Possible Worlds and Wide-Scope Indefinites: A Reply to Bäuerle (1983)

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Bäuerle (1983) argues against the Scope Theory of Intensionality (STI), proposing instead a system that divorces the relative scope of quantifiers from their intensional status (*de re* or *de dicto*). One convincing argument Bäuerle presents involves sentences like the following (translated loosely from German), which create a paradox for the STI:

(1)   George thinks every Red Sox player is staying in some five-star hotel downtown.

Imagine that George believes a group of men to all be staying at the same five-star hotel – perhaps he overhears the men comparing notes on their luxurious accommodations. This group of men happens to be the Boston Red Sox, but George does not know this. Furthermore, George does not know which hotel they are staying at; he is only of the opinion that they are all staying together in a five-star establishment. In fact, there may not even be any five-star hotels downtown; the sentence can be true even if the players' hotel actually has only four stars.

In this context, the quantificational force of the existential quantifier *some five-star hotel* outscopes that of the universal quantifier *every Red Sox player*, since there is only one hotel in which all of the players are staying. Therefore, under standard assumptions about quantifiers, the existential quantifier should outscope the universal quantifier. However, the universal quantifier is *de re* and the existential quantifier is *de dicto*. Therefore, under the STI, the universal quantifier should scope above the intensional verb *think* and the existential quantifier should scope below *think*. The

universal quantifier should therefore outscope the existential quantifier. So the predictions of the STI contradict the standard theory of quantifiers.

Authors since Bäuerle (1983) (Cresswell (1985), von Fintel and Heim (2008), Schlenker (2003), and von Stechow (1984), among others) have cited this type of example as evidence that the STI is incorrect. However, this paper will propose an alternative explanation for the data in (1) involving the exceptional scopal properties of indefinites. Under this analysis, the example in (1) no longer poses a paradox for the STI. My analysis also correctly predicts the Bäuerle readings to disappear when there are no indefinites in such sentences.

1 Wide-Scope Indefinites

Researchers since Fodor and Sag (1982) have noted that indefinites can scope out of positions that are islands for other operators. For instance, take the following sentences:

(2)   Each professor overheard the rumor that a student of mine was called before the
        dean. (= Fodor and Sag's 69)

(3)   If two uncles of mine die, I will be rich. (after Ruys 1992)

An NP complement is an island for movement (Ross 1967), and thus most quantifiers cannot scope out of this position. For instance, consider the following variation on (2):

(4)   At least one professor overheard the rumor that every student of mine was called
        before the dean.

Example (4) only has the reading where *at least one professor* outscopes *every student of mine*; it cannot mean that for each of my students, at least one (possibly different) professor overheard the rumor that he or she was called before the dean. This is presumably since the complement to the noun *rumor* is an island, and the quantifier *every student of mine* cannot escape this island to take scope over *at least one professor*. The situation is quite different for (2), however. Example (2) does indeed have a reading where the embedded DP, *a student of mine* in this case, takes scope over the subject DP, *each professor*. It can mean that there is a single rumor about a single student, and each professor has heard this very rumor.

    If-clauses are also islands for movement and also restrict the scopal possibilities for quantifiers within them. Consider, for instance, the following example:

(5)   If each/every uncle of mine dies, I will be rich.

Example (5) only has a reading where my uncles must all die before I can get an inheritance. If the quantifier *every uncle of mine* could scope above the *if*-clause, the sentence would have a reading where if any of my uncles dies, I will be rich. However, this reading is unavailable. Once again, though, the reading is available for the corresponding sentence with an indefinite in (3). This sentence can mean that there are two particular uncles of mine who, if they both die, will leave me a fortune. This sentence can be true even if there are two other uncles of mine whose death will not provide such a windfall.

1.1 Analysis

Several explanations of this phenomenon have been proposed. Although, in the end, I do not believe that the choice between these explanations will affect my argument, for the purposes of this paper I will adopt the existentially closed choice function analysis (Reinhart, 1992; 1997; Winter, 1997)[1]. Under this analysis, indefinite determiners such as those in sentences (2) and (3) denote choice functions, which are bound by a freely-occurring existential closure operator. When this operator scopes at the top of the sentence, such indefinites appear to outscope any other element in the sentence. For instance, the meanings for (2) and (3) in this system would be as follows:

(6) $\exists f$ such that each professor overheard the rumor that f(student of mine) was called before the dean.

