p'+[\underline{\underline{w\text{: } w \text{ is } z\text{'s car}}},\ z \text{ comes to the match in } w],\ \text{every}_z\ p'\ q']$

The quantifier in the first sentence of (34a) induces the presupposition that there is a given set of team members, represented here by p. We assume that this presupposition has already been dealt with. Besides presupposing a set of team members, the first conjunct of (34a) also introduces the subset of team members that can drive, represented by q. In more than one respect these two sets differ in status. In the first place, p is presupposed while q is not. In the second place, p is more salient in the sense that the first conjunct of (34a) will be interpreted as being about the team members rather than about the team members that can drive. It is immaterial to our purposes how this observation is spelled out in detail. What matters is the fact that the first sentence of (34a) sets up a context in which expressions that are anaphorically dependent upon *few of team members* are much more likely to be construed as referring back to p than to q (see Moxey and Sanford, 1993, for discussion). What is more, it seems that a *quantifier* that is anaphorically dependent upon *few of the team members* can *only* pick up p. In (36), for example, *every team member* cannot be construed as 'every team member that can drive':

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[16] In the following we will focus on Beaver's argument, because the particular notion of accommodation criticized by von Fintel is one we never advocated and have no intention of advocating in the foreseeable future.

[17] In particular, these versions leave open the actual number of team members (15 in Beaver's examples), and we have dismissed five cheerleaders who didn't play an essential part in the original examples, although they enhanced their naturalness somewhat.

(36) Few of the team member can drive, but every team member will arrive in time.

The second conjunct of (34a) introduces two presuppositions that are relevant to our concerns, which are triggered by *every team member* and *her car*, respectively. The former induces the presupposition that there is a set of team members, represented in (35) by p'. The latter in fact triggers two presuppositions, one of which has already been dealt with by assuming that z is the female person whose existence is presupposed by *her car*. We may assume that the presupposition triggered by the quantified NP *every team member* will be processed first,[18] and that the hearer must first identify a suitable set of team members. There are two such sets available, p and q, but as we have seen the hearer will decide to bind the presupposition triggered by *every team member* to p, equating p' with p (and z with x). The outcome of this decision is (37a), which is equivalent to (37b):

(37) a. [p, q, p', q': p' = p, p $\vdash$[x: team member x], q = p+[: x can drive], few_x p q,
p' $\vdash$[z: z = x, team member z],
q' = p'+[w: w is z's car, z comes to the match in w], $every_z$ p' q']
b. [p, q, q': p $\vdash$[x: team member x], q = p+[: x can drive], few_x p q,
q' = p+[w: w is x's car, x comes to the match in w], $every_x$ p q']

Next, the presupposition triggered by *her car*, represented here by [w: w is x's car], comes up for processing. This presupposition cannot be bound, hence must be accommodated, and there are two DRSs in which it could be accommodated, in principle: the DRS [x: team member x] (intermediate accommodation), and the presupposition's home DRS (local accommodation). The global option is excluded by the well-formedness constraint, because the x in the presupposition [w: w is x's car] would then become unbound. Local accommodation gives (37b) as the final interpretation of (34a). Intermediate accommodation leaves us with the following:

(38) [p, q, q': p $\vdash$[x, w: team member x, w is x's car], q = p+[: x can drive], few_x p q,
q' = p+[: x comes to the match in w], $every_x$ p q']

The maximality principle predicts that, *ceteris paribus*, intermediate accommodation will be preferred to local accommodation, but in this particular case either choice will result in an incoherent discourse. To see this, suppose that the hearer opts for local accommodation. Then (34a) is interpreted as implying that, although few members of p can drive, all of them own cars. This might be true, of course, but it is so unlikely that it can be safely dismissed as a possible reading of (34a).[19] Suppose, on the other hand, that the speaker opts for intermediate accommodation. We then get basically the same result, but via a somewhat different route. For

