

# Possessive Antecedents to Donkey Pronouns

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## 1 Introduction

In this paper, I discuss the problem of *of*-possessive antecedents of donkey pronouns. These are cases where a donkey pronoun is anteceded by a morphologically definite possessive DP (e.g. *the cover of a book*), but because of the smaller indefinite *a book*, the whole possessive still instantiates the donkey-binding effect. I show that this data poses problems for several accounts of donkey pronouns (both D-type and dynamic), and give an analysis in dynamic semantics. The analysis is couched in a Heim/Kamp familiarity theory of definiteness, and takes the familiarity presupposition of the definite article to be accommodated (in a constrained way) at the point of composition failure with the descriptive content *cover of a book*. The buried indefinite plays a crucial role in licensing the parasitic quantificational force of a donkey antecedent.

The classic **donkey pronoun** setup is illustrated in (1–2). An indefinite (or weak) DP in the restrictor of a quantificational structure (a conditional in (1), a universal quantifier in (2)) antecedes a pronoun in the nuclear scope.

- (1) If a farmer owns **a donkey**, he feeds **it**.
- (2) Every farmer who owns **a donkey** feeds **it**.

Donkey pronouns are not bound – they are not (and cannot be) c-commanded by their antecedent. They also aren't referring, since their value varies with the value of the antecedent, in a way parasitic on the larger quantificational structure. The longstanding puzzle, therefore, is what the relationship is between a donkey pronoun and its antecedent. (Geach 1962, Evans 1977, 1980, Parsons 1978, Cooper 1979, Kamp 1981, Heim 1982, Kadmon 1987, Heim 1990, Neale 1990, Elbourne 2001, 2005 and many others)

Donkey pronouns can be anteceded by possessives, shown in (3) and (4).<sup>1</sup>

- (3) If **the cover of a book** is missing, someone unethical must have removed **it**. (*of*-possessive)
- (4) If **a book's cover** is missing, someone unethical must have removed **it**. (*'s*-possessive)

The pronoun in each example is a donkey pronoun. They are not bound by their possessive antecedents, but their values co-vary with the value of each antecedents. Another way of putting the problem is that definite possessives with buried indefinites show a quantificational variability effect (QVE) in the restrictor of a universal operator, leading to the donkey problem.

The complication for every theory of donkey pronouns is this: **the pronoun is anteceded by the entire possessive DP, but the cause of the QVE is the indefinite DP *a book***. The problem is most acute in *of*-possessives such as (3), where the antecedent DP can clearly be seen to be morphologically definite, and therefore this paper focuses on *of*-possessives. The schematic of an *of*-possessive is given in (5). An OP consists of a DP with a relational head noun, and an overt internal argument to that noun. This paper focuses exclusively on OPs with a definite head determiner, and an indefinite DP in the internal argument position.

- (5) *Of*-possessives: [DP D [NP N<sub>relational</sub> [PP *of/to* [DP ...]]]]

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<sup>1</sup>The backstory: when a book is reported as unsold by a book shop, the shop just sends back the cover to the publisher and is supposed to destroy the rest. Sometimes they unethically sell the rest.

*Of*-possessives (OPs) are exceptional in a variety of closely related ways: (i) they don't need to refer familiarly, even when morphologically definite (Poesio 1994, Rawlins 2005), (ii) they don't need to refer uniquely, either (Löbner 1985, Kadmon 1987, Barker 2005, Rawlins 2005), (iii) they can appear in the pivot of existentials, even when morphologically definite (McNally 1992, 1998, Poesio 1994, Rawlins 2006), and of course (iv) they instantiate the donkey problem. This paper is about (iv).

There are two standard kinds of analyses of donkey pronouns: the E-type or D-type analyses (see Elbourne 2005 for a recent summary of the E-type/D-type distinction), and the dynamic analyses. The natural question is therefore whether either of these can account for the *of*-possessive data. I leave mostly open the question about E-type/D-type analyses, though I do show that the data presents difficulties for recent syntactic D-type accounts (Heim 1990, Elbourne 2001, 2005). What I do provide is a compositional dynamic analysis of OPs that explains their ability to antecede donkey pronouns.

