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HOW ANTISYMMETRIC IS SYNTAX?

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Since the emergence of Kayne's (1994) stimulating proposal for an antisymmetric theory of phrase structure and linear order, much work has been devoted to arguing for or against his theory as well as discussing its empirical predictions. As a result, for a number of phenomena involving rightward positioning, such as rightward adjuncts, heavy NP shift, extraposition, postverbal subjects, and postverbal constituents in OV languages, there now exist both an approach consistent with Kayne's theory (the antisymmetric approach) and another not consistent with it (the symmetric approach). In such a situation, it is often difficult to show on empirical grounds that one approach is superior to the other (see Rochemont and Culicover 1997). In what follows, I describe this situation with respect to two well-known phenomena in English: rightward positioning of adjuncts and heavy NP shift. For each of these phenomena, the symmetric and antisymmetric approaches have been proposed, and both approaches can correctly account for the data discussed in previous studies. Here, I examine the approaches from a novel point of view, showing that data involving the licensing of negative polarity items allow us to differentiate them and to decide which is the right one for each of the two empirical domains. Interestingly, the relevant facts lead to different conclusions for the two phenomena. The results have important implications for the antisymmetric view of syntax.

1 Adjuncts and Heavy NP Shift: Symmetric versus Antisymmetric Approaches

It appears that adjuncts can be high in the syntactic structure while appearing rightward on the surface (see Reinhart 1976, 1981, 1983 and Solan 1983 for much relevant discussion). The contrast in (1) shows that the adjunct α is located higher than the object but lower than the subject.

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- (1) a. *He_i was fired by the company [_α because John_i was lazy].
 b. The company fired him_i [_α because John_i was lazy].

(1a) is unacceptable on the coreference reading; this is predicted if α is located lower than the subject, so that the subject pronoun *he* c-commands the R-expression *John* in α , violating Condition C. The relative acceptability of (1b) then shows that α is located higher than the object.

Another argument of the same nature can be provided by considering the interpretation of “stacked” adjuncts discussed by Andrews (1983), Pesetsky (1989), and Ernst (1999). Consider the following examples from Andrews 1983:

- (2) a. ?John twice intentionally knocked on the door.
 b. ??John intentionally twice knocked on the door.
 c. John knocked on the door twice intentionally.
 d. John knocked on the door intentionally twice.

Discussing the interpretation of the two adjuncts *twice* and *intentionally*, Andrews points out that while in (2a–b) the preceding adjunct has the following adjunct in its scope of modification, the modification relation is reversed in (2c–d); that is, the following adjunct has wider scope. If the scope relations between adjuncts are a matter of structural asymmetry and hence are determined by c-command relations between them, these facts indicate that in (2a–b) the preceding adjunct c-commands the following one, whereas in (2c–d) the following adjunct c-commands the preceding one.¹

The traditional approach to cases like (1b) and (2c–d), going back to Reinhart 1976, has been to assign them structures in which the higher element is right-adjoined to a phrase containing the lower element. This kind of analysis can be called a *symmetric approach*, given that it claims that syntax allows a structurally higher element to appear on the surface to the right of a lower element as well as to its left.

As pointed out by Abe (2001) and Ernst (1999), facts like these pose an empirical challenge to an antisymmetry hypothesis of the kind advanced by Kayne (1994) (they are equally problematic for antisymmetric theories developed by Haider (1997, 2000), Takano

¹ Although Andrews (1983) reports that the examples in (2) are all unambiguous, Richard Kayne (personal communication) points out that in (2c–d) the preceding adjunct can have wider scope if it is stressed. The effect of focal stress in these cases has also been noted by Phillips (1996), who observes that the unmarked wide scope of the second adjunct in (2c–d) is due to the effect of sentence-final focal stress and that if this factor is controlled for by adding a third adverbial that receives focal stress, as in (ia–b), each of the first two adjuncts can have scope over the other.

- (i) a. Sue kissed him willingly many times in front of the boss.
 b. Kremer plays concertos in foreign countries on weekends at the height of the season.

