The compositional semantics of *same*

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Abstract

Barker (2007) proposes the first strictly compositional semantic analysis of internal *same*. I show that Barker's analysis fails to predict the presuppositional content of sentences such as *John and Mary read the same book*. I also show that Barker's approach yields incorrect truth conditions for sentences in which *same* appears in a plural NP. This includes sentences such as *Anna and Bill know some of the same people*, in which *same* appears in the complement of a partitive quantifier. I propose that although Barker's analysis is for these reasons insufficient, his insights that *same* is a scope-taking adjective and that the analysis of *same* requires parasitic scope are crucially correct. I offer an analysis which retains these insights, but on which it is *the same book*, not *same*, that takes parasitic scope in *John and Mary read the same book*. I show that this analysis captures the facts that Barker's misses. I implement the analysis in Barker's continuation-based Type Logical Grammar.

1. Introduction

Sentences involving *same* systematically admit of two distinct kinds of readings. Consider as an example the following sentence:

(1) John and Mary read the same book.

The sentence has a DEICTIC reading on which *the same book* picks out a particular contextually salient book. For instance, suppose Bill is gesturing toward a copy of *The Great Gatsby*. An utterance of (1) in this context can mean the same as (2):

(2) John and Mary read *The Great Gatsby*.

Note that (2), and so (1) on its deictic reading, is ambiguous between collective and distributive interpretations; it can assert either that John and Mary read *The Great Gatsby* together, or that each of them read the book individually.

In addition to this deictic reading, (1) also has a separate reading on which it is equivalent to (3):

(3) John and Mary read the same book as each other.

On this reading, (1) will be true just in case there exists a book that John and Mary both read. Barker (2007), following Carlson (1987), calls this the INTERNAL reading of (1), as no reference to the context is needed to determine the comparison made by *same*. On this reading, *John and Mary* can only be interpreted distributively; the internal reading of (1) cannot mean that there is a book that John and Mary read together.

Prior to Barker (2007), the internal use of *same* had resisted a compositional semantic analysis. While the deictic reading of (1) makes reference to a particular book, the internal reading of (1) will be true if there is ANY book that John and Mary both read. So the semantic contribution made by *same* on the internal reading must be inherently quantificational. But Keenan (1992) proves that no generalized quantifier can express the meaning of *the same book* in the internal reading of (1). This appears to be a serious challenge to the possibility of a compositional account of *same*. Consequently, *same* has received pragmatic and non-compositional analyses. As Barker argues, however, Keenan's result only precludes a compositional semantic analysis of *same* if NPs are the only expressions that can take scope, and hence the only quantificational meanings are generalized quantifiers. But this is just an assumption, not a requirement imposed by compositionality. Barker instead proposes that scope-taking is much more general—expressions of any category, not just NPs, can take scope. In particular, he proposes that *same* is a scope-taking adjective.

2. Barker's Analysis

Barker presents his analysis in the context of a Type Logical Grammar, as in Moortgat (1997). In addition to the default mode of grammatical combination, Barker's system features a second continuation which implements scope-taking. The general form of a quantificational category in this system is R//(P\\T), where P is the local syntactic Personality, T is the scope Target, and R is the Result category. The double slashes indicate combination in the continuation mode. So an expression of category R//(P\\T) behaves locally like an expression of category of P, takes scope over an expression of category T, and ultimately produces an expression of category R. The nuclear scope of the quantifier forms a constituent of category P\\T. An expression of category R//(P\\T) has semantic type $\langle\langle P,T\rangle,R\rangle$, where P, T, and R are the semantic types of the categories P, T, and R, respectively.

If we take NP to be the category of a full noun phrase such as *the book*, with basic semantic type $\mathtt{e}$, and S to be the category of a clause, with semantic type t, then a generalized quantifier like *every woman* has category S//(NP\\S). The corresponding semantic type is then the expected $\langle \mathtt{et},\mathtt{t}\rangle$. If N is the category of nominals such as *book*, with semantic type $\langle \mathtt{e},\mathtt{t}\rangle$, then an ordinary prenominal adjective like *long* has category N/N, taking a nominal on its right and producing another nominal, with the single slash indicating combination in the default mode. We can see that *same* looks syntactically like this kind of adjective:

(4) a. John and Mary read the long book.
 b. John and Mary read the same book.