The key insight of this analysis is that when descriptive content like *cover of a book* tries to compose with *the*, the presuppositions of the definite article trigger composition failure. In order for composition to continue, accommodation must happen locally. The salience of the relation *cover* to an existing discourse referent (d.r.) is what makes accommodation possible here, but not with "short" definite (e.g. *the man*) – a return to old ideas by Prince 1981 and Heim 1982 about bridging definites.

Local accommodation introduces a new d.r. before composition with *the*, so the definite article sees an input context which satisfies its presuppositions. During composition, the DP appears definite. From the outside, however, it simply appears as if a new d.r. has been introduced – *the cover of a book* doesn't appear definite externally.

This remainder of this paper is divided in two. in §2 I go into the problem in more detail from the perspective of both dynamic and syntactic D-type analyses, and in §3 I provide a dynamic analysis of *of*-possessives.

## 2 The problem

In (6–9) are several more examples of the donkey-binding configuration with OPs.<sup>2</sup>

- (3) If **the cover of a book** is missing, someone unethical must have removed **it**.
- (6) Every kid in my class who knows **the son of a cop** dislikes **him**.
- (7) Nobody who buys **the manual to a VCR** ever reads **it**.
- (8) Any linguist who thinks they know **the answer to a hard question** should publish **it**.
- (9) If **the owner of a car** doesn't take care of it, **he** or **she** will lose a substantial investment.

All of these examples involve an OP antecedent that shows a quantificational variability effect. For instance, in (3) any paraphrase involves universal force of some kind: *for every book, if the cover of that book is missing, someone must have removed the cover of that book*. The plot twist, as noted above, is that the indefinite that most immediately instantiates the QVE is not the actual antecedent of the pronoun. This turns out to be why current theories of donkey pronouns consistently make the wrong predictions.

### 2.1 Dynamic accounts of donkey pronouns

On the dynamic account of donkey pronouns, initiated by Kamp 1981 and Heim 1982, it isn't donkey pronouns themselves that are special. Rather, it is the antecedents. Indefinites don't have their own quantificational force, but "receive" it from a higher operator. They denote restricted free variables, and are bound (in an unselective way) by whatever operators appear above them. QVEs are predicted by the quantificational force of the higher operator. Any time a novel DP (e.g. an indefinite) is in the restrictor of a universal operator, and the pronoun in the nuclear scope, we predict a donkey pronoun.

At first glance, *of*-possessives don't fit in with this view. They are morphologically definite, and therefore don't seem like they should instantiate the donkey problem. The definiteness suggests that they

<sup>2</sup>Thanks to Jim McCloskey (p.c.) for the extremely natural sounding (6) and (7).

should not pick out novel discourse referents, patterning with simple definites. Simple definites (e.g. *the man*) only antecede non-donkey pronouns in the nuclear scope of an operator.

However, *of*-possessives can clearly be interpreted as novel – they typically are used to introduce unmentioned entities into the discourse. The challenge for a dynamic account is to show how *of*-possessives can (compositionally) be interpreted as novel DPs, despite morphological definiteness. I return to this challenge in §3.

## 2.2 D-type accounts of donkey pronouns

D-type accounts of donkey pronouns treat the pronouns, in one way or another, as disguised definite descriptions. I focus here on “syntactic” D-type theories of donkey pronouns.<sup>3</sup> “Syntactic” theories provide some syntactic (transformational) relationship between the donkey pronoun and antecedent (Parsons 1978, Heim 1990); the most thorough instantiation of this kind of theory is given in Elbourne 2001, 2005. This account combines the situation semantics of Heim 1990 with an analysis of the descriptive content of the pronouns as being supplied through NP-deletion. I focus on Elbourne’s NP-deletion account, as it is the most precise and concrete.

The core of the NP-deletion account is that donkey pronouns consist of a pronoun (which has the category D and the semantics of a definite article, cf. Postal 1966), and an elided NP. The elided NP is deleted by the process that generally manages NP-ellipsis. A typical PF for a donkey sentence on this account is given in (10): (~~crossed out~~ = elided)

- (10) If [DP a [NP farmer]] owns [DP a [NP donkey]], [DP he [NP farmer]] feeds [DP it [NP donkey]].

