Asymmetries Between An Antecedent and Its Trace

Kwang-sup Kim
University of Maryland

1 Introduction

It is generally assumed that a moved element, that is, an antecedent and its trace have the same content and the only difference between an antecedent and its trace lies in their position. However, there is compelling evidence that an antecedent and its trace must have different semantic types and even different indices. In fact, the GB theory implicitly assumes that there is a semantic asymmetry between an antecedent and its NP-trace: Even if the antecedent is an R-expression, its NP-trace is treated as an anaphor in the GB theory. The asymmetry between the antecedent and its trace in semantic types is further supported by the compositionality. QR is motivated not only by a scope phenomenon but also by the type mismatch. It is generally assumed that a predicate requires a <e> type argument. When an argument is a quantified expression, of which semantic type is <e, <e, t>>, there is no way to compose a predicate and the quantifier. The type mismatch can be resolved by the assumption that a trace has a type required by a predicate, that is, <e> type. Thus, it might not be surprising that an antecedent and its trace have a different semantic type. What is surprising is that there are some phenomena which indicate that an antecedent and its trace have a different index. The movement-and-copy analysis of Antecedent Contained Deletion (ACD) constructions forces us to admit that the index of an antecedent must be different from that of its trace; Otherwise, we face so-called 'i-within-i' problem. This paper is concerned with how to resolve the semantic asymmetries between an antecedent and its trace. We propose that the asymmetries between them can be captured by the argument that a trace is completely erased at LF, as Hornstein (1996b) suggests, and the theta roles of a predicate play the role of a trace. In the appendix it is claimed that the constructions that motivate the necessity for QR are better accounted for by A-movement. Thus, this paper is mainly concerned with the asymmetries between an A-moved antecedent and its trace.

2 Asymmetries between An Antecedent and Its Trace

This section reviews some phenomena to suggest that there are asymmetries between an antecedent and its trace. The constructions considered are ACD constructions, constructions containing quantified expressions, and relative constructions. Let us first consider ACD constructions. One of convincing arguments for the existence of QR comes from ACD constructions. May (1985) provides two arguments for the claim that *every book Bill did* in (1a) undergoes QR to the IP-adjoined position, as illustrated by (1b). The first argument is based on the anti-c-command condition. VP-deletion is subject to the constraint that neither the missing verb nor its antecedent c-commands the other. May argues that ACD constructions must respect the anti-c-command constraint, since it is a case of VP-deletion, and the constraint can be satisfied by moving DP1 to the IP-adjoined position at LF.

(1) a. John $[_{VP2}$ read $[_{DP1}$ every book Bill did $[_{VP1}$ e]]]
b. $[_{IP}$ $[_{DP1}$ every book Bill did $[_{VP1}$ e]] $[_{IP}$ John $[_{VP2}$ read t]]]

The second argument is on the basis of Williams' (1977) proposal that the missing VP is copied from the antecedent VP for interpretation. Let us suppose that there is no QR, and copy VP2 in (1a) into the VP gap. Then, we run into the so-called regress problem; the copied VP again contains a VP gap, as we see in (2).

(2) John $[_{VP2}$ read $[_{DP1}$ every book Bill did $[_{VP1}$ read $[_{DP1}$ every book Bill did $[_{VP1}$]]]]]

If we raise DP1 at LF, as in (1b), however, we can remove the VP gap out of its antecedent VP2. Since VP2 does not contain the VP-gap anymore, copying of VP2 into VP1 causes no regress problem.

(3) $[_{IP}$ $[_{DP1}$ [every book]$_i$ Bill did $[_{VP1}$ read t_i]]$_i$ $[_{IP}$ John $[_{VP2}$ read t_i]]]

So the arguments for QR appear to be quite convincing.

If we take a close look at (3), however, we find that there is a potential problem: In

(3) the DP1 is given an index i and the trace inside it has also an index i, although t_i is not the head of DP1. This gives a flavor of 'i-within-i' violation. Another related problem is that we have to give the same index to the traces in VP1 and VP2, although they have a different antecedent. The antecedent of t_i in VP2 is not *every book*, but the whole DP1, while the antecedent of the trace in VP1 is *every book*, not the whole DP1. These problems are encountered by any version of movement approaches to ACD constructions. So it seems that even under the movement-and-copy approach the regress problem is implicitly present in the form of the problem of 'i-within-i' violation.