Since *same* is a scope-taking adjective, it will have the category R//((N/N)\\T) for some categories R and T. Barker proposes that *same* takes scope not over a whole clause, as generalized quantifiers do, but rather that *same* takes scope over the nuclear scope of another quantifier. As the existence of the scope target for *same* depends on another quantifier already having taken scope, Barker calls this mechanism PARASITIC SCOPE.

In the most common case, *same* takes parasitic scope over the nuclear scope of an NP quantifier. Therefore R and T are both NP\\S, the category of such a nuclear scope, so *same* has the category (NP\\S)//((N\N)\\(NP\\S)). Barker gives the denotation of *same* as:

(5) *Barker's denotation for* same:

$$[[same]] = \lambda F_{\langle\langle \mathtt{et},\mathtt{et}\rangle,\mathtt{et}\rangle}\lambda X_{\mathtt{e}}.\exists f_{\mathtt{choice}}\forall x < X.F(f)(x)$$

Thus *same* has semantic type $\langle\langle\langle \mathtt{et},\mathtt{et}\rangle,\mathtt{et}\rangle,\mathtt{et}\rangle$. The category (NP\\S)//((N\N)\\(NP\\S)) means that *same* is an adjective which takes scope over the nuclear scope of an NP quantifier and returns another expression of the same kind. X takes as its values plural entities, so that *read the same book* denotes the collective property that is true of a group just in case there is a book that every member of the group read. $<$ denotes the proper part relation in the domain of plural entities.

The type annotation `choice` on the variable f indicates that it ranges over/takes as values a subclass of type ⟨et,et⟩ adjective meanings that Barker calls CHOICE FUNCTIONS. A choice function in this sense is a prenominal adjective meaning, of type ⟨et,et⟩, which when applied to a set of entities always returns a singleton set containing exactly one element chosen from the original set. This allows *same* to in effect quantify over entities while binding its trace f with a value of the right type ⟨et,et⟩.

Barker's account gives the paradigmatic example *John and Mary read the same book* the following analysis:

(8) a. John and Mary read the same book.
   b. $(\textbf{John}\oplus\textbf{Mary})(\lambda X.\exists f\forall x < X.\textbf{read}(\textbf{the}(f(\textbf{book})))(x))$
   $\exists f\forall x < \textbf{John}\oplus\textbf{Mary}.\textbf{read}(\textbf{the}(f(\textbf{book})))(x)$
   c. $\exists f$.John and Mary each read the f book.
   d. There is a book that John and Mary both read.

Barker shows how to derive this meaning in his Type Logical Grammar, so that his account constitutes the first strictly compositional semantic analysis of *same*. The question now is whether it is correct.

3. Presuppositions

Definite descriptions ordinarily trigger existence and uniqueness presuppositions. But Barker observes that definite descriptions involving *same* fail to trigger such presuppositions.

(9) a. John and Mary read the long book.
   b. John and Mary didn't read the long book.
   c. Did John and Mary read the long book?
   d. John and Mary might read the long book.

The use of *the long book* in (9a) presupposes the existence of a unique long book. This implication is seen to be a presupposition as it survives negation (9b), questioning (9c), and embedding under a modal (9d).

(10) a. John and Mary read the same book.
   b. John and Mary didn't read the same book.
   c. Did John and Mary read the same book?
   d. John and Mary might read the same book.

Of the sentences in (10), only (10a) implies that the existence of a book that John and Mary both read. Of course, this is precisely what is asserted by (10a) and at issue throughout (10). If (10a) presupposed there was a book that John and Mary both read, it would say nothing. So replacing the non-quantificational adjective *long* with *same* seems to strip the definite description of its presuppositional force.

