DERIVATIONAL SELECTIONAL RESTRICTION AND RECONSTRUCTION

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This paper proposes a derivational approach to selectional restrictions, arguing that it gives rise to a new system of phrase structure where there is an argument/adjunct asymmetry with respect to merger. In the system proposed here, arguments are required to be merged cyclically while adjuncts are required to be merged postcyclically, i.e., after argument-of relations are established. The proposed system receives strong empirical support from argument/adjunct asymmetries regarding reconstruction effects with Condition C of the binding theory, variable binding, and the interpretation of *each other*.*

1. Introduction

Lebeaux (1988, 1991) argues for an argument/adjunct asymmetry in the composition of phrase structure, which claims that adjuncts may be merged after argument-of relations are established. He proposes a heterogeneous licensing of phrase structures within the framework of the Extended Standard Theory (EST), arguing that elements in adjunct-of relations are licensed in a different way from those in argument-of relations. Following Chomsky (1981), Lebeaux assumes that the Projection Principle (PP) holds at all levels of representation. Then, elements in argument-of relations, being subject to the PP, must be present at all levels of representation, crucially at D-structure. Elements in adjunct-of relations, on the other hand, may not be present at D-structure, since they are not subject to the PP. They may be added by the operation called Adjoin-α in the course of derivations.

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He presents (anti-)reconstruction facts as evidence in support of his view of phrase structure. Let us first look at the following examples:

(1) a. *He_i likes those pictures of $John_i$.
b. *He_i likes those pictures near $John_i$.

(1a, b) are deviant due to violations of Condition C of the binding theory (2), because *John*, being an R-expression, is c-commanded by the coreferent *he*:

(2) If α is an R-expression, interpret it as disjoint from every c-commanding phrase. (Chomsky(1993: 43))

As observed by Lebeaux (1988, 1991) and Van Riemsdijk and Williams (1981), however, the divergence occurs in (3):

(3) a. ?*[Which pictures of $John_i$] does he_i like *t*?
b. [Which pictures near $John_i$] does he_i like *t*?

While *John* and *he* can be coreferential in (3b), they cannot be coreferential in (3a). The difference between (3a) and (3b) resides in the fact that while John is the complement of the noun in the former, it is within the adjunct modifying the noun in the latter. In other words, while the reconstruction effects are observed in (3a), the anti-reconstruction effects are observed in (3b).

Lebeaux argues that this argument/adjunct asymmetry with respect to the (anti-)reconstruction effects follows from his theory of phrase structure together with the assumption that Condition C of the binding theory applies throughout a derivation. Under Lebeaux's view, (3a, b) would be derived as in (4, 5), respectively:

(4) a. D-structure: he likes which pictures of John
b. S-structure: which pictures of John does he like

(5) a. D-structure: S_1: he likes which pictures
S_2: near John
b. S-structure: which pictures near John does he like

In (4), the complement of *pictures*, being subject to the PP, must be present at all levels of representation. Crucially, it must be present at D-structure and prior to *wh*-movement, as in (4a). Then, *John* within the complement is c-commanded by the coreferent pronoun *he* at D-structure, which violates Condition C at that level. In (5), on the other hand, the adjunct *near John* may not be part of S_1 at D-structure. *Wh*-movement applies to S_1, moving *which pictures* to the front. At that point, Adjoin-α may apply, adjoining *near John* to the already moved *wh*-phrase. At no time in this derivation is *John* within the c-command domain of the coreferent *he*. Hence, there is no violation of

Condition C.

Although Lebeaux's theory of phrase structure explains the argument/adjunct asymmetry with the (anti-)reconstruction effects, it is incompatible with the minimalist program (MP) proposed by Chomsky (1993, 1995b) where the PP is eliminated. It is therefore necessary to find a minimalist way of capturing the asymmetry. I will propose a derivational approach to selectional restrictions (SRs), arguing that it gives a minimalist way of explaining the asymmetry.

The organization of this paper is as follows. Section 2 proposes the Derivational Selectional Restriction (DSR). I will first show that the DSR enforces cyclic merger of arguments and postcyclic merger of adjuncts. I will then argue that the DSR together with the assumption that Condition C of the binding theory applies at LF explains the argument/adjunct asymmetry with the (anti-)reconstruction effects. Section 3 shows that there is also an argument/adjunct asymmetry with reconstruction effects with variable binding and *each other*. I will argue that they present further empirical arguments for the DSR. Section 4 makes concluding remarks.

2. Proposal

2.1. Derivational Selectional Restriction and Postcyclic Merger of Adjuncts

In the following discussion, I use the notion SR as a cover term for the θ-role assignment properties of thematic items and the categorial selection properties of functional items.[1] Within the EST, SRs were assumed to be satisfied at D-structure (see, among others, Chomsky (1981)). Within the MP where D-structure is abandoned, SRs should be reformulated either as conditions on interface levels or constraints which apply throughout derivations. Chomsky (1993, 1995b) pursues the former approach, claiming that SRs should be satisfied at LF. I rather pursue the latter, arguing that SRs should be satisfied derivationally. Specifically, I propose the Derivational Selectional Restriction (DSR) (6):

[1] It is important to note that the present definition of SR differs from that of Chomsky (1965). The latter specifies the restrictions which verbs impose on the semantic features of their arguments like [+/− Human] and [+/− Abstract].

(6) The Derivational Selectional Restriction (DSR)
Satisfy selectional restrictions as early as possible.

(6) claims that when we have an option of applying an operation for satisfaction of an SR at a certain stage of a derivation, we should apply it as early as possible. In this subsection, I will argue that the DSR enforces cyclic merger of arguments and postcyclic merger of adjuncts. Before we illustrate it, let us present several assumptions which are necessary for the understanding of the following discussion.

