The same people ordered the same dishes

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Introduction

In his 1992 paper, 'Beyond the Frege Boundary', Keenan proves that a number of constructions have meanings that cannot be adequately described using ordinary generalized quantifiers. Among these constructions are many simple, utterly colloquial sentences of English involving the words *same* and *different*, such as (the most natural reading of) *Ann and Bill read the same book*. In Keenan's terminology, such constructions lie "beyond the Frege boundary".

More recently, at least two analyses give compositional treatments of some uses of *same* and of *different*, namely, Barker 2007 and Brasoveanu 2011. (See also Barker and Bumford 2012 for a different implementation of the analysis in Brasoveanu 2011, along with a brief comparison with Barker 2007). And sure enough, they each use techniques that rely on more than just ordinary generalized quantifiers. So we're beginning to slowly explore the territory that lies beyond the Frege boundary.

But Keenan draws attention to other examples that are not fully analyzed in any published compositional analysis:

1. The same people ordered the same dishes.
2. Different students answered different questions (on the exam).

The distinctive feature of these examples is that they contain more than one occurrence of *same* or of *different*. Keenan discusses (2) in some detail, suggesting that it has a reading that requires a one-to-one correspondence between students and problems. As for (1), native speakers robustly report that there is an interpretation requiring multiple ordering events during which a certain group of people not only re-ordered a particular set of dishes—each member of the group must have re-ordered the same dish that person ordered on a previous occasion. That is, the truth conditions distinguish between the following two kinds of situations:

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                     Occasion 1   Occasion 2   (1) True?
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     Situation 1: people  a b c d     a b c d     yes
                  dishes  1 2 3 4     1 2 3 4

     Situation 2: people  a b c d     a b c d     no
                  dishes  1 2 3 4     4 3 2 1
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Apparently, it is necessary to establish a relation between two sets that is sensitive to an ordering internal to those sets.

The goal of this squib is to explore what the analysis of Barker 2007 has to say about examples involving multiple *same*. The analysis will handle what Keenan calls 'resumptive' uses in which multiple occurrences of *same* distribute over the a single, shared set. I will also offer some tentative speculations about *same* distributing over implicit adverbials, and about cases in which DPs involving *same* may be dependent plurals.

1   Scouting the truth conditions of multiple *same*

The first challenge is to characterize the truth conditions of sentences containing multiple *same*'s.

As is well-known, *same* and *different* have two kinds of uses, deictic and sentence-internal:

3. a. Ann read the same book.   DEICTIC
   b. Ann and Bill read the same book.   SENTENCE-INTERNAL

Sentence (3a) is supposed to only have a reading on which the book in question closely resembles some contextually salient book (though see discussion below). Sentence (3b) has in addition a reading on which it is true iff there is some book such that Ann and Bill each read it, independently of which books are salient from discourse.

Sentence-internal interpretations involve *same* distributing over some set of entities. In (3b), *same* distributes over the sum of Ann and Bill; but Carlson 1987 shows that *same* can distribute over many different licensors, including the referent of a plural DP such as *the men*, the set corresponding to a quantifier such as *every*, *each*, or *no*, or even over a set of events, as in *Ann read the same book **twice***.

The first question about (1), then, is whether the reading in question is deictic or sentence-internal. Barker 2007:442 speculates that the first occurrence of *same* is deictic, referring to the participants of some salient past event. But the second occurrence of *same* appears to be sentence-internal, so that its contribution to the truth of the sentence depends only on the existence of an appropriate set of person-dish correspondences.

If at least the second occurrence of *same* has a sentence-internal interpretation (as I believe it does), this is our first mystery, since it's not clear what that *same* is distributing over. It's not distributing over the people in any simple way, since there is no requirement that any of the people ordered the same dish as each other, in contrast with, e.g., *Those people (all) ordered the same dish*. Rather, there appears to be distribution over at least two ordering occasions, so that each person must order the same dish on the two occasions. But there is nothing overt in the sentence that guarantees multiple dish-ordering events. I will suggest, therefore, that some interpretations of (1) may require positing a silent adverbial meaning.

