research. It was the intent of this squib to reveal one particularly thorny and exciting area to be explored.

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Indefinites and Choice Functions

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1 Introduction

The idea of analyzing indefinites with the help of choice functions is not new; it even has a venerable tradition in mathematical logic (see von Heusinger 1997 for details). What is new is the claim that, with the help of choice functions, specific indefinites can be interpreted without being moved about. That is, choice functions make it possible to construe specific indefinites in situ—or so it is claimed by Reinhart

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(1997), Winter (1997), Kratzer (1998), and Matthewson (1999), among others (there are various differences among these proposals, most of which I will ignore). In the following I hope to show that such claims are precipitate.

A choice function is any function that takes a set X as its argument and returns an element of X as its value. The idea is that it is choice functions that carry the existential force typically associated with indefinite expressions. Therefore, it is not the indefinite itself that has existential force. Indefinites merely introduce properties for choice functions to apply to, and choice functions are contributed by extraneous sources, the precise nature of which need not concern us here. Following Reinhart (1997) and Winter (1997), I will assume that a choice function is existentially bound somewhere between the sentence root and the position at which the indefinite occurs. For example, if *a German* in (1a) is construed specifically, we may obtain a specific reading whose representation in standard predicate logic would be as in (1b). This reading (or, at any rate, something approximating it—see below) may be rendered with the help of quantification over choice functions as shown in (1c).

(1) a. All bicycles were stolen by a German.
b. $\exists$y[German(y) $\wedge$ $\forall$x[bicycle(x) $\rightarrow$ y stole x]]
c. $\exists$f[CF(f) $\wedge$ $\forall$x[bicycle(x) $\rightarrow$ f(German) stole x]]

(1c) says that there is a choice function f such that all bicycles were stolen by f(German), which is equivalent to (1b) provided the predicate *German* denotes a nonempty set. This raises the question of what happens if there are no Germans. Another question that comes to mind is what exactly f's argument is. Is it just the set of individuals that *German* happens to denote, or is it a richer object, such as the intension of *German,* for example? These questions will be addressed below.

The main points that I hope to establish are that there is no good reason for believing that choice functions allow us to construe specific indefinites in situ, and that some sort of movement is indispensable if we are to have an adequate account of specificity. It is immaterial to my argument what exactly a movement analysis must look like, although I should note that I do not equate movement with quantifier raising or anything equivalent to that: I prefer to view specificity as a pragmatic phenomenon, to be treated in tandem with presupposition projection, which on my account involves a form of movement (Geurts 1999). This, however, is as it may be, for what I want to show here is that just about any movement theory will do better than a nonmovement choice function account.

2 What Is a Choice Function?

For the time being I will adopt the extensional stance and suppose that a choice function takes as its argument the set of individuals satisfying the descriptive content of an indefinite NP. Now let us first ask: What exactly is a choice function? This is a rather obvious question, and therefore it may come as a surprise that the answer is not nearly as obvious. Here is a first stab:

(2) $CF(f)$ iff $\forall X[X \neq \emptyset \rightarrow f(X) \in X)]$

This says that a choice function picks an element from X provided X is not empty. This definition imposes no restrictions on f if X is empty, and this is what renders it inadequate, because it will generally yield truth conditions that are too weak. For example, if (2) is adopted, then only on the premise that there are Germans will (1a) entail that a German stole all bicycles. It has been suggested by Reinhart (1997) and Winter (1997) that this problem may be solved by revising (2) along the following lines:

(3) $CF(f)$ iff $\forall X[[X \neq \emptyset \rightarrow f(X) \in X] \wedge [X = \emptyset \rightarrow f(X) = *]]$, where $*$ is a special object that, by definition, blocks the satisfaction of any predicate it associates with (i.e., for any n-place predicate P, if $a_i = *$, $1 \leq i \leq n$, then $\langle a_1 \ldots a_n \rangle$ is not in P's extension)

This takes care of empty arguments by stipulating that f(X) yields $*$ whenever X is empty, where $*$ is the universal falsifier. This is an improvement, but it still won't do. Intuitively, one would like to say that if *a Polish friend of mine* is construed specifically, (4a) entails that the speaker has a Polish friend. Our revamped notion of choice function does not account for this, however, since it implies that (4a) is true if the speaker does not have any Polish friends.

(4) a. I didn't introduce Betty to a Polish friend of mine.
b. $\exists f[CF(f) \wedge \neg$[I introduced Betty to f(Polish-friend-of-speaker)]]

Is there any way of defining and deploying choice functions that will deliver the right truth conditions for specific indefinites? Not as long as it is insisted that specific indefinites be interpreted in situ. When we consider why a representation like (4b) is inadequate, the answer must be, evidently, that it should state that the speaker has a Polish friend at the point at which the choice function is introduced. But that requires movement, which is precisely what choice function theorists are determined to do without. I concede that this diagnosis is still a bit impressionistic, but it will solidify as we proceed.