First, I use the term "operation" to refer to term-manipulation. Attract and Merge count as operations, since they manipulate terms in phrase structures. Select, on the other hand, does not count as an independent operation. This is because it only introduces a lexical item from a numeration (N) without manipulating any terms in phrase structures. Rather, I assume with Collins (1997) that Select is part of Merge.

Second, thematic and functional items satisfy their SRs in different ways. Functional items satisfy their SRs by taking specific categories as their complements. For example, a light verb v selects V^{max} as its complement. T selects v^{max} as its complement. C selects T^{max} as its complement. Thematic items, on the other hand, satisfy their SRs by the assignment of their θ-roles. I claim that each thematic item has an explicit representation of all of its θ-roles which are to be assigned to its arguments, called a θ-grid in the sense of Stowell (1981). Essentially following Fukui (1986), let us assume that the θ-roles in a θ-grid are structured according to the "closeness" of a θ-role to the computational system C_{HL}.[2] This is represented by the linear order of the θ-role in a θ-grid. The lefthand θ-role is "closer" than the one to its right in a θ-grid. The assignment of the θ-roles in a θ-grid takes place sequentially from left to right. The rightmost θ-role of transitive and unergative verbs is an "external" θ-role. I assume with Chomsky (1995b) that an "external" θ-role is assigned to an element in the Spec of a light verb v. This may only take place when a verb raises to adjoin to v, forming the amalgamated verbal element $[_v$ V-$v]$. Since this movement takes place overtly during structure-building, we assume that

[2] The structure of θ-roles within a θ-grid corresponds to the traditional argument structure, which is advocated by, among others, Grimshaw (1990) and Williams (1981).

it is triggered by the strong V-feature of *v*. As an example, let consider the verb *put*, which has the following θ-grid (where L is Locative, Th is Theme, A is Agent):

(7) put: <L, Th, A>

According to (7), Locative is "closest" to C_{HL} and thus assigned first. After that, Theme is assigned. Hence, the verb *put* assigns Locative to its complement and Theme to its specifier. Since Agent is an "external" θ-role, it is assigned to the Spec of *v* after *put* raises to *v*.

Third, we assume a new derivational definition of the notion "strong feature" (SF). Chomsky (1995b) also proposes a derivational definition of the notion SF, claiming that SFs should be defined as those that derivations "cannot tolerate" in the sense stated in (8):

(8) Suppose that a derivation D has formed a structure containing α with an SF. Then, D is canceled if α is in a category not headed by α. (adapted from Chomsky (1995b: 234))

He claims that (8) can derive two properties of strength. First, it triggers an overt operation. Second, it induces cyclicity.

Chomsky's definition, however, cannot fully capture the properties of strength. Specifically, contrary to Chomsky's claim, there is a pattern of cases where (8) cannot trigger overt operations. (8) cannot trigger root overt operations like overt *wh*-movement in the matrix clause. Let us consider (9) as an example:

(9) What did you read *t*?

During the derivation of (9), we come to the stage where C with a strong Q-feature appears:[3]

(10) $[_{C^{max}}\ C_{[Q]}$ [you read what]]

In order to derive (9), we have to raise the *wh*-phrase *what* to the Spec of C^{max} and check the strong Q-feature of C. (8), however, cannot trigger this overt *wh*-movement. If the *wh*-phrase *what* did not raise to the Spec of C^{max}, then the strong Q-feature would remain. According to (8), however, this derivation would not be canceled. This is because the C^{max} is the root clause and never contained in another category. According to the principle of Procrastinate, which prefers covert operations to overt operations, the relevant feature of *what* should raise in the covert component to check the Q-feature of C. There would be

[3] Essentially following Chomsky (1995b) and Muysken (1982), we define the notion of maximal projection derivationally.

no way to trigger root *wh*-movement before Spell-Out. Hence, triggering an overt operation, a property of strength, does not follow from (8).

In order to solve this difficulty, I develop Chomsky's derivational definition of SF and propose (11):

(11) When a derivation D has formed a structure which contains α with an SF, the SF must be checked immediately.

Let us consider structure (10) again. (11) requires that when (10) is formed, the strong Q-feature of C should be checked immediately by the raising of the *wh*-phrase *what* to the Spec of C^{max}, correctly triggering root *wh*-movement before Spell-Out. Hence, (11) can correctly trigger an overt operation, while inducing cyclicity.[4]

It should be noted that our derivational definition of SF (11), which requires immediate checking, overrides the DSR, which only requires earliest possible satisfaction. Suppose that we have an option of applying an operation for satisfaction of an SR at a certain stage Σ of a derivation D. Suppose further that D has formed a structure containing α with an SF at Σ. In such a situation, we cannot apply the operation for satisfaction of the SR at Σ. This is because if we applied that operation, D would violate (11). Rather, we should apply the operation for checking the SF. Hence, the DSR coupled with (11) ensures that we should satisfy an SR when possible unless there exists any SF to be checked.[5]

[4] An *EL* reviewer points out that (8) can derive the two properties of strength if coupled with the assumption that SFs must be checked before Spell-Out for convergence. Then, it would be more precise to say that (11) has advantages over (8) in that (11) can derive these properties without any additional assumption.

When a functional head has more than one SF, like T in languages with overt subject-raising (attracted by a strong D-feature) and overt V-raising (attracted by a strong V-feature), we assume a structure among SFs which ensures that only one SF is available for checking at one time. I would like to thank an *EL* reviewer for bringing my attention to this subject.

[5] An *EL* reviewer points out that (6) together with (11) raises the following problem. Suppose that V has an SF which triggers overt object-shift. Then, (11) requires that the SF must be checked immediately. If merger of V and its object does not check this SF, then this merge operation is never allowed, which is undesirable. I claim, however, that strength is a property of functional categories. Overt object-shift is triggered by an SF under a light verb *v*, which enables us to avoid the above problem. Note in passing that this does not exclude the possibility of checking an SF by Merge. For example, as argued by Chomsky (1995b), the SF of T may be checked by merger of an expletive.

