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1. *The Case for Reconstruction*

In this squib we will explore the ambiguity of examples like (1).

(1) Someone tried [*e* to read every book].

$\exists > \forall; \forall > \exists$

There are in principle two ways in which one could account for the reading in which the universal takes scope over the existential. The first analysis would involve quantifier raising of the universal out of the infinitival clause, as in (2a). The second analysis assumes quantifier raising to be strictly clause-bound, relying on quantifier lowering, or reconstruction, to place the existential within the scope of the universal. The relevant steps of the derivation after (1) are given in (2b).

(2) a. [Every book]₁ [someone tried [*e* to read t₁]].

b. (i) [__ tried [someone to read every book]].

(ii) [__ tried [[every book]₁ [someone to read t₁]]].

The analysis in (2a) is most readily compatible with the literature on control, which claims that the empty category in the subject position of control complements does not permit reconstruction. For relevant discussion, see May 1985, Hornstein 1998, Brody 1999, 2001, Boeckx 2001.

The two analyses can be distinguished empirically as follows. The theory in (2b) is ‘selective’, in that only the category that controls the empty subject can scope under elements in the infinitival clause. The theory in (2a) is more permissive, in that it allows a quantifier in the embedded clause to take scope over any quantifier in the main clause. As we will now show, the data strongly favour a lowering analysis.

Consider (3) and (4). The first set of examples present cases of object control, while the second set presents cases of subject control. Crucially, the examples are only ambiguous if the quantifier in the matrix clause is the controller of the infinitival subject. Thus, the universal can scope over the object in (3) and the subject in (4), but not vice versa. This, of course, is as predicted by the lowering analysis, and unexpected on the analysis that assumes long-distance quantifier raising.

(3) a. Mary has persuaded someone [*e* to read every book on the reading list].

$\exists > \forall; \forall > \exists$

b. Someone has persuaded Mary [*e* to read every book on the reading list].

$\exists > \forall; * \forall > \exists$

(4) a. Someone promised Mary [*e* to read every book on the reading list].

$\exists > \forall; \forall > \exists$

b. Mary promised someone [*e* to read every book on the reading list].

$\exists > \forall; * \forall > \exists$

The lowering analysis also correctly predicts that a quantifier in a control complement will never be able to take scope over non-arguments in the matrix clause. For example, the adverbial in (5a,b) must take wide scope with regard to the universal quantifiers *every book* and *everyone*.

(5) a. John probably wants [*e* to buy every book we're thinking of throwing away].

probably $> \forall; * \forall > \text{probably}$

b. When in town, John rarely tries [*e* to visit everyone he knows].

rarely $> \forall; * \forall > \text{rarely}$

The analysis in (2b) makes further predictions concerning examples like (6a,b), which contain two quantifiers in the matrix clause and one in the control complement. In principle such examples could give rise to six possible

readings, but only three of these are actually attested. This is because an embedded universal can take scope over the controller (as a result of lowering), but not over other scope-taking elements in the matrix clause.

(6) a. Someone probably wants [*e* to buy every book we're thinking of throwing away].

$\exists > \text{probably} > \forall$; $*\exists > \forall > \text{probably}$; $\text{probably} > \exists > \forall$;

$\text{probably} > \forall > \exists$; $*\forall > \text{probably} > \exists$; $*\forall > \exists > \text{probably}$

b. When in town, a student rarely tries [*e* to visit everyone he knows].

$\exists > \text{rarely} > \forall$; $*\exists > \forall > \text{rarely}$; $\text{rarely} > \exists > \forall$;

$\text{rarely} > \forall > \exists$; $*\forall > \text{rarely} > \exists$; $*\forall > \exists > \text{rarely}$

If inverse scope in the examples like (1) really depends on quantifier lowering, unambiguous surface scope will be forced if the quantifier in the matrix clause binds an anaphor. This is because anaphors must be in the scope of their antecedents, which is incompatible with lowering the antecedent into the complement clause. (7) is indeed unambiguous.

(7) Someone promised himself [*e* to read every book on the reading list].

$\exists > \forall$; $*\forall > \exists$

A final prediction of the lowering analysis is that scope ambiguity requires a syntactic dependency between the controller and the null subject (on the assumption that this is a general property of reconstruction). Therefore, non-obligatory control, which is generally taken to be non-syntactic in nature (Williams 1980, Landau 2000), should differ from its obligatory counterpart in not allowing a narrow-scope reading of a quantified controller. As shown in (8), this prediction is borne out.

(8) It is easy (for a new lecturer) [*e* to confuse every student].

$\exists > \forall$; $*\forall > \exists$

None of the data in (3) through (8) are within reach of the alternative analysis based on quantifier raising out of the control complement.

