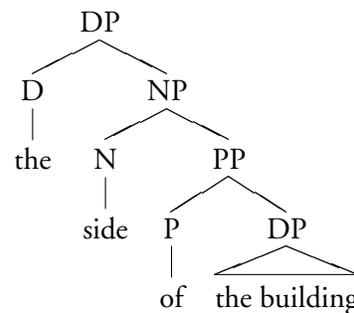


I Introduction

Several authors (Abbott 1999, 2001, 2000; Roberts 2003; Barker 2005) have recently argued in various ways that the Heim-Kamp notion of familiarity (Kamp 1981; Heim 1982) is not the right characterization of definiteness. The arguments lead either to no familiarity at all, or to a much weaker version of familiarity than what Heim proposed. In this paper I provide direct empirical evidence that the presupposition of the definite article *the* must contain both a familiarity and a uniqueness component, following Kadmon 1987; Birner and Ward 1994; Farkas 2002; Roberts 2003. The evidence further shows that the familiarity component must implement a strong version of Heim-Kamp familiarity, and the uniqueness must at a minimum be uniqueness relative to the discourse model, not to objects in the world. The proposal is compatible with an additional stronger uniqueness claim, but discourse uniqueness is required.

The construction which provides the evidence is what I'll refer to as the "possessive definite" construction, illustrated schematically and exemplified in (1).

- (1) **Possessive Definites (PDs):**
 $[_{DP} \text{the} [_{NP} N_{\text{relational}} [_{PP} \text{of} [_{DP} \dots]]]]$



A possessive definite consists of a definite determiner with an NP complement headed by a relational noun, and an *of*-PP providing an explicit internal argument to that noun. I do not consider here double genitives (*the book of Alfonso's*) or true possessives (*Alfonso's book*) - see Partee 1997; Barker 1991, 1998; Partee and Borschev 2003; Barker 2005 and others for more discussion of these.

Theories of definiteness fall roughly into two kinds. On the familiarity view, definite descriptions are felicitous if they refer to a familiar entity (Christopherson 1939; Kamp 1981; Heim 1982, 1983a, among

*Thanks to Chris Barker, Sandy Chung, Donka Farkas, Veerle van Geenhoven, Bill Ladusaw, Jim McCloskey, Alia Sperling, the participants of the Winter 2005 research seminar, and the audience of Linguistics At Santa Cruz 2005 for comments on this work and discussions about this topic. This material is based upon work supported by the National Science Foundation under Grant No. BCS-0131767.

others). On the uniqueness view, definite descriptions are felicitous if they refer uniquely (Russell 1905; Löbner 1985; Kadmon 1987, 1990; Abbott 1999 among others). Possessive definites are exceptional under both views; they can be used felicitously without referring familiarly (Poesio 1994) or uniquely (Löbner 1985; Kadmon 1987; Barker 2005).

The bolded possessive definite in (2) illustrates the potential lack of familiarity - it is perfectly felicitous without prior mention of any friends of any statesmen, and in fact was a first mention in the source web page.

- (2) After some Victorian-era debacle, **the friend of a British statesman** (I don't recall who) cried, "It is the ruin of the nation!"

The bolded PD in (3) illustrates the lack of uniqueness. It is felicitous despite the fact that nothing about the PD or discourse determines which side of the truck Superman crashes into.

- (3) That's the one where Superman crashes spectacularly into **the side of a Marlboro-emblazoned truck**. (Barker (2005) ex.4)

The end goal of this paper, beyond having an account of possessive definites, is to have a satisfactory denotation for the definite determiner *the* that covers a range of cases. I make the core assumption that *the* has the same denotation in all definite descriptions, and that apparent exceptions must arise from that denotation in combination with the compositional semantics/pragmatics. Exceptions do not arise from different lexical variants on what *the* can mean.

In §2, I discuss the behavior of possessive definites with respect to uniqueness and familiarity. §2.1 addresses the non-familiarity effect, and §2.2-2.4 discuss the non-uniqueness effect, considering a range of uniqueness conditions in the literature, as well as Barker 2005's account of PDs. In §2.5 I provide evidence that despite allowing non-uniqueness in one sense, PDs still refer uniquely relative to the discourse model. I argue that the effects here, as well as the "reference tracking" effects in §2.6 require the strong familiarity of the Heim-Kamp approach - they can't be accounted for without familiarity, and they can't be accounted for with weaker notions of familiarity.

In §3, I provide an analysis that captures the familiarity and uniqueness facts of possessive definites, assuming a combined Heim-Kamp familiarity and discourse-uniqueness presupposition. I show how this weak kind of uniqueness is compatible with non-uniqueness in a stronger sense, and how the facts in §2.5 follow from assuming a combined strong-familiarity/discourse-uniqueness presupposition.

In §4 I consider the wider picture of how this account of the definite determiner holds up outside possessive definites. I conclude that while the account is compatible with an additional stronger uniqueness

component, discourse uniqueness is the minimum kind of uniqueness required. I show several ways in which stronger uniqueness might be added, as well as predictions that are made by each of these ways.

2 Familiarity, uniqueness, and non-uniqueness

2.1 Familiarity

Some definites seem to require familiarity (Christopherson 1939; Heim 1982, 1983a, among others):

- (4) a. # (out of the blue) **The man** just left.
b. A strange man was in the cave earlier, but **the man** just left.
- (5) a. # (out of the blue) **The book** is on my desk.
b. I just bought a new book. **The book** is on my desk.

A straightforward definite description like *the man* in (4a) is not felicitous out of the blue. The familiarity view has taken this to be because no man is previously under discussion. We can see that in (4b), prior mention of some man allows felicity of a definite description of this kind. *The book* in (5) behaves similarly.

A definition of this kind of linguistic familiarity is given in (6):

- (6) A use of a definite determiner is a **familiar use** iff there is at least one entity in the discourse model (that has been brought to salience by prior linguistic mention) that satisfies the descriptive content of the determiner's nominal complement.

Poesio 1994 has argued convincingly that possessive definites don't require familiar use. Here are some examples to illustrate this, found on google:

- (7) **The cover of the next Harry Potter book**, the Order of the Phoenix, has been revealed.
- (8) After some Victorian-era debacle, **the friend of a British statesman** (I don't recall who) cried, "It is the ruin of the nation!"
- (9) ...the information content inside a room depends not on **the volume of the room** but on **the area of the bounding walls**.
- (10) The Special Master for the September 11th Victim Compensation Fund of 2001 has issued a final report detailing **the activities of the Fund**...
- (11) Then I noticed he was trying to pull apart the American flag furled in **the corner of the porch**.

(12) **The outside of a home** can be one of the hardest and most expensive areas to maintain.

In every case, the PD is a first mention. In many cases, the PD is used in the first few sentences of an article in order to introduce a topic. I know of no example where a PD must be used familiarly, but of course, a negative claim of this type is hard to establish absolutely. I will take it for granted from here on in. It is of course possible to use PDs familiarly, despite the fact that it isn't necessary - I return to this issue in §2.6.

The main empirical claim of this section is that possessive definites don't require familiarity. It depends very much on assumptions about the theory of definiteness whether this claim matters. The analysis of Barker 2005 disregarded the familiarity patterns of possessive definites, arguing that familiarity is simply the wrong theory of definiteness in the general case, and therefore needn't play any role in PDs. That analysis therefore never directly touches on the fact that PDs don't require familiarity.

The problem with assuming familiarity out of the picture is that at least some familiarity effects seem to be systematic, and therefore deserve an explanation. Even if the locus of definiteness is entirely on uniqueness, any intuitions that are systematic about familiarity should be derivable from a correct analysis. PDs instantiate such an effect - no PD at all need be familiar, regardless of the head noun, any modifiers, context, etc. Regardless of whether the explanation of this fact is direct or indirect, an analysis of this construction is not complete without an explanation of this fact. That is, I do not believe that the kind of data shown in this section can simply be ignored, whatever the analysis comes out as.

In §2.5 and §2.6 I add to this methodological argument two pieces of empirical evidence that a familiarity component is crucial to the analysis of definites. First I'll discuss the issue of uniqueness in possessive definites.

2.2 (Non-)uniqueness in PDs

On the uniqueness view of definiteness, definite descriptions are felicitous when they refer uniquely (Russell 1905; Evans 1977; Löbner 1985 among others). The best example of this appears in superlatives, illustrated in (13).

- (13) a. # (out of the blue) **The student** came to my office hours.
b. (out of the blue) **The tallest student in my class** came to my office hours.
- (14) a. # (out of the blue) Write down **the prime number**.
b. (out of the blue) Write down **the smallest prime number**.

The definite description *the student* in (13a) is not felicitous, but when we apply a superlative and explicitly set the domain, as in (13b), the description is felicitous. A similar effect appears in (14). On the uniqueness story, the superlative DPs are felicitous because they are each guaranteed (thanks to the superlative) to refer uniquely.

Barker 2005 argues that possessive definites do not need to refer uniquely in order to be felicitous (PDs have also been noted as problems for uniqueness by Löbner 1985 and Kadmon 1987). Here are some examples from Barker 2005 which illustrate the point.

- (15) Take scissors and cut **the finger of the latex glove** off at the base of the finger. The finger you cut depends on the size of the glove.
- (16) 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. (from Zork 2)

The bolded DP in (15) refers non-uniquely in the sense that it does not pick out any particular finger to be cut off. If it did refer uniquely in a fairly strong sense, we'd expect infelicity, unless the glove has only one finger. Similarly, there is no particular side of a cube determined in (16); the lettering could equally well be engraved on any side. If the bold DP in that sentence referred uniquely, we'd expect infelicity unless the cube only had one side, a definitional (or geometrical) impossibility.

Here are some more (attested) examples, all from Barker 2005. In (17), while there is only one top of the chart, nothing about the descriptive content of the bold DP tells the hearer which side is being referred to. In (18), the bold DP doesn't refer uniquely in the sense that there are guaranteed to be two parents. In (19) and (20), the bold DPs don't tell a hearer which corner of the cardboard and tomb respectively are intended as the referents. In fact, in (19), the continuation indicates that any corner of the cardboard will do.

- (17) Did students notice anything about the categories on **the side and the top of the chart**?
- (18) As you know, I didn't expect to be **the parent of a hyper-active child**.
- (19) Tie one end of a piece of string to **the corner of the cardboard with the picture**. Tie the other end to the same corner of the other piece of cardboard with the label.
- (20) Remove all the objects to discover the really cool artifact that the archaeologists found buried in **the corner of the Pharaoh's tomb!**

There are two main questions that I will address about this data, given in (21).

- (21) a. For what formulations of uniqueness are these PDs non-unique?
 b. Are there any formulations of uniqueness under which these PDs are unique?

In the next few sections I will consider a variety of uniqueness theories, as well as Barker 2005's analysis of possessive definites.

2.3 Uniqueness relative to objects in the world

The first class of uniqueness conditions I will consider is those where a uniqueness claim is made relative to objects in the world. This kind of condition goes back to Russell 1905. Possessive definites flout this kind of uniqueness condition.

In PDs such as *the side of a cube*, we don't know which side is meant (given the choice of all sides). That is, the reference is not unique relative to all objects in the actual world, and isn't even unique relative to a plausibly restricted subset of the actual world, the set of all sides of the cube. One implementation of this kind of uniqueness, is given in (22). I will refer to uniqueness relative to objects in the world as strong-uniqueness.

