The Elusive Scope of Descriptions[*]

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1   Descriptions, Scope, and Grammar

Many people have noted that sentences like (1) are, in a certain sense, ambiguous.

(1)   Every miner went to a meeting.

It seems that (1) can mean either that there was one meeting that every miner went to, or that every miner went to at least one meeting with no guarantee that they all went to the same meeting. In the language of first-order logic we can represent these two readings as a matter of the universal and existential quantifiers having different scope with respect to each other:

(2) $\forall x \exists y$ miner$(x) \wedge$ meeting$(y) \wedge$ went(x, y)

(3) $\exists y \forall x$ miner$(x) \wedge$ meeting$(y) \wedge$ went(x, y)

It is well-known that first-order logic can capture the ambiguities of some natural language sentences by varying scope. If all we are interested in is finding some mode of

representing various ambiguities of natural language, we could stop at this observation. However, much current research in philosophy and linguistics aims for a deeper understanding of how language works. In particular, it aims to find an explanation of why we find such ambiguities in natural language at all.

The standard hypothesis is that natural languages are, in critical respects, like first-order logic (and related logical languages). In particular, the standard explanation of why (1) is ambiguous is simply that it has quantifiers in it which themselves exhibit scope ambiguities.

In this paper, I will explore this particular hypothesis in so far as it concerns descriptions, expressions such as "a miner" and "the mayor".[1] The standard philosophical account—which I will call the neo-Russellian account—has it that indefinite and definite descriptions are quantificational expressions similar in crucial respects to the ones in first-order logic.[2] The neo-Russellian treatment of descriptions allows us to explain the presence of scope ambiguities in sentences with descriptions and quantifiers in them such as (1). To do so we simply appeal to the fact that descriptions *are* quantificational expressions that exhibit scope ambiguities.

Of course, in first-order logic what scope a given quantifier has is a matter of where it appears in a well-formed formula (i.e. a sentence). However, the fact that natural language exhibits scope ambiguities without corresponding ambiguities in the positioning of quantifiers, as in (1), indicates that scope in natural language is not just a matter of where a

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[1]Three excellent reviews of the philosophical and linguistic literature on descriptions are Heim (1991) Ludlow (2004) and Neale (2005).

[2]The mature neo-Russellian view, as presented in the masterful Neale (1990), differs substantially from the view put forward in the classic Russell (1905).

quantifier appears in a sentence as it is spoken or written.

Nonetheless, it is not the case that just any quantifier can have any scope in any sentence of English: as I will show, there are restrictions on what scopes are available for different quantifiers in different sentences. Moreover, I will review some evidence that these restrictions closely parallel restrictions on what is usually called syntactic movement. This correlation naturally suggests the hypothesis that natural language quantifiers undergo some form of *covert* movement, so that scope ambiguities in natural language, as in first order logic, are in fact resolved by the placement of quantifiers, but this placement is at a level of representation that differs from the apparent, spoken or written level. Often, this level is referred to as "logical form" (or "LF").[3]

Let us, however, put aside the exact mechanism by which quantifier scope ambiguities are resolved in natural language. The core commitment of the approach I am suggesting here is only that quantifier scope ambiguities are resolved as part of a syntactic process and this process explains the appearance of the different readings of sentences with more than one quantifier. This approach is motivated by the observation that not all theoretically possible scope ambiguities between different quantifiers or operators (such as negation, modal operators, conditional operators, etc.) are always available, and that there are systematic facts (to be explained as part of a theory of syntax) about which scope ambiguities appear in which sentences. This general approach is accepted by many people working on syntax and semantics.

The focus of this paper is the distinctive neo-Russellian addition to this theory, namely that descriptions—expressions such as "a man" and "the man"—are quantifiers that exhibit

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[3]See, for instance, May (1985) and for a more recent review, Fox (2003).

scope ambiguities linked to possibilities of syntactic movement at some level of representation which does not link up directly to what is pronounced. I will not attempt to resolve the question of whether descriptions really are quantifiers (the standard view in linguistic semantics, oddly enough, seems to be that "a F" is a quantifier phrase and "the F" is not). I will assume for the rest of this essay that descriptions are quantificational and thus assume the basic neo-Russellian programme. However, I will explain why this picture of quantifiers and descriptions cannot necessarily explain the scopal behavior of descriptions, as exhibited in sentences such as (1). In the process I hope to show something about the division of labor between syntax, semantics and pragmatics. More importantly, I hope to give the reader a taste of the nature of work being done today at the intersection of linguistics and philosophy.