[18] To begin with, this assumption is plausible in its own right. Furthermore, it is difficult to *avoid* this assumption, because *her car* is dependent on *every team leader*. In van der Sandt (1992) it is stipulated that presuppositions are processed from left to right, but even without this axiom his theory imposes a sequential order in cases like (34a). The same holds for the theory of Geurts (1995), who does not stipulate that presuppositions are processed in any fixed order.
[19] According to Beaver, this reading is contradictory. It is not, but given the fact that most of the people who own a car can drive in it, too, it is such a remarkable thing to want to say that (34a) is just not the right way of saying it.

according to this interpretation the speaker, who has just claimed that few of the members of p can drive, is now *presupposing* that the members of p have cars. This is so because the domain of *every team member*, represented in (35) by p', has been bound to, and thus equated with, p. So in this case there really isn't much to choose between intermediate and local accommodation: they give rise to very similar, and equally weird, interpretations. Consequently, accommodation actually *fails*, and the binding theory thus predicts that the discourse in (34a) is unacceptable, which it is.

It is not hard to see what must have led Beaver to think that (34a) presents a problem for the binding theory. Starting out from the fact that the theory predicts a general preference for intermediate as opposed to local accommodation, he concludes that it cannot tell the difference between (34a) and (34b), because there can be no difference between explicit domain restriction by a relative clause, for example, and implicit domain restriction by a presupposition triggered outside the quantified NP.[20] But as a matter of fact there is a difference and the binding theory accounts for it in what we take to be just the right way, namely on the basis of the fact that in one case a piece of information is presupposed which is not presupposed in the other case. (34b) presupposes that there is a set of team members who own a car. This presupposition cannot be bound, and will therefore have to be accommodated, and in order to establish a coherent discourse representation, the hearer will infer that this presupposed set is part of the set of team members introduced in the first sentence of the discourse. However, (34a), as we have seen, is a different thing altogether, for here the speaker first presupposes the existence of a set of team members, and then he goes on to either presuppose that they own cars (intermediate accommodation) or to assert that they do (local accommodation).

Beaver's approach is exceptional in that he confines his attention to instances of domain restriction, or rather attempts at domain restriction, that are properly contextualized. However, most of the discussion of this phenomenon has revolved around sentences presented 'in isolation', like (33a). When judged 'in isolation', does (33a) presuppose that every German has a car, does it entail that every German has a car, or does it merely assert that every German who has a car is proud of it? Intuitions vary on this score, and we believe we can explain why. But first let us consider a few more examples:

(39) a. Every German is proud of his $\left\{\begin{array}{ll} i. & \text{car} \\ ii. & \text{bicycle} \\ iii. & \text{kangaroo} \end{array}\right\}$.

b. Every German who has a $\left\{\begin{array}{ll} i. & \text{car} \\ ii. & \text{bicycle} \\ iii. & \text{kangaroo} \end{array}\right\}$ is proud of it.

According to our judgments, (39a*i*) is fine, (39a*ii*) is less so, and (39a*iii*) is weird. The differences between the examples in (39b) are less pronounced, but still to us (39b*i*) sounds somewhat pedantic, (39b*ii*) is okay, and (39b*iii*) is strange, though not as strange as (39a*iii*). Let us consider the second set of examples first.

Of course, our intuitions about these examples are intimately tied up with the cultural prejudices we share with many other people. Germans own cars almost by definition, some of

[20] 'Clearly, if the explicit addition of a domain restriction produces a coherent discourse, it is not open to claim that without these clauses an implicit domain restriction results in incoherence.' (Beaver 1994: 38) In our view, however, it is.

them own bicycles, and the number of German kangaroo owners is negligible. These prejudices explain why (39b*i*) has an air of redundancy about it: someone who uses ‘every German who has a car’ instead of ‘every German’ *simpliciter* is being overly explicit. In contrast to this, (39b*ii*) is perfectly okay, because we assume that it is quite normal, though not virtually necessary, for a German to own a bicycle. (39b*iii*), finally, is strange because it presupposes a set of Germans who own kangaroos, and although on reflection it is likely that there is a non-empty set that fits this description, the notion is so remarkable that it cannot simply be presupposed.