- (22) A DP is used **strong-uniquely** relative to a situation *s* if there is exactly one entity *x* that is part of *s* such that *x* satisfies the descriptive content of the DP.¹

In this definition I assume a situation semantics like that of Kratzer 1989, where a situation is a part of the world. This notion of uniqueness which comes most directly from Elbourne 2002, following from work by Heim 1990 (which in turn follows from a variety of work by authors including Kadmon 1987 and Evans 1977, 1980).

A PD such as *the side of a cube* is not used strong-uniquely relative to a situation containing the whole cube (i.e. the physical object). The situation of evaluation for any sentence containing a PD like this would typically involve the whole cube, and therefore we can conclude that this kind of PD is never used strong-uniquely.

An empirical test for strong non-uniqueness is compatibility with sluicing². The superlative *closest* in (24) forces strong uniqueness by virtue of its meaning, and therefore the sluicing is pragmatically odd.

- (23) Write the message on **the side of the cube** - it doesn't matter which.

¹Thanks to Dan Roth for pointing out errors in a previous version of (22) and (26).

²Thanks to Bill Ladusaw for suggesting this to me.

(24) Write the message on **the closest side of the cube** - #it doesn't matter which.

The uniqueness condition of Kadmon 1987, 1990 also falls into the category of world-based uniqueness. For Kadmon 1987, an anaphoric definite description (ADD) is felicitous if it refers uniquely relative to conditions on antecedents of the ADD. In DRT terms, an ADD contributes a variable, and presupposes that its variable must pick out only one object in the world. In other words, there must be only one object in the model that satisfies all the conditions on the variable at the point in the discourse when the ADD is used. This involves something like the domain restriction present in the strong-uniqueness defined above, except the domain is more concrete. In a case like (25), the first sentence introduces a variable that is restricted to be a car, and to be owned by Alfonso. In linearized form, that sentence's DRS might be $[x, y | \text{car}(x), \text{motorcycle}(y), \text{owns}(\text{Alfonso}, x), \text{owns}(\text{Alfonso}, y)]$. The bolded definite description in the second sentence denotes the same variable. The uniqueness presupposition is that there is only one thing in the world that satisfies these conditions - there is only one thing in the world that is both a car and owned by Alfonso.

(25) Alfonso has a car and a motorcycle. **The car** is in the shop right now.

Various authors have debated the presence of a uniqueness implication in examples like (25), though the judgments go back to Evans 1977. I will return to this issue in §4, but for now I will take this kind of data for granted.

This account of uniqueness rests on the Heim-Kamp account of familiarity - the choice of variable for an ADD is made entirely by a standard familiarity system. What this means is that novel definite descriptions will involve accommodation of a familiarity presupposition - possessive definites will introduce a novel variable and a condition on that variable corresponding to the descriptive content of the PD. Whenever a definite in this system is novel, there will be only one condition on its variable for the uniqueness condition to look at - the condition introduced by the descriptive content. Therefore, for the case of novel definite descriptions, Kadmon 1987's uniqueness condition reduces to the general case of strong uniqueness relative to objects in the world. Therefore, PDs are anomalous under Kadmon 1987's account (a fact explicitly recognized by Kadmon in §5.7 of that work).

Farkas 2002 provides a more general uniqueness condition via the idea of "determined reference." A DP has determined reference if the condition introduced by the DP causes there to be no choice as to the value of the variable introduced by that DP. All definites achieve determined reference in some way, but they differ as to what way. Pronouns, for example, achieve determined reference by means of the equative value condition they introduce. Farkas 2002 suggests that the definite determiner marks that a

DP must achieve determined reference in view of the condition contributed by its descriptive content - this subsumes the strong uniqueness condition given above. Relative to its descriptive content, an ADD will achieve determined reference only if there is exactly one object in the world (possibly relative to a contextual domain) that fulfills the condition introduced by the descriptive content. The general notion of determined reference does not force us into strong uniqueness in this form, however. For instance, Kadmon 1987's uniqueness condition also fulfills determined reference in almost every case by ensuring in a different way that ADDs have no choice as to their value (there is one case in which definites on Kadmon's account do not achieve determined reference - see §4.4).

Farkas 2002 does not discuss novel definite descriptions (NDDs), but Umbach 2002 extends the determined reference account to cover some cases of NDDs. Under Umbach 2002's analysis, NDDs achieve determined reference by means of their descriptive content (Umbach also gives a different treatment of ADDs than Farkas 2002, but I won't consider that here). This works quite well in some cases, such as superlatives (*the smallest prime number*), some relative clauses (*the man who is elected president in Italy*) and even some PDs (*the president of Italy*). In each of these cases, the material in the descriptive content will only pick out one thing. In the case of the PDs Umbach discusses, this is because (in the terms of Löbner 1985) the nouns are functional nouns - they denote relations that are guaranteed by convention to be functions. However, it should be clear that the account won't work for the PDs under discussion here. NDDs such as *the side of a cube* don't appear to achieve determined reference at all, since there is in fact choice as to what the reference of the DP will be.

In summary, PDs are exceptional under every world-based account of uniqueness that I am aware of.

2.4 Uniqueness relative to a discourse model

Several analyses of uniqueness, including Barker 2005 and also Roberts 2003, give a uniqueness condition relative not to objects in the world, but to objects in the discourse model. This kind of uniqueness condition will be the subject of this as well as the next few sections. In this section I'll discuss the relation of discourse uniqueness to world-based/strong uniqueness, and give some detail of how Barker 2005 makes use of this relation. In the next section, I reconsider the empirical question of whether possessive definites ignore or obey a discourse uniqueness condition.

The analysis of possessive definites in Barker 2005 gets at the lack of strong-uniqueness indirectly.³

³The following is my interpretation of the way uniqueness works in (Barker 2005), so errors about this are mine. Barker 2005 only discusses a notion of discourse uniqueness.

(Barker 2005) adopts discourse uniqueness as a property of definites. I've rephrased this notion slightly into the form given in (26):

- (26) A DP is used **discourse-uniquely** relative to a discourse model f if there is exactly one discourse referent i in the domain of f such that $f(i)$ satisfies the descriptive content of the DP.

A discourse model for now can be thought of as simply an assignment function, i.e. a partial function from discourse referents to entities. A discourse referent is a formal object used to track reference - it corresponds with some object in the world, but is not an object in the natural language ontology. The discourse model might contain referents to less objects than the actual world contains (I will address the contents of the discourse model in more detail shortly).

Note that discourse uniqueness is a very general property, and certainly isn't a characterization by itself of definites. Indefinites, for instance, might well be used discourse-uniquely, in the sense that after their interpretation, discourse uniqueness is satisfied.⁴

If a definite description does not need to be used discourse-uniquely, it does not need to be used strong-uniquely. That is, if the description is compatible with the discourse model containing multiple potential referents to (potentially different) objects satisfying the descriptive content, it is also compatible with there being multiple objects in the world that satisfy the descriptive content. The converse is not generally true, however. If a definite description is not used strong-uniquely, it may still be discourse unique. For instance, consider a context where there is only one discourse referent to a side of a cube, even though the cube has multiple sides in the evaluation situation. Then *the side of a cube* would be used discourse-uniquely but not strong-uniquely.

⁴Normal indefinites won't presuppose discourse uniqueness, though they may be compatible with it. However, Donka Farkas (p.c.) has pointed out to me that indefinites headed by *another* might very well carry a discourse uniqueness presupposition:

- (1) # (out of the blue) Another man left.
- (2) A man walked in, and another man left.
- (3) # Ten men walked in, and another man left.

The peculiar thing is that the presupposition isn't quite the same as on definites, as speakers typically accept the following discourse:

- (4) ? Two men walked in, and another man left.

This would be unexpected given a strong discourse-uniqueness presupposition on *another*, but then, given the lack of one, the judgement on (3) would also be unexpected. If the behavior of *another* does reflect some discourse-uniqueness type presupposition, then on accounts of definite descriptions such as the one I develop here, and potentially that of Roberts 2003, discourse uniqueness can't be the defining characteristic of definiteness. I'll leave further investigation of this for a future date.

The crucial difference between strong and discourse uniqueness is the domain with respect to which uniqueness is calculated. Strong-uniqueness would have it be some set of objects in the world, but discourse-uniqueness would only have it be objects in the discourse model.

Barker 2005 assumes that definites generally must involve discourse-uniqueness, and that possessive definites are counterexamples to this. This is accounted for by providing a mechanism that cancels the uniqueness presupposition exactly in the case that a definite description is a possessive definite. The cancellation means that all PDs are compatible with being used non-discourse-uniquely. It follows that they will also be compatible with non-strong-uniqueness.

The cancellation mechanism is keyed (indirectly) on the fact that PDs always have as their head noun a relational noun. More directly, presuppositions are canceled in the presence of alternative modes of semantic composition to the standard Montagovian function-argument application. Steedman 1985 argues that in a combinatory categorial grammar the best account of non-constituent coordination (NCC) involves a compositional operation of function composition, not function application. Function composition is a way of deferring function application until a later compositional point. For example, in an NCC example like *[John read] and [Mary criticized] an article*, the two conjoined non-constituents would be interpreted like $(j \circ \text{read}')$ and $(m \circ \text{criticized}')$ where \circ signals function composition (defined as $(f \circ g) \equiv \lambda x. f(g(x))$, where x will have the type of the domain of g).

The presence of a relational noun in PDs will allow two paths of composition to achieve the same truth-conditions. We could compose the definite determiner with the relational noun, and then apply the *of*-PP to the resulting function, or we could go the normal route with function application all the way. These two options are illustrated in (27) (slightly modified from Barker 2005 ex. 74):

- (27) a. the [corner [of a busy intersection]] (NORMAL UNIQUENESS)
 b. [the \circ corner] [of a busy intersection] (POSSESSIVE DEFINITE)

Barker proposes that the presuppositions of *the* apply to the first element it composes with, not the element that corresponds to the argument in the end. For either mode of composition in (27), *corner of a busy intersection* will amount to being the argument of *the*, but the two ways of composing get there by different routes. In the (b) case, the relational noun composes with *the* by function composition first, and in Barker 2005's view, this means that the presuppositions of *the* will apply not to the denotation of *corner of a busy intersection*, but just to *corner*. Since this presupposition needs a one-place predicate, but *corner* is a two-place predicate, the presupposition will fail to apply. In Barker 2005's view this is not ideal - intuitively what we want is for the uniqueness presupposition to apply in some way to the relation, but there is no

obvious technical means to do this.

The function composition order of composition will not be present unless the complement of the definite determiner is a NP containing a relational noun. This is because of a type mismatch - function composition requires a predicate that is still waiting for an argument. Therefore, only the specific case of possessive definites will be an exception to uniqueness.

As far as I can see, nothing in Barker 2005's account hinges on the uniqueness condition being relative to the discourse model as opposed to the world. A world-based uniqueness condition could equally well be canceled under these circumstances, but it is important to note that any uniqueness presupposition will be canceled.

To the questions posed in (21), Barker 2005's answers are that possessive definites are not necessarily discourse-uniqueness, and that discourse uniqueness is generally a property of definites.

2.5 Discourse uniqueness effects

In this section I provide empirical evidence, that possessive definites must be discourse unique, contra Barker 2005. I also argue that the uniqueness is relative only to strongly familiar entities - those that have been mentioned.

First I will detour to the issue of how objects come to be present in the discourse model. This issue amounts to what kind of theory of familiarity we assume. On the view of Heim 1982, objects enter the discourse model only by being brought to salience by linguistic mention (or presupposition accommodation, which isn't important for the moment). This is what Roberts 2003 termed "strong familiarity." Roberts 2003 proposes "weak familiarity," where objects are present in the discourse model if their existence is entailed by the common ground. The common ground consists of the mutual beliefs of all discourse participants (Stalnaker 1978), and so any object that is linguistically mentioned (barring modal subordination etc.) will have its existence entailed by the context. This idea follows from Prince 1992's suggestion that definites are not discourse-old but rather hearer-old. However, under both of these versions of familiarity, mention serves as a lower bound for what must be in the discourse. As long as a discourse model is assumed at all, if something is linguistically mentioned, it will be in the discourse model.