2   Syntactic Constraints on Scope

For our purposes, the particular technical implementation of quantification in natural language is not important. I will assume that we have some basic system of restricted quantification.[4] In what follows, I will merely translate sentences of English into a pseudo-logical language that makes scope explicit. Take for instance this sentence:

(4)   John saw a saxophonist.

In order to explicitly represent where its quantifiers are in relation to each other we will bind variables with quantifiers and move them out to the front of the sentence.

(5) $[\exists x:$ saxophonist $x]$ John saw x.

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[4]For a clear account of the basic issues about natural language quantification see Lewis (1970), Barwise and Cooper (1981), or Heim and Kratzer (1998).

This closely parallels how we would treat other quantifiers in natural language such as "every":

(6) John saw every percussionist.

(7) $[\forall x$: percussionist $x]$ John saw x.

This notation provides an easy way of handling the "restrictors" of quantifiers (i.e. "percussionist" in these last two examples). The key point is that the restrictor of the quantifier is treated as being part of the quantifier expression and not as just another predicate. We can put aside the details and just write quantifier phrases denoted by "a percussionist" as $[\exists x$: percussionist $x]$ and the one denoted by "every percussionist" as $[\forall x$: percussionist $x]$.

As we saw at the beginning of the this paper, sentences like (8) are ambiguous.

(8) Every percussionist saw a dancer.

Using a restricted quantifier notation we can represent them as follows:

(9) $[\forall x$: percussionist $x]$ $[\exists y$: dancer $y]$ x saw y.

and

(10) $[\exists y$: dancer $y]$ $[\forall x$: percussionist $x]$ x saw y.

Merely saying that sentences have different readings that are captured by resolutions of scope ambiguities in a logical (or psuedo-logical) language is not really saying very much. What we aim for is rather a description of the actual syntactic-semantic system natural language uses, not merely a translation of the various different readings of natural language sentences into a logical language. In other words, we want to know how our grammatical system actually encodes the quantifier scope ambiguities (if it does encode them at all).

There is considerable evidence that scope ambiguities really do form a part of the grammar.[5] One example is a constraint on movement out of coordinated conjuncts. Co-ordinated conjuncts are conjunctions of verbs phrases such as "speaks Chinese and writes French." One can see the effect these constructions have on a classical kind of syntactic movement called wh-movement: the movement of questioned words (so-called wh-words such as "what" and "where") to the front of a sentence in English as seen in a direction question such as (11).

(11)   Who does the pianist like t?

According to most syntactic theories the wh-phrase "who" moved out of its position after the verb "like" in (11). The "t" (a "trace") is used to indicate the spot where the word would have been in the original declarative sentence. Note that a parallel sort of movement is not possible when we have a coordinate structure:

(12)   * Who does the pianist like t and hate the dean.

This sentence is awful even though it is perfectly fine to say:

(13)   The pianist likes *the president* and hates the dean.

Contexts such as this which disallow wh-movement across them are usually called syntactic *islands.*[6]

In a similar manner, we do not get quantifier movement, as evidenced by scope ambiguities, out of coordinated conjuncts. This is to say that quantifiers within coordinated

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[5]By "the grammar" I mean, in a vaguely Chomskyan sense, the peculiar set of rules that constitute our tacit competence with language, many of which are presumably innate and most of which are not consciously available.

[6]The first major discussion of them is due to John R. Ross (1967).

conjuncts cannot get scope above quantifiers outside of the conjuncts.

(14)   One student likes every professor and hates the dean.

This cannot mean:

(15) $[\forall x$: professor $x]$ $[\exists y$: student $y]$ y likes x and hates the dean.

For (15) can be paraphrased as in (16):

(16)   For every professor there is one student that likes him and hates the dean.

That this reading is unavailable is made clear by the fact that we must read (14) as speaking of only one student, whereas (15) and (16) can be taken as speaking of different students, one corresponding to each professor. So syntactic movement and semantic scope are correlated in this case.[7]

   For another example consider relative clauses such as the one in this sentence:

(17)   Mary liked the woman who reared John.

When we try to change this into a question, by changing "John" to "who" and moving it to the front of the sentence, we get an ungrammaticality:

(18)   * Who did Mary like the woman who reared t?

Likewise, consider a universal quantifier in this position:

(19)   Someone like the woman that reared everyone.