According to the binding theory, a hearer who must process any of the variants of (39a) ‘in isolation’, will go about as follows. Given that this sentence has no context, there is no suitable antecedent for the presupposition triggered by the universal quantifier, so he will have to accommodate a set of Germans (call it ‘G’). It seems reasonable to suppose that there is a strong tendency to equate G with the set of all Germans, or perhaps with the set of typical Germans, but this assumption is not crucial. Now the only presupposition that remains to be interpreted is the one triggered by *his N*. Assuming that *his* is bound by *every German*, this results in intermediate accommodation and thus in domain restriction. So if we construe (39a) this way, we take the speaker to be conveying that it may be assumed *as a matter of course* that the members of G own *N*s. However, given our cultural prejudices, we are bound to feel that this assumption is fully justified only in (39a*i*): in the case of (39a*ii*) it is more remarkable already, and in the case of (39a*iii*) it is rash. Needless to say, this matches with our judgments about these variants.

The binding theory correctly predicts that none of the sentences in (39a) presupposes that every German has a {car/bicycle/kangaroo}. Nor do we believe that this follows from any of these sentences. Admittedly, people do tend to associate the claim that every German has a {car/bicycle/kangaroo} with these sentences (e.g., Heim 1983, van Eijck 1993). Somehow it seems that (39a*ii*), for example, suggests that all or nearly all Germans own bicycles, but this suggestion is to be expected on the view we defend here. We mentioned in the foregoing that if (39a*ii*) is presented in the absence of a specific context, hearers will tend to identify G, i.e. the set presupposed by the subject term, with the set of Germans — or, what seems even more likely, with the set of typical Germans. If this happens, intermediate accommodation of the second presupposition in (39a*ii*) will convey, in effect, that according to the speaker there is nothing remarkable about the assumption that (typical) Germans have bicycles. This is rather close to, but not the same as, saying or presupposing that all Germans have bicycles. So the binding theory helps to explain both the inference associated with (39b*ii*) and the fact that it is not more than a strong suggestion. Intermediate accommodation is a crucial ingredient in this explanation.

4 Domain restriction through focusing

It is well known that the focus-background division within a quantifier’s nuclear scope affects the interpretation of its domain (see, for example, Rooth 1985, Schubert and Pelletier 1987, Krifka 1990 and the contribution of Partee to this volume). Roughly speaking: backgrounded material in the nuclear scope tends to be interpreted as part of the quantifier’s restrictor, while focused information remains part of the nuclear scope. Thus the most likely interpretations of (40a) and (41a) are (40b) and (41b), respectively:[21]

(40) a. Fred always drinks [milk]$_F$.
b. Always, if Fred drinks something, he drinks milk.

(41) a. Most tickets were sold [at counter 4]$_F$.
b. Most of the tickets that were sold were sold at counter 4.

There are two plausible lines of explanation of this regularity, which we will consider in turn. According to the first, a sentence like (40a) is typically interpreted in a context where there is an issue as to where the tickets were sold. The supposition that there is such an issue is prompted by the focus-background division of this sentence, and is taken to be part of the global context. But then the domain presupposition triggered by the quantifier may link up to this issue, thus giving rise to an interpretation which can be paraphrased by (40b). In essence, this is the approach adopted by von Fintel (1994) and Beaver (1995), and it is also in agreement with the proposals by Büring and Jäger in this volume.

In order to implement this idea, two assumptions are required. First, we have to assume that the focus/background dichotomy and the division between presupposition and assertion are mutually independent. Secondly, we have to assume that the former distinction takes priority over the latter in the sense that focus/background structures are interpreted before presuppositions are resolved, because presuppositions must be able to pick up antecedents established, in effect, through focusing. On this account, focusing and presupposition are separate though related and interacting phenomena. They are related in that both signal that the speaker takes certain pieces of information to be contextually given. They interact in that presuppositions may pick up material from the global context set set up by focusing.