Barker (p. 20) writes that "it remains a mystery" why this is so. But in fact, Barker's analysis actually predicts that (10a) does not presuppose the existence of a book that John and Mary both read. The reason is that nowhere in the semantic analysis of (10a) is an expression with the meaning of *the book that John and Mary read*. The presupposition in (9a) arises when **the** applies to the nominal **long**(**book**). In this case there must be a unique long book for **the** to be defined, so this surfaces as a presupposition. But in (10a),

the only applies to *f*(**book**). By the definition of a choice function, *f*(**book**) is always true of a unique entity, and so **the**(*f*(**book**)) is always defined. Since choice functions are a way to essentially quantify over entities while formally quantifying over adjective meanings, (10a) is predicted by Barker's analysis to be precisely equivalent to (11):

(11) There is a book that John and Mary both read.

There are no presuppositions of the kind introduced by *the* in (11) because there is no *the* in (11). The only contribution of *the* to the semantics of (10a) then is to undo the wrapping of the quantified entity inside the choice function.

But this is not exactly right. Definite descriptions involving *same* DO trigger existence and uniqueness presuppositions, just not the ones Barker is looking for. The sentences in (9) all presuppose the existence of a unique long book, but they say nothing about which other books, if any, John and Mary read. Compare this (10a), which requires that the common book John and Mary read is the ONLY book either of them read:

(12) a. John and Mary read the long book, and John also read *The Great Gatsby*.
b. #John and Mary read the same book, and John also read *The Great Gatsby*.

The only acceptable reading of (12b) is a deictic one. Thus (10a) presupposes that John and Mary each read exactly one book. What is asserted by (10a) are that these two books are the same. So (10a) is not equivalent to (11), but rather to (13):

(13) The book John read = the book Mary read.

The presuppositions triggered in the normal way by *the* in (13) match the presuppositions we find in (10a). That *the* triggers these kinds of presuppositions in sentences involving internal *same* can be seen sharply in the contrasts in (14):

(14) a. #John and Mary have the same friend.
b. John and Mary have the same best friend.
c. #Anna and Bill take the same class.
d. Anna and Bill go to the same school.

On the internal reading, (14a) is anomalous as it implies, contrary to ordinary assumptions, that John and Mary each have only one friend. Since a person can only have one best friend, (14b) is perfectly fine. (14c) can only be used licitly in a context in which Anna and Bill are both already assumed to be taking exactly one class. For instance, it can be used to say that Anna and Bill are taking the same class at the gym if they are both taking only one, but it cannot be used to say that out of the four classes Anna and Bill take at college, they have one in common. (14d) is more natural since a person usually only goes to one school at a time.

This pattern follows if the sentences in (14) are equivalent to:

(15) a. #John's friend = Mary's friend.
b. John's best friend = Mary's best friend.
c. #The class Anna takes = the class Bill takes.
d. The school Anna goes to = the school Bill goes too.

On Barker's analysis, however, the sentences in (14) would be equivalent to:

(16) a. There is a person John and Mary are both friends with.
b. There is a person John and Mary are both best friends with.
c. There is a class that Anna and Bill both take.
d. There is a school that Anna and Bill both go to.

Thus Barker's analysis incorrectly predicts that (14a,c) should be acceptable in any context.

Heim (1985) recognizes the existence of these presuppositions. On her approach, the logical form of *John and Mary read the same book* looks like:

(17) $\mathbf{same}(\{\mathbf{John},\mathbf{Mary}\})(\lambda x\iota y.\mathbf{read}(y)(x) \wedge \mathbf{book}(y))$

Here ι is the presuppositional definite description operator, so $\iota y.\mathbf{read}(y)(x) \wedge \mathbf{book}(y)$ is the meaning of *the book that* x *read*. Thus (17) is equivalent to (13), which gives the correct truth conditions and presuppositions. However, Heim does not provide compositional derivations for these logical forms.

4. Plurals

Barker only considers cases like (18), where *same* appears in a singular NP. But *same* easily appears in plural NPs as well:

(18) a. John and Mary read the same books.

b. Anna and Bill know the same people.

The truth conditions of these examples are clear. (18) will be true just in case John and Mary read exactly the same books—that is, if John read every book that Mary did, and vice-versa. Likewise (18b) will be true just in case Anna knows every person Bill does, and Bill knows every person Anna does.

Nothing would seem to prevent us from applying Barker's analysis to these cases, with *f* ranging over choice functions of plural entities. But this analysis gives the wrong truth conditions:

(19) a. John and Mary read the same books.

b. $\exists f \forall x < \mathbf{John} \oplus \mathbf{Mary}.\mathbf{read}(\mathbf{the}(f(\mathbf{books})))(x)$

c. ∃*f*.John and Mary each read the *f* books.

d. There are some books that John and Mary both read.