(1996), and Fukui and Takano (1998)). The essential core of the antisymmetry hypothesis states that what is structurally higher necessarily precedes what is lower. Under this hypothesis, α in (1b) should precede the object. Similarly, *intentionally* in (2c) and *twice* in (2d), having wider scope, should precede *twice* and *intentionally*, respectively.

Recently, a number of proposals have been made to rescue the antisymmetry hypothesis. Following ideas of Costa (1997) and Cinque (1999), one might imagine the derivations shown in (3) and (4) for (1b) and (2c), respectively.

- (3) a. the company α [β fired him]
 b. the company [β fired him] α t_β
- (4) a. John intentionally [γ knocked on the door twice]
 b. John [γ knocked on the door twice] intentionally t_γ

In (3), the adjunct α is originally generated higher than β (a category containing VP), and the latter moves to a position higher than α . In this derivation, the pronoun does not c-command α ; hence, the possibility of coreference in (1b) follows. In (4), *intentionally* asymmetrically c-commands *twice* before movement of γ . Thus, on this analysis the correct scope relation between the two adjuncts will be obtained under reconstruction. Given that this type of analysis conforms to the antisymmetry hypothesis, we might call it an *antisymmetric approach*.

The situation so far is this: there exist both symmetric and antisymmetric approaches to rightward positioning of adjuncts, and both approaches can correctly account for their structural as well as linear properties.

Exactly the same situation obtains with the analysis of heavy NP shift. Heavy NP shift has traditionally received a symmetric analysis in which the shifted NP undergoes movement that is upward and rightward (see Ross 1967, 1986 for original discussion). On this view, the example in (5a) receives the analysis in (5b), where the shifted NP is assumed to c-command its trace.

- (5) a. John gave to Mary [α a book that she had wanted to read for a long time].
 b. John gave t_i to Mary α_i

Among recent advocates of this general approach are Saito (1994), Pesetsky (1995), Saito and Fukui (1998), Ernst (1999), and Abe (2001). On the other hand, alternative analyses that do not appeal to rightward movement have also been proposed by Larson (1988), Kayne (1994, 1998), Takano (1996, 1998), and Rochemont and Culicover (1997). Developing Larson's idea, Kayne (1998) proposes to account for heavy NP shift in terms of a combination of two leftward movement operations, namely, leftward movement of the heavy NP to Spec,F, F a functional head, and leftward movement of a remnant category containing a trace of the heavy NP to another specifier position higher than the landing site of the heavy NP's movement. Rochemont and Culicover (1997) also entertain the same analysis. On this analysis,

(5a) is derived as shown in (6), where α is a heavy NP and β a verbal category.

- (6) a. John [β gave α to Mary]
 b. John α_i [β gave t_i to Mary]
 c. John [β gave t_i to Mary] α_i t_β

Since the two movement operations both result in leftward positioning of the moved elements, this analysis of heavy NP shift is consistent with the antisymmetry hypothesis.

As we have just seen, the symmetric and antisymmetric approaches to heavy NP shift can correctly capture the linear order of the heavy NP relative to the rest of the sentence. Both of them are also compatible with binding facts like these:

- (7) a. ?Mary wanted to meet until each other's trials [the men who had been accused of the crime]. (Saito 1994)
 b. ?She has been requesting that he_i return ever since last Tuesday [the book that John_i borrowed from her last year]. (Kayne 1998)

These facts show that the heavy NP originating in the object of the embedded clause can be high enough to c-command an adjunct of the matrix clause (7a) and to escape from c-command by the subject of the embedded clause (7b).²

These patterns of binding can be accounted for under the symmetric approach in the following way. Suppose that in (7a–b) the heavy NP moves out of a category containing *until each other's trials/ever since last Tuesday*. Then in (7a) the shifted NP c-commands the anaphor and hence the intended binding follows if the landing site of the shifted NP qualifies as an A-position. In (7b) the shifted NP is outside the c-command domain of the embedded subject, thus escaping a Condition C violation.

The facts in (7) can be captured by the antisymmetric approach, too. Recall that under this approach the heavy NP undergoes leftward

² A few remarks about (7a–b) are in order. First, one reviewer finds (7a) not to contrast in any noticeable way with (i), the same example minus heavy NP shift.