The asymmetries between an antecedent and its trace can be taken for granted if we consider the semantic motivation of QR. One of semantic motivations for the argument that a quantified expression must not be in a theta position is a type mismatch.

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(4)     [ John [    loves        every bird ]]
                 <e <e,t>>     <<e,t> t>
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Since the semantic type of *love* is <e <e,t>> and that of *everyone* is <<e,t> t>, *love* cannot take *every bird* as its argument, nor *every bird* can take *love* as its argument. If we assume that *every bird* undergoes QR or moves to AGRoP for Case checking and the trace left behind is an <e> type, we can deal with the type mismatch. In other words, we must say that the antecedent and its trace are different if we are to solve the type mismatch. Let us consider Heim and Kratzer's (1991) analysis of QR. According to them, QR is a two-step movement.

(5) Adjoin an index of a quantified expression to a node that dominates it, and then adjoin the quantified expression to the node adjoined by the index.

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(6)     [S Every bird  [S  1 [S John  [VP     loves        t1  ]]
           <<e, t>t>           <e>       <e <e, t>>    <e>
              |          |     |              |__________|
              |          |     |                 <e, t>
              |          |     |___________________|
              |          |              <t>
              |          |___________________|
              |                <e, t>
              |______________________|
                        <t>
```

Given that the index 1 in the second S plays the role of 8-operator, we can get rid of the type mismatch problem, as illustrated by (6). What is noteworthy in (6) is that the semantic type of a trace is different from that of its antecedent, *every bird*. In addition, (6) shows that *every bird* itself does not have an index. This means that the antecedent does not have to have an index identical with the index of its trace. The structure in (6) is a purely semantically motivated one. The question is how to come up with a syntactically motivated structure which captures the fact that the antecedent and its trace do not have the same semantic type and they may have different indices.

The relative clause is another construction which shows asymmetries between an antecedent and its trace. It is still controversial what is a correct analysis of relative clauses. If we consider semantic composition, we are led to admit that (7a) must be analyzed as (7c), not as (7b). In other words, the relative clause CP must be adjoined to NP, not to DP. Otherwise, we cannot get a correct interpretation.

(7) a. every book that John bought
b. [[$_{DP}$ every [$_{NP}$ book]] [$_{CP}$ that John bought]]
c. [$_{DP}$ every [$_{NP}$ [$_{NP}$ book] [$_{CP}$ that John bought]]]

(8) a.
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[[DP every            book][CP that John   bought     t ]]]
< <e,t> <<e, t> t>>>   <e,t>  I    <e>   <e<e,t>>    e
 I___________________I     I     I       I_______I
       <<e, t> t>          I     I          <e,t>
            I              I     I_____________I
            I              I          <t>
            I              I____________I
            I                   <e,t>
            I___________________I
                      <t>
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b.      [DP  every            [NP [NP book]  [CP that  John    bought    t]]]
     <<e,t> <<e, t> t>>>             <e,t>        I    <e>  <e<e,t>>  e
          |                            |          |     |       |_______|
          |                            |          |     |        <e,t>
          |                            |          |     |___________|
          |                            |          |           <t>
          |                            |          |___________|
          |                            |              <e,t>
          |                            |_______________|
          |                                 <e,t>
          |_________________________________|
                    <<e, t> t>
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If we assume that the relative clause is adjoined to CP, as illustrated by (8a), we wine up with a <t> type, which is a wrong type for DP. On the other hand, we get a right semantic type for the whole DP, when we analyze (7a) as (7c), as shown by (8b). The semantic consideration leads Partee (1976) to conclude that (7c) is a correct analysis.