Let us now illustrate how the DSR (6) enforces cyclic merger of arguments and postcyclic merger of adjuncts, taking the reading of (12) where the adjunct *yesterday* modifies the embedded clause as an example:

(12) Bill said that John saw Mary yesterday.

I claim following Collins (1997) that each stage of a derivation can be characterized a set of syntactic objects (phrase structures) already formed and the remaining part of N. At the initial stage of the derivation of (12), there is no formed syntactic object. It only consists of the N of (12), which can be represented as below:

(13) N={(Bill, 1), (T, 1), (v, 1), (say, 1), (that, 1), (John, 1), (T, 1), (v, 1), (see, 1), (Mary, 1), (yesterday, 1)}

Among its members is the verb *see*, which has the θ-grid (14):

(14) see: <Th, A>

At this initial stage, we have an option of applying the merge operation to *see* and *Mary* for satisfaction of the Theme θ-role of *see*. Recall that although we have to select *see* and *Mary* from the N before merger of these two items, Select does not count as an independent operation but as part of the merge operation. The DSR requires that we should apply the merge operation at the earliest possible stage of the derivation. Hence, we should do so at the present stage, resulting in (15):[6]

(15) [$_{V^{max}}$ see Mary]

When we construct (15), the stage of the derivation can be characterized as the syntactic object (15) and the remaining part of the N. At this stage, we have an option of applying merger of v and *see Mary* for satisfaction of the SR of v. According to the DSR, we should apply that merge operation at the present stage, yielding (16):

(16) [$_{v^{max}}$ v [$_{V^{max}}$ see Mary]]

Recall that the Agent θ-role of *see*, being an "external" θ-role, is not

[6] As correctly pointed out by an *EL* reviewer, when the verb *see* is selected, it may count as either V^{max} or V^0 under the bare phrase structure. The DSR alone allows the verb *see* to be merged with the light verb v before its object *Mary*, which is undesirable. I assume that the SR of an element in the syntactic object already formed is "closer" to C_{HL} than that of an element which is still in N. This prevents the verb *see* from being merged with the light verb v before its object *Mary*, since the SR of *see* is "closer" than that of the light verb v. It is desirable that this assumption should be derived from some deeper principles. I leave this subject for future research.

available for satisfaction when we construct (15), since the verb *see* has not been adjoined to the light verb yet.

When we construct (16), our definition of SF (11) requires that the verb *see* should raise to adjoin to the light verb v for checking the strong V-feature of v. One might claim that when we construct (16), the DSR requires that we should merge T and (16). This is because when we construct (16), we have an option of applying the merge operation for satisfaction of the SR of T, which states that T takes v^{max} as its complement. Recall, however, that the DSR is overridden by our definition of SF (11). Since (16) contains v with a strong V-feature, (11) requires that it should be checked immediately. Hence, we cannot satisfy the SR of T by merger of T and (16) at that stage.

When *see* is adjoined to v, we have an option of applying merger to *John* for satisfaction of the Agent θ-role of *see*. According to the DSR, we should apply the merge operation at the present stage, yielding (17). Note that we are assuming the copy theory of movement proposed by Chomsky (1993):[7]

(17) [$_{v^{max}}$ John [[$_v$ see-v] [$_{V^{max}}$ see Mary]]]

When we construct (17), the DSR requires that we should apply merger of T and (17) at the present stage:

(18) [$_{T^{max}}$ T [$_{v^{max}}$ John [[$_v$ see-v] [$_{V^{max}}$ see Mary]]]]

Since T has a strong D-feature, our definition of SF (11) requires that it should be checked immediately. Hence, we check the strong D-feature by raising *John* to the Spec of T^{max}. The resulting structure is (19):

(19) [$_{T^{max}}$ John [T [$_{v^{max}}$ John [[$_v$ see-v] [$_{V^{max}}$ see Mary]]]]]

Recall that since the DSR is overridden by our definition of SF, we cannot satisfy the SR of C by merger of C and (18) when we construct the latter.

Suppose that the adjunct *yesterday* is adjoined to the embedded T^{max} (19) for its proper licensing.[8] Then, there are two logically possible

[7] Note that we may not apply an operation for satisfaction of the SR of T at this stage, since the SR of *see*, which is in the syntactic object, is "closer" than that of T, which is still in the N.

[8] Specifically, I assume with Higginbotham (1985) and Travis (1988) that modification relations like adjective-noun and adverb-verb/clause are established by θ-identification. In the relation between the adverb *yesterday* and the embedded clause in (12), for example, it is conceivable that the event position in the latter is

continuations when we construct (19): (i) selection of C and merger of C with the T^{max} (19), and (ii) merger of the adjunct *yesterday* and the T^{max} (19). The DSR requires that we should choose the former, since it satisfies the SR of C:

(20) $[_{C^{max}}$ C $[_{T^{max}}$ John [T $[_{v^{max}}$ John $[[_{v}$ see-v] $[_{V^{max}}$ see Mary]]]]]]

The derivation proceeds further in accordance with the DSR, resulting in (21):

(21) $[_{T^{max}}$ Bill [T $[_{v^{max}}$ Bill $[[_{v}$ say-v] $[_{V^{max}}$ say $[_{C^{max}}$ C $[_{T^{max}}$ John [T $[_{v^{max}}$ John $[[_{v}$ see-v] $[_{V^{max}}$ see Mary]]]]]]]]]]

It is important to point out that until this final stage of the derivation, the adjunct *yesterday* has not been allowed to be merged with the main structure due to the DSR. At this final stage, we can combine the adjunct *yesterday* with the main structure (21) by adjoining the former to the embedded T^{max} of the latter. Hence, if we conform to the DSR during a derivation, arguments are required to be merged cyclically while adjuncts are required to be merged postcyclically, i.e., after argument-of relations are established.