The truth conditions in (19b-d) are too weak. (18a) requires not just that were some books that John and Mary both read, but that they each read exactly the same books. So (18a) is not equivalent to (19d), but to (20):

(20) The books John read = the books Mary read.

For *same* in singular NPs, Barker's analysis gives the correct truth conditions but incorrectly predicts a lack of presuppositions. For the plural cases, the analysis also yields the wrong truth conditions. Note that Heim's account does give the correct truth conditions in this case as well.

5. A New Analysis

Our goal is to give compositional analysis of *same* that yields truth conditions equivalent to those given by Heim and the equational paraphrases in the previous two sections:

(21) a. John and Mary read the same book.

b. $\mathbf{same}(\{\mathbf{John},\mathbf{Mary}\})(\lambda x\iota y.\mathbf{read}(y)(x) \wedge \mathbf{book}(y))$

c. The book John read = the book that Mary read.

This makes it clear that we need an expression with the meaning *the book that* x *read*, which in Heim's account is $\iota y.\mathbf{read}(y)(x) \wedge \mathbf{book}(y)$. I propose that Barker is right that *same* crucially involves parasitic scope-taking, but that in order to form this expression, it must be the whole *same*-NP, in our example *the same book*, and not *same* itself, that takes parasitic scope. Thus *the same book* is of category (NP\\S)//(NP\\(NP\\S)) with semantic type $\langle\langle \mathtt{e},\mathtt{et}\rangle,\mathtt{et}\rangle$, locally an NP, which takes scope over the nuclear scope of a NP quantifier, and yields an object of the same type. Even though *the same book* will be a quantificational NP of sorts, it will not be a type $\langle \mathtt{et},\mathtt{t}\rangle$ generalized quantifier, and so this analysis will not violate Keenan's result. I propose *the same book* has the denotation:

(22) $[[\textit{the same book}]] = \lambda R_{\langle \mathtt{e},\mathtt{et}\rangle}\lambda X_{\mathtt{e}}.\exists z\forall x < X.\mathbf{the}(\lambda y.R(y)(x) \wedge \mathbf{book}(y)) = z$

Then:

(23) $[[\textit{read the same book}]]$

$= [[\textit{the same book}]](\lambda y\lambda x.\mathbf{read}(y)(x))$

$= \lambda X.\exists z\forall x < X.\mathbf{the}(\lambda y.\mathbf{read}(y)(x) \wedge \mathbf{book}(y)) = z$

Here we can see the expression $\mathbf{the}(\lambda y.\mathbf{read}(y)(x) \wedge \mathbf{book}(y))$ which expresses exactly *the book that* x *read*, as we wanted.

If this is the denotation of *the same book*, how is this arrived at compositionally from the denotation of *same*? I propose that *same* takes scope over the NP that contains it to form an expression with the category proposed for *the same book* above. So *same* has category ((NP\\S)//(NP\\(NP\\S)))//((N/N)\\NP) and denotation:

(24) *Preliminary denotation for* same:

$[[\textit{same}]] = \lambda F_{\langle\langle \mathtt{et},\mathtt{et}\rangle,\mathtt{e}\rangle}\lambda R_{\langle \mathtt{e},\mathtt{et}\rangle}\lambda X_{\mathtt{e}}.\exists z\forall x < X.F(\lambda g\lambda y.R(y)(x) \wedge g(y)) = z$

Then:

(25) $[[\textit{the same book}]]$

$= \mathbf{same}(\lambda f.\mathbf{the}(f(\mathbf{book})))$

$= \lambda R\lambda X.\exists z\forall x < X.\mathbf{the}(\lambda y.R(y)(x) \wedge \mathbf{book}(y)) = z$

This is just the denotation for *the same book* just proposed. So what is happening is that *same* takes scope in two steps. First, *same* takes scope over the NP that contains it and turns that into a new scope-taking expression, which then takes parasitic scope over the NP\\S nuclear scope of another quantifier.