A problem with the analysis in (7c) is that syntactic consideration forces us to admit that (7b) is a correct structure. Korean provides convincing evidence for (7b), that is, (9a).

(9) a. [$_{DP}$ [$_{CP}$ Con-i san] [$_{DP}$ ku chayk]]
John-nom bought the book
'the book that John bought'

b. */? [$_{DP}$ ku [$_{CP}$ Con-i san] [$_{NP}$ chayk]]
the John-nom bought book

In Korean the relative clause cannot occur between the determiner 'ku' and NP. Unless we admit a discontinuous structure, there is no way to argue that the relative clause combines with NP, not DP. This phenomenon is not confined to Korean, but languages like Scandinavian languages show a similar pattern. This phenomenon provides the ground for Chomsky's (1981) argument that a relative clause is adjoined to DP, not to NP.

This is a typical syntax-semantics mismatch. One way-out is to propose that the definite article 'ku' or the quantified expression 'every' undergoes QR, adjoining to DP. Of course, QR is not the only option. We may provide an A-movement account even for the D-movement, as proposed in the Appendix. Anyway, let us assume that D moves.

(10) a. [$_{DP}$ every$_1$ [$_{DP}$ t_1 book [$_{CP}$ that John bought]]]

<<e, t> <<e, t>t> <e, t> <e, t>> <e, t> <e, t>

<e, t>

<e, t>

<<e, t> t>

b. [$_{DP}$ every$_1$ [$_{DP}$ book [$_{CP}$ that John bought]]]

<<e,t><<e,t>t> <e,t> <e,t>

<e,t>

<<e,t>t>

The D-movement approach seems to solve the syntax-semantics mismatch, as shown by (10a). What is noteworthy in (10a), the D-movement does not require 8-conversion. Recall that we needed 8-conversion for the QP-movement in (6). The fact that there is no need for 8-conversion suggests that in case of D-movement we do not have to care about the original position of *every*. Given that it is true, we can argue that the LF of (9a) is not (10a) but (10b) in which there is no trace. Then, we can argue that D-movement does not require a trace at all unlike DP-movement. This is an extreme asymmetry between an antecedent and its trace.

To recapitulate, the asymmetries between an antecedent and its trace are clearly shown by ACD constructions, quantified expressions, and relative constructions: in case of DP movement an antecedent must be different from its trace in indices and semantic types, and in case of D-movement we do not have the need for a trace. The main topic of sections 3 and 4 is to provide an account for why we have asymmetries illustrated in this section.

3 No Chain Approach

This section introduces Hornstein's (1996b) proposal that there is no chain at LF. Assuming that he is fundamentally correct, I argue that the theta role assignment problem encountered by the no-chain approach can be resolved by the claim that a theta role is assigned through binding. Both the no-chain approach and the theta checking theory advocated here will provide a basis of a solution to asymmetries between an antecedent and its trace.

3.1 No Chain Approach

Recently, Hornstein (1996b) raises an objection to the view that A-chains are the objects of interpretation on the ground that chains give rise to not only empirical but also theory-internal problems. It is generally assumed that an LF trace is necessary for two reasons: One is to account for relative quantifier scope and the other is to transmit a theta role. Let us first examine whether a chain or an LF trace is necessary for the quantificational scope. Hornstein (1996b) compares the chain approach with his reconstruction approach, concluding that the chain approach is empirically inadequate. The chain approach requires an interpretive rule like (11a) and the reconstruction approach needs (11b).

(11) a. $\forall$ scopes over $\exists$ just in case some link of $\forall$ c-commands some link of $\exists$.
b. $\forall$ scopes over $\exists$ just in case $\forall$ c-commands $\exists$.

Both approaches appear equivalent, when we consider the simple sentence like (12a) and its LF (12b).

(12) a. Someone seems to Bill to be reviewing every report.
b. Someone seems to Bill [$_{IP}$ someone to be [$_{AGRoP}$ every report [$_{VP}$ someone reviewing every report]

In (12b) a link of *every report* c-commands a link of *someone* and vice versa. So the chain approach correctly accounts for the ambiguity regarding the scope of *someone* and *every report*. The reconstruction approach requires deletion of all copies except one at CI interface. There are 12 ways of deleting copies. Let us illustrate just two cases: one for the wide scope reading for *someone* and the other for the wide scope reading for *every report*. Let us delete *someone* in the theta position and in the intermediate position, and *every report* in the theta position, as presented in (13a). Then we get the interpretation in which *someone* has scope over *every report*.