Pronouns such as *he* and *it* have the semantics of the definite article – they presuppose unique reference relative to a situation. An existential quantifier contributes an existence entailment relative to a situation. A conditional or universal quantifier quantifies over situations – achieving the quantificational variability effect of both indefinites and locally-anteceded definite descriptions. The example in (10) has a paraphrase roughly like “for every minimal situation *s* that contains a farmer and a donkey, where that farmer owns that donkey in *s*, *s* can be extended into a situation *s'* such that the unique farmer in *s'* feeds the unique farmer in *s'*”.

This works quite well for many cases of donkey donkey pronouns. However, it does not work well for the case of donkey pronouns anteceded by *of*-possessives. In fact, the NP-deletion account predicts a very strange reading, illustrated by the PF for (3) given in (11). The reading is one where the indefinite in the antecedent is copied over.

- (11) If [DP the [NP cover of a book]] is missing, someone unethical must have removed [DP it [NP cover of a book]].

The pronoun *it* clearly refers to the cover, not the book, so the antecedent must be the whole DP. The problem is that the only NP antecedent that includes *cover* also contains an indefinite, and in fact the very indefinite that leads to the QVE. To get the right interpretation for the pronoun, this indefinite can’t be copied, but the NP-deletion account predicts that it has to be.

Stepping back from this particular example, the NP-deletion account, as well as syntactic D-type accounts in general, work by exploiting a correlation between indefiniteness in the antecedent, and the syntactic position of the head determiner of the antecedent. Some procedure, such as NP-deletion (or in the case of Heim’s 1990 version, a rule of interpretation which ignores the determiner), is then used to excise the indefinite from the descriptive content interpreted in the pronoun. What *of*-possessives tell

<sup>3</sup>The alternative would be a pragmatic account (Cooper 1979, Heim 1990, von Stechow 1994). These accounts involve the pronoun consisting of a definite operator that is restricted by a contextually defined function. It is not clear generally how the function relates to the form or content of the antecedent on these accounts; witness von Stechow 1994 p.156: “Which particular function is understood to restrict a particular pronoun is left to the pragmatics to decide. A salient function will usually be recoverable from the context.” Therefore it is hard to see whether they make any predictions about OP antecedents. What I have to say here does not reflect on pragmatic accounts, and in fact if I were picking up the D-type challenge of OP antecedents, it is probably here I would start.

us is that this correlation doesn't always hold – the indefinite triggering the donkey problem may be elsewhere.<sup>4</sup>

There does remain one possible approach; we could replace all copied determiners with *the* (adapting Fox's 1999 analysis of the interpretation of traces). While this is technically viable, it loses the elegance of Elbourne's reduction to a known, overt syntactic process – NP deletion doesn't replace determiners. Therefore I won't consider the possibility further here.

### 3 A dynamic analysis of *of*-possessives

In this section I present a dynamic analysis of *of*-possessives. As mentioned above, the problem is that an entire morphologically definite *of*-possessives still shows a QVE; apparently as a result of the smaller indefinite. This phenomenon is related to what Chung 2006 calls **possessor dominance** – the whole *of*-possessive acts as if it were indefinite, because the possessor is indefinite.

The analysis I present is that the article *the* in OPs is the same as the definite article anywhere, but special circumstances have arisen that allow accommodation of its familiarity presupposition. The special circumstances arise by the presence of a relational head noun. The two main ingredients are (i) local accommodation, happening when the descriptive content tries to compose with *the*., and (ii) appropriate constraints on accommodation.

Before presenting the analysis, I consider the possibility that *the* in an OP isn't really *the*, and show that the donkey problem has nothing to do with the exceptional non-uniqueness of OPs.

#### 3.1 *Asides: the is the, and uniqueness is not the issue*

One possibility about *the* in definite OPs is that it is some kind of default, expletive determiner – not the familiar definite article. Two reasons to think so are the exceptionality of OPs in the first place, and the fact that parallel 's possessives mean something similar, but lack an overt determiner (*the top to a box* vs. *a box's top*). Treating *the* as a default determiner in definite OPs would simplify the problem of definite OP antecedents – we could stipulate any meaning we wanted.