This gives us a tool with which to test a discourse-uniqueness-cancellation analysis. The prediction is that discourse uniqueness should never be relevant to PDs - it should be canceled. The data below shows that discourse uniqueness is in fact relevant to PDs (assuming it is relevant at all), and isn't canceled. When multiple possible values for the referent have been linguistically mentioned in prior discourse, a PD

becomes infelicitous.

- (28) a. Alfonso examined both visible sides of the cube. # Engraved on **the side of the cube** was some lettering.
- b. In the center of the room is a large stone cube. Engraved on **the side of the cube** is some lettering.

In (28a), the PD *the side of the cube* is not felicitous, because of the fact that multiple sides have been linguistically mentioned. This contrasts with (28b), where no sides have been previously mentioned, and the PD is felicitous (and not strong unique). Here are two more examples along these lines:

- (29) a. Examine each finger of the latex glove carefully. # Then take scissors and cut **the finger of the glove** off at the base of the finger.
- b. Choose a latex glove. Take scissors and cut **the finger of the latex glove** off at the base of the finger.
- (30) a. There were coffee shops on three corners of the intersection of the main streets. # There was also a phone booth on **the corner of the intersection**.
- b. Alfonso surveyed the intersection of the main streets. There was a phone booth on **the corner of the intersection**.

In all of these cases, the felicitous definites in the (b) sentences aren't strong unique. For example, in (30b), we don't know which corner the phone booth is at. Despite the lack of strong uniqueness, it is clear that the PDs must be discourse unique, contra Barker 2005. I take Barker 2005 to predict the lack of strong uniqueness via the lack of discourse uniqueness, and this clearly won't work here.

As mentioned earlier, we could reformulate Barker 2005's analysis to cancel a strong uniqueness presupposition, instead of a discourse uniqueness presupposition. However, if definites generally contain a strong uniqueness presupposition, the data above shows that they must also contain a discourse uniqueness presupposition that isn't cancellable. The function-composition based canceling of presuppositions does not allow us to pick and choose which get canceled, and therefore it can't cover this data either way uniqueness is formulated.

The uniqueness effect shown above relies crucially on linguistic mention. If multiple sides are linguistically mentioned, *the side of the cube* is infelicitous. This motivates the use of a discourse model encoding strong familiarity in order to separate entities under discussion from those that aren't. That is, we at least need some notion of familiarity to account for this data.

The data also provides evidence for a particular notion of familiarity, the strong version of familiarity advocated by Heim 1982. Weaker notions won't do. Take the version in Roberts 2003 where familiarity of an entity means that its existence is entailed by common ground. In all of the examples above, the existence of multiple possible referents is entailed regardless of explicit linguistic mention. In (28a), the existence of a cube entails the existence of its six sides, regardless of whether the sides are mentioned. PDs, on this view, should be infelicitous in these cases, and they are not.

These pieces of data do not force us to a discourse-uniqueness view of uniqueness - a discourse uniqueness view is simply sufficient to account for them. Most of the world-based uniqueness accounts would predict infelicity in the (a) discourse above as well, though for most of these theories the prediction isn't keyed on mention. Kadmon 1987 is an exception - under that account, mention would indirectly trigger infelicity. In (30a), mention of multiple corners containing coffee shops means that any variable with its value as one of those corners will be non-unique. This happens for intuitively the right reason, that multiple corners have been brought to salience and given the same conditions. Kadmon 1987's account requires strong familiarity to achieve this, so I conclude that regardless of whether uniqueness is world or discourse based, strong familiarity is required.

In summary, possessive definites, despite being compatible with non-strong-unique use (relative to objects in the world), must still refer uniquely relative to just those objects that have been raised to salience by linguistic mention. A strong familiarity component is necessary to capture this.

2.6 Discourse Familiarity

The previous section compared cases where no potential referents for a possessive definite exist to ones where multiple potential referents exist. When we look at cases where exactly one potential referent exists, we find further evidence for strong familiarity.

In §2.1 I discussed the fact (due to Poesio 1994) that PDs never require familiarity. Despite not requiring it, they are perfectly compatible with familiarity. Consider (31), where exactly one potential referent is introduced by linguistic mention:

- (31) There was a coffee shop on one corner of the intersection of the main streets. There was also a phone booth at **the corner of the intersection**.

In this example, there is a "reference tracking" effect: the phone booth has to be at the same corner that the coffee shop is on. That is, when a corner of an intersection has been mentioned, future PDs like *the corner of the intersection* must refer to the same corner.

This can't be predicted without assuming strong familiarity; a theory that assumes weak familiarity (or a theory that assumes uniqueness alone) predicts that the corners in (31) need not match.

Consider first the case of a pure uniqueness theory. This kind of theory would assume that reference is felicitous when it is unique, and that reference is entirely determined by uniqueness relative to some domain. However, each corner of the intersection would be equally unique from the perspective of the bolded DP in (31). Therefore, if that definite description is felicitous, then it should behave the same as a novel PD. A novel PD would not specify which corner of the intersection is intended, and because of this, a pure uniqueness theory would predict a non-uniqueness effect regardless of whether a PD is anteceded. What we find however, is that the reference of an anteceded PD is chained to the reference of its antecedent, even if that reference is not determined uniquely.

Note that while Kadmon 1987's uniqueness condition would make the right predictions here, that theory is not a pure uniqueness theory. Kadmon does not believe that a uniqueness condition can be given independently of a familiarity condition (see §8.2 of Kadmon 1987). It would make the right prediction because uniqueness is relative to **all** conditions on a variable - the PD would refer to the unique corner of the intersection that had a coffee shop on it. This of course can't happen without knowing what the antecedent is of the PD, and a familiarity condition is used for this.

The combined theory of Roberts 2003, which assumes only weak familiarity, fares no better than pure uniqueness theories. Prior to the second sentence in (31), the existence of the intersection and all of its corners are entailed, even though only one corner has been mentioned. Therefore, a discourse uniqueness condition relative to a discourse model based on weak familiarity would predict infelicity. Even if this could be mitigated, the weakening of familiarity provides no mechanism for actually tracking the reference - like pure uniqueness theories, this combined theory gives no explanation for why the corners would have to be the same. On Roberts 2003's theory, if uniqueness effects are simply absent in PDs, the corner could be any corner, and if they are present, the discourse should simply be infelicitous.

A theory combining strong familiarity with discourse uniqueness would do as well on this example as Kadmon 1987's does. Accommodation would only happen if no discourse referent exists, but if one does, there would be no accommodation, and the discourse uniqueness presupposition would be satisfied.

On the other side of the coin, this data suggests that the fact that possessive definites can be non-familiar is due to presupposition accommodation (Lewis 1979; Heim 1982; van der Sandt 1992 and others) of a familiarity presupposition, as opposed to canceling of such a presupposition. Presupposition accommodation is a process that can happen in some cases of presupposition failure. If a presupposition is not met at the time of interpretation, in many cases a speaker will accommodately assume that the presup-

position holds. For example, in a sentence like (32), the verb *quit* presupposes that the subject (Alfonso) used to participate in the activity that is denoted by the complement of *quit* (in this case, smoking):

(32) Alfonso quit smoking.

Typically, when someone hears this sentence, they assume that Alfonso used to smoke, assuming they didn't already know this.

Accommodation is a "last-resort" phenomenon, in that it occurs only after presupposition failure. The behavior of PDs and the case in (31) pattern exactly like this. In the normal case, where no referents exist, a familiarity presupposition isn't met, and accommodation can act to introduce a referent. In (31) there is a potential referent, and so accommodation is blocked. We are forced to stick with the referent that exists rather than introducing a new one. On the alternative, where for whatever presupposition (familiarity or uniqueness) that generally causes reference tracking, that presupposition is canceled in novel PDs, we would expect blanket cancellation. PDs (like indefinites) should be novel in every case - but in fact, we don't find this. They are only novel when forced into it by their discourse circumstances.

2.7 Summary

The main claims in §2 are summarized in (33).

- (33)
- a. When no antecedent for a PD is present, the PD is felicitously novel. (§2.1)
 - b. A novel PD refers non-uniquely, relative to objects in the world. (§2.2-2.3)
 - c. PDs do show a kind of uniqueness effect when anaphoric. (§2.5)
 - d. Accounts with any kind of strong uniqueness make the wrong predictions for novel PDs. Discourse uniqueness combined with weak familiarity (Roberts 2003) also makes the wrong predictions, but when combined with strong familiarity, makes the right ones. (§2.5)
 - e. When an antecedent is present, a PD must be anaphoric. (§2.6)
 - f. Accounts without what Roberts 2003 calls “strong familiarity” (Heimian familiarity) cannot account for the behavior of anaphoric PDs. This leaves out any uniqueness-only account, as well as Roberts 2003’s weak familiarity account. (§2.6)
 - g. The familiarity effects show signs of last-resort accommodation. (§2.6)

The best account of definites for possessive definites, in light of the data in this section, is the combination of strong familiarity with discourse uniqueness. Running at a close second is Kadmon 1987’s combination of strong familiarity with world-uniqueness, but this account makes the wrong predictions for novel PDs. In §3 I give an analysis which combines strong familiarity and discourse uniqueness, and I return to a consideration of Kadmon 1987’s account in §4.

3 Analysis

In this section I present an analysis of possessive definites that captures the facts presented by Poesio 1994 and Barker 2005, as well as those I have introduced in the previous section. The analysis combines both a discourse uniqueness presupposition and a discourse familiarity presupposition into the definite determiner, following Roberts 2003. Contra Roberts, I use strong familiarity *à la* Heim 1982.

The previous section argued against Barker 2005’s analysis, but it still leaves a modified version of the main observation intact: Possessive definites are generally compatible with not being used strong-uniquely. I show that the lack of strong-uniqueness is compatible with discourse-uniqueness, on the right assumptions about what a discourse referent is. The right assumption, in particular, is one implicit in the model of a context in Heim 1983b.

I have argued that strong familiarity is necessary to account for both the discourse uniqueness effects,

and the behavior of PDs in the presence of potential antecedents. The combination of discourse uniqueness and strong discourse familiarity in the presuppositions of *the* accounts for the effects shown in the previous section. However, as Poesio 1994 showed that PDs don't actually require strong familiarity, I will use presupposition accommodation (see Lewis 1979; Heim 1982; van der Sandt 1992, as well as further references and discussion in Beaver and Zeevat to appear) to override this when no potential antecedents for the definite are present.

3.1 Technical setup

I will give my analysis in a dynamic semantics that is roughly a merger of Heim 1983b and Heim and Kratzer 1998. The aim of this section is to sketch the semantics in enough detail to give the interpretation of the indefinite article *a*, and interpret a simple sentence like *a book is missing*.

The system needs to be dynamic clause-internally for two reasons: first, because of the use of the Heim 1983b-style context, the presuppositions of *the* need to be stated as presuppositions on full contexts. Second, for similar reasons, presupposition accommodation needs to be an operation on full contexts.