2. Asymmetries between Raising and Control

If we accept the conclusion of the previous section, namely that (1) is ambiguous as a result of lowering, we are faced with a new choice. Either we say that obligatory control is A-movement (Hornstein 1999, 2001), in which case the lowering operation appealed to above is an instantiation of the general availability of quantifier lowering in A-chains. Alternatively, we extend the domain of the rule of quantifier lowering to dependencies other than movement.

Of course, the analysis of control is a matter of ongoing debate. We are persuaded, however, by the arguments presented in Brody 1999, 2001, Culicover & Jackendoff 2001 and Landau 2003 that control should not be analyzed as an instance of A-movement. If that conclusion is correct, we must revise the rule of quantifier lowering. The case for taking this tack can be strengthened when we consider under which circumstances reconstruction is allowed in raising and control structures. Following Hornstein (2000), the movement theory of control would seem to predict a complete identity of the conditions on reconstruction in the two types of structures. The fact of the matter, however, seems to be that quantifier lowering in control structures is much more limited than it is in raising structures. As stated in (9), quantifier lowering into the subject position of a control complement is blocked by any kind of intervening quantifier. In contrast, quantifier lowering in an A-chain is only blocked by negative operators and numeral quantifiers of the form *at most N*.

(9) a. In a configuration [Q₁ ... [Q₂ ... [PRO₁ ...]]], Q₁ cannot be lowered.

- b. In a configuration [Q1 ... [Q2 ... [t1 ...]]], where Q1 occupies an A-position, Q1 can be lowered, unless Q2 ∈ {negation, at most N}.

A first illustration of the effects of this condition is given in (10). There is a clear contrast between the first example, in which the universal can take scope over the existential in the matrix subject position, and the second, in which such a reading is unavailable. (For the sake of clarity, only pertinent readings are given in (10b)).

- (10) a. At least one student has promised Mary [*e* to read every book].

$1 > \forall; \forall > 1$

- b. At least one student has promised exactly three lecturers [*e* to read every book].

$1 > \text{exactly } 3 > \forall; \text{*exactly } 3 > \forall > 1$

In contrast, raising constructions freely allow quantifier lowering across at least intervening existential quantifiers. The ambiguity of (11a) must be attributed to lowering of the existential; an analysis based on long-distance quantifier raising fails to explain why anaphoric binding, as in (11b), has a disambiguating effect. Therefore, the fact that (11c) permits the underlined reading, while (10b) does not, militates against a complete unification of raising and control.

- (11) a. At least one student seemed to Mary [*t* to be reading every book in the library].

$\exists > \forall; \forall > \exists$

- b. At least one student seemed to himself [*t* to be reading every book in the library].

$\exists > \forall; \text{*}\forall > \exists$

- c. At least one student seemed to exactly three lecturers [*t* to be reading every book in the library].

$1 > \text{exactly } 3 > \forall; \text{exactly } 3 > \forall > 1$

Similar contrasts between raising and control can be observed in the following examples:

(12) a. At least one student has promised every lecturer [*e* to read every book].

at least 1 > \forall > \forall ; * \forall > \forall > at least 1

b. At least one student seemed to every lecturer [*t* to be reading every book].

at least 1 > \forall > \forall ; \forall > \forall > at least 1

(13) a. At least one student has promised at least three lecturers [*e* to read every book].

at least 1 > at least 3 > \forall ; *at least 3 > \forall > at least 1

b. At least one student seemed to at least three lecturers [*t* to be reading every book].

at least 1 > at least 3 > \forall ; at least 3 > \forall > at least 1

(14) a. At least one student has promised some lecturer [*e* to read every book].

at least 1 > \exists > \forall ; * \exists > \forall > at least 1

b. At least one student seemed to some lecturer [*t* to be reading every book].

at least 1 > \exists > \forall ; \exists > \forall > at least 1

For completeness' sake, we add the examples in (15) and (16), which demonstrate that negative operators and numerals introduced by *at most* block lowering in both raising and control environments.

(15) a. At least one student has promised no-one [*e* to read every book].

at least 1 > neg > \forall ; *neg > \forall > at least 1

b. At least one student seemed to no-one [*t* to be reading every book].

at least 1 > neg > \forall ; *neg > \forall > at least 1

(16) a. At least one student has promised at most three lecturers [*e* to read every book].

at least 1 > at most 3 > \forall ; *at most 3 > \forall > at least 1

b. At least one student seemed to at most three lecturers [*t* to be reading every book].

at least 1 > at most 3 > \forall ; *at most 3 > \forall > at least 1

As far as we can tell, there is no way to capture contrasts of the type discussed above on a theory that equates control with A-movement. In order for any theory to capture these contrasts, it must distinguish between a relation that is sensitive to any intervening quantifier and one that is selectively sensitive to negation and *at most N*. The point of the movement theory of control is that A-movement and control instantiate the same relation. The only difference between the two structures is whether the head of the chain is theta-marked or not. It is, of course, possible to argue that theta-marking freezes the scope of a moved category (see Hornstein 1998), but this would predict a total absence of reconstruction in control structures, rather than a sensitivity to a large class of interveners.