However, I do not believe that *the* in OPs is different from the definite article. Not only is the default determiner hypothesis somewhat unexplanatory, but there is a solid empirical argument that OP *the* is the regular *the*. This argument rests on a peculiarity of the normal definite article, discussed by Abbott 1999. The definite article can be focused (or at least receive some sort of intonational accent), and when this happens, the article emphasizes or strengthens the uniqueness implication. Abbott suggests that this happens by paradigmatic contrast with the indefinite article, but this assumption is not crucial for the present argument. Importantly, this fact about the meaning holds for the definite article in OPs, even though, as Barker 2005 observed, when unstressed it appears to contribute no uniqueness implication. This can be seen in the example (12a), which has no uniqueness implication, in contrast with (12b), which does. In (12b), we take the sentence to indicate that the speaker is the only parent of the child, but no so in (12a).

- (12) a. As you know, I didn't expect to be **the parent of a hyper-active child**. (Barker 2005 ex.20)  
 b. As you know, I didn't expect to be **THE parent of a hyper-active child**.

This same property can be used to show that uniqueness is not the issue here. In (13–14) are two more of Barker's examples that lack a uniqueness implication. For instance, (13) does not imply that the cube has one side, something we'd expect from e.g. Kadmon's 1987 uniqueness account of definiteness.

<sup>4</sup>One obvious potential solution is to QR the indefinite out and copy what's left; this might be needed independently to account for inverse linking. However, we wouldn't want to copy an unbound trace along with the descriptive content. Also, there is no predictable location for the problematic indefinite (e.g. *the shape of the side of the entrance of the headquarters of the most productive division of a major US company*), and there is no limit (at least in principle) to the number of indefinites in the antecedent:

- (i) If **the record of a sale of some property** is missing, we'll have to go look for **it**.  
 (ii) If **the corner of a page of a book** is turned down, someone must be using **it** to mark their place.

- (13) In the center of the room is a large stone cube, about 10 feet on a side. Engraved on **the side of the cube** is some lettering.
- (14) The baby's fully-developed hand wrapped itself around **the finger of the surgeon**.

We can construct donkey sentences with parallel OPs. The example in (15) illustrates a OP-anteceded donkey pronoun, using a variant of one of Barker's non-unique OPs. If we use Abbott's intonation on the definite article, as in (16), we get a rather odd uniqueness implication that the surgeon only has one finger, and the pronoun is still a donkey pronoun.

- (15) If **the finger of a surgeon** is hurt, she usually can't operate until **it** heals.
- (16) If **THE finger of a surgeon** is hurt, she usually can't operate until **it** heals.

The QVE effect shows up regardless of the uniqueness of the OP antecedent, and therefore, the uniqueness of the OP doesn't play a role in whether it can antecede a donkey pronoun.

### 3.2 *Compositional preliminaries*

I state my analysis in a compositional re-implementation of the dynamic semantics in Heim 1983, blended with the standard compositional semantics of Heim and Kratzer 1998. The analysis must be dynamic clause-internally in order to model presupposition accommodation during composition of a DP. This system is in many ways similar to that of Muskens 1996. Here are some preliminary definitions:

- (17) An **assignment** is a partial function from discourse referents ( $D_r$ , the set of natural numbers) to entities ( $D_e$ ).
- (18) A **context** is a set of world-assignment pairs. (Heim 1983)

Intuitively, a context is a set of all the ways the world and discourse model might be, in view of the mutual public beliefs of the discourse participants (an enrichment of the Stalnaker 1978 model.) I will refer to the domain of contexts as  $D_c$ . Sentences (and in fact all constituents) are interpreted relative to a context, instead of to a single world or single assignment function. Using this, we can give the context-change potential (CCP) of a sentence  $S$  on a context  $c$ : it is  $c + S \stackrel{\text{def}}{=} \llbracket S \rrbracket^c$ .

In this framework, a discourse referent will be familiar exactly when it appears in every assignment function in the context:  $\forall \langle w, f \rangle \in c : i \in \text{Dom}(f)$ . A d.r. will be novel otherwise (in practice, for the definitions given here, when no assignment function defines it).