There is no way that (19) can mean: "Everyone is such that someone likes the woman that reared them." So "everyone" cannot get wide scope out of the relative clause (i.e. scope

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[7]This example and the next are adapted from Fox (2003) which contains an excellent review of many of the issues about quantifier scope and movement.

over elements outside of the relative clause), just as the wh-word cannot move out of the relative clause in (18). Because of these examples of parallel constraints on quantifier scope ambiguities and syntactic movement, it is widely thought that the syntactic constraints on movement also provide constraints for quantifier scope.

This evidence about the relationship between scope ambiguities and syntax entirely changes the sort of game we play when we talk about descriptions, or any other allegedly quantificational natural language expression type. If we are interested in the hypothesis that descriptions behave like quantifiers then we must assimilate what we know about them to what we know about the behavior, generally, of quantifiers in natural language. This includes syntactic facts such as the ones we have just gone through about coordinate structures and relative clauses.

3   Wide-Scope Indefinites

In this section we will see a puzzle about the scope of indefinite descriptions (expressions like "a man"). As before, I will follow the Russellian approach and treat indefinite descriptions as restricted existential quantifiers.

As we just saw there are severe syntactic restrictions on the possible scope available to quantifiers. Another example which is particularly useful is that of the antecedent of a conditional.

(20)   * Who if John hit t, then I'd be happy?

(21)   If John hit everyone, then I'd be happy.

In (20) we can see that wh- word ("who") cannot move out of the antecedent of a condi-

tional. Likewise in (21) it is easy to see that the quantifier phrase "everyone" is not capable of getting wide scope. On the wide-scope reading the sentence would mean that everyone is such that if John hit them, I'd be happy. But this reading is simply not available.

But what about indefinite descriptions in the antecedent of conditionals? As has been recognized since a landmark article by Fodor and Sag (1982), indefinites sometimes show wide-scope readings when they are in positions that do not allow other quantifiers to have wide-scope readings. Here is a variation of a standard example:

(22)   If a relative of mine from Texas dies, then I'll be rich.

The most natural reading of this sentence says that there is a certain relative of mine in Texas such that if he/she dies then I'll be rich. However, if we read "a relative of mine" as just a normal narrow-scope quantifier, this is not the reading we find. Rather the reading we should find is one that says "if there exists a relative of mine from Texas that dies, then I'll be rich." However, it seems that (22) could be true, but it could still be the case that if just any relative of mine in Texas dies, I won't get rich. That is, I could say (22) even if I have ten relatives from Texas only one of whom is a rich man who has made me his heir. This reading, on the normal neo-Russellian treatment of indefinites, requires that we scope the indefinite out of the conditional, as in 23:

(23) $[\exists x:$ relative of mine $x]$ if x dies, then I'll be rich

Similar problems occur with coordinate structures and relative clauses, which we saw acted as scope islands for regular quantifiers.

(24)   Everyone hates a man from Manchester with a blue hat and loves *Shameless*.

The most natural reading of (24) has it that there is a man from Manchester with a blue hat that everyone hates and everyone loves the show *Shameless*. Call this the wide-scope

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reading. On this reading the indefinite description "a man from Manchester with a blue hat" takes wide scope out of a coordinate structure.[8] An example with a relative clause is also easy to find:

(25)   Everyone at the party had a hat that was made by a man in Turkey.

There is a reading of (25) on which all the hats are made by some specific man in Turkey. This reading is, intuitively, one where the indefinite description inside the relative clause, "a man in Turkey", gets scope above "everyone".

The problem as we saw in (20) and (21) is that conditionals are not the sort of things that either wh-words or other quantifiers seem to be able to move out of. So it seems that indefinite descriptions, on the neo-Russellian view, behave exceptionally with respect to syntactic islands. Now, one might say that this is just a funny fact about indefinites that syntax needs to explain. Indeed Ludlow and Neale (1991) seem to bite the bullet and acknowledge that indefinite descriptions sometimes get wider scope than other quantifiers (scope that seems to violate constraints in syntax). However, many linguists think that what is happening in examples like (22) is not a matter of syntactic movement across normal barriers. In the next section, following Schlenker (2006), I will revive an argument of Hintikka's that attempts to shows that what is happening with indefinites cannot be purely a matter of scope.

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[8]In some ways, this example is less straightforward than (22). This is because the wide-scope reading of (24) strictly entails the narrow scope reading. For this reason many have argued in parallel cases that the readings are not really syntactically or semantically distinct but merely a sort of "strong spin" on the one real reading. However, in Section 4 we will see a way of demonstrating that the wide-scope readings are really semantically distinct from the narrow-scope ones.