2.2. The (Anti-)Reconstruction Effects with Condition C

Let us return to the (anti-)reconstruction effects with Condition C. Let us first consider the case where R-expressions are contained within fronted complements, taking (3a) (repeated here as (22)) as an example:

(22)?*[Which pictures of *John*$_i$] does *he*$_i$ like *t*?

identified with the θ-role of the former. Putting technical details aside, modifiers and modifiees must appear within a certain local configuration for θ-identification. This brings about restrictions on the positioning of adverbs (see, among others, Jackendoff (1972)). It ensures that *yesterday* is adjoined to the embedded T^{max} in (12). It also ensures, for example, that the "VP-adverb" *merely* must appear within the domain of V, as shown in (i):

(i) a. John is *merely* being a fool.
b. **Merely* John is being a fool.

We define the notion SR as an asymmetric relation where a head, which has a property that needs to be satisfied, asymmetrically selects an element. Crucially, the selected element does not have any property that needs to be satisfied. θ-identification, on the other hand, is a symmetric relation between two θ-roles. Both modifiers and modifiees have properties that need to be satisfied. Hence, θ-identification does not count as an SR. Then, since θ-identification is not subject to the DSR, modifiers are merged postcyclically. I would like to thank an *EL* reviewer for bringing this subject to my attention.

Since *of John* is an argument, the DSR requires that it should be merged cyclically. Crucially, it has already been merged with *which pictures* when *wh*-movement takes place. The *wh*-phrase *which pictures of John* raises to the Spec of C^{max}. We yield the following structure, ignoring irrelevant details:

(23) [which pictures of John] does he like [which pictures of John]

In this derivation, *wh*-movement creates the following chain:

(24) CH=(*which pictures of John*, *which pictures of John*)

We assume with Chomsky (1993) that there is an LF-operation for construction of an operator-variable structure. According to that operation, all but the operator phrase must delete in the head position of a chain. In the tail position of a chain, on the other hand, nothing but the operator phrase must delete. If we apply the operation for construction of an operator-variable structure to chain (24), we get the following two LF-representations depending on what counts as an operator:

(25) a. [which *x*] [he likes [*x* pictures of John]]
b. [which *x*, *x* pictures of John] [he likes *x*]

If only the D *which* counts as an operator, *pictures of John* deletes in the head position of the chain while *which* deletes in the tail position of the chain, resulting in (25a). If the D^{max} *which pictures of John* as a whole counts as an operator, on the other hand, nothing deletes in the head position of the chain while *which pictures of John* deletes in the tail position of the chain, resulting in (25b).

Chomsky (1993) proposes the preference principle for reconstruction, which states that the restriction in the operator position must be minimized unless it would make a derivation crash. The preference principle compares (25a, b) and requires that only the D *which*, but not the whole D^{max} *which pictures of John*, should remain in the operator position. Since both (25a) and (25b) converge, the former rather than the latter is chosen as the LF representation. Following Chomsky (1993) and Chomsky and Lasnik (1993), let us assume that binding conditions are formulated as interface conditions which hold at LF. In LF-representation (25a), *John* is c-commanded by *he*. Condition C (2) requires that *John* should be disjoint in reference from *he*. Hence, the deviancy of (22), where *John* and *he* are coreferential, follows.

Let us next consider the case where R-expressions are contained within "fronted" adjuncts, taking (3b) (repeated here as (26)) as an ex-

ample:

(26) [Which pictures near *John*$_i$] does *he*$_i$ like *t*?

Unlike in (22), *John* and *he* may be coreferential in (26). Since *near John* is an adjunct, the DSR requires that it should be merged postcyclically. Crucially, it has not been merged with the *wh*-phrase *which pictures* when *wh*-movement takes place. The *wh*-phrase *which pictures* raises to the Spec of C^{max}. After *which pictures* raises to the Spec of C^{max}, we adjoin *near John* to the *wh*-phrase in the Spec of C^{max}. We yield the following structure, ignoring irrelevant details:

(27) [which pictures [near John]] does he like [which pictures]

In this derivation, *wh*-movement creates the following chain:

(28) CH=(*which pictures*, *which pictures*)

It is important to note that the adjunct *near John*, which gets merged with *which pictures* after the latter undergoes movement, is not part of the chain.

After application of the LF-operation for construction of an operator-variable structure and the preference principle, we get (29):

(29) [[which *x*] near John] [he likes [*x* pictures]]

In (29), *John* is not c-commanded by *he*. There is no violation of Condition C of the binding theory even if *John* is in the coreference relation with *he*. We can correctly predict that (26) is acceptable.[9, 10]

[9] As correctly pointed out by an *EL* reviewer, our analysis crucially assumes the representational notion of c-command. Under the derivational notion of c-command advocated by, among others, Epstein (1995), our analysis cannot rule out (1b). This is because *near John* is merged postcyclically, crucially after *he* is merged, and thus *John* is never c-commanded by *he*. To discuss the notion of c-command as a whole is beyond the scope of this paper. I leave this important subject, especially the investigation of merger of adjunct-of relations under the derivational notion of c-command, for future research. Note in passing that Lebeaux's analysis also has to assume the representational notion of c-command to exclude (1b), since it allows postcyclic merger of the adjunct *near John*.

[10] It has been observed that "VP-internal" PP modifiers like temporal location in (i) exhibit the reconstruction effects (see, among others, Reinhart (1983)):

(i) *In *Ben's*$_i$ office, *he*$_i$ placed his new brass bed.

I claim that "VP-internal" PP-modifiers like (i) originate within V^{max} for θ-identification, though its merger takes place postcyclically (see note 8 for discussion of θ-identification). This brings about the reconstruction effects. This is in contrast with "VP-external" (sentential) PP-modifiers like the locative phrase in (ii), which do not exhibit any reconstruction effects:

(ii) In *Ben's*$_i$ office, *he*$_i$ is an absolute dictator.