There is another explanation of the interaction between focusing and presupposition, which relies almost entirely on the mechanism of presupposition projection. Let us suppose, following Jackendoff (1982), that intonational focusing acts, inter alia, as a presupposition inducer. The binding theory will then account for the fact that the background tends to be interpreted as part of the restrictor in the same way it accounts for the fact that other presuppositions triggered in the nuclear scope may restrict the domain of a quantifier.

To say that focusing induces presuppositions is not to imply that there is no difference between backgrounds and presuppositions. As in most other contributions to this volume it is assumed here that backgrounds are essentially incomplete. Backgrounds may be thought of as a properties obtained by abstracting over focused material, or they may be construed as open propositions or likened to questions. For example, in (42) the background is something like ‘λx(x stole the tarts)’ or ‘____ stole the tarts’ or ‘Who stole the tarts?’.

(42) [Barney]$_F$ stole the tarts.

The presupposition is obtained by replacing the focused material by a variable or reference marker. This presupposition will be resolved in the usual way, either by binding to a given

[21] (41) is inspired by an example of Eckardt’s (this volume).

antecedent or by accommodation.[22] It then follows that an utterance of (42) presupposes that someone stole the tarts just as the corresponding clefted sentence does:[23]

(43) It is Barney who stole the tarts.

If this account is correct, then focusing should indirectly give rise to the projection behaviour that is the hallmark of presuppositions. And this appears to be the case, as the following observations show:

(44) a. If $[\text{Barney}]_F$ stole the tarts, then Fred is innocent.
b. If Fred is innocent, then $[\text{Barney}]_F$ stole the tarts.
c. If someone stole the tarts, then $[\text{Barney}]_F$ stole the tarts.

(45) a. Maybe $[\text{Barney}]_F$ stole the tarts.
b. Maybe the tarts were stolen and maybe $[\text{Barney}]_F$ stole the tarts.

(46) a. $[\text{Barney}]_F$ didn't steal the tarts.
b. I'm not at all certain that the tarts have been stolen, but (I am absolutely convinced that) $[\text{Barney}]_F$ didn't steal the tarts.

Normally, one would infer from (44a) and (44b) that someone stole the tarts, but not from (44c). Similarly, (45a) would and (45b) would not normally license the inference that someone stole the tarts, and the same holds for (46a, b). This is precisely the pattern of inferences that the proposal under consideration leads us to expect.

We started this section with the observation that backgrounded material in the nuclear scope of a quantifier tends to be construed as part of the quantifier's domain. In conjunction with the principle that focusing induces presuppositions, the binding theory allows us to see this phenomenon as a special case of much larger class of data, exemplified by (44)–(46) above. For example, (41a) is interpreted as follows:

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[22] This method of deriving presuppositions from focal backgrounds is the same as Jackendoff's, with one crucial exception. On Jackendoff's account a predicate $\text{Presup}_S(x)$ is formed by replacing the focus by a variable. From this expression he constructs $\lambda x\ \text{Presup}_S(x)$, which is the set of objects of which the presuppositional predicate holds. Then Jackendoff obtains the actual presupposition by stipulating that this set must either be under discussion or otherwise be a well-defined set in the current context. Thus the assertion made by the sentence is that the focus value is a member of this set. It is not implied that the predicate holds of at least one member of this set. Jackendoff's analysis thus gives a semantics for presupposition which is essentially weaker than an account which associates an existential presupposition with focus constructions. See also Rooth (this volume) who argues on different grounds that the interpretation of focus should not be strengthened so as to yield an existential presupposition.