(i) ?She wanted to meet those two until each other's trials.

However, Saito (1994:267) observes that (7a) clearly improves on (ii), which he stars.

(ii) *Mary wanted to meet the men who had been accused of the crime until each other's trials.

Second, in apparent contrast to (7b), Pesetsky (1995) judges (iii) ungrammatical.

(iii) *We gave to him_i on Friday [John_i's brand-new toy].

Here, I focus on the improvement of (7b) over standard violations of Condition C, leaving factors distinguishing the two cases open for future research.

movement but the effect of this movement is masked by subsequent leftward movement of a remnant containing the trace of the shifted NP. This analysis accounts for the cases in (7) in essentially the same way as the symmetric approach. The grammaticality of (7a) is due to the fact that the shifted NP in Spec,F in the matrix clause c-commands the trace of the moved remnant [*wanted to meet t until each other's trials*], ensuring binding through reconstruction (again, the assumption here is that the position of the shifted NP qualifies as an A-position). (7b) is grammatical since the heavy NP moves out of the c-command domain of the embedded subject.

Thus, we have the following state of affairs. There are two approaches to rightward adjuncts and heavy NP shift: the symmetric approach and the antisymmetric approach. Both approaches can apparently account for structural as well as linear properties of the two phenomena. Thus, Rochemont and Culicover (1997) seem to be correct in concluding that the two approaches may be notational variants of one another and that there can be no empirical basis for choosing between them (although Rochemont and Culicover discuss heavy NP shift, they do not discuss rightward adjuncts; but their claim holds with equal force for the latter as well).

In the next section, however, I show that it is in fact possible to find empirical evidence for one over the other, if we look at phenomena other than scope interpretation and binding. Specifically, I argue that the licensing of negative polarity items (NPIs) in the contexts of rightward adjuncts and heavy NP shift provides empirical grounds to distinguish the two approaches. Interestingly, the two empirical domains lead to different conclusions about the right approach.

2 The Right Approach: Evidence from NPI Licensing

Let us consider the examples in (8), discussed by Branigan (1992).

- (8) a. John paints pictures at all well only rarely.
 b. Jay tells jokes with any gusto only occasionally.

In (8), the NPIs are licensed by elements that follow them.³ As Branigan observes, this fact shows that the adjuncts *only rarely* and *only occasionally*, even though they follow the NPIs they license, are located higher than the NPIs. Thus, the effect seen here is parallel to the effects seen in (1b) and (2c–d).

What is interesting about the cases in (8) is that they involve the licensing of NPIs. As Laka (1990), Phillips (1996), Johnson (1997),

³ One reviewer claims that the sentences in (8) are less grammatical than those in which the order of the two adverbs is reversed. Branigan (1992:45) reports the opposite pattern, noting that the sentences in which the licensing adjunct precedes the adjunct containing the NPI are less acceptable than those in (8) (though he also acknowledges that the contrasts are extremely delicate). In any case, what is crucial is that there is a significant contrast between the examples in (8) and cases like **Anyone saw nothing*.

and Kayne (1998) point out, NPIs generally cannot be licensed under reconstruction (whatever its ultimate analysis may be). That this generalization is correct is shown by the following facts:⁴

- (9) a. *[Buy any records]_i she didn't t_i. (Laka 1990)
 b. *[Whose theory about anything]_i does John not like t_i? (Phillips 1996)
 c. *It's [anyone's pictures]_i that no one likes t_i. (Johnson 1997)
 d. *[Anyone's picture]_i seemed to no one t_i to be outrageous. (Johnson 1997)
 e. *[Anything]_i has nobody done t_i. (Kayne 1998)

This property of NPIs ensures that the examples in (8) cannot involve derivations similar to (3) and (4). In other words, we cannot claim that the examples in (8) are derived by generating the licensing adjunct α higher than (and to the left of) an element β containing the NPI and moving β (leftward) to a position higher than α . If (8) involved such a derivation, the NPIs would have to be licensed under reconstruction, which is known to be impossible. Therefore, the examples in (8) constitute strong evidence for the symmetric approach: the following adjunct must be base-generated higher than, and to the right of, the preceding one.