3.1 Wide-Scope by Domain Restriction

There are other approaches to explaining what is happening in (22) besides simply assuming that indefinite descriptions can get wider scope than other quantifiers. An approach that does not rely on scope has been suggested by Schwarzschild (2002).[9] His proposal is that the phenomenon we see in (22) is another example of quantifier domain restriction, a very general syntactic phenomenon much discussed in the recent philosophical literature (see, e.g., Recanati (1996); Stanley and Szabó (2000); Stanley (2002)). The basic phenomonon is simply that quantifier phrases, such as universal quantifiers, only quantify over some subset of objects in the world. When we speak of "everyone" we rarely mean every person in the universe, but usually just speak of some subset of people. Examples are almost too obvious to be necessary. For example a typical utterance of (26) will not be speaking about all the inhabitants of the universe but rather some small subset of them:

(26) Everyone was given a button and a five-dollar gift certificate to Starbucks.

Schwarzschild uses quantifier domain restriction combined with the simple existential analysis of indefinite descriptions to get the requisite readings in examples like (22) *without* forcing the indefinite description to scope out of the conditional. His critical idea is that an indefinite can have its scope "neutralized" if its domain is restricted to a *singleton* set. By neutralized Schwarzchild simply means that the scope of the description is no longer relevant for the truth-value of the sentence. To see this think about a typical ambiguity between an indefinite quantifier and negation:

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[9]Schwarzschild's basic idea is not original to him but rather to Kai von Fintel who in turn credits Uli Sauerland. It is also on crucial respects similar to the choice-function approach to wide-scope indefinites arising from Reinhart (1997).

(27) NOT there exists x, Fx

(28) there exists x NOT Fx

If we presuppose that there is exactly one entity in the universe, then these two sentences come out equivalent. In general, one can see that once you assume that there is only one entity in the domain of discourse then where you put the existential quantifier with respect to other operators is irrelevant since no matter where the quantifier has scope the variable it binds will pick out the same individual.

So if we add a restriction F to the indefinite under the conditional and only one entity in the domain of discourse satisfies F, then it simply doesn't matter whether the indefinite is inside or outside of the conditional.

Let us look at this in detail. The narrow-scope reading of (22) is written as follows:

(29) If [$\exists x$: x is a relative of mine] x dies, then I'll be rich.

The problem with this narrow-scope reading is that it does not capture the natural reading of this sentence on which only one of my relatives is such that if he dies then I'll be rich. However, let us suppose we have a domain restriction F and F picks out exactly one relative of mine. Now we can capture the right reading:

(30) If [$\exists x$: x is a relative of mine and x is F] x dies, then I'll be rich.

This approach is, in certain respects, very similar to the original proposal for explaining the wide-scope reading of indefinite descriptions given by Fodor and Sag (1982). Influenced by those who argued that definite descriptions were ambiguous between referential and quantificational readings such as Donnellan (1966), Fodor and Sag suggested that indefinites were also so ambiguous and that the wide-scope readings were just instances of referential

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uses of indefinite descriptions. A referential use would always directly pick out one object and so could never have a narrow scope reading under any operator or other quantifier. Allowing a domain restriction that restricts the domain to exactly one item in the universe may seem very similar to allowing a referential reading.

However, Schwarzchild's approach has a number of conceptual and empirical advantages over Fodor and Sag's. Conceptually, Fodor and Sag needed to postulate a semantic ambiguity in indefinite descriptions. All else equal this is surely undesirable. Schwarzchild, on the other hand, just appeals to an antecedently needed device: domain restriction. Moreover, Schwarzchild does not depend on the elusive notion of direct reference, thus avoiding the charge that not all uses of wide-scope indefinites seem intuitively to be referential (a point emphasized in Ludlow and Neale (1991)).

Most importantly, however, there are clear counterexamples to the generalization that once an indefinite description scopes out of a syntactic island it is essentially scopeless (and hence can be modeled as referential). Here is one such example:

(31)   Every member of the club believes that if an uncle in Texas dies he'll get rich.

There is clearly a reading of (31) that can be paraphrased as follows:

(32)   Every member of the club believes of an uncle, that if the uncle dies, he'll get rich.

This reading does not have the indefinite "an uncle" having widest scope, rather it has intermediate scope inside "every member" but outside of the conditional. Critics of Fodor and Sag pointed out that these sorts of examples simply cannot be handled by their account.[10]

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[10]Fodor and Sag argued that intermediate scope was in general impossible once an indefinite appeared to have scope outside of a syntactic island. It turns out that the distribution of intermediate scope readings of indefinites is quite complex, so that sometimes they seem possible and sometimes not.