Notationally and compositionally this system is very similar to the compositional DRT developed by Muskens 1996. The difference is primarily in two areas: work that in Muskens' system is put into the merge operation on DRSs is here put into the composition via lambda abstraction over contexts, and I have used a different notion of a context (Heim 1983b) than is the norm for DRT. These differences are not significant to the analysis, but what is significant is that I find the kind of presupposition at issue here easier to express in the neo-Heimian style of restrictions on input contexts, as opposed to e.g. conditions on DRSs. The system I present here is not compositionally as similar to a system like Bittner 2001, where dynamic interpretation proceeds in pace with composition. Here, the interpretation of the sentence is built up in the standard compositional manner, resulting in a context-change potential for the sentence as a whole. The CCP of a sentence might be composed of a series of isolatable updates on contexts, but they can't be readily isolated until the whole sentence is built - typically variables remain free until composition is complete.

Given a typical notion of assignment functions, a context is defined as in (35).

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

Intuitively, a context is a set of all the ways the world and discourse model might be, in view of the mutual beliefs of the discourse participants. This is (on Heim’s part) a straightforward extension of the notion of the context set from Stalnaker 1978 to include the discourse model as well as facts about the world. I will refer to the set of contexts as D_c . Sentences (and all constituents) are interpreted relative to a context.

Given this, we can define the context-change potential of a sentence S on a context c as:

$$(36) \quad c + S = \llbracket S \rrbracket^c$$

where the double-brackets stand for compositional interpretation in the standard Heim and Kratzer 1998 manner, enriched with the types and extra mode of composition I develop here. I will often refer to the contextual index for a constituent as the “input context.”

This is also enough to define a more technical notion of familiarity:

$$(37) \quad \text{A discourse referent } i \text{ is } \mathbf{familiar} \text{ relative to a context } c \text{ iff } \forall \langle w, f \rangle \in c : i \in \text{Dom}(f)$$

The discourse model on this system amounts to the set of all assignment functions defined in the context.

A noun like *book* will denote the dynamic analogue of a predicate: a function from discourse referents to contexts. Most dynamic types here have analogues in the static type system, which may be useful for conceptualizing the dynamic versions:

- Discourse referents (D_r) are analogous to entities (D_e).
- Contexts (D_c) are analogous to worlds/indices of evaluation (D_s)/truth values (D_t).
- Dynamic predicates (type $\langle rc \rangle$) are analogous to static predicates (type $\langle et \rangle$).
- Dynamic generalized quantifiers (type $\langle \langle c \langle rc \rangle \rangle c \rangle$) are analogous to static generalized quantifiers (type $\langle \langle et \rangle t \rangle$).
- Dynamic quantification determiners (type $\langle \langle c \langle rc \rangle \rangle \langle \langle c \langle rc \rangle \rangle c \rangle$) are analogous to static quantificational determiners (type $\langle \langle et \rangle \langle \langle et \rangle t \rangle \rangle$).

$$(38) \quad \llbracket \mathbf{book} \rrbracket^c = \lambda x \in D_r . \{ \langle w, f \rangle \mid \langle w, f \rangle \in c \wedge f(x) \text{ is a book in } w \}$$

This predicate removes from its input context any world-assignment pairs where its argument (abstracted over as the variable x) is not assigned to a book.

Some items will need to “modify” the context of their arguments, so we need a unary mode of composition for shifting the context.⁵

(39) **Context shifting**

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

This is exactly analogous to lambda abstraction over a world or time index in a static Montagovian semantics.

Recall that I am building up to the denotation of an indefinite. For this we need some notation for adding a new discourse referent to a context. A context c updated with a discourse referent i will be written as $c[i]$ and defined as follows:

$$(40) \quad c[i] = \{ \langle w, f \rangle \mid \exists f'. \langle w, f' \rangle \in c \wedge f'[i]f \}$$

(41) $f'[i]f$ 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).

This introduces into a context every way of assigning the new discourse referent to some object in the world.

These are the tools needed for an indefinite. The article a will denote a dynamicized quantificational determiner, which in this system is a function (ignoring abstraction over contexts) from dynamic predicates to a function from dynamic predicates to contexts. In practice the indefinite needs to control the input context for each of its arguments (this is more standardly handled by dynamic conjunction or left-to-right merging of DRSs), so both predicate arguments have their contexts abstracted over.

I will assume that there is free indexing of determiners in the inputs to semantic representation. It doesn't matter if this indexing happens at LF, is determined in the lexicon, etc. This is how I will manage underspecification of reference; the semantics serves in part as a filter on indexings.

Here is the denotation of a , where i is an index:

$$(42) \quad \llbracket a_i \rrbracket^c = \lambda P \in D_{\langle c \langle rc \rangle \rangle} . \lambda Q \in D_{\langle c \langle rc \rangle \rangle} . \{ \langle w, f \rangle \mid \langle w, f \rangle \in c \wedge Q(P(c[i])(i))(i) \}$$

This involves three updates from the input context.

⁵In general, any item that is “upwardly dynamic” w.r.t. some argument (in the sense of Groenendijk and Stokhof 1991 slightly modified: it may supply new discourse referents to that argument) has to shift the context of that argument and modify. The shifting of context is analogous to the shifting of indices (e.g. unary modes of composition that shift the world index).

1. $c[i]$: An intermediate context is built from c by adding i .⁶
2. $P(c[i])(i)$: This intermediate context is used as the input context for P (the restrictor of the quantifier), and i as the argument to P . (In practice: pairs in the context are thrown out where i does not satisfy the property P).
3. $Q(P(c[i])(i)(i))$: This 2nd intermediate context is used as the input context for Q (the nuclear scope of the quantifier), and i as the argument to Q .

The denotation I've given here does not differ substantively for current purposes from the denotation for an indefinite given by Muskens 1996. Given the current setup, there is one piece that is missing - there is no novelty presupposition on the indefinite (c.f. Heim 1982). Since I have assumed free indexing, it is possible that an indefinite could be given an already in-use index, resulting in a (obviously incorrect) interpretation as non-novel. The simplest patch is of course to add a novelty presupposition:

$$(43) \quad \llbracket \mathbf{a}_i \rrbracket^c = \lambda P \in D_{\langle c,rc \rangle} . \lambda Q \in D_{\langle c,rc \rangle} . \{ \langle w, f \rangle \mid \langle w, f \rangle \in c \wedge Q(P(c[i])(i))(i) \}$$

and is defined for an input context c iff $\forall \langle w, f \rangle \in c : i \notin \text{Dom}(f)$

However, I don't believe that a novelty presupposition is the right solution, even though the use of free indexing locks us into it. Intuitively, the first update caused by the indefinite ($c[i]$) shouldn't already specify an index - it should pick an arbitrary index that isn't in use in the input context, whatever the input context is. Free indexing, though conceptually simple, doesn't provide a mechanism for this. Therefore, I will disregard the novelty presupposition from now on, and think of the indexing on indefinites as only a notational device to indicate the index that the indefinite will introduce.

To illustrate how this indefinite works, I'll walk through a simple example of the sentence *a book is missing*.

Assume an input context: $c = \{ \langle w_1, f \rangle, \langle w_2, f \rangle \}$ for some arbitrary assignment function f . Also assume that there are three individuals, A , B , and C . A and B are books in both w_1 and w_2 , and C is a book in neither world. All three individuals are missing in w_1 , none are missing in w_2 .

The two predicates form the two arguments to a , by FA:

- $\llbracket \mathbf{a}_1 \text{ book is missing} \rrbracket^c$
- $= \llbracket \mathbf{a}_1 \rrbracket^c (\lambda c' \in D_c . \llbracket \mathbf{book} \rrbracket^{c'}) (\lambda c'' \in D_c . \llbracket \mathbf{missing} \rrbracket^{c''})$

⁶The sudden expansion of the context in this step is exactly analogous to the expansion of the set of alternatives during the interpretation of an indefinite in the Hamblinized grammar of Kratzer and Shimoyama 2002.

Doing lambda reduction on the indefinite (substituting arguments for variables in the denotation of *a*) gives us:

$$\bullet = \{\langle w, g \rangle \mid \langle w, g \rangle \in [\lambda c'' \in D_c. \llbracket \text{is missing} \rrbracket^{c''}]([\lambda c' \in D_c. \llbracket \text{book} \rrbracket^{c'}](c[1])(1))(1)\}$$

Doing lambda reduction on the context abstractions gives us:

$$\bullet = \llbracket \text{is missing} \rrbracket \llbracket \text{book} \rrbracket^{c[1]}(1) (1)$$

That is, *book* is interpreted with the argument 1 relative to an input context $c[1]$, and *is missing* is interpreted relative to the output of that. Substituting in the example context assumed earlier, gives us:

$$\bullet = c+a_1 \text{ book is missing} = \{\langle w_1, f/1 \rightarrow A \rangle, \langle w_1, f/1 \rightarrow B \rangle\}$$

3.2 Presuppositions of *the*

I turn now to the formal treatment of the presupposition of *the*. My denotation for *the* is given in (44):

$$(44) \quad \llbracket \text{the}_i \rrbracket^c = \lambda P \in D_{\langle c \langle r c \rangle \rangle} \text{s.t.} \left(\begin{array}{l} (\forall \langle w, f \rangle \in c : i \in \text{Dom}(f)) \\ \wedge \quad P(c)(i) = c \\ \wedge \quad \forall j \in D_r : P(c)(j) = c \rightarrow i = j \end{array} \right) . \lambda Q \in D_{\langle c \langle r c \rangle \rangle} . Q(c)(i)$$

I am assuming that presuppositions manifest themselves in two ways. The first is the Heim and Kratzer 1998 partial-definedness story about presuppositions: a constituent is presuppositional if its denotation is partially defined for its argument domains. Presupposition failure in this sense is composition failure, due to partial definedness. Presupposition failure also manifests itself as conditions on input contexts - a completely composed sentence will be defined only for input contexts that satisfy certain conditions.

The is partially defined for its first argument. There are three components to this (seen in the large parenthesis above), and they are broken down in the table in (45).

part 1:	$(\forall \langle w, f \rangle \in c : i \in \text{Dom}(f))$	The discourse referent i is familiar (defined for every pair in the context). (see the technical notion of familiarity defined in (37))
(45) part 2:	$P(c)(i) = c$	The descriptive content of the DP (the argument P) holds of the discourse referent i in every world-assignment pair in the context.
part 3:	$\forall j \in D_r : P(c)(j) = c \rightarrow i = j$	There is no other discourse referent than i s.t. P holds of i (uniqueness).

Part 1 is the familiarity component; if the input context does not provide the discourse referent that *the* is indexed with, *the* is defined for no values of this argument. This is really a condition on input contexts.

The second part presupposes that its first argument is true. That is, P holds of the value of the index in all world-assignment pairs. *The* is not defined for any first argument that this is not true of, assuming it is ever defined.

The third part is the uniqueness component that is crucial for accounting for the facts in (2.5). *The* is not defined for any first argument that would be true for any other choice of index than i . If the context contains two different referents (say, 23 and 42) that map onto books, *the* would not be defined for values of P that pick out a book. If the context defined only one referent to a book, however, *the* would be defined for values of P that pick out books.

The third conjunct constitutes uniqueness here, but all it really enforces is an “at most one” condition - there is no more than one discourse referent that satisfies the restrictor of the definite.⁷ An “at least one” condition is enforced by the familiarity clause combined with the truth clause.

The definite article on this analysis has only one presupposition, but this presupposition is complex. The three parts really can't be disentangled from each other, except analytically. This is important to note in response to a point by Abbott 2000, in response mainly to Birner and Ward 1994. Birner and Ward argue that none of familiarity, uniqueness, or relevance are sufficient for a theory of definiteness. One conclusion they suggest is that we need all three, or at least some combination. Abbott 1999 responds that this “implies an ambiguity where none is felt”, perhaps assuming that what Birner and Ward had in mind was ambiguity between different definiteness conditions. It is true that the definite article doesn't seem ambiguous. In the analysis given here, there is a combination of familiarity and uniqueness without ambiguity. There is one (complex) presupposition, and it must be satisfied in some way - familiarity and discourse uniqueness are

⁷Note that I am assuming free indexing - this is where the implicit quantification over choices of index come from.