3. A typology of reconstruction

The data so far suggest that control and A-movement should be distinguished from the point of view of scope reconstruction. We also adopt the standard position that A'-movement has distinct reconstructive properties. We do not, however, think that the properties of three relations are completely independent. When we consider their reconstructive properties, control seems to be weaker than A-movement, and A-movement seems to be weaker than A'-movement. By this we mean that the following generalizations hold:

(17) a. Any category that is an intervener for reconstruction in A'-chains is an intervener for reconstruction in A-chains. Any category that is an

intervener for reconstruction in A-chains is an intervener for reconstruction in control environments.

- b. Any property that undergoes reconstruction in control environments undergoes reconstruction in A-chains. Any property that undergoes reconstruction in A-chains undergoes reconstruction in A'-chains.

We will illustrate these claims in turn below. Many observations we will rely on are not new, but to the best of our knowledge, the overall picture we sketch is.

We have already shown that the quantifiers that block reconstruction in A-chains are a subset of the categories that do so in control environments. The generalization in (17a) additionally states that any quantifier that is not an intervener for reconstruction in A-chains or control relationships will not block reconstruction in A'-chains. However, it allows for the possibility that (some) quantifiers that block reconstruction in A-chains or control environments do not hinder scope reconstruction in A'-chains.

This seems to be true. In fact, it can be argued that no quantifier blocks scope reconstruction in A'-chains. The example in (18a) demonstrates that universals, which do not block reconstruction in A-chains, also do not block it in A'-chains. The examples in (18b,c) show that intervention effects in A-chains do not extend to A'-chains. (N.B.: this claim does not mean that there are no intervention effects at all in A'-chains. As is well known, reconstruction of the restriction of a WH-expression is blocked by certain quantifiers; see@@@.)

(18) a. It's [with some child] that every nurse said that Mary should go to the cinema *t*.

$\exists > \forall; \forall > \exists$

- b. It's [with some child] that at most three nurses said that Mary should go to the cinema *t*.

$\exists > 3; 3 > \exists$

- c. It's [with some child] that no nurses said that Mary should go to the cinema *t*.

$\exists > \text{no}; \text{no} > \exists$

The second way in which the 'strength' of reconstruction varies across the three types of dependency under discussion concerns the quantifiers that can be reconstructed. In the case of control and A-movement, reconstruction is limited to indefinites. Negative quantifiers and *at most N* do not reconstruct (see (19) and (20)). (The test we are using relies on clause-bounded quantifier raising of universals, and therefore cannot be used to explore reconstruction of universals. We use a universal in the embedded clause, because indefinites can take unusually wide scope, while negative quantifiers resist quantifier raising.)

- (19) a. [Some child] promised Bill [*e* to read every book].

$\exists > \forall; \forall > \exists$

- b. [At most three children] promised Bill [*e* to read every book].

At most 3 $> \forall$; $*\forall > \text{at most } 3$

- c. [No children] promised Bill [*e* to read every book].

No $> \forall$; $*\forall > \text{no}$

- (20) a. [some child] seemed to Bill [*t* to be reading every book].

$\exists > \forall; \forall > \exists$

- b. [At most three children] seemed to Bill [*t* to be reading every book].

At most 3 $> \forall$; $*\forall > \text{at most } 3$

- c. [No children] seemed to Bill [*t* to be reading every book].

No $> \forall$; $*\forall > \text{no}$

In contrast, A'-movement allows reconstruction of the full range of quantifiers (in fact across any intervener):

- (21) a. It's [to some child] that Bill said that Mary should read every book *t*.

$\exists > \forall; \forall > \exists$

- b. It's [to at most three children] that Bill said that Mary should read every book *t*.

At most 3 $> \forall; \forall >$ at most 3

- c. It's [to no children] that Bill said that Mary should read every book *t*.

*No $> \forall; \forall >$ no

(We attribute the absence of a wide-scope reading for the negative quantifier in (21c) to a combination of obligatory reconstruction in A'-dependencies and lack of QR of negative quantifiers.)

These data are consistent with the generalization in (17b). Further support for this generalization can be found by looking at reconstruction of properties represented by sub-constituents of the antecedent. As is well known, a pronoun contained within a quantified noun phrase can be interpreted as a bound variable within the scope of a lower universal as a result of reconstruction in A'-chains, and similarly, a negative polarity item contained within such a noun phrase can be licensed under reconstruction:

- (22) a. Which of his friends does each of your brothers like *t* best?