This denotation for *same* now finally gives us the correct analysis of *John and Mary read the same book*:

(26) a. John and Mary read the same book.

b. $(\mathbf{John}\oplus\mathbf{Mary})(\mathbf{same}(\lambda f.\mathbf{the}(f(\mathbf{book}))))(\lambda y\lambda x.\mathbf{read}(y)(x))$

c. $\exists z\forall x < \mathbf{John}\oplus\mathbf{Mary}.\mathbf{the}(\lambda y.\mathbf{read}(y)(x) \wedge \mathbf{book}(y)) = z$

d. There is an entity z such that for each x of John and Mary, the book that x read is z.

This meaning can be derived compositionally in Barker's Type Logical Grammar:

…	
NP●(*read*●NP) ⊦ S	
NP○λ*x*(*x*●(*read*●NP)) ⊦ S	λ
λ*x*(*x*●(*read*●NP)) ⊦ NP\\S	\\R
NP○λ*y*λ*x*(*x*●(*read*●*y*)) ⊦ NP\\S	λ
λ*y*λ*x*(*x*●(*read*●*y*)) ⊦ NP\\(NP\\S)	\\R
NP\\S ⊦ NP\\S	
(NP\\S)//(NP\\(NP\\S))○λ*y*λ*x*(*x*●(*read*●*y*)) ⊦ NP\\S	//L
…	
the●(N/N●*book*) ⊦ NP	
(N/N)○λ*f*(*the*●(*f*●*book*)) ⊦ NP	λ
λ*f*(*the*●(*f*●*book*)) ⊦ (N/N)\\NP	\\R
(((NP\\S)//(NP\\(NP\\S)))//((N/N)\\NP))○λ*f*(*the*●(*f*●*book*)))○λ*y*λ*x*(*x*●(*read*●*y*)) ⊦ NP\\S	//L
(*the*●(((NP\\S)//(NP\\(NP\\S)))//((N/N)\\NP)●*book*))○λ*y*λ*x*(*x*●(*read*●*y*)) ⊦ NP\\S	λ

λ*x*(*x*●(*read*●(*the*●(((NP\\S)//(NP\\(NP\\S)))//((N/N)\\NP)●*book*)))) ⊦ NP\\S	λ
S ⊦ S	
S//(NP\\S)○λ*x*(*x*●(*read*●(*the*●(((NP\\S)//(NP\\(NP\\S)))//((N/N)\\NP)●*book*)))) ⊦ NP\\S	//L
S//(NP\\S)●(*read*●(*the*●(((NP\\S)//(NP\\(NP\\S)))//((N/N)\\NP)●*book*))) ⊦ S	λ
…	
John●(*and*●*Mary*) ⊦ S//(NP\\S)	
(John●(*and*●*Mary*))●(*read*●(*the*●(*same*●*book*))) ⊦ S	LEX

The Curry-Howard labeling of this derivation gives the desired meaning as above:

(27) (**John⊕Mary**)(**same**(λ*f*.**the**(*f*(**book**)))(λ*y*λ*x*.**read**(*y*)(*x*)))

This denotation also gives the correct truth conditions for plural cases, with *Z* possibly taking a plural entity as its value:

(28) a. John and Mary read the same books.
b. (**John⊕Mary**)(**same**(λ*f*.**the**(*f*(**books**)))(λ*Y*λ*x*.**read**(*Y*)(*x*))
c. ∃*Z*∀*x* < **John⊕Mary**.**the**(λ*Y*.**read**(*Y*)(*x*) ∧ **books**(*Y*)) = Z
d. There is a group *Z* such that for each *x* of John and Mary, the group of books that *x* read is *Z*.

6. Partitives and a Revised Analysis

We saw above that *same* can appear in plural NPs. This includes plural NPs in the complement position of a partitive quantifier:

(29) a. Anna and Bill know some of the same people.
b. Anna and Bill know most of the same people.
c. Anna and Bill know all of the same people.

The truth conditions of at least (29a) and (29c) are clear. (29a) will be true just in case there are some people that Anna and Bill both know. (29c) is synonymous with *Anna and Bill know the same people,* and will be true just in case Anna knows everyone Bill knows and vice-versa. The truth conditions of (b) are less obvious, but there is no doubt as to its grammaticality.