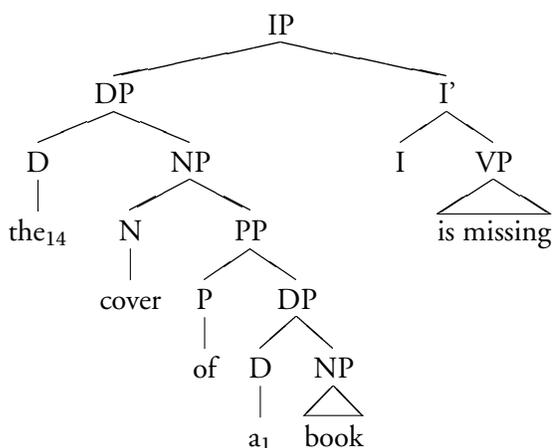
simultaneously active.

3.3 Composing possessive definites

In this section I show how the analysis works by going through an example of the composition of a possessive definite. The main goal of this section is to demonstrate how the lack of strong uniqueness falls out directly from the treatment of possessive definites as accommodating under a Heim 1983b-style context.

The example I'll go through is the sentence given in (46).

(46) The₁₃ cover of a₁ book is missing.



I'll assume an input context that doesn't define either discourse referent, and contains no covers or books. Assume an example context $c = \{\langle w_1, f \rangle, \langle w_2, f \rangle\}$ for some arbitrary f not defined for 1 or 13. Assume further that there are three individuals. B is a book in both w_1 and w_2 . A and C are B's cover in both w_1 and w_2 , the front and back cover respectively. A is missing in w_1 but not w_2 , and C is missing in neither world.

The first step is to compose a_1 with *book* as in the previous example. *Book* (after context abstraction) forms the restrictor to the indefinite, and we end up with:

- $\llbracket a_1 \rrbracket^c (\lambda c' \in D_c. \llbracket \mathbf{book} \rrbracket^{c'})$
- $= \lambda Q \in D_{\langle \langle c \langle rc \rangle \rangle c} . Q(\llbracket \mathbf{book} \rrbracket^{c[1]}(1))$

At this stage we have updated the input context (which is c) with the discourse referent 1, and removed world-assignment pairs from that context where 1 is not mapped onto a book.

I'll treat *of* as semantically vacuous, so the PP *of a₁ book* has the same denotation as *a₁ book*. This PP forms the internal argument to the relational noun *cover*.

Now comes a technical detail that is tangential to the main points: if *cover* is a two-place predicate, we now have to deal with the same compositional mismatch as when we interpret a generalized quantifier in the object position of a transitive verb. There are various solutions (see Heim and Kratzer 1998 ch. 7 for a summary) and the particular solution is not important here; since I don't wish to deal with QR out of a DP, I'll assume that a type-shift applies to turn object-position generalized quantifiers into the right type. The type-shift is given in (47). Intuitively, what this does is abstract the external argument of the transitive noun outside the composition of the noun with its internal argument, so that the internal generalized quantifier sees the internal argument of the noun as the only one.

(47) **GQ object position lift**

If a constituent α whose denotation is a function with a domain of type $\langle c \langle \langle r \rangle c \rangle \rangle$ needs to compose with a constituent β whose denotation is of type $\langle c \langle \langle r \rangle c \rangle \rangle$, α can compose as:

$$\lambda R \in D_{\langle c \langle \langle r \rangle c \rangle \rangle} . \lambda x \in D_r . \llbracket \alpha \rrbracket^c (\lambda c' \in D_c . \lambda y \in D_r . R(c')(y)(x))$$
⁸

Recall that *of a₁ book* before the typeshift denotes the same thing as *a book*, repeated from above:

- $\llbracket \text{of } a_1 \text{ book} \rrbracket^c$ (before the typeshift)
- = $\lambda Q \in D_{\langle c \langle \langle r \rangle c \rangle \rangle} . Q(\llbracket \text{book} \rrbracket^{c[1]}(1))$

After the typeshift applies, *of a₁ book* will denote:

- $\llbracket \text{of } a_1 \text{ book} \rrbracket^c$ (after the typeshift)
- = $\lambda R \in D_{\langle c \langle \langle r \rangle c \rangle \rangle} . \lambda x \in D_r . R(\llbracket \text{book} \rrbracket^{c[1]}(1))(1)(x)$

Composing with *cover*, we get:

- = $\lambda x \in D_r . \llbracket \text{cover} \rrbracket^{c'} (\llbracket \text{book} \rrbracket^{c[1]}(1))(1)(x)$

⁸This is analogous to a static type-shift as follows:

(i) **GQ object position lift (static)**

If a constituent α whose denotation is of type $\langle \langle e \rangle t \rangle$ needs to compose with a constituent β whose denotation is of type $\langle e \langle e \rangle \rangle$, α can compose as:

$$\lambda R \in D_{\langle e \langle e \rangle \rangle} . \lambda x \in D_e . \llbracket \alpha \rrbracket (\lambda y \in D_e . R(y)(x))$$

- $= \lambda x \in D_r . \llbracket \text{cover} \rrbracket^{\llbracket \text{book} \rrbracket^{c(1)}(1)}(x)$
- $= \lambda x \in D_r . \{ \langle w, f \rangle \mid \exists f' . \langle w, f' \rangle \in c \wedge f'[1]f \wedge f(1) \text{ is a book in } w \wedge f(x) \text{ is a cover of } f(1) \text{ in } w \}$

That is, *cover of a₁ book* denotes a property that will remove from the context any world-assignment pairs where its argument x isn't mapped to a newly introduced book 1.

It is now time for this property to compose with *the*₁₃. The property forms the restrictor for the definite, and therefore it can't compose with the definite unless the presuppositions are satisfied. In the example context chosen earlier, there is no discourse referent 13 present in the discourse model, and therefore *the*₁₃ is not defined for any value for its first argument. This is presupposition failure.

At this point presupposition accommodation (Lewis 1979; Heim 1982; van der Sandt 1992; Beaver and Zeevat to appear and others) comes in. Many items that presuppose are felicitous even when their presuppositions aren't met, as long as their isn't knowledge that goes against those presuppositions. Accommodation is one explanation of this fact - a mechanism whereby the common ground can be updated around the time of presupposition failure so as to meet the presupposition. Here I will simply sketch how accommodation covers these cases, and in §3.4 I will discuss how accommodation needs to be constrained.

The immediate cause of presupposition failure is the conjunct that says that the input context has to be defined for the index of the definite article. In this case the index is 13. If this was all the presupposition said, accommodation would simply involve ensuring that 13 is in the domain of every assignment function in the context, i.e. adding 13 as a new discourse referent. This would give us the following context, for the ongoing example:

$$\left\{ \begin{array}{l} \langle w_1, f/13 \rightarrow A/1 \rightarrow B \rangle, \quad \langle w_2, f/13 \rightarrow A/1 \rightarrow B \rangle, \\ \langle w_1, f/13 \rightarrow B/1 \rightarrow B \rangle, \quad \langle w_2, f/13 \rightarrow B/1 \rightarrow B \rangle, \\ \langle w_1, f/13 \rightarrow C/1 \rightarrow B \rangle, \quad \langle w_2, f/13 \rightarrow C/1 \rightarrow B \rangle \end{array} \right\}$$

Simply adding 13 isn't enough, however, because the second conjunct (that the descriptive content hold of 13) would be violated. In the context above, 13 could (in view of the common ground) refer to B , and B is a book, not the cover of a book. We also have to update the context to ensure that the descriptive content, that is the restrictor of the definite determiner, holds of 13. In this case, the descriptive content is the property denoted by *cover of a₁ book*. So, to accommodate the definiteness presupposition, we update the old input context with $P(c)(13)$, where P is the first argument to the definite article. The result is used as the input context for interpreting *the*. This context is:

$$\left\{ \begin{array}{l} \langle w_1, f/13 \rightarrow A/1 \rightarrow B \rangle, \quad \langle w_2, f/13 \rightarrow A/1 \rightarrow B \rangle, \\ \langle w_1, f/13 \rightarrow C/1 \rightarrow B \rangle, \quad \langle w_2, f/13 \rightarrow C/1 \rightarrow B \rangle \end{array} \right\}$$

1 is assigned to every possible book, which this example contains only one of. 13 is assigned to every possible cover of some book. Because there is only one book, there are only two possible covers, *A* and *C*. Accommodation has introduced one discourse referent to a cover, but it is not fixed as to which cover. We know that it is a cover because every way of assigning it a value makes it out to be a cover. The reference is not strong unique, because we don't know which cover is the cover, but it is discourse unique, because only one discourse referent has been introduced in this context.

While I haven't discussed Poesio 1994's analysis in any kind of detail, it is important to note that the behavior of presupposition accommodation here is quite similar to what was covered by "situation anchoring" under that analysis. The main difference is that accommodation happens independently of properties of the *of*-PP - Poesio's analysis predicts felicity only when the DP contained therein is indefinite, but I predict general felicity as long as that DP is felicitous. I believe this second prediction to be right, but I believe accommodation here to be accomplishing exactly the kind of thing that Poesio 1994 intended anchoring to accomplish.

At this point, the presuppositions are satisfied. There is exactly one discourse referent mapped to an object that satisfies *P*, so we can proceed. The next step is to compose *the*₁₃ *cover of a*₁ *book* straightforwardly with *is missing*. This throws out any world-assignment pairs where 13 is not assigned to a missing thing - giving us the final context:

$$\left\{ \langle w_1, f/13 \rightarrow A/1 \rightarrow B \rangle \right\}$$

This concludes the account of how PDs compose; I will turn now to the issue of how to keep accommodation from predicting felicity in the wrong cases.

3.4 Constraining accommodation

The analysis I have proposed makes crucial use of accommodation. This is not problematic for possessive definites, within a familiarity theory, since PDs can always be novel. However, it can't be quite so prolific within definite descriptions in general. There are many well-known cases of definites that needn't be familiar, but there are many cases of definite descriptions that have to be familiar no matter how accommodating the hearer. A second fact to account for is that the discourse-uniqueness component of the presupposition

of *the* can never accommodate. In examples like (28a), where there were multiple mention effects, violation of the presupposition leads to infelicity, not accommodation.

In general, “short” definites (such as *the linguist* and other such cases) and demonstratives, some proper names, and pronouns are among presupposition triggers (also including *too*, *indeed*, *another*, politeness markers, and intonationally marked focus; see Beaver and Zeevat to appear for discussion and references) that do not allow accommodation readily or at all. PDs fall into a class that has been called “long definites”, which Beaver and Zeevat use to refer to those that do allow accommodation. Russell’s famous examples (*the king of France*, and *the author of Waverly*) appear to be PDs, but there are long definites which aren’t PDs, including definites with relative clauses (*the guy Alfonso told me about the other day*) and superlatives (*the youngest player on the football team*). The analysis I give here will not consider long definites besides PDs (in fact, the class might not even be particularly homogeneous in terms of licensing conditions), but it must at a minimum separate out PDs from short definites.

I am aware of three explanations of why some presupposition triggers don’t allow accommodation, and unfortunately none of them seem to quite work here.