(7) $\exists f$ such that if f(two uncles of mine) die, I will be rich.

Given the same set, a choice function will always return the same individual. Therefore, in the reading represented in (6), it is the same student about whom each professor heard a rumor. Similarly, the choice function in (7) always returns the same two uncles. Thus, even though the NP complement and the *if*-clause are islands for movement, the indefinites can seem to take wider scope.

In certain cases, indefinites can seem to take scope above an island, but below another quantifier in the sentence. For instance, consider the following:

(8)   Each professor rewarded every student who read some book he had recommended. (after Abusch's (1993) 10)

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The sentence in (8) can have a meaning where each professor chose a different book he had recommended and rewarded students who read that book. This reading, where the apparent scope of the indefinite is above the DP *every student who…* but below the subject DP *each professor*, can be achieved under this analysis as well, by scoping the existential operator between the two other quantifiers:

(9)   [[each professor]$_x$ [$\exists f$

        [x rewarded every student who read f(book he had recommended)]]].

1.2   Intensional Contexts

Consider the following sentence:

(10)   Mary thinks that if two uncles of hers die, she will be rich.

        a.   [$\exists f$ [Mary thinks that [if f(two uncles of hers) die, she will be rich]]]

        b.   [Mary thinks that [$\exists f$ [if f(two uncles of hers) die, she will be rich]]].

Now, imagine a scenario where Mary believes she has four uncles, say Alan, Bob, Charlie, and Doug. She believes that Alan and Bob are rich, and if they die, she will inherit a fortune. Finally, imagine that Mary has been horribly misled, and she actually has no uncles whatsoever. These men she thinks are her uncles are not even relatives by adoption. This scenario verifies the meaning of the structure in (10a). A choice function analysis is needed for this sentence, because the quantificational force of the indefinite scopes out of an *if*-clause island. In this structure, the existential closure of the choice function outscopes the verb *think*. The bound choice function is applied to the indefinite

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two uncles of hers, which is evaluated in the intensional context created by the verb

think.[2] (Since Mary has no real uncles, the indefinite must be evaluated in her thought

worlds.) The set of Mary's uncles is the same in all her thought worlds: Alan, Bob,

Charlie, and Doug. Therefore, the choice function will return the same two uncles for

each thought world (Alan and Bob, if the sentence is to be true).

Next, imagine instead that Mary believes that two of her supposed uncles are

poor, but that two are rich; and if the two rich ones die, she will inherit a fortune.

However, this time she does not know which are poor and which are rich. Even under

this scenario, (10) can be true, given the structure in (10b). Once again, the indefinite is

evaluated in the intensional context and the existential operator outscopes the *if*-clause.

However, this time, the existential operator scopes below the verb *think*, allowing a

different choice function, and hence a different pair of uncles, to apply in each thought

world. This is analogous to the use of the structure in (9) for the sentence in (8).

2   Bäuerle Revisited

We now have all the machinery needed to explain Bäuerle's example without posing a

paradox for the STI. Consider a structure such as the following for the sentence in (1):

(11)   [∃*f* [[every Red Sox player]$_x$ [George thinks that

    [*x* is staying at *f*(five-star hotel downtown)]]]]

For (11) to be true, George need not have a particular five-star hotel downtown in mind.

In fact, such a hotel may not even exist. For every one of George's thought worlds *w*,

though, the choice function f will pick out a single hotel from the set of hotels that have five stars in w. Therefore, even though the universal quantifier *every Red Sox player* outscopes the indefinite, due to the exceptional wide-scope properties arising from the choice-function analysis, the indefinite can appear to outscope the universal quantifier. Furthermore, the indefinite can do so without actually moving to a position higher in the structure than the universal quantifier. Therefore, under this independently motivated structure for the indefinite, the sentence is no longer an argument against the STI.[3]

Bäuerle also discusses instances of his paradox for temporal rather than possible-world operators. Keshet (2008) presents the following such example:

(12)   In 2001, a 14-year-old boy interviewed every most-wanted fugitive in America.