Fortunately domain restrictions themselves can show dependency on higher-up operators. This is a fact made much of by Stanley and Szabó (2000), who argue that it shows that domain restrictions are represented syntactically. Here is one example:

(33)   Every student passed every exam.

Clearly in (33), it does not need to be the case that every student passed the same set of exams, rather one can understand (33) to mean that every student passed every exam *that he/she took*. So the restriction on the domain for the second quantifier can be bound by the first quantifier (in the sense that domain restriction needs to include a variable bound by the first quantifier). But if domain restrictions can have such dependencies then we can cash out the intermediate scope of (31) in terms of a domain restriction containing a bound variable. Here is how the sentence could look:

(34) $[\forall x$: member of the club $x]$ x believes that if $[\exists y$ uncle in Texas$\wedge$F(x) $y]$ y dies x will get rich.

In this case, F() is a function from members of the club to singleton properties. This strategy perfectly captures the intermediate-scope readings. In the philosophical literature on descriptions it is common to cite Kripke (1977) as showing that you cannot capture the possibly n-fold distinction made by scope with the simple two-fold distinction between referential and attributive readings. While the referential-attributive distinction cannot do all the work scope can, it turns out the domain restrictions can do much of the work that scope does.

Nonetheless Schwarzchild's approach is not unproblematic, and like most proposals in this area it will need to be refined if not replaced. For one thing, normal domain restrictions need to be understood by both speaker and hearer. For me to felicitously utter a sentence

such as (35), I normally need to assume that my audience has a tacit understanding of what domain of students I am speaking of—if there is no such understanding one normally assumes the quantification is unrestricted.

(35)   Every student likes Star Wars.

However, with singleton indefinites (should they exist) it is relatively clear that the audience need not know the domain restrictions being used. Suppose I utter this sentence:

(36)   If a building in Washington is destroyed, our defense network will be seriously harmed.

It seems that "a building in Washington" can act like a singleton indefinite without my audience needing to know which building I am talking about. Indeed the use of expressions like "a certain" or "a specific" seem to actually mark the fact that either the particularly identity of the object is unknown to the audience or it is not relevant. Perhaps this is just how domain restriction works on indefinites, perhaps there are parallels with other quantifiers, but the conversational pragmatics clearly require more investigation.

More seriously there is a problem about how Schwarzchild's domain restriction behave when embedded under negation.[11] Here is an example where an indefinite might get wide scope out of a conditional but narrow scope under negation.

(37)   I doubt that if a relative of John's dies then John will be rich.

The problem is one cannot take just any singleton domain restriction since then the sentence will be too easily true: as long as, for a certain relative of John's, I doubt that if that relative dies John will be rich, then the sentence is true. On the most natural reading what I doubt

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[11]This problem was noted by Chierchia (2001).

is that *any* relative of John's is such that if that relative dies John will be rich. How do we capture that reading without positing actual intermediate scope? While many think this problem is unsolvable, an ingenious solution has been proposed by Richard Breheny (2003, 2006).[12]

Another potential problem with Schwarzchild's approach is that it does not give a predictive account of which other quantifiers will show wide-scope readings like the ones indefinite descriptions do. If all that is responsible for the wide-scope readings is domain restrictions than one should expect other quantifiers to also show wide-scope readings, since other quantifiers also can have domain restrictions. This prediction is born out for plain numerical quantifiers:

(38)   If two uncles of mine in Texas die, I'll inherit a fortune.

Clearly, (38) has the wide-scope reading on which it is true even when it's not the case that any two uncles of mine in Texas dying is sufficient for me to inherit. However, if we slightly switch the quantifier from "two" to "more than one" this reading is much harder to get:

(39)   If more than one uncle of mine in Texas dies, I'll inherit a fortune.

Here the most natural reading seems to say that as long as *any* two uncles of mine in Texas die then I'll inherit a fortune. The difference between (38) and (39) is unexpected if we

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[12]The basic idea is that for (37) one assumes that there is a domain restriction to relatives satisfying F such that for any x satisfying F, if there is any relative y such that if y dies John will be rich, then x is also a relative such that if x dies John will be rich. It can be verified that NOT(if there exists a relative satisfying F and x dies then John will rich) implies that NOT (exists x s.t. if x dies then John will be rich). Interestingly, it appears that once you use this solution the restriction on indefinites under negation no longer needs to pick out a singleton.

think that domain restriction alone explains the apparent wide-scope readings. Nonetheless, our understanding of different types of quantifiers and how they interact with respect to domain restriction is still very primitive, so it is not clear that this is a decisive objection to Schwarzschild's approach.