(13) a. Someone seems to Bill [$_{IP}$ (someone) to be [$_{AGRoP}$ every report [$_{VP}$ (someone) reviewing (every report)]

b. (Someone) seems to Bill [$_{IP}$ (someone) to be [$_{AGRoP}$ every report [$_{VP}$ someone reviewing (every report)]

On the other hand, if we delete *someone* except the one in the theta position and delete *every report* in the theta position, as shown by (13b), we get the wide scope reading for *every report*. So both approaches can deal with the ambiguity of (12a).

However, the two approaches diverge in their prediction about the sentence involving a pronoun. (14a) disallows the reading in which *every report* scopes over *someone*. This follows from the reconstruction approach, but not from the chain approach.

(14) a. Someone$_i$ seemed to his$_i$ boss to be reviewing every report.

b. Someone$_i$ seemed to his$_i$ boss [$_{IP}$ someone$_i$ to be [$_{AGRoP}$ every report [$_{VP}$ someone$_i$ reviewing every report]

Let us first consider the reconstruction approach. *Someone* in the Case position cannot be deleted if it is to be an antecedent of *his*. So the LF for (14a) would be (15) in which *every report* cannot c-command *someone*.

(15) Someone$_i$ seems to his$_i$ boss [$_{IP}$ (someone$_i$) to be [$_{AGRoP}$ every report [$_{VP}$ (someone$_i$) reviewing (every report)]

Accordingly, the reconstruction approach correctly explains the fact that *someone* cannot be inside the scope of *every report* under the reading that we take *someone* to be the antecedent of *his*. However, the chain approach cannot provide an account for the phenomenon. In (14b) the chain of *someone* c-commands *his* and the *every report* chain c-commands one copy of *someone*. So, the chain approach says that *every report* can have scope over *someone*, while *someone* takes *his* as its variable. These considerations lead Hornstein (1996b) to conclude that there is no chain.

3.2 Theta Checking

Now let us think of another role of an LF trace: Theta role transmission. If we completely erase a trace at LF, the question is how the argument in the non-theta position is assigned a theta role. The theta role transmission problem disappears if we assume that a theta role is assigned via binding, as proposed in Kim (1997).[1] In Kim I propose that a theta role is assigned when a theta role and its argument are co-indexed: A theta role is assigned to an argument when the argument binds its theta role or a theta role binds its argument. I propose (16), dividing arguments into two classes: a weak variable and an argument with a two-place predicate or operator.

(16) X can bind Y iff X is a variable bound by a predicate or an operator.

The idea is that binding is a relation between two arguments and there must be a predicate or an operator to relate the two arguments. In case of arguments with a two-place operator, it can bear a binding relation to other argument through the two-place operator. In case of a variable, it does not have an operator so that it cannot bind other argument. The only way for a weak DP to be related to other argument is to be bound by an argument with an operator or a predicate.[2]

Let us illustrate (16). Suppose that *someone* in (17) is not specific but a weak variable, and it is in the SPEC of IP.

(17) a. Someone came.
b. $[_{IP}$ Someone$_i$ $[_{VP}$ came(i)]]

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[1] Hornstein (1996b) provides another line of solution to the theta role assignment problem. He treats theta roles as features that can be acquired in the course of derivation. So once an argument is assinged a theta feature in the theta position, it is no problem to delete the trace in the theta position.

[2] Even a weak variable can make a binding relation to other argument after being bound. In Kim (1997) I argue that a weak variable is existentially quantified if it is bound by its theta role. Once it is existentially quantified, it can bear a binding relation to other variable.

(i) Someone thinks that he is a genious.

We can take *someone* in (i) to be an antecedent of *he*, now that *someone* is existentially quantified by its theta role.

c. $[_{VP}$ someone$_i$ came(i)$]$