The sentence in (12) can describe the following scenario: in 2001, a boy who was fourteen years old at the time interviewed ten prisoners at a maximum-security penitentiary for his school newspaper. Recently, all ten broke out of prison and are now America's ten most-wanted fugitives. The current analysis works for these examples, too, assuming the following structure:

(13)   [$\exists f$ [[every most-wanted fugitive]$_x$ [PAST f(14-year-old boy) interviewed x]]]

In (13), the universal *every most-wanted fugitive* scopes outside of the past tense operator and the indefinite *a 14-year-old boy* scopes within, but the indefinite is bound by an existential operator at the top of the sentence.[4] Once again, this simulates widest scope

for the indefinite even while its descriptive content remains within the relevant intensional context.

2.1 Predictions

Only a small number of DPs have wide-scope properties. As seen in (4) and (5) above, DPs headed by *each*, *every*, and *at least one* do not share the wide-scope properties of those headed by *a*, *some*, or a number. Hence, if my new analysis of the Bäuerle sentence is correct, then sentences similar to Bäuerle's where the indefinites have been replaced by items without exceptional scope properties should lose the readings that Bäuerle describes. Preliminarily, this seems true. Consider the following variation on sentence (1) that contains no simple indefinites:

(14)   George thinks every Red Sox player ate at at least one five-star restaurant downtown.

Imagine a scenario where George hears a group of men comparing different luxurious restaurants. Once again, this group is the Red Sox, unbeknownst to George. Also, once again, there are possibly no such restaurants downtown – George could be mistaken. Sentence (14) is much less clearly acceptable than (1) in the relevant scenario. However, it is hard to keep the scenario in mind long enough to make a very clear judgment: you must remember that the men are really the Red Sox, but George does not know this, and also that they went to some eating establishments that are not five-star restaurants, although George thinks they are.

Therefore, I will present a pair of sentences where the judgments are much clearer. The first sentence has an indefinite and exhibits the readings which Bäuerle discusses. The second has no indefinites and clearly lacks such readings. Consider the following:

(15)   John told me some relative of his in the area gave him at least two shirts he bought for himself.

Imagine that your friend John has some crazy Hawaiian shirts in his closet that he is embarrassed about having bought. He therefore lies about them, saying that one particular relative of his in the area bought him some of the shirts. As you later find out, though, he does not even have any relatives in the area. In this scenario, sentence (15) is a real Bäuerle sentence. The DP *some relative of his in the area* outscopes the DP *at least two shirts he bought for himself*, since there is only one putative relative who alone bought at least two of the objectionable shirts. However, the DP *some relative of his in the area* must be *de dicto*, since there is no such relative; and the DP *at least two shirts he bought for himself* must be *de re*, since John certainly did not divulge the fact that he bought the shirts himself. The judgment is very clear here that this DP is *de re* since John cannot have bought for himself the same shirt that a relative gave him.

Now, consider a small change to the scenario that will allow us to write a minimal pair to sentence (15). Imagine that John instead claims (falsely again) that he has several relatives in the area and each of these relatives gave him a few of the shirts in question. We might try to use the following sentence to describe this amended scenario:

(16)   John told me each relative of his in the area gave him at least two shirts he bought

         for himself.

Unlike (15), though, sentence (16) is very hard to make sense of in the given scenario.

The only way it could make sense would be if the DP *each relative of his in the area* was

de re: John is not making up the relatives; he is only lying about the fact that they gave

him the shirts. Perhaps he went relative-by-relative: "Aunt Edna gave me these two

shirts," "Uncle Charlie gave me these three," etc. Then, I later found out that he had

bought each shirt he told me about. However, this sentence without an indefinite is

lacking the reading that might have disproved the STI, where the two DPs' relative

quantificational scope conflicts with their relative intensional status.

2.2   Remaining Issues

In this last section, I will examine the following sentence, which Bäuerle also discusses:

(17)   George thinks that unicorns exist and that none of these unicorns has read every

         book by Chomsky.

Bäuerle claims that (17) has a reading where the negative quantifier *none of these*

unicorns is *de dicto* and the universal quantifier *every book by Chomsky* is *de re*, but the

quantificational force of the negative quantifier still outscopes that of the universal

quantifier – another counterexample to the STI. Once again, though, judgments here are

very tricky: it is hard to keep in mind the fact that we are talking about actual books by

Chomsky, as differentiated from books George *thinks* are by Chomsky. Also, it seems

possible that the definite *these unicorns* could mean, or at least refer to, something like

these unicorns that George thinks exist.[5] If so, the phrase could be *de re* without any contradiction for the scope theory in a structure like the following for the second clause:

(18)   [[none of these unicorns <that George thinks exist>]$_x$ [[every book by Chomsky]$_y$ [George thinks that *x* has read *y*]]]

Therefore, I propose the following example, which sharpens the judgments and contains no definites inside the quantifiers in question:

(19)   The Nazis believed that no Allied scientist working in Wyoming knew every technique that Oppenheimer knew.