A noun like *book* will denote the dynamic analogue of a predicate: a function from discourse referents to contexts.<sup>5</sup> It will reduce the context to a state where its argument is known to be a book:

- (19)  $\llbracket \text{book} \rrbracket^c = \lambda x \in D_r . \{ \langle w, f \rangle \mid \langle w, f \rangle \in c \wedge f(x) \text{ is a book in } w \}$

Some denotations will need to "modify" the context of their arguments, so we need a unary mode of composition for shifting the context (e.g. denotations that are "upwardly dynamic" the sense of Groenendijk and Stokhof 1991).

- (20) **Context shifting** If  $\alpha$  denotes something of type  $T$  (for any  $T$ ) and needs to compose as type  $\langle cT \rangle$ , then it can be interpreted as  $\lambda c \in D_c . \llbracket \alpha \rrbracket^c$

We are now in a position to give a denotation for a definite article. The first steps are some notation: adding a referent  $i$  to a context  $c$  is written  $c[i]$ .

- (21)  $c[i] = \{ \langle w, f \rangle \mid \exists f' . \langle w, g \rangle \in c \wedge f'[i]f \}$
- (22)  $f'[i]f$  holds of any two assignment functions  $f$  and  $f'$ , and referent  $i$ , iff  $f$  differs at most from  $f'$  by the presence of  $i$  in its domain (from Groenendijk and Stokhof 1991).

The article  $a$  will denote a dynamicized generalized quantifier. Here is a denotation:

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<sup>5</sup> Dynamic types here have analogues in the static type system: Discourse referents ( $D_r$ ) are analogous to entities ( $D_e$ ). Contexts ( $D_c$ ) are analogous to worlds ( $D_s$ )/truth values ( $D_t$ ). Dynamic predicates (type  $\langle rc \rangle$ ) are analogous to static predicates (type  $\langle et \rangle$ ).

$$(23) \quad \llbracket \mathbf{a}_i \rrbracket^c = \lambda P \in D_{\langle c, rc \rangle} \cdot \lambda Q \in D_{\langle c, rc \rangle} \cdot Q(P(c[i])(i))(i)$$

defined iff  $\forall \langle w, f \rangle \in c : i \notin \text{Dom}(f)$  (novelty presupposition)

This involves three updates from the input context. First, an intermediate context  $c[i]$  is built by introducing the discourse referent  $i$ . Second, this intermediate context is used to interpret the restrictor, giving a new intermediate context  $P(c[i])(i)$ . Finally, the second intermediate context is used to interpret the nuclear scope – resulting the final context in  $Q(P(c[i])(i))(i)$

These are all the tools needed to interpret a sentence like  $a_2$  *book is missing*. First the indefinite article composes with its restrictor *book*, by FA (after abstraction of contexts), giving us:

$$(24) \quad \llbracket \mathbf{a}_2 \rrbracket^c (\lambda c' . \llbracket \mathbf{book} \rrbracket^{c'}) = \lambda Q_{\langle c, rc \rangle} \cdot Q(\llbracket \mathbf{book} \rrbracket^{c[2]}(2))(2)$$

Next, the VP (with its context parameter abstracted over) provides the restrictor  $Q$  for the indefinite:

$$(25) \quad \llbracket \mathbf{a}_2 \rrbracket^c (\lambda c' . \llbracket \mathbf{book} \rrbracket^{c'}) (\lambda c' . \llbracket \mathbf{is\ missing} \rrbracket^{c'}) = [\lambda c' . \llbracket \mathbf{missing} \rrbracket^{c'}](\llbracket \mathbf{book} \rrbracket^{c[2]}(2))(2)$$

$$(26) \quad = \{ \langle w, f \rangle \mid \exists f' : \langle w, f' \rangle \in c \wedge f(2) \text{ is missing in } w \wedge f(2) \text{ is a book in } w \}$$

The CCP of this sentence introduces a new d.r. 2 into this context, and throws out all world-assignment pairs where 2 is not a book that is missing.