Geurts and van der Sandt 2001 suggest that we can’t accommodate presuppositions which provide too little descriptive material. This idea was suggested in part to differentiate long and short definites, as intuitively, this is one major difference between them. While I wouldn’t want to throw away the intuition, this idea by itself has several problems (discussed by Beaver and Zeevat to appear). First, it is very difficult to formalize precisely - there does not seem to be any easy way to pick a line below which the content is too little. Second, it is unclear how this would be theoretically motivated. Third, it isn’t clear that it can handle all or even most cases of non-accommodation (see Beaver and Zeevat for discussion). If this condition can be stated in a more precise way, it would very likely work for possessive definites. Intuitively, they provide “enough” information to do accommodation. However, as it stands, this constraint does not seem precise enough.

Zeevat 2003 provides an analysis of non-accommodation in bidirectional OT, based on unpublished work by Blutner. Under this analysis, a presupposition can’t accommodate if there is a non-presupposing form that is equivalent in meaning to the presupposing form. It is unclear how to apply the notion of “equivalent in meaning” to the kinds of presuppositions involved here. The closest candidate for equivalence is the indefinite article *a*, but I would be hard pressed to conclusively show either equivalence or non-equivalence between *the* and *a*. Furthermore, this analysis provides no way that I can see of distinguishing short definites on the one hand, and PDs on the other. The crucial difference between the two categories lies not in the source of the presupposition (the definite article), but rather in the construction

itself, and a bidirectional-OT approach provides no clear way of dealing with this.

Beaver and Zeevat to appear propose a third principle: accommodation can't modify the discourse record. While for other cases of non-accommodation, this seems to be the most promising of the principles they review, I don't think it works here. It is possible to envision familiarity presuppositions in a way that need not involve the discourse record - Prince 1992's notion of hearer-old will accomplish this. On this view, *the* would presuppose that addressees are aware of the existence of some particular object meeting the descriptive content of the definite. This may even be the right view of familiarity, but the problem is that somewhere along the line, if discourse referents exist at all, a PD is going to have to introduce one. This is mainly demonstrated by the fact that pronouns can refer back to the accommodated entity:

(48) The cover of this book is missing. Some unethical book store employee must have removed it.

The PD in (48) is novel, and no cover was previously mentioned, but it still is perfectly felicitous as a pronominal antecedent. It is possible that the discourse referent is introduced by the uniqueness presupposition, but then we'd expect uniqueness not to be accommodated. Furthermore, this principle once again can't easily distinguish between short definites, and possessive definites.

Though Beaver and Zeevat's proposal is problematic as-is, a very simple modification will allow us to explain the difference between possessive/bridging definites and short definites. It may help with other long definites, but I will not address that here. For present purposes, the Beaver and Zeevat principle would have banned any new discourse referents. What we see is that new discourse referents are allowed if they are attached to some old referent, in some way. This is like an inverted version of Geurts and van der Sandt's proposal above - instead of preventing accommodation if there isn't enough descriptive content, accommodation is allowed just in case there is enough descriptive content that is the right kind.

(49) Beaver and Zeevat's **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 discourse referent.

This kind of attachment is similar to what Prince 1981 referred to as anchoring: "A discourse entity is Anchored if the NP representing it is LINKED, by means of another NP, or "Anchor," properly contained in it, to some other discourse entity." Here referents that are anchored are not a separate kind of discourse referent; rather they are normal definites which are allowed to accommodate because of a constraint on accommodation.⁹

⁹Though I am ignoring other cases of long definites, it is worth noting that this formulation may be too strong to cover them.

This condition is also quite similar to Heim 1982's constraint on accommodation, meant primarily to handle bridging definites: "When a new file card is introduced under accommodation, it has to be linked by crossreferences to some already-present file card(s)." While I do not address bridging definites here, they do share a commonality with possessive definites: in many cases bridging is triggered by the presence of a relational noun.

I assume that the use of a relational noun in a PD makes the relation denoted by that noun highly salient. In this way the entire accommodation analysis is built on the presence of a relational noun. This matches interestingly with Barker 2005's analysis. That analysis worked by canceling a discourse uniqueness presupposition in the case of possessive definites. The cancellation was keyed (indirectly) on the presence of a relational noun, and so the two analyses converge on this point, despite fairly different paths to the point.

4 Beyond Possessive Definites

The uniqueness condition proposed in the previous section is one that is very weak. The weakness comes in because it is a condition that is relative not to objects in the world, but rather to discourse referents. The obvious question is whether this uniqueness condition stands up at all outside of possessive definites, or whether we need something stronger.

In earlier sections, I have discussed how previously proposed uniqueness conditions, as well as the new combination of discourse uniqueness with strong familiarity, handle anaphoric and novel possessive definites. The combination of discourse uniqueness with strong familiarity has come out ahead so far - it is the only version that works in every case for possessive definites. However, most uniqueness conditions proposed in the literature have been stronger than discourse-uniqueness. The obvious question is how discourse-uniqueness stands up outside of PDs. To get at this question, I consider a small selection of anaphoric definite descriptions from the literature, as well as one additional class of novel definite descriptions.

4.1 Anaphoric Definite Descriptions

Perhaps the most important cases of anaphoric definites are examples like (50) and (51), adapted from Evans 1977, 1980 and Kadmon 1987:

Prince's original formulation of anchoring was apparently intended to cover all long definites; she gives examples involving relative clauses.

(50) Alfonso found a penny. **The penny** was rare.

(51) Alfonso has a chair. **The chair** is in the kitchen.

Assume a context that is neutral w.r.t. penny-finding or chair-owning. The first sentences are compatible with Alfonso finding more than one penny or having more than one chair, though there is a scalar implicature against this. However, on interpretation of the bolded definite, we learn that Alfonso must have found only one penny, and must have only one chair. There are various contextual factors that might mitigate this kind of interpretation, but I will set those aside for the moment. The effect to be explained is one where the definite descriptions in bold introduce a uniqueness effect that wasn't previously seen in the discourse.

I will first note one peculiarity of this kind of data. It is much more natural, in cases like (50) and (51), to use a pronoun:

(52) Alfonso found a penny. It was rare.

Since I am not concerned directly with pronouns in the present paper, I will present the examples with definite descriptions. The difference in acceptability between pronouns and DDs is a confound, and should be ignored. There are two good ways to force ignoring of the confound. The first is to imagine that the same speaker utters each sentence in a pair like those above, and that between the first and the second, someone new walks into the room, and the speaker greets them. That is, there would be a discourse like this:

(53) A: Alfonso has a penny.

B: (enters room)

A: Oh hi B.

A: The penny was rare.

In this case, the use of a definite description instead of a pronoun is much more natural. The second way of ignoring the compound is to treat the sentences like they are conjoined:

(54) Alfonso found a penny and the penny was rare.

The use of a definite description is again natural here. The reasons I do not present the data in this second form are both to conform with the previous literature as much as possible, and because in the conjoined form I do not understand why the definite description is more natural, so I'm wary of relying on it. The use of an interjected greeting to force felicity seems preferable on these grounds.

Kadmon's uniqueness condition works well for examples like (50) and (51) - the definite in (50) presupposes that there is a unique thing that is a penny and was found by Alfonso, and refers to that thing. Interpreting the definite involves accommodating this presupposition, predicting exactly the kind of uniqueness effect that is observed.

As Evans and Kadmon noted, the uniqueness effect is much weaker than what a condition like Russell 1905's would predict. The definites do not presuppose or entail that there is only one penny or chair in the entire world. It is not even entirely clear how to pick the domain of uniqueness on a domain-restricted version of Russell's uniqueness. Quite possibly Elbourne 2002's uniqueness condition could be made to work here - somehow the situation of evaluation for the second sentence would have to be large enough to include (potentially) any other pennies found, or chairs owned. The ADD would presuppose uniqueness relative to this large-ish situation, and we would accommodate that there were no other pennies/chairs in the situation. There is no clear mechanism for ensuring this, but it is no less vague than most accounts of domain restriction for quantificational determiners.

Discourse-uniqueness combined with strong familiarity doesn't fare well here. The discourses in (50) and (51) should be felicitous in light of this condition, since only one chair/penny has been mentioned. However, no additional predictions about uniqueness are made, and in particular, discourse-uniqueness provides no obvious explanation of why the bolded definites should have to refer uniquely.

It is not clear that even with weak familiarity discourse uniqueness (i.e. informational uniqueness) would accomplish anything in cases like (50) and (51). The choice of familiarity theories doesn't seem to make a difference to the uniqueness effects predicted. Roberts 2003 does not address these cases directly in the analysis, but as far as I can tell, follows Heim 1982 in arguing that the uniqueness effects I've portrayed in (50) and (51) aren't real, or at least aren't very general. This possibility becomes clearer if we consider a wider range of scenarios and data than I have presented up until now. In the following example discussed originally by Heim 1982, for many speakers what uniqueness effect there is can be fairly easily mitigated.

(55) A wine glass broke last night. **The wine glass** had been very expensive.

Given a context where two wine glasses broke, and the speaker was very upset about the first but didn't care about the second, (55) is purported to be felicitous, as long as only one of the broken wine glasses was expensive. Most speakers I have consulted agree with this judgment, though the judgment seems somewhat murky and the context is difficult to control for entirely.

A similar effect is possible with the chair example from earlier:

(51) Alfonso has a chair. **The chair** is in the kitchen.

In a context where what we need is one chair, and any chair will do, speakers will accept this sentence even if Alfonso has several chairs in the kitchen. Kadmon reports that the chairs need to be identical, but most speakers I have consulted don't even require this.

An even better example¹⁰, similar to Heim 1982's sage plant sentences, looks like this:

- (56) John bets on five horses each race. Finally, John bet on a horse and **the horse** did well. His four other bets tied for last, though.

For every speaker I have consulted, this discourse is perfectly natural. There does not seem to be the uniqueness effect that Kadmon 1987 would predict here - *the horse* does not have to refer uniquely among all horses that John bet on. If it did, the discourse wouldn't be felicitous, since it doesn't determine **which** horse did well. All that seems important is that one horse out of a somewhat homogeneous bunch has been brought to salience, and is under discussion.

The data in this section leaves us with several possibilities. The first is that the uniqueness effects are just as strong as Kadmon 1987 argues, in which case Kadmon 1987 provides the best uniqueness condition for ADDs. The second possibility, which in light of data like (56) seems much more plausible, is that the strongest form of the uniqueness condition on ADDs is not empirically right. If this is the case, we still have to answer the question of what *is* right about Kadmon's condition, since it's certainly not clearcut that there is no uniqueness effect in ADDs altogether. A third possibility is that the strong uniqueness effects are altogether an illusion (or, are pragmatic). This is the approach that Heim 1982 took, and that Roberts 2003 takes. I do not find this approach satisfying, in that underneath the speaker uncertainty, there seems to be something real. I do not provide here any further answers to the question of what is real.

4.2 Novel Definite Descriptions

I will mention in this section one class of novel definite descriptions which supports the stronger views of uniqueness. Superlatives can serve to entail that a definite refers uniquely:

- (57) Alfonso climbed **the tallest mountain in Spain**.

- (58) Alfonso wrote down **the smallest prime number**.

There can only be one tallest mountain in Spain, and there can only be one smallest prime number. A common claim is that definites of this kind are felicitous exactly because they refer uniquely.

¹⁰Thanks to Dan Kaufman for this example.

Strong uniqueness (a la Russell) fares well here - the bolded DPs are unique in as strong a sense as possible. Kadmon's uniqueness also works well, in that it reduces to strong uniqueness in the case of novel definites. If we assume that the discourse referent becomes familiar through accommodation (since Kadmon assumes a Heim-Kamp familiarity theory), what is accommodated is a variable that satisfies only the descriptive content of the definite description. Since this is the only condition on the variable, it is all that the uniqueness condition is relative to, just as in strong uniqueness. Domain-restricted uniqueness should work fine too, except that we have to ensure that there is no domain restriction in the case of superlatives.