Then, it cannot bind the theta role agent$_i$ in the predicate, because it does not have an operator or a predicate. Neither the theta role in *came* can bind *someone* because the former cannot c-command the latter. If, on the other hand, *someone* is reconstructed into the theta position, as in (17c), then the theta role can bind *someone* via the predicate *came*. Although *came* is traditionally taken to be a one-place predicate, I argue that it is a two-place predicate in the sense that as its arguments, it takes not only an agent theta role but also an argument to satisfy it. Therefore, the agent theta role *i* can bind *someone$_i$* via the two-place predicate *came*.

On the other hand, an argument with a two-place operator binds a theta role via the operator.

(18) a. Everyone came.
b. $[_{IP}$ Everyone$_i$ $[_{VP}$ came(i)$]]$
c. $[_{VP}$ Everyone$_i$ came(i) $]$

If *everyone* is in the SPEC of IP, *one* can bind the theta role in the predicate via *every*. Therefore, *one* can make a relation with its theta role, without reconstructing into a theta position. If *everyone* reconstructs into the theta position, *one* is bound by its theta role. This results in an ill-formed LF, because *one,* which is bound by *every*, must not be bound again. This line of theta role assignment not only obviates the need for a trace but derives a principle of reconstruction.

4 A Solution to the Asymmetry Problem

In this section the problems introduced in Section 1, that is, the asymmetries between an antecedent and its trace can be accounted for on the basis of proposal that there is no trace at LF and a theta role is assigned via binding. Let us first consider how the proposal handles the sentence with a quantified expression like (19). Let us think of the index of a quantified expression like *every bird*. *Bird* must have an index, because it is a predicate and the index is bound by *every*. A quantifier like *every* takes an NP like *bird* as its complement, just like a verb takes an argument.

(19) [every$_x$ bird(x)]$_y$

On the other hand, *every* itself has an index. Let us assume that the index of *every* is y. If *every* has the index y, the whole DP must have the same index y. The index y is not a referential index, since *every bird* is not a referential expression, while the index x, which *bird* has, is a referential index. In other words, the index x is an <e> type index, while the index y is an <<e, t> t> type. Provided that verbs have a referential index, the theta role of *love* can be assigned to *every bird* through x, not through y. According to the proposal advocated here, the structure of (1), which is repeated as (20), is (21a).

(20) John loves every bird.

(21) a. John$_z$ loves (z, x) [every$_x$ [bird(x)]]$_y$.
b. [$_{IP}$ [every$_x$ [bird(x)]]$_y$ [$_{IP}$ John$_z$ [$_{VP}$ loves (z, x) [every$_x$ [bird(x)]]$_y$]
c. [$_{IP}$ [every$_x$ [bird(x)]]$_y$ [$_{IP}$ John$_z$ [$_{VP}$ loves (z, x)]

After 'every bird' undergoes movement to IP, the copy of 'every bird' in the theta position must be erased, since there is no trace at LF. So the LF of (21a) is (21c). In (21c), as in (2), the index of *every bird* does not play any role in interpretation. What is a crucial index is the index of *bird*, because a theta role of *love* is assigned via the index. (21c) clearly shows why 'every bird' must have a different semantic type from its trace, and the indices of those two elements are different. Besides, (21c) correctly gives the reading for (20): "For every x such that x is a bird, John loves x'

Now let us consider the relative clause construction in (7), which is rewritten here as (22).

(22) [$_{DP}$ every1 [$_{DP}$ t1 book [$_{CP}$ that John bought]]]

(22) will be represented as (23) under the proposal advocated in this paper, since there is no trace.

(23) $[_{DP}$ every$_x$ $[_{DP}$ book(x) $[_{CP}$ that John bought(x)]]]

In (23) we do not have to worry about the type mismatch or the fact that we do not need a trace in the case of D-movement, for we assume that a trace is completely erased at LF. (23) gives a correct interpretation like (24).

(24) Every x such that x is a book and John bought x

Before considering the structure of ACD constructions, let us think of simple VP-deletion, which is given in (25). Given that a subject is generated VP-internally, the structure of (25a) would look like (25b).

(25) a. John loves Mary and Tom does too.
b. John$_i$ $[_{AGRoP}$ $[_{VP1}$ (John$_i$) loves (i, j) Mary$_j$] and [Tom]$_k$ does too.

Let us copy the antecedent VP1 in (25b) into the gap after deleting the copy *John$_i$*, as illustrated by (26).