These problems are serious enough, but there are others that are at least as serious, and while discussing the latter I will assume, for argument's sake, that the former can somehow be solved. So I propose to ignore the problems discussed in the foregoing, and I simply suppose that, say, (4b) is an adequate representation of the intended reading of (4a). What I want to show is that, even then, various other problems arise, each of which indicates that a nonmovement treatment of specificity is too tall an order.

3 Troublesome Pronouns

Winter (1997) points out that the choice function analysis runs into trouble over examples like the following, in which an indefinite NP contains a pronoun that is bound by a higher quantifier:

(5) Every girl gave a flower to a boy she fancied.

The problem with this type of example is that, without further provisions, there is nothing in the choice function account to block the following reading:

(6) $\exists$f[CF(f) $\wedge$ $\forall$x[girl(x) $\rightarrow$
x gave a flower to f(λy[boy(y) $\wedge$ x fancied y])]]

That this is a disturbing consequence may be seen as follows. Suppose there are two girls, Betty and Wilma, who happened to fancy the same boys. Therefore, λy[boy(y) $\wedge$ x fancied y] is the same set regardless whether x stands for Betty or Wilma, and since f is a function, f(λy[boy(y) $\wedge$ x fancied y]) is the same boy for either girl. Hence, (6) entails that any pair of girls who happened to fancy the same boys gave their flowers to the same boy, which is not a possible reading of (5).

Winter proposes to solve this problem by construing the choice function's argument intensionally: instead of applying to sets of boys, f applies to (intensional) properties of the form 'being a boy fancied by x', and since there are possible worlds, presumably, in which Betty and Wilma do not fancy the same boys, we can now differentiate between 'being a boy fancied by x' with x standing for Betty and 'being a boy fancied by x' with x standing for Wilma, even if in reality Betty and Wilma fancied the same boys. I have two objections to this proposal. First, it strikes me as implausible, because I fail to understand why intensional concepts should be crucially implicated in the interpretation of an apparently extensional construction. Second, even with intensional arguments for choice functions we will get wrong readings for sentences like the following:

(7) a. Every odd number is followed by an even number that is not equal to it.
b. $\exists$f[CF(f) $\wedge$ $\forall$x[odd-number(x) $\rightarrow$
f(ˆλy[even-number(y) $\wedge$ x $\neq$ y]) follows x]]

The property of being an even number different from x is the same for any odd number x, and therefore one of the interpretations predicted for (7a) is that there is an even number that follows every odd number, which is incorrect.

Another possible way of trying to get around this problem is by adopting Kratzer's (1998) proposal to equip choice functions with extra arguments, to be bound by quantifiers occurring between the indefinite and the position where the choice function is introduced. This means, in other words, that we create a hybrid from choice functions and Skolem functions, which allows for (5) to be represented as follows:

(8) $\exists f[CF(f) \wedge \forall x[girl(x) \rightarrow$
x gave a flower to $f(x, \lambda y[boy(y) \wedge x$ fancied $y])]]$

Although (8) may be an adequate rendering of (5), this approach does not alleviate the trouble in any way. To begin with, it is not enough that we have a formalism in which sentences like (5) can be represented with the choice function variable being bound externally. Such representations must be derived in a principled way, and it is by no means obvious how that could be done. Second, even if choice functions are allowed to take further arguments, we do not want to force them to do so, because that would frustrate the proposed treatment of specific indefinites. For example, if (1a) were assigned the following representation, the indefinite NP *a German* would be construed, in effect, as having narrow scope:

(9) $\exists f[CF(f) \wedge \forall x[bicycle(x) \rightarrow f(x, German)$ stole $x]]$

But now we are back to square one; for even if (8) is a possible representation of (5), we still have not found a way of ruling out (6).

The reason why sentences like (5) cause trouble in the first place is the premise that indefinites must be interpreted in situ. If specificity is treated by means of movement, the problem does not even arise: moving (the semantic correlate of) the indefinite *a boy she fancied* to the left periphery will render it impossible for the universal quantifier to bind the pronoun—and that is all there is to it. Not only is this an adequate explanation obtained without ad hoc stipulations; it is also the most natural way of explaining how bound pronouns can obstruct a specific interpretation.

4 A Problem with Polarity

If *some* occurs within the syntactic scope of a negative expression, either the sentence may be construed as a denial, or the indefinite headed by *some* may receive a specific construal. With the negative polarity counterpart of *some,* in contrast, neither option is available, as witness:

(10) a. Wilma didn't see some gnus in her front garden.
b. Wilma didn't see any gnus in her front garden.
c. $\exists x[gnu(x) \wedge \neg$ [Wilma saw x in her front garden]]

(11) Wilma didn't see {SOME / *ANY} gnus in her front garden: she saw a whole herd!