Discourse uniqueness coupled with strong familiarity doesn't do any work for cases like this. The discourse referent would be novel, and therefore vacuously unique. Informational uniqueness does work here, however, since the existence of tallest mountains in Spain and smallest prime numbers would be entailed by any common ground, as long as there are prime numbers and mountains in Spain at all.

4.3 An expanded account

Considering just possessive definites, the evidence strongly suggests that the best account of the presuppositions of the definite determiner is the combination of strong familiarity with discourse uniqueness. However, the data in the preceding two sections casts doubt on this conclusion. While strong familiarity is not in doubt, discourse uniqueness does not fare well outside of PDs - it predicts a lack of world-based uniqueness effects across the board. The data isn't clear in ADDs, and one option is to follow other authors in claiming that there are in fact no uniqueness effects. This amounts to leaving my analysis as is and claiming generality. I don't find this satisfactory, as the data simply doesn't justify it. Leaving the account as is also make the superlative cases entirely a mystery. However, the ADD data doesn't clearly justify a strong uniqueness account - enough doubt has been cast on the data by previous authors to make it unclear what to do. Despite these worries, I will present two strong-uniqueness accounts in this section, and show that there is small pockets of evidence for each within possessive definites.

Let us first consider how Kadmon 1987's uniqueness could be formulated in the present system. Like the discourse-uniqueness view I have been advocating, it relies on strong familiarity. This means that of the presuppositions of the definite article, only the third conjunct needs to be changed:

(59) Kadmon's *the* translated into my terms:

$$\llbracket \mathbf{the}_i \rrbracket^c = \lambda P \in D_{\langle c \langle rc \rangle \rangle} \text{s.t.} \left(\begin{array}{l} (\forall \langle w, f \rangle \in c : i \in \text{Dom}(f)) \\ \wedge P(c)(i) = c \\ \wedge \forall \langle w, f \rangle \in c, \langle w', f' \rangle \in c : f(i) = f'(i) \end{array} \right) . \lambda Q \in D_{\langle c \langle rc \rangle \rangle} . Q(c)(i)$$

The condition in the third conjunct above requires that every world-assignment pair in the input context agree on the value it assigns the index. For the moment, this conjunct has replaced the discourse-uniqueness conjunct. As it stands, of course, this is hopelessly strong for the case of possessive definites - many PDs (e.g. *the side of the cube*) ensure that this condition is violated.

Kadmon 1987 responded to Heim 1982's wine-glass sentences by suggesting that even if other wine glasses broke, there must be something special about the one that is mentioned.

(55) A wine glass broke last night. **The wine glass** had been very expensive.

That is, the wine glass in (55) is the only one that affected the speaker's mood, or the only one that is uniquely determined in some other way. To make this work, Kadmon 1987 assumes that if it is known that multiple wine glasses broke, a hearer will accommodate some property uniquely distinguishing the wine glass mentioned in (55). This kind of accommodation provides one way of weakening a uniqueness claim.

Data from some possessive definites is suggestive of this kind of accommodation. In (60), there is the sense that the whale must be on the side of the building visible from the road (assuming that the whale serves as a landmark for some directions). This sentence would not be appropriate if the whale wasn't visible from the road. In (61), while we know that any road has two sides, we know that what is meant is the right side (in the US), especially for a divided highway.

(60) Look for the huge Whale on **the side of the building**.

(61) It is safer to mount and dismount towards **the side of the road**, rather than in the middle of traffic.

That is, in cases like these, despite the possibility of an interpretation that lacks strong-uniqueness, we get the sense that either conventional information or contextual information can make the reference truly unique.

However, many PDs don't seem to work like this. In cases like the following, it doesn't seem to matter what reference is chosen:

(16) Engraved on **the side of the cube** is some lettering.

(19) Tie one end of a piece of string to **the corner of the cardboard with the picture**. Tie the other end to the same corner of the other piece of cardboard with the label.

In (16), it is clear that the side can't be the one facing the floor or pushed up against a wall, but it can clearly be any of the remaining sides and it doesn't matter which. In (19), not only can the corner be any corner, but the use of *the same corner* in the continuation indicates that it doesn't matter which one was chosen in the first place. Given this, there are two options. One is to follow through on Kadmon 1987's response to Heim, and say that even in these cases there must be some property that the hearer accommodates to satisfy uniqueness when they hear these sentences. This seems problematic, and certainly more problematic than even accommodation in the case of (55), something which is not generally accepted as correct.

However, if we don't want to do this, and still want to keep strong uniqueness as part of the definite determiner, we need a mechanism to cancel just strong uniqueness in the case of possessive definites. Note that to account for the multiple-mention facts in (2.5) (which followed both under Kadmon 1987's account and a discourse uniqueness account) we need to either limit cancellation further, to possessive definites that are novel, or to also include a discourse uniqueness presupposition. If a Kadmon-style uniqueness presupposition is accommodated for all PDs, we don't expect multiple-mention problems, and we don't expect the reference tracking effects either. We can't cancel all presuppositions, because the strong familiarity presupposition shows clear signs of being accommodated and not canceled.

To summarize, what we would need is some mechanism that cancels the strong-uniqueness presupposition of PDs, and of no other definite. In a nutshell, we are back to Barker 2005's direction of analysis, despite the presence of discourse uniqueness effects.

The cancellation mechanism proposed by Barker 2005 won't work for present purposes for several reasons. First, it predicts wholesale cancellation of any presuppositions, including familiarity presuppositions, and it predicts cancellation regardless of whether the definite description is novel or anaphoric. Second, it predicts cases of cancellation outside of PDs which don't occur. Recall that cancellation occurred when function composition (as opposed to application) could occur. Barker 2005 suggests that the best independent evidence for function composition comes from non-constituent coordination. These two pieces predict presupposition cancellation in cases like the following:

(62) Alfonso stopped and Joanna started smoking.

The non-constituent coordination in (62) should force a non-standard order of semantic composition - we should get each subject and verb composing via function composition. This should give a mismatch with the normal order of presupposition application - *stop* should presuppose that its second argument (compositionally) used to be true of its first argument (compositionally), and this clearly would make no sense if *Alfonso* were taken to be the first argument, and *smoking* the second.

I won't do a full-scale survey of presupposition cancellation mechanisms here, and leave that for future work. I will work from the idea, given in Beaver 2001 §10.3, that a combination is possible of a cancellationist treatment of presupposition, with a Karttunen-style treatment where if a presupposition doesn't project, it isn't canceled, but rather hidden by local context (Karttunen 1973, 1974, 1977). The intuitive idea is that in some cases presuppositions can be canceled if they conflict with material in the local context, but not always. This constitutes technical evidence that it isn't inconsistent to have some kind of cancellation mechanism at the same time as having the (currently) more standard Karttunen-influenced account. I will show that at least for the core cases of possessive definites, a strong uniqueness presupposition would necessarily be unsatisfiable. I will further give some new data showing that in at least some cases where a strong uniqueness presupposition could be satisfiable, we seem to accommodate a strong uniqueness presupposition.

I take the core cases of non-unique PDs to be examples with *side* and *corner* as the head noun. These constitute the vast majority of attested cases. Here are two variants on this theme:

(63) **The side of the cube** was engraved with some writing.

(64) There was a coffee shop at **the corner of the intersection**.

If a strong uniqueness presupposition were present in each of these examples, it would necessarily be impossible to satisfy. A cube has to have six sides, or it isn't a cube. Similarly, an intersection cannot have just one corner. I take this to be the kind of conflict that could trigger cancellation of the part of a presupposition that triggers the conflict.

This makes a prediction: if the noun doesn't entail that it has multiple possible values, there won't be cancellation. This explains a small patch of data that I haven't previously mentioned, and which is otherwise not easily explainable. In (65), we find that the book must have only one page. Similarly, the bird in (75) must have only one feather, and the tree in (67) must have only one leaf.

(65) **The page of the book** is damaged.

(66) **The feather of the bird** fell on my shoulder.

(67) Alfonso picked up the **leaf of the tree**.

In each of these cases, the noun does not seem to entail multiple possible referents - a bird could have no feathers and still be a bird, unlike a cube and its sides. A tree could have no leaves and still be a tree, and in fact many kinds of trees do for a good part of the year. The case is slightly less clear for books, but it still seems safe to say that if you tore out every page of a book, it would still be a book.

Unfortunately, the prediction is too strong. First, it's unclear for cases like *the finger of the latex glove* why a glove would have to have more than one finger. Second, the properties of the PDs in (65), (75), and (67) are unexpectedly dependent on whether the lower DP is definite. When we make it indefinite, the strong uniqueness effect disappears:

(68) **The page of a book** is damaged.

(69) **The feather of a bird** fell on my shoulder.

(70) Alfonso picked up the **leaf of a tree**.

In (68), the PD does not presuppose that the book to which the page belongs has only one page. The bird that lost the feather in (69) may have other feathers, and the tree in (70) may have other leaves. Possibly this difference between definiteness and indefiniteness will fall out from the technical details of the part-time cancellation theory, but I will have to leave this problem for another day.

Assuming that these difficulties can be overcome, note that this approach cancels the strong uniqueness presupposition for novel and anaphoric possessive definites alike. In order to account for multiple mention and reference tracking effects, therefore, we still need discourse uniqueness. Thus, the final version of the definite article will incorporate both.

(71) Definite article combining discourse and strong uniqueness:

$$\llbracket \mathbf{the}_i \rrbracket^c = \lambda P \in D_{\langle c \langle rc \rangle \rangle} \text{s.t.} \left(\begin{array}{l} (\forall \langle w, f \rangle \in c : i \in \text{Dom}(f)) \\ \wedge P(c)(i) = c \\ \wedge \forall j \in D_r : P(c)(j) = c \rightarrow i = j \\ \wedge \forall \langle w, f \rangle \in c, \langle w', f' \rangle \in c : f(i) = f'(i) \end{array} \right) . \lambda Q \in D_{\langle c \langle rc \rangle \rangle} . Q(c)(i)$$

The interpretation of this, in the case of PDs, will be quite complex, and in fact a mixture of cancellation and accommodation. The strong-familiarity component is accommodated, the discourse-uniqueness component is trivially satisfied after accommodation, and the strong-uniqueness component is canceled to keep presupposition failure from being necessary.

4.4 Discourse and strong uniqueness

There is overlap between the notions of discourse uniqueness and strong uniqueness. Both are capable of capturing some multiple mention effects, such as (30a) repeated from §2.5.

(30a) There were coffee shops on three corners of the intersection of the main streets. #There was also a phone booth on **the corner of the intersection**.

This could be infelicitous because multiple corners have been mentioned, but it also could be infelicitous because *the corner of the intersection* doesn't refer uniquely. I have earlier rejected the strongest form of strong-uniqueness in these cases; these accounts predict infelicity here for exactly the same reason they would predict infelicity in novel PDs - there could be only one corner of the intersection - and we don't find infelicity there.

Kadmon 1987 is the one account where the prediction of infelicity is made for a different reason. In sentences like (30a), the bolded DP is infelicitous because it would be matched to the same variable as one of the previously mentioned corners, by strong familiarity, and that variable won't refer uniquely relative to conditions on it. This reasoning seems potentially correct, and we need to consider whether discourse uniqueness is entirely redundant with a Kadmon-style uniqueness. This issue comes up again outside of PDs, where sentences like (72) also could be covered either by discourse uniqueness or by Kadmon-uniqueness:

(72) Alfonso has two cats. #The cat likes pizza.