As one reviewer points out, this claim raises a question about cases like (10a–b).

- (10) a. *John visited anyone few days this week. (Larson 1990)
 b. *I bought any books only occasionally.

The question is why the adjunct cannot license the NPI preceding it in (10a–b). Note that these examples differ from those in (8) in that whereas the NPI is contained in an adjunct in (8), it is contained in an object NP/DP in (10). The literature contains proposals in which the object NP/DP in English necessarily undergoes overt object shift for reasons of Case/agreement (see Johnson 1991, Koizumi 1995, Runner 1998, Takano 1998, and Bowers 2002 for various implementations of this general idea). If so, we might attribute the ungrammaticality of (10a–b) to the effect of object shift. Thus, although the adjunct is generated higher than the object, the object moves, ending up in a higher position than the adjunct.⁵

Given that NPI licensing serves to guard against reconstruction effects, let us consider heavy NP shift in this light. Observe the following contrasts:

⁴ See Uribe-Echevarria 1994 and Sauerland and Elbourne 2002 for exceptions to this generalization.

⁵ This analysis predicts that an NPI contained in a PP complement can be licensed by a following adjunct (on the assumption that PPs do not enter into Case checking/agreement). Example (i) of footnote 6 bears out this prediction.

- (11) a. John paints [none of these pictures] at all well.
 b. *John paints at all well [none of the pictures which he sends to this gallery].
- (12) a. Jay tells [none of his jokes] with any gusto.
 b. *Jay tells with any gusto [none of the standard jokes about a duck in a bar].
- (13) a. I showed [none of the pictures of John's mother] to anyone.
 b. *I showed to anyone [none of the pictures of John's mother].

These examples show that in the heavy NP shift constructions, the shifted NP cannot license an NPI to its left. Thus, there is an interesting asymmetry between rightward adjuncts and heavy NP shift. Note the striking contrasts between (8a) and (11b) and between (8b) and (12b).⁶ The asymmetry between rightward adjuncts and heavy NP shift indicates that the landing site of heavy NP shift cannot be assimilated to a position for rightward adjuncts.

In fact, it is very hard for the symmetric approach to heavy NP shift to account for the ungrammaticality of the (b) examples of (11)–(13) in a principled way. Recall that this approach claims that (as a result of upward and rightward movement) the heavy NP can be high enough to license anaphor binding in (7a) and to avoid violating Condition C in (7b). Moreover, leftward movement can feed NPI licensing, as illustrated in (14b) and (15b).

- (14) a. *There seem to any philosophers to have been [no good linguistic theories] formulated.
 b. [No good linguistic theories]_i seem to any philosophers to have been t_i formulated. (Lasnik 1995)
- (15) a. *Anyone read none of the books.
 b. [None of the books]_i did anyone read t_i .

So the symmetric approach predicts that the (b) examples of (11)–(13) should be grammatical. The fact that they are not is therefore unexpected and mysterious under this approach.

In contrast, this apparently paradoxical situation receives a simple account under the antisymmetric approach to heavy NP shift. Under this approach, the (b) examples of (11)–(13) all involve leftward movement of the heavy NP followed by leftward movement of a remnant to a higher position. This is shown in (16), where α is the heavy NP and β the remnant.

⁶ There is another striking contrast between (13b) and (i).

(i) John talks quietly to anyone only rarely/only on those rare occasions when he has a sore throat.

(13b) is substantially worse than (i). The status of (i), like that of (8a–b), falls in place under the symmetric approach to rightward adjuncts.

- (16) a. Subj [_β V α . . . NPI . . .]
 b. Subj α_i [_β V t_i . . . NPI . . .]
 c. Subj [_β V t_i . . . NPI . . .] α_i t_β

Note that in (16c) the NPI to the left of the heavy NP α is contained in the phrase β that has undergone remnant movement and therefore is not c-commanded by the heavy NP (only the trace of the remnant is c-commanded by the heavy NP). This means that the NPI must be licensed by the heavy NP through reconstruction. Thus, on this analysis the (b) examples of (11)–(13) are excluded for the same reason as the examples in (9).⁷ As we saw in the previous section, the antisymmetric approach can correctly account for the cases in (7) as well.