In (ii), *in Ben's office* originates in its surface position, where it can enter into a θ-identification relation with its modifiee.

It has also been observed that the reconstruction effects with Condition C disappears when an R-expression is "deeply embedded" within the moved constituent (see, among others, Reinhart (1983)):

(iii) a. ?*[In *Ben's*$_i$ box], *he*$_i$ put his cigars *t*.
b. [In the box that *Ben*$_i$ brought from China], *he*$_i$ put cigars *t*.

(iv) a. *[In *Mary's*$_i$ kitchen], *she*$_i$ spoke about butterflies.
b. [In the letter John got from *Mary*$_i$], *she*$_i$ spoke about butterflies.

In (iiib) and (ivb), the R-expression is contained within the relative clause, which is directly merged to its surface position due to the DSR. Hence, no reconstruction effects appear. I would like to thank an *EL* reviewer for bringing my attention to this subject.

2.3. (Anti-)Reconstruction and Complex NPs

This subsection considers the (anti-)reconstruction effects with Condition C when R-expressions are contained within "fronted" complex NPs. Lebeaux (1988, 1991) observes that the anti-reconstruction effects are observed with the relative clause case of complex NPs while the reconstruction effects are observed with the non-relative case of complex NPs. (30a, b) are taken from Lebeaux (1991: 211):

(30) a. Which claim that *John*$_i$ made did *he*$_i$ deny *t*?
b. Whose claim that *John*$_i$ likes Mary did *he*$_i$ deny *t*?

Contrary to Lebeaux's observations, however, there are speakers who take (30b) as acceptable. They do not see any substantial contrast in acceptability between (30a) and (30b).[11] The following examples cast further doubt on the validity of Lebeaux's observations:

(31) a. [Which piece of evidence [that *John*$_i$ discovered]] was *he*$_i$ willing to discuss *t*?
b. [Which piece of evidence [that *John*$_i$ was asleep]] was *he*$_i$ willing to discuss *t*? (Watanabe (1995: 290))

(32) a. [Which evidence [that *John*$_i$ presented to court in order to deceive the attorney]] did *he*$_i$ later ignore *t*?

[11] Lebeaux (1991: 237, fn. 3) himself points out that the contrast between (30a) and (30b) disappears if we replace *whose* by *which* in (30b). He admits that the deviancy of (30b) may not be due to the fact that the noun *claim* and its following clause constitute a noun-complement structure but due to the existence of the genitive *wh*-phrase *whose*.

Another possible reason for the deviancy of (30b) for some speakers is that there is no difference in phonetic shape between the noun *claim* and the verb *claim*. One of them is derived from the other by conversion or zero-derivation. It is reasonable to claim that because of their having the same phonetic form, some speakers interpret the noun *claim* and its following clause as a noun-complement structure by analogy with the verb *claim* and its complement.

b. [Which evidence [that *John*$_i$ quarreled with his wife at a boathouse]] did *he*$_i$ later ignore *t* in court?

(33) a. [Which explanation [that *John*$_i$ offered based on his careful observations]] did *he*$_i$ later deny *t*?

b. [Whose explanation [that *John*$_i$ was temporarily mad at his wife]] did *he*$_i$ deny *t* in court?

(34) a. [Which belief [that *John*$_i$ discovered]] was *he*$_i$ willing to discuss *t*?

b. [Whose belief [that *John*$_i$ was asleep]] was *he*$_i$ willing to discuss *t*?

In (31–34a), the R-expression *John* is contained within the "fronted" relative clause. In (31–34b), on the other hand, the R-expression *John* is contained within the "fronted noun-complement" clause. In all of these examples, *John* can be coreferential with *he*. In other words, the anti-reconstruction effects are observed. It should be noted that (31–34b) are acceptable even for speakers who do not accept (30b). Based on these observations, I claim that the anti-reconstruction effects are observed when R-expressions are contained within "fronted" complex NPs, whether they are relative or non-relative.

The anti-reconstruction effects with relative complex NPs straightforwardly follow from our DSR analysis. This is because relative clauses, being adjuncts, are required to be merged postcyclically. Turning to non-relative complex NPs, I assume with Grimshaw (1990) and Stowell (1981) that the head nouns of non-relative complex NPs like *evidence* in (31b) do not assign any θ-roles to the following clauses. The relation between the head nouns and the following clauses is an appositive one rather than one of a θ-role assignment. Hence, the DSR requires that "noun-complement" clauses should be merged postcyclically. Hence, the anti-reconstruction effects with non-relative complex NPs also follow.[12]

[12] Let us consider (i) (adapted from Brody (1995: 134)):

(i) *Mary*$_i$ wondered [which evidence [that pictures of *herself*$_i$ disturbed *Bill*$_j$]] *he*$_{?*j/k}$ discussed.

This involves a non-relative complex NP, where "long-distance" ("logophoric" in the sense of Reinhart and Reuland (1993)) reflexivization is allowed while the coreference reading between *Bill* and *he* is not. As correctly pointed out by an *EL* reviewer, the unavailability of the coreference reading is problematic to our analysis. This is because the appositive clause is directly inserted to its surface position and thus never undergoes reconstruction. Note also that the same observation applies to relative complex NPs:

(ii) *Mary*$_i$ wondered [which information [that pictures of *herself*$_i$ gave to *Bill*$_j$]] *he*$_{?*j/k}$ witnessed.

It should be pointed out, however, that the coreference reading between *Bill* and *he* is available in (iii) and (iv), which also involve a "long-distance" ("logophoric") reflexive:

(iii) *Mary*$_i$ wondered [which evidence [that *Bill*$_j$ invited Lucy and *herself*$_i$ for a drink]] *he*$_j$ discussed.

(iv) *Mary*$_i$ wondered [which information [that *Bill*$_j$ gave to Lucy and *herself*$_i$]] *he*$_j$ witnessed.