3.2   Wide-Scope by Choice Function

I want to review one more approach to this problem, the *choice-function* approach, which is the most standard in the linguistics literature. This approach explains the scope of indefinite descriptions by means of choice functions which are functions from domains to individuals inside those domains (Reinhart, 1997; Kratzer, 1998; Winter, 1997). For instance, one might have a (partial) choice function that goes from any set of boys to the tallest boy in the set (if there is a unique such boy). Some linguists have suggested that choice functions (or certain variations on choice functions) are part of the semantic contribution of an indefinite description.

On the standard proposal indefinite descriptions are ambiguous between their usual treatment as existential quantifiers and a special choice function use. The choice function use can be detected in one instance when an existential quantifier shows the sort of wide scope not explicable by standard quantifier raising. In the choice function use the semantic contribution of an indefinite description is a choice function whose argument is the domain of things satisfying the predicate inside the description. Consider for instance (25) repeated here as (40):

 (40)   Everyone at the party had a hat that was made by a man in Turkey.

As we observed above the most natural reading of (40) has the indefinite description "a

man in Turkey" getting scope above the quantifier phrase "everyone". To get this reading without actually scoping the indefinite description out of the relative clause (a syntactic island) we can instead suppose that the semantic contribution of the indefinite description is a choice function that takes as its argument the set of things satisfying the predicate "man in Turkey".

There are two major ways to think about this choice function. The first is to treat it as a functional *variable* that is existentially bound at some syntactic level. It is an assumption of this approach that which level the choice-function variable can be bound at is not constrained by movement restrictions on quantifiers. The wide-scope readings of indefinites out of a scope island are then just examples where the choice function is existentially bound at a level outside of the scope island. So, for instance, we understand a sentence like (40) as having a logical form like (41):

(41) $[\exists F : \text{choice function } F]$ $[\forall y : \text{person at party } y]$ y had a hat made by $F(\text{man in Turkey})$.

We can see that (41) get us the wide-scope reading; it is actually equivalent to the logical form we would get if we simply scoped the indefinite descriptions "a man in Turkey", with its usual quantificational interpretation, out of the scope island. On the other approach, starting with Kratzer (1998), we treat the choice function as not existentially bound but rather as being pragmatically determined. So the logical form of (41) is now (42), where F is a choice function which is chosen pragmatically (i.e. in a manner akin to indexical resolution).

(42) $[\forall y : \text{person at party } y]$ y had a hat made by $F(\text{man in Turkey})$.

This approach also gets us the wide-scope reading: for if one value of F is pragmatically

fixed then (42) can only be used to pick out one particular man in Turkey. This version of the choice-function approach, like the domain restriction approach, has trouble accounting for readings where an indefinite appears to have narrow scope under some form of negation such as in (37) above, where a wide-scope indefinite nonetheless seems to have scope under negation.[13] For various reasons both versions of the basic choice-function approaches will be improved if we allow F to range not just over choice functions but over *skolemized* choice functions which can take other variables in addition to domains (but still return members of the domain).[14]

Treating indefinite descriptions as ambiguous between normal existential quantifiers and choice functions correctly predicts the exceptional scope of indefinite descriptions for the basic range of casse. In terms of empirical adequacy, the choice function approach, in both its major versions, is as good as the domain restriction approach which I focused on above. Nonetheless, I think the domain restriction approach should be *ceteris paribus* preferred, which is why I have focused on it more in this paper. There is little direct evidence that choice functions are involved in the interpretation of standard uses of descriptions and other natural language quantifiers. (But see Winter (2004) for evidence that choice functions may be involved in special uses of definite descriptions as well as in certain kinds of questions.) Domain restriction, on the other hand, is a pervasive phenomenon in the processing of quantifiers. It would be better if we could explain the behavior of indefinite descriptions without positing any special mechanisms that do not appear in garden-variety uses of quantifiers.

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[13]For discussion see Chierchia (2001), Breheny (2003, 2006), Kratzer (2003) and Schlenker (2006).

[14]See Kratzer (1998) and Schlenker (2006) for arguments showing the need for skolemized choice functions.

4 Branching Readings

Here I want to review an interesting piece of further evidence that something else is happening with indefinite descriptions besides their merely getting wider scope than other quantifiers. Of course, given the parallels between syntactic movement and quantifier scope with other quantifiers it may seem obvious that indefinite descriptions do not really get wide scope when they have readings that appear to show wide scope. Nonetheless, the philosophically-minded reader may not be over-impressed by such a syntactic argument against the thesis that indefinite descriptions scope outside of conditionals, coordinated conjuncts and so on. However, it turns out that positing scope ambiguities alone does not really give us a way to represent all the readings that sentences with indefinites exhibit.