(26) John$_i$ $[_{AGRoP}$ $[_{VP1}$ loves (i, j) Mary$_j$] and [Tom]$_k$ does $[_{AGRoP}$ $[_{VP1}$ loves (i, j) Mary$_j$]too.

(26) is not a well-formed LF. In (26) *Tom* cannot be assigned a theta role, since the index of i does not match with k. The LF we desire is (27).

(27) John$_i$ $[_{AGRoP}$ $[_{VP1}$ loves (i, j) Mary$_j$] and [Tom]$_k$ does $[_{AGRoP}$ $[_{VP1}$ loves (k, j) Mary$_j$]too

We can get the desired LF only if we do not make an exact copy. At LF we copy the antecedent VP in the first conjunct into the gap in the second conjunct. If we exactly copy *i*, we get the wrong LF, as in (26). However, we do not have to copy the unbound variable exactly. When the antecedent VP is copied into the elided VP, the index *j* must not be changed, because it is bound by *Mary*, but the variable *i* can be changed into *k*, since *i* is an unbound variable. In other words, we can change the index of a variable when the variable is not accompanied by its antecedent when copying. In fact the unbound variable cannot be said to have a fixed value so that it is natural that their index is changeable. Therefore, we can get the desired LF presented in (27).

Now let us turn to the LF of ACD constructions. Under the proposal advocated here, (28a) has a structure like (28b). Since the index y is not a referential index, the theta role of *read* is assigned to DP1 via the index x.

(28) a. John read every book Bill did.

b. $[_{IP}\ \text{John}_z\ [_{VP2}\ \text{read}(z, x)\ [_{DP1}\ \text{every}_x\ [[\text{book}(x)][O_x\ [\text{Bill}_w\ \text{did}\ [_{VP1}\ ]]]_y]]$

Let us move DP1, delete the copy left behind, and copy VP2 into VP1, as (29a-c) illustrate each step.

(29) a. $[_{IP}\ [_{DP1}\ \text{every}_x\ [[\text{book}(x)]\ [O_x\ [\text{Bill}_w\ \text{did}\ [_{VP1}\ ]]]]_y\ [_{IP}\ \text{John}_z\ [_{VP2}\ \text{read}(z, x)\ [_{DP1}\ \text{every}_x\ [\text{book}(x)]\ [\text{Bill}_w\ \text{did}\ [_{VP1}\ ]]]_y]]]$

b. $[_{IP}\ [_{DP1}\ \text{every}_x\ [[\text{book}(x)]\ [O_x\ [\text{Bill}_w\ \text{did}\ [_{VP1}\ ]]]]_y\ [_{IP}\ \text{John}_z\ [_{VP2}\ \text{read}(z, x)\ ]]]$

c. $[_{IP}\ [_{DP1}\ \text{every}_x\ [[\text{book}(x)]\ [O_x\ [\text{Bill}_w\ \text{did}\ [_{VP1}\ \text{read}(w, x)]]]]_y\ [_{IP}\ \text{John}_z\ [_{VP2}\ \text{read}(z, x)\ ]]]$

When we copy VP2 into VP1, we may change the value of z into w, since the variable z is a variable and its antecedent *John* is not accompanied in the movement. Notice that (29c) does not have the 'i-within-i' problem: In (29c) the index of DP1 is y and the index which plays the role of a trace is x. So there does not occur the 'i-within-i' problem. In addition, (29c) gives a correct reading. We can directly transform (29c) into the logical form in (30).

(30) x [x is a book and Bill read x] [John read x]

To sum up, the asymmetries between an antecedent and its trace arise from the fact that a theta role is assigned via an index of N, not D. In conclusion, the discrepancy between an antecedent and its trace can be resolved by the proposal that there is no LF trace and a theta role is assigned through an index.

5 Concluding Remarks

This paper has explored the possibility to account for the asymmetries between an antecedent and its trace under the copy theory. It has been shown that there are two types of asymmetries between an antecedent and its trace: The asymmetries between a DP antecedent and its trace, and the asymmetries between a D antecedent and its trace. The DP asymmetry, which is illustrated by ACD constructions and a quantified expression, is that the antecedent and its trace must have a different semantic type and index. The asymmetry triggered by the D-movement is that the D antecedent does not require a trace at all. It has been proposed that the asymmetries can be accounted for with the proposal that there is no trace at LF, and the theta role of a predicate plays the role of a trace at LF.

Appendix: A-movement vs. QR

All the phenomena illustrated above, that is, ACD constructions, quantified expressions, and relative constructions strongly support the existence of QR. However, Hornstein (1995) argues that QR can be replaced by the A-movement under the minimalist program. This appendix shows that the A-movement approach is empirically more adequate than the QR approach.

Let us see how the A-movement can replace the QR. It is straightforward in the example like (4), rewritten as (31a), that A-movement can replace QR.

(31) a. John loves every bird.
b. $[_{AGRsP}$ John$_x$ $[_{AGRoP}$ every bird$_y$ $[_{VP}$ loves(x, y)]]]]