This suggests that something other than reconstruction may be involved with the judgments of (i) and (ii). I leave further investigation of this important subject for future research.

3. Arguments for the Proposal

As shown in sections 1 and 2, our DSR analysis and Lebeaux's Adjoin-α analysis agree on the view that there is an argument/adjunct asymmetry with respect to merger. They differ, however, as to obligatoriness/optionality of postcyclic merger of adjuncts. Our theory claims that adjuncts *must* be merged after argument-of relations are established. Lebeaux's theory, on the other hand, claims that adjuncts *may* be merged after argument-of relations are established. In this section, I will argue that our theory should be preferred over Lebeaux's theory, presenting empirical facts which only follow from the former but not from the latter.[13]

3.1. Reconstruction Effects with Variable Binding

As first empirical evidence in favor of our DSR theory, this subsection presents reconstruction effects with variable binding. Pronouns

[13] Kitahara (1995) proposes the Target-α approach, arguing that it captures the argument/adjunct asymmetry. Like Lebeaux's (1988, 1991) theory, however, his theory claims that adjuncts *may* be merged after argument-of relations are established. Hence, empirical facts to be presented below serve as evidence against Kitahara's theory as well as Lebeaux's theory. Apart from the empirical difficulties, Kitahara's approach also faces conceptual problems. He employs the Shortest Derivation Requirement (SDR), one of the economy conditions, to explain the asymmetry. The SDR, however, compares two or more derivations and thus needs global considerations. This induces the well-known problem of computational complexity. As we shall see later in section 4, our DSR analysis only needs local considerations.

may take not only referential phrases but also quantificational phrases as their antecedent. In the latter situation, pronouns are used as bound variables, the referential values of which vary with the value-assignment of their quantificational antecedents, as shown below:

(35) *Everyone*$_i$ loves *his*$_i$ mother.

The fuller study of bound pronouns lies outside the scope of this paper.[14] For the purpose of the present discussion, it is sufficient to claim that bound pronouns are subject to (36):

(36) Pronouns can be interpreted as bound variables only if they are c-commanded by quantificational phrases at LF.

This condition is one of the necessary conditions for pronouns to be used as bound variables.

There is, however, a set of examples which apparently do not conform to (36):

(37) a. [Which pictures of *his*$_i$ parents] do you think that *everyone*$_i$ likes *t*?

b. [Which attack on *his*$_i$ country] do you think that *every American*$_i$ still remembers *t*?

This type of construction is extensively discussed in Engdahl (1986). In (37), although the pronouns are moved out of the scope domain of the quantificational phrases, the pronouns can be properly interpreted as bound variables. In other words, the reconstruction effects with variable binding are observed.

Such reconstruction effects with variable binding, however, are not always available, as shown below:[15]

(38) a.*?[Which criticism [because of *his*$_i$ scandal]] do you think that *every congressman*$_i$ remembers *t*?

b.*?[Which book [around *him*$_i$]] do you think that *everyone*$_i$ most often read *t*?

[14] See, among others, Chomsky (1981), Higginbotham (1980), and May (1985) for detailed discussion of bound pronouns.

[15] Lebeaux (1991) observes that pronouns can be interpreted as bound variables even when they are contained within "fronted" adjuncts. Based on such observations, he argues that while complements are always inserted cyclically, adjuncts are inserted either cyclically or postcyclically. Contrary to Lebeaux's observations, there is a clear contrast in acceptability between examples in (37) and those in (38), though the degree of deviance of the latter varies among speakers.

The difference between the examples in (37) and those in (38) resides in the fact that while the pronouns are contained within the complements in the former, they are contained within the adjuncts in the latter. There exists an argument/adjunct asymmetry concerning the reconstruction effects with variable binding.

I argue that this argument/adjunct asymmetry follows from the DSR together with the assumption that variable binding relations are established at LF. In (37), the DSR coupled with the preference principle requires that the complements of *wh*-phrases, which are merged cyclically, should be reconstructed to their original positions. It then follows that the pronoun within the fronted complement is c-commanded by the quantificational phrase at LF. The former can be properly interpreted as a variable bound by the latter; the reconstruction effects emerge. In (38), on the other hand, the adjuncts modifying the *wh*-phrases are merged postcyclically. There is no way to reconstruct those adjuncts, since they undergo direct insertion to their surface positions and thus do not have any "original" positions. It then follows that the pronoun within the "fronted" adjunct is not c-commanded by the quantificational phrase at LF. Hence, we can correctly predict that the pronoun cannot be interpreted as a bound variable.

If our analysis is correct, we should expect that bound variable readings are not available when pronouns are contained within "fronted" complex NPs. This prediction is borne out:

(39) Appositive Clauses

a.*?[Which evidence [that *he*$_i$ received a bribe from the company]] do you think that *every congressman*$_i$ will ignore *t*?

b.*?[Which story [that *he*$_i$ kills the monster]] do you think that *every student*$_i$ likes *t* best?

(40) Relative Clauses

a.*?[Which evidence [that *he*$_i$ presented in court]] do you think that *every congressman*$_i$ lied about *t*?

b.*?[Which claim [that *he*$_i$ made in court]] do you think that *every congressman*$_i$ lied about *t*?

It is important to note that Lebeaux's (1988, 1991) theory of phrase structure cannot account for this argument/adjunct asymmetry. Specifically, his theory would wrongly predict that bound variable readings are available in examples like (38–40), where the pronouns are con-

tained within the "fronted" adjuncts.[16]

3.2. Reconstruction Effects with *Each Other*

This subsection considers reconstruction effects with *each other*. Before we come to the reconstruction effects, let us consider the interpretation of *each other*. It is beyond the scope of this paper to enter into a fuller discussion of the interpretation of *each other*.[17] For the purpose of the present discussion, it is sufficient to claim that *each other* is subject to the following condition:

(41) *Each other* must have a c-commanding antecedent in a certain domain for its proper interpretation.