The sentences that scope ambiguities cannot capture at all are Jaakko Hintikka's examples of *branching readings* of indefinites (Hintikka, 1974). Consider a natural reading of this sentence (adopted from Schlenker, 2006):

(43) A representative from each school wrote on behalf of a dissident in each prison.

One normal reading would be simply this:

(44) $[\forall s$: school $s]$ $[\exists r$: representative-from-s $r]$ $[\forall p$: prison $p]$ $[\exists d$: dissident-in-p $d]$
       wrote-on-behalf-of(r, d).

This reading however does not guarantee that each of the representatives wrote on behalf of the same dissident in each prison. Yet many have noted a reading for (43) which requires that the representatives from each school write on behalf of the same dissident at each prison. You might think that this reading could be captured by (45):

(45) $[\forall p$: prison $p]$ $[\exists d$: dissident-in-p $d]$ $[\forall s$: school $s]$ $[\exists r$: representative-from-s $r]$

wrote-on-behalf-of(r, d).

But (45) does not require that the same child from each school write on behalf of each dissident, which is another aspect of a standard reading of (43). This standard reading has it that there is one set of students (one from each school) and one set of dissidents (one from each prison) and every member of the first set wrote on behalf of every member of the second set. Unfortunately, there is no way of capturing this reading simply by varying the scopes of the four quantifiers in any way.[15] We will call this reading the *branching* reading.

Some question the existence of the branching reading by pointing out that it entails the weaker readings which can be obtained by normal quantifier scope ambiguities such as (44) and (45). So, it is argued, the branching reading is just a sort of pragmatic enrichment of one of these weaker sentences and not a real, semantically available meaning—it is just one way for the weaker sentence to be true. Nonetheless, if we embed this type of example in the antecedent of a conditional, the branching reading is still attested, even though it no longer entails the non-branching reading:

(46) If a representative from each school writes on behalf of a dissident from each prison then our campaign will succeed.

There is clearly a true reading of (46) in a situation in which the campaign will only succeed if the representative from each school writes on behalf of the *same* dissident from each prison and the *same* representative from each school writes on behalf of each dissident. Schlenker, using examples like this, showed that one must account semantically for the existence of branching readings, rather than just see them as pragmatic strengthenings of the usual

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[15]For further discussion see Eklund and Kolak (2002) and Schlenker (2006).

readings obtainable by varying quantifier scopes.[16]

Branching quantifiers indicate that one cannot simply treat the behavior of indefinites as a matter of varying scope. Rather one must have some richer mechanism for capturing some of the quantificational dependence indefinites show. Although they were not designed for this purpose Schwarzchild's singleton domain restrictions can capture the branching readings of indefinites assuming the description "a dissident" is a singleton indefinite dependent on the choice of prison:

(47) $[\forall s: s$ is a school] $[\exists r: r$ is a representative from $s]$ $[\forall p: p$ is a prison] $[\exists d: d$ is a dissident in p s.t. $F(p)]$, write-on-behalf-of (r, d).

In (47) we assume that F is a function from prisons to properties that obtain of just one dissident. In this case for (47) to be true, the same one representative from each school needs to write on behalf of a dissident from each hospital and each of the representatives

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[16]Indeed Schlenker's technique is quite useful for showing that the observed scopal ambiguities of sentences with indefinites are in general not just a matter of hearers giving stronger "spins" on sentences which semantically speaking have weaker meanings. For instance Pietroski and Hornstein (2002) argued that some sentences with just universal and existential quantifiers may not exhibit scope ambiguities since the wide-scope reading of the existential quantifier entails the narrow scope reading. However, if we embed such a sentence under negation or in a conditional antecedent these entailment relations no longer hold:

(1) Every girl kissed a boy.

(2) If every girl kissed a boy, then one boy has been kissed a lot.

(3) I doubt every boy kissed a girl.