1.1   Naturally-occurring examples

We can find naturally-occurring examples that have just this kind of implicit dependence on implicit multiple events.

Here's the context for such an example (collected from the internet): "Every five years for the past three decades, John Wardlaw, John Dickson, Mark Rumer, Dallas Burney and John Molony have been meeting at the California lake and taking the same photo." Then we have:

4. In 1987, the now college-educated men sat in the same position on
   the same bench, again with a self-timed camera.

We can be reasonably confident that the intended truth conditions require each member of the group to sit in the same position they occupied in the original photograph based on links to the photographs themselves:

In order to compute the truth conditions, we must distribute *the same position* not only over the sum of the five men, but also over at least two photographing events, so that each man sat in the same position on the same bench in each photograph.

We can also find examples in which multiple occurrences of *same* distribute over entities that are explicitly mentioned in the sentence (as in (5a)):

5. a. You can't put the same foot in the same river twice.

   b. A puzzle of identical twins: The interesting thing is that each brother will give the same answer to the same question.

   c. Economic theory suggests four main reasons why firms in the same industry end up in the same place.

   d. Many animals have hit upon the same adaptations by altering the same genes. Rattlesnakes and boas evolved the ability to sense body heat by tweaking the same gene. Three desert lizards evolve white skins through different mutations to the same gene. The literally shocking abilities of two groups of electric fish have the same genetic basis.

   e. Generic and brand name products may look or taste different but both contain the same amount of the same active drug(s).

    f. The vast majority of the genome's sequence is the same from one person to the next, with the same genes in the same places. In other words, my genome is a pretty good approximation of yours, and if scientists sequenced your genome they would learn a lot about mine.

    g. Record and mark the alignment of the driveshaft to the front differential so that you can put the same bolt through the same holes of each unit upon reassembly.

    h. So we put the same woman, saying the same line, in all of their Yellow Page ads, on other marketing materials, and on the website.

    i. Always put the same type of product in the same bag. For instance, you may set aside a few bags for meats, another set for fresh produce and yet another set for ...

    j. The baseline is that its your internet service provider that decides what IP you get. but usually they give the same ip to the same computer.

The contribution of multiple-same to the truth conditions of these sentences is by no means uniform. Nevertheless, theses examples give us something to work with as we try to craft an account of at least some multiple-same sentences.

2   Compositional truth conditions for multiple *same*

2.1   Sketch of Barker 2007

In order to apply the account in Barker 2007 to multiple *same*, I must first sketch the basic analysis.

There are two key assumptions. The first is that *same* is a scope-taking adjective. The semantic behavior of a scope-taking adjective is analogous to that of a scope-taking DP: when quantificational DPs take scope, they abstract over the clause that contains them in order to form a new, quantified clause. Their semantic type, then, is $(e \rightarrow t) \rightarrow t$, where the argument $e \rightarrow t$ is the type of the abstracted clause. (See, e.g., Keenan 2002 for a discussion of generalized quantifier theory.)

Barker 2007 argues that when *same* takes scope, it is natural to expect that it can abstract over a nominal. So, for example, in *two men with the same name*, *same* abstracts over the adjective position in the nominal *men with the [ ] name*, and it has semantic type $(\texttt{Adj} \rightarrow \texttt{Nom}) \rightarrow \texttt{Nom}$, where $\texttt{Adj}$ is the type of an ordinary adjective (namely, $\texttt{Nom} \rightarrow \texttt{Nom}$), and $\texttt{Nom}$ is the semantic type of a nominal (namely, $e \rightarrow t$). The semantic composition of *two men with the same name*, then, is (two (same (λf (men with the (f(name)))))), where f is a variable of type $\texttt{Adj}$.

The second key assumption is that *same* is polymorphic, and can take scope over other predicate-denoting expressions besides nominals. In particular, the semantic type of a clause with a DP abstracted has semantic type $e \rightarrow t$, the same semantic type as a nominal. This means that the analysis of a sentence like *The same waiter served the men* proceeds in two conceptual steps.

$$\text{((the (same (waiter))) (served (the men)))}$$

First, the DP *the men* takes scope:

$$\text{the-men } (\lambda x \text{ ((the (same (waiter))) (served } x)))$$

Next, *same* takes scope in between the quantifier *the men* and its nuclear scope:

$$\text{the-men } (\text{same } (\lambda f \, (\lambda x \, ((\text{the } (f \, (\text{waiter}))) \, (\text{served } x)))))$$

In Barker 2007, this is called 'parasitic scope', since the scope target of *same* does not even exist until some other scope-taker (here, *the men*) takes its scope first.