Imagine that during World War II, the Nazis mistakenly believed that Oppenheimer's secret nuclear lab was in Wyoming instead of New Mexico. At the time, suppose that the Nazis also believed they were ahead of the Allies in that they knew more bomb-making techniques. However, Oppenheimer and his laboratory (in New Mexico) actually knew all the techniques that the Nazis did. Even in this scenario, sentence (19) sounds like a contradiction, since the Nazis believe that Oppenheimer is an Allied scientist in Wyoming on the one hand, and yet they believe that no such scientist knows everything that Oppenheimer knows on the other. Contra to Bäuerle's claims, therefore, there is no reading where the quantificational force of the *de dicto* negative quantifier *no Allied scientist…* outscopes that of the *de re* universal quantifier *every technique…*

Interestingly, the following very similar sentences sound fine in this scenario:

(20)   The Nazis believed that no Allied scientist working in Wyoming knew …

a.   …the techniques that Oppenheimer knew.

b.   …all (of) the techniques that Oppenheimer knew.

In (20a), since the DP *the techniques that Oppenheimer knew* is a definite, it no longer

has any scopal interaction with the quantifier *no Allied scientist…* It seems as though the

phrase *all the techniques…* in (20b) patterns with the definite in (20a) rather than the

quantifier in (19). One explanation for this last fact would be if there is a hidden partitive

in (20b), as suggested by the possibility (in English) of adding the word *of*. If there were

such a partitive, perhaps the DP *the techniques…* could move (in a STI analysis) to

become *de re* independently of the quantifier *all of…* This may explain examples like

Bäuerle's (17). Because of this potential confusion, I have been very careful in the

discussion above to avoid any quantifiers which might have hidden partitive structures.

3   Conclusion

Bäuerle (1983) presents a perplexing scope paradox for the STI, pitting an indefinite

phrase's quantificational force against its intensional status. However, this paper has

shown how exceptional scope properties of indefinites can explain the paradox,

especially once the interaction between the scope of indefinites and intensionality is more

fully explored.

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[1] An anonymous reviewer points out that Schwarz (2001) discusses an overgeneration problem for choice function analyses of wide-scope indefinites. Schwarz shows such analyses predict that sentences like (i) should have readings like (ii), which in fact they lack.

(i)　　No linguist submitted a paper he had written.

(ii)　　No linguist submitted every paper he had written.

He argues that since a choice function analysis would require a stipulation to rule this reading out, such an analysis loses any advantage over one where indefinites take wide scope due to (exceptional) QR. Although I agree that this problem must be solved, I disagree with the conclusion that it invalidates the choice function approach. Without independent evidence, the stipulation made by the choice-function approach seems no worse than the stipulation made by the QR approach. Also, see Reinhart (1997) and Winter (1997) for arguments against the QR analysis.

[2] This is a change from Reinhart's (1997) system.

[3] An anonymous reviewer asks whether further embeddings act as expected. For instance, consider the following sentence:

(iii)   Every fan thinks that George believes that every Red Sox player is staying in some five-star hotel.

To the extent that I have intuitions about such a sentence, there do seem to be readings corresponding to different placements of an existential operator. For instance, I can understand (iii) to mean that a group of fans (and George) all believe in the same set of (non-existent) five-star hotels and yet each fan thinks that George believes the whole Red Sox team to be staying in a different such hotel. Alternatively, (iii) could mean that all the fans are thinking of the same such hotel, or that they know there are no five-star hotels, but believe George thinks there is one such that the Red Sox players are staying there.

[4] Note that this past tense operator cannot be a true existential operator or the sentence would have a meaning where each interview took place at a different time. If

there were separate interviews, the set of 14-year-old boys could be different at the time

of each interview and hence f(14-year-old boy) could also potentially be different,

invalidating the analysis. So, I assume a pronominal past-tense operator as discussed in

Partee (1973).

[5] In his paper, Bäuerle intermixes discussion of definite descriptions with

discussion of quantified DPs. I take these phrases to function quite differently from one

another (see Keshet 2008).