Every approach assumes this condition as a necessary condition for the proper interpretation of *each other*, though its exact formulations vary among them. The discussion to follow assumes that condition (41) applies at LF.

Returning to reconstruction effects with *each other*, let us first consider the following examples:

(42) *They*$_i$ saw [pictures [of *each other*$_i$]].

(43) a. *They*$_i$ were watching [the bags [around *each other*$_i$]] at the airport.

[16] An apparent counterexample to our analysis is the following example (taken from Lebeaux (1991: 230)):

(i) [Which paper [that *he*$_i$ gave to *Bresnan*$_j$]] did *every student*$_i$ think that *she*$_j$ would like *t*?

In (i), although *he* is within the adjunct, it is easier to get the bound variable reading than in (38-40). It should be noted, however, that in (i), either *which paper* or *every student* may be interpreted as having scope over the other (see May (1985)). Hence, it is plausible to claim that *he* may be within the scope of *every student*, which makes it easier to get the bound variable reading. This receives support from the fact that when *every student* is more deeply embedded as in (ii), the bound variable reading is not available:

(ii)*?[Which paper [that *he*$_i$ gave to *Bresnan*$_j$]] do you think that *every student*$_i$ thought that *she*$_j$ would like *t*?

Further evidence comes from examples like (iii):

(iii) [Which criticism [because of *his*$_i$ scandal]] does *every congressman*$_i$ remember *t*?

In contrast to (38-40), it is easier to get the bound variable reading in (iii), where the quantificational phrase appears in the matrix clause and thus may have scope over the *wh*-phrase. I would like to thank an *EL* reviewer for brining my attention to this subject.

[17] See, among others, Chomsky (1981, 1986) and Lebeaux (1983) for detailed discussion of this subject.

b. *They*$_i$ were looking at [the girls [near *each other*$_i$]] on the beach.

In (42), *each other* appears within the complement and can take *they* as its antecedent. In (43a, b), on the other hand, *each other* appears within the adjunct. Although the judgments vary, there are some speakers who accept (43a, b).

If we "front" the phrase containing *each other* by *wh*-movement, however, an argument/adjunct asymmetry emerges:

(44) [Which pictures of *each other*$_i$] did *they*$_i$ see *t*?

(45) a. ?[Which of the bags around *each other*$_i$] were *they*$_i$ watching *t* at the airport?

b. ?[Which of the girls [near *each other*$_i$]] were *they*$_i$ looking at *t* on the beach?

While (44) is acceptable, (45a, b) are deviant even for the speakers who accept (43a, b). It is clear that this argument/adjunct asymmetry concerning the reconstruction effects with *each other* straightforwardly follows from the DSR coupled with the assumption that condition (41) applies at LF. It should be noted that Lebeaux's (1988, 1991) theory of phrase structure would wrongly predict that examples like (45a, b) are acceptable.

4. Concluding Remarks

This paper has proposed the DSR, arguing that it gives a minimalist way of explaining the argument/adjunct asymmetries concerning the reconstruction effects with Condition C of the binding theory, variable binding, and the interpretation of *each other*.[18] This analysis also raises a lot of interesting issues. I will briefly point out two of them here.

First, our DSR analysis enables us to capture the argument/adjunct distinction in a minimalist way. It has been assumed in the pre-minimalist period (see, among others, Chomsky (1972)) that the argument/adjunct distinction should be made representationally. Given the X-bar theory, while arguments are attached under X′-level,

[18] Heycock (1995) argues that a referential/nonreferential contrast also leads to asymmetries with reconstruction. As space is limited, we have not investigated how our analysis can be extended to incorporate her insight. I leave this important subject for future research.

adjuncts are attached under higher-bar levels. Let us consider the following examples:

(46) a. John hit Mary.
b. John left early.

While *Mary* in (46a) is the argument of the verb *hit*, *early* in (46b) is an adjunct. Under Chomsky's (1972) X-bar theory where the uniform two-level hypothesis is adopted, for instance, (46a) and (46b) are represented as in (47a, b), respectively, with the irrelevant parts being ignored:

(47) a. $[_{V'}$ hit $[_{N''}$ $[_{N'}$ Mary]]]
b. $[_{V''}$ $[_{V'}$ left] $[_{ADV}$ early]]

While *Mary* in (47a), being an argument, is attached under V′, *early* in (47b), being an adjunct, is attached under V″.

Such a representational argument/adjunct distinction, however, is no longer available in the MP, where phrase structures should be "bare." Crucially, neither non-branching nodes nor bar-levels in the sense of the X-bar theory are allowed any more. Hence, we need an alternative way of making the argument/adjunct distinction which is compatible with the minimalist spirit. Our DSR theory claims that arguments are merged cyclically whereas adjuncts are merged postcyclically. Arguments and adjuncts are therefore distinguished by means of derivational terms instead of representational terms in conformity with bare phrase structure. Questions still remain how we explain the ECP effects with *wh*-variants of the adverbials and the Adjunct Condition effects based on our derivational notion of adjunct. I leave these questions for future research.

Second, our definition of SF (11) only needs local considerations. Suppose that we have an option of applying an operation OP for checking an SF at a certain stage Σ of a derivation D. (11) can decide whether to apply OP only on the basis of information available at Σ, since it simply requires us to check the SF immediately when we form a structure containing the SF. Chomsky (1993), on the other hand, defines SFs as illegitimate objects at PF, arguing that this forces us to check SFs before Spell-Out. This analysis, however, needs global considerations. In order to make the decision, it has to look ahead to see whether the application/non-application of OP would result in PF where the SF remains unchecked. Note also that Chomsky's (1995) definition of SF (8) is not local, either. In order to make the decision, it must look at the next stage of D. It is generally agreed that while

global considerations necessarily induce computational complexity, local ones do not (see, among others, Chomsky (1995b)). Then, our definition of SF (11) enables us to avoid the problem of computational complexity, which is conceptually desirable. The DSR also gains conceptual support if Chomsky (1995a) is correct in claming that pure Merge for argument-of relations must be forced by SRs. To be specific, suppose that we select the verb *see*. Suppose further that we have an option of applying merger of *see* and *Mary* for satisfaction of the "internal" θ-role of *see*. Under the standard assumption that SRs apply at LF, global considerations are needed to decide whether to apply the merge operation. This is because we have to look ahead to see whether this merger satisfies the SR at LF. The DSR, on the other hand, forces *see* to be merged with *Mary* only on the basis of information available at the present stage. This is because the DSR requires the "internal" θ-role of *see* to be satisfied as early as possible. Hence, the DSR only needs local considerations, reducing computational burden.