Here is the denotation of the definite article:

$$(27) \quad \llbracket \mathbf{the}_i \rrbracket^c = \lambda P \in D_{\langle c, rc \rangle} \text{ s.t. } \left( \begin{array}{l} (\forall \langle w, f \rangle \in c : i \in \text{Dom}(f)) \\ \wedge \quad P(c)(i) = c \end{array} \right) \cdot \lambda Q \in D_{\langle c, rc \rangle} \cdot Q(c)(i)$$

This is a very standard Heim/Kamp treatment, given compositionally (I ignore entirely the issue of whether a uniqueness presupposition should be part of this definition.) The important part is the familiarity presupposition, which has two parts:

- **Presupposition part (i):** “ $(\forall \langle w, f \rangle \in c : i \in \text{Dom}(f))$ ”: the context defines a discourse referent  $i$ .
- **Presupposition part (ii):** “ $P(c)(i) = c$ ”: the context ensures that the descriptive content (restrictor) of the definite DP holds of the d.r.  $i$ .

Note that I am assuming the Heim and Kratzer 1998 partial-definedness account of presuppositions: a constituent presupposes if its denotation is partially defined for its argument domains. Presupposition failure is composition failure, due to partial definedness. This situation arises with the definite article – *the* will fail to compose with its descriptive content in any context that doesn’t satisfy the two parts of the presupposition above. This is the crucial case that will lead to presupposition accommodation.

### 3.3 Composition of Of-possessives

I will illustrate how the analysis works by going through the composition of an OP example, using the tree shown to the right in figure 1. Assume an arbitrary context where no covers or books have been mentioned, and there is no discourse referent (d.r.) 25 or 2.

Composition starts from the bottom. The indefinite  $a_2$  *book* is interpreted normally. It introduces a discourse referent corresponding to the index 2, and is infelicitous if the input context already furnishes such a discourse referent.

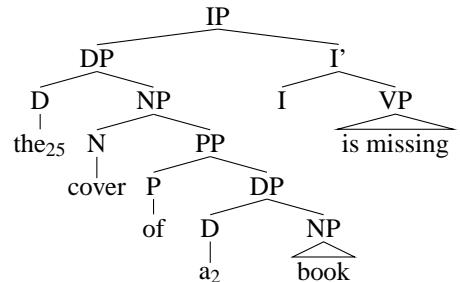


Figure 1: Structure of antecedent in (3)

$$(28) \quad \llbracket \mathbf{a}_2 \rrbracket^c (\lambda c' \in D_c . \llbracket \mathbf{book} \rrbracket^{c'}) = \lambda Q \in D_{\langle c, rc \rangle} \cdot Q(\llbracket \mathbf{book} \rrbracket^{c[2]}(2))(2)$$

Prepositions are vacuous, so  $a_2$  *book* effectively forms the internal argument to the relational noun *cover*. Now we run into a technical problem – analogous to the interpretation of a generalized quantifier in direct object position of a verb. There are various possible solutions, including QR (i.e. inverse linking) and type-shifting. I will use type-shifting here.

- (29) **GQ object position lift** If a constituent  $\alpha$  whose denotation is a function with a domain of type  $\langle c\langle rc \rangle \rangle$  needs to compose with a constituent  $\beta$  whose denotation is of type  $\langle c\langle r\langle rc \rangle \rangle$ ,  $\alpha$  can compose as:
- $$\lambda R \in D_{\langle c\langle r\langle rc \rangle \rangle} . \lambda x \in D_r . \llbracket \alpha \rrbracket^c (\lambda c' \in D_c . \lambda y \in D_r . R(c')(y)(x))^6$$
- (30)  $\llbracket \text{of } a_2 \text{ book} \rrbracket^c$  (after the typeshift)  
 $= \lambda R \in D_{\langle c\langle r\langle rc \rangle \rangle} . \lambda x \in D_r . R(\llbracket \text{book} \rrbracket^{c[2]}(2))(2)(x)$
- (31)  $\llbracket \text{cover of } a_2 \text{ book} \rrbracket^c =$   
 $\lambda x \in D_r . [\lambda c' \in D_c . \llbracket \text{cover} \rrbracket^{c'}](\llbracket \text{book} \rrbracket^{c[2]}(2))(2)(x) = \lambda x \in D_r . \llbracket \text{cover} \rrbracket \llbracket \text{book} \rrbracket^{c[2]}(2)(2)(x)$
- (32)  $= \lambda x \in D_r . \{ \langle w, f \rangle \mid \exists f' . \langle w, f' \rangle \in c \wedge f'[1]f \wedge f(2) \text{ is a book in } w \wedge f(x) \text{ is a cover of } f(2) \text{ in } w \}$

Now *cover of a<sub>2</sub> book* must compose with the definite article. *The*<sub>25</sub> demands of the input context not only that it furnish a d.r. 25, but that 25 be associated with the object that is the cover to the newly mentioned d.r. 2. We are assuming a context that does no such thing, and therefore at this point in composition there is presupposition failure. In fact, no context could satisfy this presupposition – because 2 is newly introduced, so composition is caught in a bind between the novelty presupposition of the indefinite, and the familiarity presupposition of the definite.