However, it is not so straightforward how to deal with the relative clause construction with A-movement. Let us attempt to replace the QR approach with the A-movement approach. There is some syntactic and semantic evidence that a weak determiner occupies an NP-internal position, while a strong determiner occupies an NP-external position. First, weak determiners can be generally be added to another determiner but strong determiners cannot.

(32) a. many a, a good many, the two
b. *the every, *the most (not the superlative)

And weak determiners can be preceded by strong determiners, not vice versa.

(33) a. *two every
b. every two

These phenomena give support to the argument that weak determiners are NP-internal, whereas strong determiners are NP-external.

The second piece of evidence derives from Partee's (1988) argument that 'many' is ambiguous between cardinal (existential) and proportional (quantificational) readings.

(34) Many aspens burned.
a. Cardinal: $|A \quad B| \quad n$
b. Proportional: $\dfrac{|A \quad B|}{|A|} \quad k$

On the cardinal reading (34) would be saying that the cardinality of the set of aspens that burned is at least n. The truth condition of (34) on its proportional readings is that a relatively large proportion of the aspens burned. The cardinal reading and the proportional reading satisfy the definition of 'weak' and 'strong' reading respectively. Intriguingly enough, Partee (1989) points out that 'the many' does not show that ambiguity and has only the cardinal or weak interpretation. This phenomenon can be straightforwardly accounted for by our proposal. Given that 'the' occupies the SPEC of or head of DP, 'many' of 'the many' must be NP-internal and hence must be weak.

Thus we are led to a conclusion that in English the strong determiner occupies the SPEC of DP, while the weak determiner occupies the SPEC of NP. Let us compare English determiners with Korean determiners from a minimalist point of view. Let us assume that the strong determiner is generated inside NP and moves to the SPEC of DP. Let us also assume that in English D has a strong feature which attracts the strong quantifier, whereas in Korean D has a weak feature so that the feature does not attract a strong determiner in an overt way. Given that this is true, the relative clause in (9a), repeated as (35a), must be analyzed as (35b).

(35) a. $[_{DP}$ $[_{CP}$ Con-i san] $[_{DP}$ ku chayk]]
John-nom bought the book
'the book that John bought'
b. $[_{DP}$ $[_{NP}$ $[_{CP}$ Con-i san] $[_{NP}$ ku chayk]] D]
John-nom bought the book
'the book that John bought'

The LF of (35b) would be (36), since a strong determiner undergoes a covert movement in Korean.

(36) $[_{DP}$ ku_i $[_{NP}$ $[_{CP}$ Con-i san] $[_{NP}$ t_i chayk]] D]

(36) solves the syntax-semantics mismatch. In addition, the analysis is more plausible than the analysis provided by QR. According to the QR approach, the structure for (35a) is (37).

(37) $[_{DP}$ ku_i $[_{DP}$ $[_{CP}$ Con-i san] $[_{DP}$ t_i chayk]]]

There are some problems with (37). One of the problems is that the motivation of Q movement is not clear in (37). The question is what attracts 'ku' to the adjoined position. If 'ku' is adjoined to DP, it must be due to the feature of D. But the feature of D can be checked in its original position. Thus it is very hard to find the motivation of the movement shown by (37). One the other hand, (36) does not encounter the problem. So A-movement is more adequate than QR in accounting for the syntax-semantics mismatch of relative clauses.

Now let us turn to ACD constructions. Hornstein (1995) points out some empirical problems of the QR approach for ACD and claims that a better account can be provided if we assume Chomsky's (1995) minimalist assumption that an object moves to AGRoP for Case checking, just as a subject moves to AGRsP.

(38) John $[_{AGRoP}$ $[_{DP1}$ every book Bill did $[_{VP1}$ e]$]_i$ $[_{VP2}$ read t_i]]]

The A-movement of DP1 to the SPEC of AGRoP not only satisfies the anti c-command condition but also enables us to avoid the regress problem. Furthermore, the A-movement approach can explain the boundedness effect which is orthogonal to the QR approach.

(39) a. Who [$_{VP3}$ thought that Fred [$_{VP2}$ read [$_{DP1}$ how many of the books that Bill did [$_{VP1}$ e]]]]?
b. Who thought that Fred read [how many of the books that Bill thought that he had read]?
c. Who thought that Fred read how many of the books that Bill read?