If the above conjecture is correct, our analysis supports the design of language suggested by Chomsky (1995b): Language is fundamentally computationally-intractable and thus unusable due to its inherent global properties, but there are local "computational tricks" which reduce computational burden and facilitate usability of language in practice. The MP assumes that language is subject to "bare output conditions" (BOCs), which ensure that linguistic expressions, i.e. PF and LF, are legible to the external systems at the interface. Under the BOC-driven view of language, therefore, both SFs and SRs should be subject to interface conditions as their fundamental properties: SFs are illegitimate at PF while SRs must be satisfied at LF. As argued above, however, these interface conditions alone necessarily need global considerations and their corresponding optimization problems are computationally intractable. The DSR and our definition of SF serve as local "computational tricks" to solve these intractable problems induced by their fundamental properties, making that part of language usable in practice.[19]

[19] It should be noted that I am arguing against globality but not against interface conditions. There is no conceptual problem with local interface conditions, which do not trigger any OP during D but simply rule out illegitimate interface representations.

REFERENCES

Brody, Michael (1995) *Lexico-Logical Form: A Radically Minimalist Program*, MIT Press, Cambridge, MA.

Chomsky, Noam (1965) *Aspects of the Theory of Syntax*, MIT Press, Cambridge, MA.

Chomsky, Noam (1972) *Studies on Semantics in Generative Grammar*, Mouton, The Hague.

Chomsky, Noam (1981) *Lectures on Government and Binding*, Foris, Dordrecht.

Chomsky, Noam (1986) *Knowledge of Language: Its Nature, Origin, and Use*, Prager, New York.

Chomsky, Noam (1993) "A Minimalist Program for Linguistic Theory," *The View from Building 20*, ed. by Kenneth Hale and Samuel Jay Keyser, 1-52, MIT Press, Cambridge, MA.

Chomsky, Noam (1995a) "Fall Lectures," ms., MIT. [Transcribed and edited by Robert Freidin.]

Chomsky, Noam (1995b) *The Minimalist Program*, MIT Press, Cambridge, MA.

Chomsky, Noam and Howard Lasnik (1993) "The Theory of Principles and Parameters," *Syntax: An International Handbook of Contemporary Research*, ed. by Joahim Jacobs, Armin von Stechow, Wolfgang Sternefeld, and Theo Vennemann, 506-569, Walter de Gruyter, Berlin.

Collins, Chris (1997) *Local Economy*, MIT Press, Cambridge, MA.

Engdahl, Elisabet (1986) *Constituent Questions*, Reidel, Dordrecht.

Epstein, Samuel (1995) "Un-Principled Syntax and the Derivation of Syntactic Relations," ms., Harvard University.

Fukui, Naoki (1986) *A Theory of Category Projection and its Applications*, Doctoral dissertation, MIT.

Grimshaw, Jane (1990) *Argument Structure*, MIT Press, Cambridge, MA.

Heycock, Caroline (1995) "Asymmetries in Reconstruction," *Linguistic Inquiry* 26, 547-570.

Higginbotham, James (1980) "Pronouns and Bound Variables," *Linguistic Inquiry* 11, 679-708.

Higginbotham, James (1985) "On Semantics," *Linguistic Inquiry* 16, 547-594.

Jackendoff, Ray (1972) *Semantic Interpretation of Generative Grammar*, MIT Press, Cambridge, MA.

Kitahara, Hisatsugu (1995) "Target α: Deducing Strict Cyclicity from Derivational Economy," *Linguistic Inquiry* 26, 47-77.

Lebeaux, David (1983) "A Distributional Difference Between Reciprocals and Reflexives," *Linguistic Inquiry* 14, 723-730.

Lebeaux, David (1988) *Language Acquisition and the Form of the Grammar*, Doctoral dissertation, University of Massachusetts, Amherst.

Lebeaux, David (1991) "Relative Clauses, Licensing, and the Nature of the Derivation," *Syntax and Semantics* 25, ed. by Susan Rothstein, 209-239, Academic Press, San Diego.

May, Robert (1985) *Logical Form: Its Structure and Derivation*, MIT Press, Cambridge, MA.

Muysken, Pieter (1982) "Parametrizing the Notion 'Head'," *Journal of Linguistic Research* 2, 57-75.

Reinhart, Tanya (1983) *Anaphora and Semantic Interpretation*, Croom Helm, London.

Reinhart, Tanya and Eric Reuland (1993) "Reflexivity," *Linguistic Inquiry* 24, 657-720.

Riemsdijk, Henk van and Edwin Williams (1981) "NP Structure," *The Linguistic Review* 1, 171-217.

Stowell, Timothy (1981) *Origins of Phrase Structure*, Doctoral dissertation, MIT.

Travis, Lisa (1988) "The Syntax of Adverbs," *McGill Working Papers in Linguistics*, 280-310, McGill University.

Watanabe, Akira (1995) "Conceptual Basis of Cyclicity," *MIT Working Papers in Linguistics* 27, 269-291.

Williams, Edwin (1981) "Argument Structure and Morphology," *The Linguistic Review* 1, 81-114.

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