To save the situation, presupposition accommodation (Lewis 1979, Heim 1982, van der Sandt 1992, Beaver and Zeevat to appear, and others) happens – the context is updated with a new d.r. 25 that is the cover of the newly mentioned 2 – and the presuppositions of the definite article are satisfied. Composition can continue, but before it does, I discuss how accommodation must be constrained.

### 3.4 Constraints on accommodation

Accommodation can't happen all the time – we have to prevent it in short definites (e.g. *the man*) and in indefinites, for instance (as well as with other items that resist accommodation, such as *too*). I take as a starting point a constraint suggested in Beaver and Zeevat to appear, called the Discourse Record Principle (p.33): “Presuppositions about what is in the discourse record may not be accommodated.” This rules out accommodation in a range of cases where it is undesirable. For example, short definites like *the book* wouldn't be able to have an accommodated familiarity presupposition – such accommodation would involve introducing a new discourse referent into the discourse record. Similarly, accommodation of the novelty presupposition of an indefinite would involve removing a d.r.

This principle is of course too strong for OPs – we should also not be able to accommodate the familiarity presupposition with these definite descriptions. Therefore, I will modify this principle in accord with Prince's 1981 notion of anchoring and Heim's 1982 constraint for bridging definites:

- (33) **Discourse Record Principle (modified)** Accommodation may not modify the discourse record except to add discourse referents that are in some highly salient relation with an existing d.r.

The other piece needed is an observation made by Barker 2000, about 's possessives:

- (34) **Salience of relations** Given a possessive with a semantically relational head noun, the relation denoted by that noun is guaranteed to be salient. (Barker 2000:17)

The modified discourse record principle allows accommodation exactly in the case of definite OPs. This accommodation will involve the modification of the discourse referent, but that is licit, because of the relational head noun.<sup>7</sup> This analysis provides a formal reconstruction of Prince's 1981 third category of

<sup>6</sup> This is analogous to a static type-shift as follows:

- (i) **GQ object position lift (static)** If a constituent  $\alpha$  whose denotation's domain is of type  $\langle et \rangle$  needs to compose with a constituent  $\beta$  whose denotation is of type  $\langle e\langle et \rangle \rangle$ ,  $\alpha$  can compose as:  
 $\lambda R \in D_{\langle e\langle et \rangle \rangle} . \lambda x \in D_e . \llbracket \alpha \rrbracket (\lambda y \in D_e . R(y)(x))$

<sup>7</sup> Accommodation will be ruled out in other cases that have been noted to be exceptions to the familiarity theory of definiteness (e.g. definites with certain kinds of relative clauses, superlatives, etc.) The discourse record principle would presumably need to be modified further to account for these, but I will neglect this issue here. See Roberts 2003 for a somewhat different attempt to subsume all of these cases under accommodation.

discourse referent – anchored referents. An anchored referent is one that is introduced by accommodation using a highly salient relation.

This analysis (re-)raises the issue of why this constraint should exist, and I have no new answers.

### 3.5 Composition in a conditional

The analysis at this point allows us to derive a CCP for the content of the antecedent of the example conditional:

$$\begin{aligned}
 (35) \quad c + \textit{The}_{25} \textit{ cover of } a_2 \textit{ book is missing} &= \llbracket \mathbf{The}_{25} \textit{ cover of } a_2 \textit{ book is missing} \rrbracket^c \\
 &= \llbracket \mathbf{missing} \rrbracket \llbracket \mathbf{cover} \rrbracket \llbracket \mathbf{book} \rrbracket^{c[25][2](2)(25)(25)} \\
 &= \{ \langle w, f \rangle \mid \exists f', f'' . \langle w, f'' \rangle \in c \wedge f''[2]f' \wedge f'[25]f \wedge \\
 &\quad f(2) \textit{ is a book in } w \wedge f(25) \textit{ is a cover of } f(2) \textit{ in } w \wedge f(25) \textit{ is missing in } w \}
 \end{aligned}$$

The antecedent introduces two discourse referents (25 and 2), and reduces the context to world-assignment pairs at which 2 is a book, and 25 the cover of 2.