Whereas (10a) can be read as (10c), with a specific reading of the indefinite object, (10b) affords only a narrow scope interpretation. And if *some gnus* in (10a) is interpreted in situ, the sentence can have only a marked denial reading, which is not available with *any,* as (11) illustrates. A movement analysis readily accounts for these observations. Since *some* is a positive polarity item, a *some*-NP that remains within the scope of a negative expression will have to have a marked interpretation, and if that is to be avoided, the indefinite must be moved out of the negative environment and thus receive a specific interpretation. *Any*, on the other hand, *requires* a negative environment and therefore cannot get a specific interpretation.

It is crucial to this explanation that indefinites be movable objects, so it is hard to see how it could be incorporated in a theory that insists that indefinites must always be interpreted in situ. But then it is something of a mystery how a choice function theory could ever account for the peculiarities of *some* and *any*.

5 An Attitude Problem

The statement in (12) has at least three distinct readings, which, in terms of scope, may be represented as in (13a–c).

(12) Bob believes that all sows were blighted by a witch.

(13) a. ∃y[witch(y) ∧ Bob believes: ∀x[sow(x) → y blighted x]]
b. Bob believes: ∃y[witch(y) ∧ ∀x[sow(x) → y blighted x]]
c. Bob believes: ∀x[sow(x) → ∃y[witch(y) ∧ y blighted x]]

(13a) and (13b) both require a specific reading of the indefinite *a witch.* Some people (not I) would say that, on the former reading, the speaker must have a particular witch in mind, whereas, on the latter reading, it is Bob who must have a particular witch in mind. In contrast to these two interpretations, the third reading, represented by (13c), allows for the possibility that, according to Bob, more than one witch was involved in the blighting of the sows. Let us focus on the first two readings and consider how they could be rendered in a choice function framework.

(14) a. ∃f[CF(f) ∧ Bob believes: ∀x[sow(x) → f(witch) blighted x]]
b. Bob believes: ∃f[CF(f) ∧ ∀x[sow(x) → f(witch) blighted x]]

Apart from the fact that (14a) and (14b) commit the speaker and Bob, respectively, to a belief in choice functions, which does not seem to be right, these representations cannot both be correct. If (14a) captures (13a), then (14b) does not capture (13b), and vice versa: if (14b) captures (13b), then (14a) does not capture (13a). For suppose that (14b) is correct. If this formula is true, on its intended interpretation, then it is Bob who believes that there is a witch; someone who utters (12) with this interpretation in mind does not commit himself or herself to this claim. But if this holds for (14b), then the same holds for (14a), for if the predicate *witch* is construed relative to Bob's doxastic state in one case, it should have the same construal in the other. This is not right, however: whereas (14b) should entail that Bob believes that there is at least one witch, (14a) should commit the speaker to this belief. Of course, if we start from the assumption that (14a) is correct, we obtain the mirror image of the preceding argument, so at least one of (14a) and (14b) is inadequate as it stands.

This problem arises because the intended distinction between (14a) and (14b) demands that the indefinite *a witch* be interpreted relative to different contexts. The most natural way of accomplishing this is by moving the indefinite to the context it belongs to, but this option is anathema to the choice function theorist. That being so, I can think of only one solution, which is admittedly clumsier than the movement analysis, but at least allows us to leave specific indefinites in place. We introduce a new inventory of indices for keeping track of contexts and key the interpretation of an indefinite to the appropriate context, for instance, by means of Peacocke's (1978) indexed actuality operator (which has been reinvented several times in the linguistic literature, e.g., by Kuroda (1981) and, more recently, by Farkas (1997)). Formally, this means that we trade in our standard intensional logic for a multidimensional intensional logic (note that two indices will not suffice because attitude reports can be embedded within each other), and (14a–b) give way to (15a–b).

(15) a. $[_0\ \exists f[CF(f) \wedge$ Bob believes: $[_1\ \forall x[sow(x) \rightarrow f(@_0(witch))$ blighted $x]]]]$
b. $[_0$ Bob believes: $[_1\ \exists f[CF(f) \wedge \forall x[sow(x) \rightarrow f(@_1(witch))$ blighted $x]]]]$

In (15a) the predicate *witch* is evaluated in the main context, and the choice function selects an individual that, according to the speaker, is a witch. In (15b), on the other hand, the predicate is evaluated relative to Bob's doxastic context, and the choice function selects an individual that is a witch in Bob's belief worlds.

This solution has an obvious drawback, however: it is inconsistent, if not with the letter, then certainly with the spirit of the requirement that indefinites be interpreted in situ. Granted, choice function theorists who embrace this approach may rightly claim to have a theory of specificity that does not involve movement, but they cannot pretend to have shown how to *interpret* specific indefinites in situ: although the predicate *witch* in (15a) may not have been moved, it is interpreted upstairs. So, apart from the fact that this approach entails considerable complications of a technical nature, it merely serves to keep up appearances.

6 Conclusion

The choice function theory is faced with a number of nontrivial problems, none of which arise if we adopt a movement theory, of one kind or another. So the least we can conclude is that, as matters currently stand, theories using choice functions are not a serious alternative to movement theories. But, furthermore, all the various objections raised in the foregoing point in the same direction, which is that the simplest and most natural way of dealing with specificity is by means of movement.

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