- b. It's a doctor of any dubious standing that I don't want to see *t*.

In A-chains, reconstruction allows bound-variable readings of pronouns in some versions of English (including that of one of the authors). A-chains also allow reconstruction of embedded negative polarity items, as reported in Linebarger 1980, Sauerland and Elbourne 2002, and others:

- (23) a. %His best friend seemed to each boy [*t* to be wonderful].

- b. A doctor of any reputation does not seem [*t* to be available].

The prediction for control is that comparable structures will be ungrammatical, as control does not allow reconstruction across any operator, which is of

course required to test these two properties. Indeed, the following examples are unacceptable:

(24) a. *His friends promised every boy [*e* to meet him after school].

b. *A doctor of any reputation didn't threaten Mary [*e* to abandon her].

We can observe a similar pattern with condition C. There is general agreement reconstruction under A'-movement can give rise to condition C violations (see (25a), from Fox 1999: 167). Speakers also agree that reconstruction under control never does so: the example in (25c) is scopally ambiguous. Judgments are mixed when it comes to reconstruction under A-movement. Fox (1999:179) judges (25b) to be ungrammatical on the inverse scope reading, but other speakers (including one of the authors) accept them as fully grammatical. Either way, the implicational relation summarized in (17b) holds.

(25) a. *How many stories about Diana₁'s brother is she₁ likely to invent *t*?

b. Someone from David₁'s city seems to him₁ [*t* to be likely to win the lottery].

$\exists > \text{seem}; \% \text{seem} > \exists$

c. A friend of John₁'s promised him₁ [*e* to win every game].

$\exists > \forall; \forall > \exists$

The final asymmetry in the properties reconstructed involves idiom chunks. Idiomatic readings are lost under control, but as is well known, they are preserved by A- and A'-movement:

(26) a. Whose tongue does the cat have *t* now?

b. The shit seems [*t* to have hit the fan].

c. #The cat wanted [*e* to have John's tongue].

4. Conclusion and Implications

We can draw three conclusions from the preceding discussion. (i) Control shows scope reconstruction. (ii) The reconstructive behaviour of control is not

identical to the reconstructive behaviour of A-movement. (iii) There are systematic implicational relations in the reconstructive behaviour of control, A-movement and A'-movement. For some phenomena, control and A movement behave alike; for others, A- and A'-movement do.

The material presented in this squib has several implications. First, a joint characterization of PRO and NP-trace is not enough to capture the observed differences between control and A-movement. If both are treated like copies, then, at the very least, LF deletion operations in chains must additionally be made sensitive to theta-theory. Similarly, a uniform characterization of NP-trace and A'-trace is not sufficient. At the very least, LF deletion in chains must also be made sensitive to case-theory (or whatever distinguishes A- and A'-positions).

Second, reconstruction cannot be viewed as a unitary phenomenon, in that reconstruction for one property does not imply reconstruction of others. In control dependencies, we find reconstruction for scope, but only for scope. Meanwhile, reconstruction for idiomatic readings and NPI-licensing, but not for bound-variable anaphora or condition C, is found in A-movement chains (with some variation in native speaker intuitions). A'-chains also reconstruct for these properties. Similar points could be made about interveners and the classes of quantifiers that reconstruct for scope.

These are negative results, in that they stand in the way of current attempts at unification. On the other hand, the observed implicational relations strongly suggest that elegance and empirical adequacy need not be incompatible in the realm of reconstruction. In fact, Williams' (2003) Representation Theory is designed to capture the kind of generalizations discussed above. This theory distinguishes a potentially large ordered set of levels of representation, and treats reconstruction as preservation of information established at "earlier" levels. Thus, if a constituent acquires a property P at

level n , this cannot be undone at subsequent levels. In common parlance, any operation that applies at level $n+m$ will reconstruct for P . Such an architecture clearly approximates to the implicational relations characterised in (17): we might assume that control, A-, and A'- dependencies are established at separate levels, ordered as in (27). We would then predict that control dependencies would reconstruct for properties established at Pre-Control Structure, that A-chains would additionally reconstruct for properties established at Control Structure, and that A'-chains would reconstruct for properties established at any of the three earlier levels.



However, at least two arguments can be raised against a straightforward application of Representation Theory to the data presented here. First, it would predict control complements to be smaller than raising complements, as the control dependency is established at an earlier level. Second, there is no obvious way of dealing with intervention effects in representation theory. So, although representation theory comes close to capturing the generalizations in (17), they must remain an invitation for future research.

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