[23] Thus intonational focus and clefts induce analogous presuppositions. This does not imply that they are on a par in all respects. Whereas we hold that focusing does not affect the representation of the asserted content (just as it does not affect the standard semantic value in a theory like Rooth's), we believe that clefting does. Thus while (42) presupposes that some x stole the tarts and asserts that Barney stole the tarts, we suggest that the cleft in (43) has the same presupposition as (42), but asserts only that x is Barney. This distinction is irrelevant in extensional contexts, but it may make a difference in intensional embeddings.

(47) a. [p, q: p ⊢ [x: ticket x],
q = p+[<u>u: place u, x was sold at u</u>, x was sold at counter 4], $most_x$ p q]
b. [p, q: p ⊢ [x, u: ticket x, place u, x was sold at u],
q = p+[: x was sold at counter 4], $most_x$ p q]

Within the nuclear scope of *most*, intonation indicates that 'λu(x was sold at place u)' is a background, where x is bound by the quantifier. This background corresponds with the underlined presupposition in (47a). In the absence of further contextual information this presupposition cannot be bound. The well-formedness constraint tells us that it cannot be accommodated in the main DRS either, because this would cause the reference marker x to become unbound. The maximality principle predicts, therefore, that by default this presupposition will become part of the quantifier's domain, which gives us the reading we wanted to account for.

Instances of adverbial quantification are amenable to essentially the same treatment. Let us assume for convenience that adverbial quantifiers range over events;[24] then (40a) is interpreted as follows:

(48) a. [p, q: p ⊢ [e:], q = p+[<u>e</u>: <u>Fred drinks something in e</u>, Fred drinks milk in e],
all_e p q]
b. [p, q: p ⊢ [e: Fred drinks something in e], q = p+[: Fred drinks milk in e],
all_e p q]

In (48a) the domain of the adverbial quantifier merely introduces a new reference marker. We would assume that, as a matter fact, the lexical semantics of *always* imposes certain rather general restrictions on the possible values this reference marker can take, but these restrictions are left out of account in this representation. In the nuclear scope of *always* 'Fred drinks ____' is the background, and accordingly the underlined presupposition is triggered. The binding theory predicts that this presupposition will be accommodated in the quantifier's domain, which gives us (48b) as the default interpretation of (40a).

There is a tendency in the literature to assume that, whenever focusing seems to affect the interpretation of a given sentence, some form of quantification must be involved. For instance, in an attempt to explain the well-known fact that the interpretation of negation is sensitive to focus, Kratzer (1989) proposes to analyse negation as quantification. The following pair of examples is Kratzer's:

(49) a. Paula isn't registered in $[\text{Paris}]_F$.
b. $[\text{Paula}]_F$ isn't registered in Paris.

(49a) and (49b) have different interpretations, and the difference is best described in presuppositional terms: (49a) presupposes that Paula is registered somewhere, and (49b)

[24] This assumption is not crucial. What is crucial is that the presupposition which is triggered in the nuclear scope contains a reference marker that is bound by the quantifier. Hence a treatment of adverbials in terms of unselective quantification, for example, would also be consistent with the account we propose.

presupposes that someone is registered in Paris.[25] Kratzer (1989: 647) observes that such presuppositions 'are typical for certain quantifier constructions,' and argues on this basis that negation is a form of quantification, too, which is to say that *not* has a quantificational domain and a nuclear scope, just as *all* or *most*, for example. This conclusion is easily avoided once it is realised that the presuppositions observed in (49) are *not* peculiar to quantifier constructions but conform to the much more general principles of presupposition projection: on the assumption that focusing induces presuppositions, these observations follow from the binding theory without further ado.

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[25] This is not how Kratzer characterizes the difference between (49a) and (49b). According to Kratzer, '[(49a)] presupposes that Paula is registered at some place *which is not Paris*. And sentence [(49b)] presupposes that some person *who is not Paula* is registered in Paris' (emphasis added). However, the standard diagnostics prove that the italicized material is not itself presupposed; rather, it is entailed by the asserted and presupposed content taken together.

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