Given a parasitic scope analysis of this sort, the value and type of *same* will be as follows:

$$\lambda F \lambda x \exists f . F f x : (\texttt{Adj} \rightarrow \texttt{Pred}) \rightarrow \texttt{Pred}$$

In words, the denotation of *same* takes as its first argument F a predicate from which an adjective has been abstracted (semantic type $\texttt{Adj} \rightarrow \texttt{Pred}$). It returns a function of type $\texttt{Pred}$, where $\texttt{Pred} = \alpha \rightarrow \texttt{t}$. When $\texttt{Pred} = \texttt{Nom}$, or when *same* takes parasitic scope under a quantificational DP, then $\alpha = \texttt{e}$, and $\texttt{Pred} = \texttt{e} \rightarrow \texttt{t}$. (In later examples, *same* will take scope under a temporal adverbial, in which case α will be the type of an event.) The predicate returned will be true of an entity x just in case there is some adjective function f such that x satisfies the property returned by F applied to f. In the example at hand, this gives:

$$\text{the-men}((\lambda F x . \exists f . F f x)(\lambda f (\lambda x ((\text{the}(f(\text{waiter})))\text{served}(x)))))$$

which reduces to

$$\text{the-men}(\lambda x . \exists f . (\text{the}(f(\text{waiter})))(\text{served}(x)))$$

This semantics assumes that the values of expressions with semantic type $\texttt{e}$ can be either atomic individuals or proper mereological sums (in the familiar sense of Link 1983), so that the variable x can range over individual men, or else over sets (sums) of men. On the given interpretation, then, *The same waiter served (all) the men* is predicted to entail that the relevant set of men has the property that a set has if there exists a way of choosing a waiter such that that waiter served each member of the set.

2.2 *Application to multiple same*

The unmodified analysis makes a number of predictions about sentences involving multiple occurrences of *same*.

6. [No matter how many times we ran the experiment,]
   The men (all) put the same object in the same box.

The analysis proceeds as above.

$$(\text{put}(\text{the}(\text{same}(\text{object}))))(\text{in}(\text{the}(\text{same}(\text{box}))))(\text{the-men}))$$

First, the subject *the men* takes scope in order to create a scope target for the two occurrences of *same*:

$$\text{the-men}(\lambda x(\text{put}(\text{the}(\text{same}(\text{object}))))(\text{in}(\text{the}(\text{same}(\text{box}))))(x)))$$

Next, one of the *same*'s takes parasitic scope:

$$\text{the-men}(\text{same}(\lambda f(\lambda x(\text{put}(\text{the}(f(\text{object}))))(\text{in}(\text{the}(\text{same}(\text{box}))))(x)))))$$

And finally, the other *same* takes parasitic scope:

$$\text{the-men}(\text{same}(\lambda f(\text{same}(\lambda g(\lambda x(\text{put}(\text{the}(f(\text{object})))(\text{in}(\text{the}(g(\text{box}))))(x)))))))$$

Substituting the denotation for *same*, and then performing beta reduction, we have:

$$\text{the-men}(\lambda x \exists f \exists g.(\text{put}(\text{the}(f(\text{object})))(\text{in}(\text{the}(g(\text{box}))))(x)))$$

These truth conditions say that *The men put the same object in the same box* will be true just in case there is a way of choosing an object and a way of choosing a box, and it is true of the sum of the men that they put that object in that box. This will be true if each man puts the unique distinguished object in the unique distinguished box. This is a 'resumptive'-style reading, on which multiple *same*s take parasitic scope under the same licensor, and distribute over the same sum entity.