All that is left is to interpret the consequent, and the conditional structure. In (36) I give a typical dynamic denotation for a pronoun:

$$(36) \quad \llbracket \mathbf{it}_i \rrbracket_{\text{def}}^c = i \quad \text{defined iff } \forall \langle w, f \rangle \in c : i \in \text{Dom}(f)$$

Using the denotation of an indefinite, and the denotation of a pronoun, we can give the CCP for the relevant antecedent fairly easily (arbitrarily choosing 5 for the index of the indefinite, and ignoring modality, tense, and aspect):

$$\begin{aligned}
 (37) \quad c + \textit{Someone}_5 \textit{ must have removed it}_{25} &= \llbracket \mathbf{Someone}_5 \textit{ must have removed it}_{25} \rrbracket^c \\
 &= \llbracket \mathbf{must-have-removed} \rrbracket^{c[5](25)(5)} \\
 &= \{ \langle w, f \rangle \mid \exists f' . \langle w, f' \rangle \in c \wedge f'[5]f \wedge f(5) \textit{ must-have-removed } f(25) \} \\
 &\text{defined iff } \forall \langle w, f \rangle \in c : i \in \text{Dom}(f)
 \end{aligned}$$

The consequent introduces a discourse referent 5, and reduces the context to world-assignment pairs where 5 must have removed 25.

Now we can use any dynamic treatment of conditionals to interpret the donkey binding configuration (assuming the treatment handles referents). In (39) I give a fairly simplistic one based on Heim 1983<sup>8</sup> as well as Groenendijk et al. 1996 (fact 3.2).

$$\begin{aligned}
 (38) \quad f \leq f' \text{ iff } \text{Dom}(f) \subseteq \text{Dom}(f') \\
 (39) \quad \llbracket \mathbf{if } \mathbf{A}, \mathbf{B} \rrbracket_{\text{def}}^c &= \left\{ \langle w, f \rangle \in c \mid \begin{array}{l} \neg \exists f' : \langle w, f' \rangle \in \llbracket \mathbf{A} \rrbracket^c \\ \vee \exists f' : f \leq f' \wedge \langle w, f' \rangle \in \llbracket \mathbf{B} \rrbracket \llbracket \mathbf{A} \rrbracket^c \end{array} \right\}
 \end{aligned}$$

The compositional semantics of the antecedent and consequent above now straightforwardly give us the right CCP for the conditional as a whole. The discourse referents introduced in the antecedent, A, will persist into the consequent, B, since the input context for B is  $\llbracket \mathbf{A} \rrbracket^c$  – just as in Heim 1983.

## 4 Concluding remarks

*Of*-possessives antecedents are problematic for many existing accounts of donkey pronouns. I have shown here how to give an account of them on a dynamic treatment of donkey pronouns, and largely left open the question of how they could be treated on a D-Type account.

For a dynamic account, understanding the relationship between *of*-possessives and donkey pronouns they antecede amounts to understanding the semantics of the *of*-possessive. To that end I have given a compositional, dynamic account of *of*-possessives: the key ingredient is presupposition accommodation that would prevent composition failure without accommodation. *Of*-possessives show quantificational variability effects because of the presence of a relational noun, whose argument is (or contains) an

<sup>8</sup>Recall:  $c + \text{If } A, B$  is defined there as  $c \setminus (c + A \setminus c + A + B)$ , where  $X \setminus Y$  means  $X \cap (\mathcal{W} - Y)$ .

indefinite. The novelty of the indefinite is inherited by the whole possessive structure, as a result of this relational dependency on the indefinite. Consequently, the quantificational variability is inherited by the larger possessive structure as well, as is the ability to antecede donkey pronouns.

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