These considerations lead us to the following conclusions:

- (17) a. The symmetric approach is necessary to account for some cases of rightward positioning of adjuncts.
 b. The antisymmetric approach is the right approach to heavy NP shift.

Note the difference in the strength of the conclusions about the right approach. What we can conclude from the discussion of (8) is only that the symmetric approach must be adopted to capture those (and similar) cases. Given that other cases of rightward adjuncts are compatible with both approaches, as we saw in section 1, there is at present no strong empirical reason to reject the antisymmetric approach entirely. But we can at least conclude that the “strongly antisymmetric” view of syntax, which does not allow any structures in which a higher element follows a lower element, cannot be correct and needs to be weakened.

The conclusion in (17b) is stronger than that in (17a). This is because the symmetric approach predicts the (b) examples of (11)–(13) to be grammatical and hence their ungrammaticality clearly shows that the symmetric approach cannot be an option for the analysis of heavy NP shift. Therefore, for heavy NP shift only the antisymmetric approach is the right one.

⁷ Note that in (16c) the NPI is c-commanded by the trace/copy of α contained in β. One might wonder why this trace/copy of the heavy NP cannot license the NPI in β. Notice that example (i) illustrates the same property.

- (i) *[Likely t_i to win any race] though none of them_i seemed yesterday, they all had high hopes. (cf. ?[Likely to win the race] though none of them seemed at any point, they all had high hopes.)

What is going on in these cases is perhaps related to a scope property of A-movement noted by Kayne (1998) and Lasnik (1999) (thanks to Kyle Johnson for this suggestion). Negative phrases that have undergone raising necessarily take scope in their overt position (thus, *Nobody is bound to be there* can only have a wide scope reading for *nobody*). This fact indicates that traces/copies of negative phrases that have undergone A-movement behave as if they were not present. Putting aside technical implementation, we might extend this property to (16c), on the assumption that movement of the heavy NP to Spec,F shares properties with A-movement (as suggested by (7a)).

3 On the Antisymmetric View of Syntax

The results we have obtained for the antisymmetric view of syntax, which is based on the hypothesis that what is structurally higher necessarily precedes what is lower, are therefore mixed. The conclusion about heavy NP shift does provide new empirical support for this hypothesis. But at the same time the original hypothesis needs to be weakened: syntax does allow rightward merger for adjuncts.⁸

An important question arises: what determines possible and impossible cases of rightward merger? Notice here that, as Kayne (1994) points out, a specifier of a head appears overwhelmingly to the left of the head across languages and that this generalization is part of the empirical motivation for Kayne's antisymmetry theory. Assuming that heavy NP shift involves movement to a specifier, a natural move would then be to attribute the difference between heavy NP shift and rightward adjuncts to a difference between specifiers and adjoined elements. In Chomsky's (2000) terminology, this is a difference between Set-Merge (which forms complements and specifiers) and Pair-Merge (which forms adjunction structures). One possibility that comes to mind is thus the following:

- (18) Only structures formed by Set-Merge are subject to antisymmetry.

Heavy NP shift is carried out by Set-Merge. Therefore, it obeys antisymmetry and cannot involve rightward movement. Adjuncts enter syntactic derivations by means of Pair-Merge. Since Pair-Merge is exempt from antisymmetry, adjuncts can surface in either direction.

If these suggestions are correct, it will follow that syntax is "weakly antisymmetric," in the sense of (18). If so, it is tempting to ask a more fundamental question: why does (18) hold at all? Why does UG impose antisymmetry on Set-Merge but not on Pair-Merge, and not the other way around? Whether this is an irreducible property of UG or whether it can be derived from something deeper remains to be seen.

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⁸ *Rightward merger* should be taken as a cover term with no theoretical commitment. The discussion here is neutral about whether linear order is determined in the narrow syntax or in the phonological component.

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