It is simply not clear which should do the job here. My intuition is that the problem is the multiple mentions, rather than the fact that the definite couldn't refer uniquely given conditions on its antecedents. Two cats have been made salient, but the definite really only wants one cat to be salient. Just looking at examples like this, though, I see no obvious way to verify (or not) this intuition.

The two are not entirely redundant, and will diverge in the following case. In (73), the first sentence mentions two cats, with different conditions on each. The definite in the second sentence is not felicitous.

(73) Alfonso has a outdoor cat and an indoor cat. #The cat likes pizza.

In a slightly surprising way, Kadmon 1987's account turns out to not account for this kind of sentence. Consider first how variables are assigned here, that is, how strong familiarity plays out. The DRS after the first sentence, in linearized form, might look something like (74).

(74) $[x, y \mid \text{cat}(x), \text{cat}(y), \text{has}(\text{Alfonso}, x), \text{has}(\text{Alfonso}, y), \text{outdoor}(x), \text{indoor}(y)]$

There are two possible antecedent variables for the definite given the descriptive content *cat* - x and y . Nothing about the strong familiarity system alone tells us which to choose, so the sentence should be ambiguous as to the choice of variable (this is especially clear given free indexing). If the variable chosen is x , then the uniqueness condition will be satisfied - there is only one thing that is a cat, is had by Alfonso, and is allowed to go outdoors. For the choice of y , the effect is similar - the uniqueness condition is again

satisfied. What we want, of course, is infelicity, and discourse uniqueness provides that. The definite is infelicitous simply because it wants exactly one cat to be salient, and the input context doesn't provide that.

This kind of data can be created quite easily by introducing potential antecedents with overlapping but distinct conditions, where the antecedents have approximately the same level of discourse prominence. A following definite keying into some part of the overlap in conditions will be infelicitous, and Kadmon 1987's condition has no way to explain this. Discourse uniqueness, in some form, seems to be necessary as a component of definite descriptions, even if we also include Kadmon 1987's uniqueness condition.

There is a theoretical consideration for including both kinds of uniqueness, based on this data. Kadmon 1987's system in examples like this does not achieve Farkas 2002's determined reference, since it is not entirely determined on update what the value of a definite is. Kadmon 1987 combined with discourse uniqueness on the other hand would achieve determined reference, fitting definite descriptions into the larger picture of definiteness described by Farkas.

5 Conclusions

Possessive definites show that a strong familiarity component is a necessary part of definiteness, independent of the particular uniqueness theory chosen. They also provide evidence that some uniqueness theory is necessary, and that at a minimum this uniqueness must be relative to the discourse model. A stronger (i.e. world-based) uniqueness component is also possible, and may be necessary in some cases, but the evidence for and against this remains incomplete. If adopted, a strong/world-based uniqueness component needs to be weakened in some way, either by rampant accommodation, cancellation, or both. Regardless of the exact form of uniqueness, it seems unavoidable that a combined uniqueness-familiarity model (following Birner and Ward 1994; Roberts 2003) is necessary to account for possessive definites.

The account here seems highly successful for possessive definites, and seems quite extensible outside possessive definites. I leave off with three puzzles inspired by the work here that do not yet have solutions.

World-based uniqueness in the spirit of Kadmon 1987 and discourse-based uniqueness in the style advocated here do not completely overlap, and one version of the account I have given here covers the non-overlapping parts by simply including both kinds of uniqueness. This leaves unanswered the larger and deeper question of what the relation is between the two kinds of uniqueness. This question surely has an answer, the answer can't be made clear until the status of the data about anaphoric definite descriptions in §4.3 is made clear.

A second deep question that I have left unanswered is why the constraint on accommodation in §3.4

takes the form it does. Why is it that being in some highly salient relation with an existing discourse referent allows accommodation? The appearance of this constraint in so many forms in a variety of work leaves no doubt that it is on the right track, but it remains entirely a mystery why it should be on the right track.

A third puzzle that has not been resolved in a satisfactory way concerns examples like (75) repeated from the previous section:

(75) **The feather of the bird** fell on my shoulder.

The bird in (75) can't have more than one feather. I have suggested one possible solution to puzzles like this, using a limited mechanism for canceling presuppositions in the case of necessary contradiction, but it is not clear yet whether this solution works in its entirety. It would make the cases that are the norm for PDs, where uniqueness is not strong, exceptions in general, and cases like (75), which are exceptions within PDs, the norm.

Bibliography

- Barbara Abbott. Support for a unique theory of definite descriptions. In Tanya Matthews and Devon Strolovitch, editors, *Proceedings from Semantics and Linguistic Theory IX*. CLC Publications, 1999.
- Barbara Abbott. Presuppositions as nonassertions. *Journal of Pragmatics*, 32:1419–1437, 2000.
- Barbara Abbott. Definiteness and identification in english. In Nemeth T. Eniko, editor, *Pragmatics in 2000: Selected papers from the 7th international pragmatics conference*, pages 1–15, 2001.
- Chris Barker. *Possessive Descriptions*. Phd dissertation, University of California, Santa Cruz, 1991.
- Chris Barker. Partitives, double genitives, and anti-uniqueness. *Natural Language and Linguistic Theory*, 16:679–717, 1998.
- Chris Barker. Possessive weak definites. In Ji yung Kim, Yury Lander, and Barbara Partee, editors, *Possessives and Beyond: Semantics and Syntax*. GLSA Publications, 2005.
- David Beaver. *Presupposition and Assertion in Dynamic Semantics*. CSLI Publications and FoLLI, 2001.
- David Beaver and Henk Zeevat. Accommodation. In G. Ramchand and C. Reiss, editors, *Oxford Handbook of Linguistic Interfaces*. Cornell University Press, to appear.
- Betty Birner and Gregory Ward. Uniqueness, familiarity, and the definite article in english. In *Proceedings of the Twentieth Annual Meeting of the Berkeley Linguistics Society*, pages 93–102, 1994.
- Maria Bittner. Surface composition as bridging. *Journal of Semantics*, 18:127–177, 2001.

- P. Christopherson. *The Articles: A Study of their Theory and Use in English*. Munksgaard, Copenhagen, 1939.
- Paul Elbourne. *Situations and Individuals*. PhD dissertation, MIT, 2002.
- Gareth Evans. Pronouns, quantifiers, and relative clauses (i). *Canadian Journal of Philosophy*, 7:467–536, 1977.
- Gareth Evans. Pronouns. *Linguistic Inquiry*, 2(11):337–362, 1980.
- Donka Farkas. Specificity distinctions. *Journal of Semantics*, 19:1–31, 2002.
- B. Geurts and R. van der Sandt. Too. In *Proceedings of the 13th Amsterdam Colloquium*, pages 180–185, 2001.
- Jeroen Groenendijk and Martin Stokhof. Dynamic predicate logic. *Linguistics and Philosophy*, 14:39–100, 1991.
- Irene Heim. *The Semantics of Definite and Indefinite Noun Phrases*. PhD dissertation, University of Massachusetts, Amherst, 1982. Distributed by the Graduate Linguistic Students Association, UMass Amherst.
- Irene Heim. File change semantics and the familiarity theory of definiteness. In Rainer Bäurle, Christoph Schwarze, and Arnim von Stechow, editors, *Meaning, Use, and the Interpretation of Language*, pages 164–90. Walter de Gruyter and Co., 1983a.
- Irene Heim. On the projection problem for presuppositions. In M. Barlow, D. Flickinger, and M. Wescot, editors, *WCCFL 2: Second Annual West Coast Conference on Formal Linguistics*, pages 114–125, 1983b.
- Irene Heim. E-type pronouns and donkey anaphora. *Linguistics and Philosophy*, 13:137–177, 1990.
- Irene Heim and Angelika Kratzer. *Semantics in Generative Grammar*. Blackwell, 1998.
- Nirit Kadmon. *On Unique and Non-Unique Reference and Asymmetric Quantification*. PhD dissertation, University of Massachusetts, Amherst, 1987. Garland version published in 1992.
- Nirit Kadmon. Uniqueness. *Linguistics and Philosophy*, 13:273–324, 1990.
- Hans Kamp. A theory of truth and semantic representation. In J. Groenendijk, T. Janssen, and M. Stokhof, editors, *Formal methods in the study of language: Proceedings of the Third Amsterdam Colloquium*. 1981.
- Lauri Karttunen. Presuppositions of compound sentences. *Linguistic Inquiry*, 4:167–193, 1973.
- Lauri Karttunen. Presuppositions and linguistic context. *Theoretical Linguistics*, 1:181–193, 1974.
- Lauri Karttunen. Requiem for presupposition. In *Proceedings of the Third Annual Meeting of the Berkeley Linguistic Society*, pages 266–278, 1977.
- Angelika Kratzer. An investigation of the lumps of thought. *Linguistics and Philosophy*, 12:607–653, 1989.
- Angelika Kratzer and Junko Shimoyama. Indeterminate pronouns: The view from Japanese. In Yukio

- Otsu, editor, *Proceedings of the 3rd Tokyo conference on psycholinguistics*, pages 1–25. Hituzi Syobo, 2002.
- David Lewis. Scorekeeping in a language game. *Journal of Philosophical Logic*, 8:339–359, 1979.
- Sebastian Löbner. Definites. *Journal of Semantics*, 4:279–326, 1985.
- Reinhard Muskens. Combining Montague Semantics and Discourse Representation. *Linguistics and Philosophy*, 19:143–186, 1996.
- Barbara Partee. Uniformity vs. versatility: The genitive, a case study. appendix to janssen (1997), compositionality. In Johann van Benthem and Alice ter Meulen, editors, *The Handbook of Logic and Language*, pages 464–470. Elsevier, 1997. originally distributed in 1983.
- Barbara Partee and Vladimir Borshev. Genitives, relational nouns, and argument-modifier ambiguity. In E. Lang, C. Maienborn, and C. Fabricius-Hansen, editors, *Modifying Adjuncts*. Mouton de Gruyter, 2003.
- Massimo Poesio. Weak definites. In Mandy Harvey and Lynn Santelmann, editors, *Proceedings of the Fourth Conference on Semantics and Linguistic Theory*. CLC Publications, 1994.
- Ellen Prince. Toward a taxonomy of given-new information. In P. Cole, editor, *Radical Pragmatics*, pages 223–256. Academic Press, 1981.
- Ellen Prince. The zpg letter: subjects, definiteness, and information-status. In S. Thompson and W. Mann, editors, *Discourse description: diverse analyses of a fund raising text*, pages 295–325. John Benjamins, 1992.
- Craig Roberts. Uniqueness in definite noun phrases. *Linguistics and Philosophy*, 26(3):287–350, 2003.
- Bertrand Russell. On denoting. *Mind*, 14:479–493, 1905.
- Robert Stalnaker. Assertion. In Peter Cole, editor, *Pragmatics*, pages 315–332. Academic Press, 1978.
- Mark Steedman. Dependency and coordination in the grammar of dutch and english. *Language*, 61(3): 523–568, 1985.
- Carla Umbach. (de)accenting definite descriptions. *Theoretical Linguistics*, 27(2/3), 2002.
- Rob van der Sandt. Presupposition projection as anaphora resolution. *Journal of Semantics*, 9:333–377, 1992.
- Henk Zeevat. Particles: Presupposition triggers, context markers or speech act markers. In R. Blutner and H. Zeevat, editors, *Pragmatics and Optimality Theory*, pages 91–111. Palgrave, 2003.