I assume that the partitive quantifiers such as *some of* and *most of* have category (S//(NP\\S)\NP, and so take a plural entity as their argument, and as in Lasersohn 2008, can predicate a collective property of subgroups of their argument. My denotation for *same* then gives the following truth conditions for (29a):

(30) a. Anna and Bill know some of the same people.
b. ∃*Z*∀*x* < **Anna⊕Bill**.**the**(λ*Y*.**some-of**(*Y*)(λ*W*.**knows**(*W*)(*x*)) ∧ **people**(*Y*)) = *Z*
c. There is a group *Z* such that for *x* of Anna and Bill, the maximal group of people *x* knows some of is *Z*.

However, this will be true as long as each of Anna and Bill know at least one person, regardless of whether they know anyone in common, since the maximal group of people they know some of will then just be the plural sum of all people.

Nor does Barker's analysis give correct truth conditions:

(31) a. Anna and Bill know some of the same people.
b. ∃*f*∀*x* < **Anna⊕Bill**.**some-of**(**the**(*f*(**people**)))(λ*W*.**knows**(*W*)(*x*))
c. ∃*f*.Anna and Bill each know some of the *f* people.
d. There is a group of people Anna and Bill each know some of.

This too will be true just in case Anna and Bill each know at least one person. If we let *f* be the choice function such that *f*(**people**) is the sum of the people Anna knows and the sum of the people Bill knows, then each of Anna and Bill will know some of the *f* people, even if there is actually no one that they both know.

These two analyses do no better with *most* in (29b). My analysis would give:

(32) a. Anna and Bill know most of the same people.

b. $\exists Z \forall x < \mathbf{Anna{\oplus}Bill}.\mathbf{the}(\lambda Y.\mathbf{most\text{-}of}(Y)(\lambda W.\mathbf{knows}(W)(x)) \wedge \mathbf{people}(Y)) = Z$

c. There is a group *Z* such that for *x* of Anna and Bill, the maximal group of people *x* knows most of is *Z*.

But the maximal group of people that *x* knows some of will usually not even be defined. Suppose Anna only knows two people. Then she will know most of any group of three people which contains these two. But assuming there at least four people in the universe, there will be multiple groups of three people that Anna knows most of, but she will not know most of the sum of these groups.

Barker's account gives a defined refined, but the truth conditions are still incorrect:

(33) a. Anna and Bill know most of the same people.

b. $\exists f \forall x < \mathbf{Anna{\oplus}Bill}.\mathbf{most\text{-}of}(\mathbf{the}(f(\mathbf{people})))(\lambda W.\mathbf{knows}(W)(x))$

c. $\exists f$.Anna and Bill each know most of the *f* people.

d. There is a group of people Anna and Bill each know most of.

Suppose Anna and Bill know at least one person in common. Let *f* be the choice function such that *f*(**book**) is the plural sum of these people. Then Anna and Bill will both know most of the *f* people. So Barker's analysis predicts that (29b) will be true just in case there is a person that Anna and Bill both know. But this is clearly not what it asserts.

The problem with these analyses is that they talk about the groups of people that *x* knows some of, when want we need to talk about are just the groups of people that *x* knows. The partitive comes says something about the overlap of these groups; it does not participate in defining them. So (29a) is equivalent to (34b), not (34a):

(34) a. The people Anna knows some of = the people Bill knows some of.

b. Some of the people Anna knows = some of the people Bill knows.

We can accomplish this by having *same* take scope over the whole partitive phrase, of category S//(NP\\S), instead of just over the smaller NP. We still want *some of the same people* to have the category (NP\\S)//(NP\\(NP\\S)), but in order for *same* to take scope over the partitive phrase and produce this kind of expression, *same* must have the category ((NP\\S)//(NP\\(NP\\S)))//((N/N)\\(S//(NP\\S))), and therefore semantic type $\langle\langle\langle \mathtt{et},\mathtt{et}\rangle,\langle \mathtt{et},\mathtt{t}\rangle\rangle,\langle\langle \mathtt{e},\mathtt{et}\rangle,\mathtt{et}\rangle\rangle$. The only change in the denotation of *same* is to accommodate this higher type:

(34) *Denotation for* same:

$$[[same]] = \lambda F_{\langle\langle \mathtt{et},\mathtt{et}\rangle,\langle \mathtt{et},\mathtt{t}\rangle\rangle} \lambda R_{\langle \mathtt{e},\mathtt{et}\rangle} \lambda X_{\mathtt{e}}.\exists Z \forall x < X.F(\lambda g \lambda Y.R(Y)(x) \wedge g(y))(\lambda W.W = Z)$$

A type $\mathtt{e}$ NP can be lifted to a S//(NP\\S) generalized quantifier with no effect on the meaning, so this denotation still handles the cases in the previous sections. While the previous denotation of *same* took a non-quantificational NP and turned into a quantificational (NP\\S)/(NP\\(NP\\S)), this *same* takes an already quantificational S//(NP\\S) and turns it into a different quantificational expression, again of (NP\\S)//(NP\\NP\\S).

This new denotation now gives us correct truth conditions for the examples in (29):

(35) a. Anna and Bill know some of the same people.

b. $(\mathbf{Anna}\oplus\mathbf{Bill})(\mathbf{same}(\lambda f.\mathbf{some\text{-}of}(\mathbf{the}(f(\mathbf{people})))))(\lambda y\lambda x.\mathbf{know}(y)(x))$

c. $\exists Z\forall x < \mathbf{Anna}\oplus\mathbf{Bill}.\mathbf{some\text{-}of}(\mathbf{the}(\lambda Y.\mathbf{know}(Y)(x) \wedge \mathbf{people}(Y)))(\lambda W.W = Z)$

d. There is a group Z such that for each x of Anna and Bill, Z constitutes some of the people that x knows.

Here Z is the group of people that Anna and Bill both know.

(36) a. Anna and Bill know most of the same people.

b. $(\mathbf{Anna}\oplus\mathbf{Bill})(\mathbf{same}(\lambda f.\mathbf{most\text{-}of}(\mathbf{the}(f(\mathbf{people})))))(\lambda y\lambda x.\mathbf{know}(y)(x))$

c. $\exists Z\forall x < \mathbf{Anna}\oplus\mathbf{Bill}.\mathbf{most\text{-}of}(\mathbf{the}(\lambda Y.\mathbf{know}(Y)(x) \wedge \mathbf{people}(Y)))(\lambda W.W = Z)$

c. There is a group Z such that for each x of Anna and Bill, Z constitutes most of the people that x knows.

Here Z is the group of people that Anna and Bill both know, and most of the people that each of them know must be in Z.

(37) a. Anna and Bill know all of the same people.

b. $(\mathbf{Anna}\oplus\mathbf{Bill})(\mathbf{same}(\lambda f.\mathbf{all\text{-}of}(\mathbf{the}(f(\mathbf{people})))))(\lambda y\lambda x.\mathbf{know}(y)(x))$

c. $\exists Z\forall x < \mathbf{Anna}\oplus\mathbf{Bill}.\mathbf{all\text{-}of}(\mathbf{the}(\lambda Y.\mathbf{know}(Y)(x) \wedge \mathbf{people}(Y)))(\lambda W.W = Z)$

d. There is a group Z such that for each x of Anna and Bill, Z constitutes all of the people that x knows.

Here Z is the group of people that Anna and Bill both know, and *all of* guarantees Anna and Bill know no one beside this.

The derivation of any of these sentences is essentially the same as the above derivation of *John and Mary read the same book*:

…	
NP●(*know*●NP) ⊦ S	
NP○λ*x*(*x*●(*know*●NP)) ⊦ S	λ
λ*x*(*x*●(*know*●NP)) ⊦ NP\\S	\\R
NP○λ*y*λ*x*(*x*●(*know*●*y*)) ⊦ NP\\S	λ
λ*y*λ*x*(*x*●(*know*●*y*)) ⊦ NP\\(NP\\S)	\\R
NP\\S ⊦ NP\\S	
(NP\\S)//(NP\\(NP\\S))○λ*y*λ*x*(*x*●(*know*●*y*)) ⊦ NP\\S	//L
…	
some-of●(*the*●(N/N●*people*)) ⊦ S//(NP\\S)	
N/N○λ*f*(*some-of*●(*the*●(*f*●*people*))) ⊦ S//(NP\\S)	λ
λ*f*(*some-of*●(*the*●(*f*●*people*))) ⊦ (N/N)//(S//(NP\\S))	//R
(((NP\\S)//(NP\\(NP\\S)))//((N/N)//(S//(NP\\S)))○λ*f*(*some-of*●(*the*●(*f*●*people*))))○λ*y*λ*x*(*x*●(*know*●*y*)) ⊦ NP\\S	//L
(*some-of*●(*the*●(((NP\\S)//(NP\\(NP\\S)))//((N/N)//(S//(NP\\S)))●*people*)))○λ*y*λ*x*(*x*●(*know*●*y*)) ⊦ NP\\S	λ
λ*x*(*x*●*know*●(*some-of*●(*the*●(((NP\\S)//(NP\\(NP\\S)))//((N/N)//(S//(NP\\S)))●*people*)))) ⊦ NP\\S	λ
S ⊦ S	
S//(NP\\S)○λ*x*(*x*●*know*●(*some-of*●(*the*●(((NP\\S)//(NP\\(NP\\S)))//((N/N)//(S//(NP\\S)))●*people*)))) ⊦ S	//L
S//(NP\\S)●(*know*●(*some-of*●(*the*●(((NP\\S)//(NP\\(NP\\S)))//((N/N)//(S//(NP\\S)))●*people*)))) ⊦ S	λ
…	
Anna●(*and*●*Bill*) ⊦ S//(NP\\S)	
(*Anna*●(*and*●*Bill*))●(*know*●(*some-of*●(*the*●(*same*●*people*)))) ⊦ S	LEX

The Curry-Howard labeling again gives us the correct semantics:

(38) $(\mathbf{Anna}\oplus\mathbf{Bill})(\mathbf{same}(\lambda f.\mathbf{some\text{-}of}(\mathbf{the}(f(\mathbf{people})))))(\lambda y\lambda x.\mathbf{know}(y)(x))$

7. Non-NP Triggers

Barker observes that an internal reading of *same* can be triggered by plurals other than NPs:

(#) a. John hit and killed the same man.
b. Mary read and reviewed the same book.
c. Bill ate at the same restaurant every day.

Barker is able to account for these cases by generalizing the category of *same* from (NP\\S)//((N/N)\\(NP\\S)) to the schema (*α*\\S)//((N/N)\\(*α*//S)), where *α* is a variable ranging over categories. The denotation in (12) can be generalized in exactly the same way, generalizing the category from (NP\\S)//(NP\\(NP\\S)))//((N/N)\\(S//(NP\\S))) to ((*α*\\S)//(NP\\(*α*\\S)))//((N/N)\\(S//(NP\\S))). The remaining occurrences of the category NP reflect that *same* still takes scope over the NP quantifier which contains it, and that this object, which takes scope over the nuclear scope *α*\\S, is locally an NP.

8. A Remaining Puzzle

Barker asks why *same* always requires the definite determiner *the*. For instance, why can we not say **John and Mary read a same book* instead of *John and Mary read one of the same books*? Barker's account has an explanation for this. On his analysis, the determiner in the *same*-NP always applies to the output of a choice function *f*. Since this is guaranteed to be a singleton set, the determiner must be the definite *the*. So **a same book* is ruled out for the same reason as **a longest book*.

This explanation is not available on the analysis I have presented in this paper. The determiner in the *same*-NP is not restricted to applying to the output of a choice function. The analysis explicitly allows *same* to take scope directly over quantifier phrases, in order to handle with partitive constructions such as *some of the same people*. This should rule in other quantifiers which have the same category S//(NP\\S), including **a same book*, as well as **every same book* and so on.

I have more nothing to say on this question except to note a certain trade-off between these two approaches. I have to stipulate that *same* requires *the*, but I can then use the properties of *the* to explain the presuppositions that arise. Barker, on the other hand, has an explanation for why *same* requires *the*, but this requires stipulating that *same* quantifies only over choice functions. And it is precisely the fact that the determiner is guaranteed to apply to the output of a choice function that prevents *the* from contributing any presuppositions to the sentence, which we have seen it must.

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