The QR approach and the A-movement approach diverge in their prediction about the interpretation of (39a). The A-movement approach correctly predicts that (39a) can be interpreted only as (39b), since the object, DP1 shifts to AGRoP of *read* and the only VP that can be copied is VP1.

(40) Who [$_{VP3}$ thought that Fred [$_{AGRoP}$ [$_{DP1}$ how many of the books that Bill did [$_{VP1}$ e]]$_i$ [$_{VP2}$ read t$_i$]]]?

On the other hand, under the QR approach we incorrectly expect that (39a) may have the interpretation in (39c) as well as (39b). If the *wh*-phrase DP1 is to move to SPEC of CP at LF, both VP2 and VP3 can serve as an antecedent for the deleted VP.

(41) [$_{CP}$ Who [$_{DP1}$ how many of the books that Bill did [$_{VP1}$ e]]$_i$ [$_{VP3}$ thought that Fred [$_{VP2}$ read t$_i$]]]?

Hornstein provides many other compelling arguments for the A-movement approach.

Recently, Kennedy (1996) presents quite a challenging example like (42a) against the A-movement approaches.

(42) a. John requested a copy of every paper Mary did.
b. John [$_{AGRoP}$ [$_{DP1}$ a copy of [every paper]$_j$ Mary did [$_{VP1}$ e]]$_i$ [$_{VP2}$ requested t$_i$]]]

The problem comes from the fact that what John requested is different from what Mary requested. Although John and Mary requested a copy of every paper, what they requested is not an identical but a different copy. The LF of (42a) is (43) according to the A-movement approach.

(43) John [$_{AGRoP}$ [$_{DP1}$ [a copy of every paper]$_i$ Mary did [$_{VP1}$ requested t_i]]$_i$ [$_{VP2}$ requested t_i]]]

It appears that (43) does not represent the desired interpretation, since it produces the interpretation that John and Mary requested the same copy of every paper.

The QR approach does not run into the problem. Let us suppose that only *every paper Mary did* undergoes QR, as in (44a), and copy VP2 into VP1.

(44) a. [$_{IP}$ every paper Mary did [$_{VP1}$ e]]$_i$ [$_{IP}$ John [$_{VP2}$ requested a copy of t_i]]]
b. [$_{IP}$ every paper Mary did [$_{VP1}$ requested a copy of t_i]]$_i$ [$_{IP}$ John [$_{VP2}$ requested a copy of t_i]]]

It seems that (44b) correctly gives the reading that John and Mary requested a different copy of papers. So Kennedy (1996) concludes that the QR approach is superior to the A-movement approach.

However, Kennedy's problem can be accounted for by lowering, as Hornstein (1996c) argues. According to Diesing (1992) and Hornstein (1995), a specific/definite expression does not reconstruct, while a non-specific/indefinite expression does reconstruct into a theta position. Let us assume that the mapping hypothesis is correct. *A copy of* is non-specific while *every paper Mary did* is specific. So Hornstein (1996c) proposes that we must lower only *a copy of*, not the whole DP1, as (45b) shows. And then copy VP2 into VP1, as (45c) illustrates.

(45) a. John [$_{AGRoP}$ [$_{DP1}$ a copy of [every paper]$_j$ Mary did [$_{VP1}$ e]]$_i$ [$_{VP2}$ requested t_i]]]
b. John [$_{AGRoP}$ [$_{DP1}$ [every paper]$_j$ Mary did [$_{VP1}$ e]]$_i$ [$_{VP2}$ requested a copy of t_j]]]
c. John [$_{AGRoP}$ [$_{DP1}$ [every paper]$_j$ Mary did [$_{VP1}$ requested a copy of t_j]] [$_{VP2}$ requested a copy of t_j]]]

The LF in (45c) does not face the problem (43b) does: (45c) correctly yields the reading that John and Mary requested a different copy of every paper. So Kennedy's example cannot be a counter example to the A-movement approach. Thus, we cannot decide which approach is correct on the basis of Kennedy's example.

In fact, the example like (46) seems to suggest that the A-movement approach is more adequate than the QR approach. Let us consider (46) which is identical to (42a), except that the second VP is not deleted.

(46) John requested a copy of every paper Mary requested.

(46) produces exactly the same interpretation (42a) does: John and Mary requested a different copy of every paper. The LF of (46) would be (47) under the QR approach, and it would be (48) under the A-movement approach.

(47) $[_{IP}$ $[_{DP1}$ [every paper]$_j$ Mary $[_{VP1}$ requested t_i]]$_i$ $[_{VP2}$ requested a copy of t_j]]]

(48) John $[_{AGRoP}$ $[_{DP1}$ [a copy of every paper]$_i$ Mary $[_{VP1}$ requested t_i]]$_i$ $[_{VP2}$ requested t_i]]]

It seems that under the QR approach it is impossible to derive a desired LF, which looks like (45c). On the other hand, the A-movement approach might enable us to derive (45c), if we allow lowering of *a copy of* to both VP1 and VP2.

In sum, the constructions which motivated QR can be better accounted for by A-movement.

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