In the second and third example none of the wide-scope existential readings entail the narrow-scope readings, but they are still observed. This would lead one to believe that the wide-scope reading can also be found in the plain unembedded sentence, and is not just a strong spin on the one literal reading.

needs to write on behalf of the same dissident at each prison.[17]

We have seen that singelton domain restrictions can explain the apparent wide-scope readings of indefinite descriptions without positing movement outside of syntactic islands as well as capturing the branching readings of indefinites. So not only is something like domain restriction needed independently for other quantifiers, it is even needed to explain the behavior of indefinite descriptions in branching constructions. There seems then little reason to suppose that indefinite descriptions actually have greater scopal possibilities than other quantifiers. The Russellian treatment of indefinites as existential quantifiers has not been rejected here, but we have seen that some of the work required of indefinites probably does not depend on proper scope ambiguities but rather on complex interactions between quantifiers and domains of quantification.

5 Definite Descriptions

The neo-Russellian account does not view definite descriptions as simple existential quantifiers. Rather it views them as quantifiers of a rather special sort: they guarantee both the existence and the uniqueness of their satisfier. So for the Neo-Russellian (as for Russell) the sentence "The king of France is bald," is logically equivalent to the sentence "There is just one king of France, and whoever is king of France is bald." As Neale (1990) shows "the" (as well as "a") can be elegantly treated as a restricted quantifier, akin to other natural language quantifiers. This proposal is, even more than Russell's treatment of indefinite descriptions, extremely controversial within contemporary linguistic semantics. However, I

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[17]The observation that domain-restrictions can capture branching readings follows almost immediately from Schlenker's observation that choice functions can.

will not directly discuss the pros and cons of the neo-Russellian treatment of descriptions or even outline the nature of its competition. Rather I want again to focus on the facts about the scope of descriptions.

The scope of *definite* descriptions is a tricky topic since in general definite descriptions do not exhibit scope ambiguities. Recall that the Russellian treatment of definite descriptions makes "The F is G" true if and only if there is exactly one F and it is G. Given this meaning it does not matter what order the definite quantifier has with respect to other existential or universal quantifiers. One exception is when there is a domain restriction on the definite description that is itself affected by one of those quantifiers. For instance on one natural reading of (48), below, the person picked out by the definite description, "the best student" depends on the professor.

(48)   Every professor gave the best student an A+.

But in general, without such extra implicit material added to the descriptive content, the scope of a definite description itself with respect to other objectual quantifiers has no effect on the meaning of a sentence. This is because a simple sentence with a definite description "the F" as either the subject or the object is false if there is not exactly one F in the contextually relevant domain. If it is not false, then, there is just one F in the relevant domain, which makes the definite description behave like an indefinite description with a domain restricted to one item, which, as we saw above, makes scope irrelevant.

Can we check if definite descriptions can get scope outside of scope islands, like indefinites? There is some indication that they can, based on, again, conditionals. Under most understandings of counterfactual conditionals the following two sentences are not equivalent:

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(49)   There is a unique king of France, and if he were a poet then he'd be happy.

(50)   If there were a unique king of France and he were a poet, then he'd be happy.

According to the neo-Russellian view of descriptions these (49) and (50) correspond to the wide-and narrow scope reading of this sentence with a definite description:

(51)   If the king of France were a poet, he'd be happy.

If there is any reading that most naturally seems to go with (51), it is (49). This is because (51) is most naturally read as saying that there is a (unique) king of France and if he were a poet he'd be happy. The critical point is that it is not necessary that in the counterfactual possibility in which the man who is actually king of France is a poet that he also be king of France. So, (51), on this reading, could be true because the king of France would have been happy if he were a poet *instead* of being king of France. But to get this reading the existence and uniqueness conditions of the definite description need to be read as obtaining outside of the scope of the conditional, as in (49), but not (50). As we saw before, however, conditionals are scope islands and so it is not an attractive option to derive this natural reading of (51) by supposing that the definite descriptions actually gets scope outside of the conditional.

Can we handle wide-scope definites in the same way in which we handled wide-scope indefinites? The answer is basically, "yes", though the details go beyond the scope of this brief review since it would require giving an explicit semantics for conditionals. But for (51) for instance, the basic idea is clear. As long as we allow the definite description "the king of France" to apply to a domain whose objects have the same properties that they have in reality, then the description will pick out the actual king of France even when it is

embedded in a conditional.[18]

6 Conclusion

The purpose of this discussion has been to give the reader a taste of the sorts of work going on right now at the intersection of philosophy of language and linguistics. It should be clear that there is still much interesting work to be done in working out the underlying structure of natural language quantification. Logical scope is a powerful tool, but as we have seen, its effects may be mimicked by other devices.

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[18]For more on the scope of descriptions in conditionals, modals and propositional attitude verbs see Neale (1990, ch. 4), Heim (1991, 1992), Elbourne (2005, ch. 3) and Rothschild (2007).

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