2.3   Approaching 'respectively'-style readings for multiple *same*

The example explored in the previous section involves singular DPs (*object* and *box*). If we use plural DPs, we have

7. The men put the same objects in the same boxes.

The analysis just described predicts a reading on which there is choice *f* of a set of objects and a choice *g* of a set of boxes such that each man *x* put the unique set *f*(objects) into the unique set *g*(boxes), though without each man necessarily using the same object-to-box function.

But this is not at all satisfactory, since it is not a 'respectively' style reading, which would require each man to put each object into a specific matching box on multiple occasions. (See Gawron and Kehler 2004 for some of the complexities of providing truth conditions for sentences involving *respectively*.) To build up to a respectively reading, consider:

8. John put the same object in the same box twice.

Here, the *same*'s take scope parasitic on the quantificational operator *twice*. The truth conditions guarantee that there is some object and some box such that the pair of events in question are such that each one instantiates John putting that object in that box. One unique object, one unique box, one unique person, two distinct events.

Next, consider:

9. The men put the same object in the same box twice.

There are a variety of readings, depending on relative scopes. If *twice* takes widest scope, and the remaining elements take scope as in the previous section, we get the same situation repeated twice. That is, on each occasion, there was a unique object and a unique box that the entire group of men used, though there is no requirement that it was the same object or box on both occasions.

However, if *twice* takes widest scope, and the *same*'s take parasitic scope on *twice* instead of on *the men*, then there must be a single distinguished object and a single distinguished box such that each man put that object in that box—in this case, the special object and box

must remain constant across both occasions. Although such a reading might exist, this still is not the reading of interest.

Finally, imagine that *the men* takes widest scope, but the *same*'s take scope parasitic on *twice*:

the-men(λx(twice(same(λf(same(λg(λe(put(the(f(object)))(in(the(g(box))))(x)(e)))))))))

Then it must be distributively true of each man that there was a particular object and a particular box that that man interacted with twice. Each man must use the same object and the same box on both occasions, but there is no need for different men to focus on the same objects and boxes.

But if the speaker knows there were more than one object and more than one box involved, English requires the use of the plural (see Zweig 2008 for detailed discussion of the semantics and pragmatics of dependent plurals).

10. The men put the same objects in the same boxes (twice).

I'm suggesting that on the described scoping, these are dependent plurals, with no implication that any individual man manipulated more than one object or more than one box.

A brief digression: If we suppose that adverbial quantifiers such as *twice* can be implicit, this predicts that even purportedly deictic-only sentences such as *Ann read the same book* should be able to be analyzed as sentence-internal if we postulate a silent adverbial. But in a sufficiently rich context, this may in fact be possible. Imagine that legal protocol requires eye witnesses to confront two lineups (identity parades) containing the same people in different costumes. An identification is only persuasive if the eye witness selects the same suspect out of both lineups. After the double lineup procedure, The DA asks the police lieutenant (without knowing or caring who was in the lineup):

11. So, did Ann pick the same guy?

Here, the implicit adverbial would be something like *out of both lineups* or *on both occasions*.

Finally, we can consider the original Keenan-style sentence that started our investigation, *The same people ordered the same dishes*. I will tentatively renew the speculation in Barker 2007:442 that the first *same* is deictic, as in *Five people went to dinner; a week later, **the same people** went to dinner again.* If so, then if we allow ourselves an implicit adverbial like *on both occasions*, we can give the deictic *the same people* widest scope, the implicit adverbial intermediate scope, and the second occurrence of *same* scope parasitic on the implicit adverbial, with *dishes* as a dependent plural (no individual ordered more than one dish):

those-men(λx(twice(same(λf(λe(ordered(the(f(dish)))(x)(e)))))))

The truth conditions require that it is distributively true of a certain set of people that for each person x, there is a way f of choosing a dish such that x ordered the f(dish) on both occasions.

Conclusion

In this squib, I have shown how the analysis of Barker 2007 makes explicit predictions about the interaction of sentences containing multiple *same*'s with the scope of a variety of

elements in the sentence. This brief investigation by no means settles the status of multiple-same sentences; at best, I have only shown how it is possible to discuss how a range of interpretations can arise from a compositional treatment. Much of the discussion here is highly speculative—but so it goes in the uncharted lands beyond the Frege boundary.

Acknowledgements

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