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Discontinuous Antecedents and Radical Reconstruction*

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1 Introduction

It is a traditional assumption in generative grammar that sound and meaning are indirectly connected through the syntactic component. In the minimalist program (MP) proposed by Chomsky (1995) and further developed by, among others, Chomsky (2004; 2005; 2006), the syntactic component contains operations that transfer the syntactic object (SO) already constructed in the syntactic component to the interfaces, called Transfer operations, which apply at the phase level. PF-Transfer operations hand the SO to the phonological component, which maps to the sensory-motor (S-M) interface; LF-Transfer operations hand the SO to the semantic component, which maps to the conceptual-intentional (C-I) interface. There remains an unsettled question as to at what stage of a derivation PF-Transfer and LF-Transfer should apply. Chomsky (2004; 2005; 2006) claims that phases are the same for PF-Transfer and LF-Transfer and thus both of the Transfer operations apply simultaneously, more specifically when structure- building completes a phase, which is CP and vP in his system. Since PF- Transfer and LF-Transfer are independent operations, however, there is no a priori reason to assume that they should apply simultaneously in a derivation.   In fact, it has been suggested by, among others, Megerdoomian (2002), Cecchetto (2004), and Marušič (2005) that phases should not be the same for PF-Transfer and LF-Transfer, and that these two Transfer operations should apply at different stages of a derivation.

  This paper argues that phases are the same for both PF-Transfer and LF-Transfer, that is, CP and vP, as argued by Chomsky (2004; 2005; 2006), but there are cases where these two Transfer operations do not apply simultaneously. More specifically, I propose that PF-Transfer and LF-Transfer may apply separately within a phase once the phase becomes "saturated" in the sense of Collins (2002). According to Collins (2002:46), an item is "saturated" if it does not contain any probe/selector property that needs to be satisfied; an item that contains at least one probe or selector is "unsaturated," where the selector property includes a θ-property and a categorial selection property. This analysis leads to an argument/adjunct asymmetry with respect to timing of merger within

a phase. Merger of an argument is triggered by a selector; it must be merged before PF-Transfer and LF-Transfer within a phase. Merger of an adjunct, on the other hand, is not triggered by any probe or selector. Hence, an adjunct may be merged before or after PF/LF-Transfer if we essentially assume with, among others, Lebeaux (1988), Ishii (1997; 1998), and Stepanov (2001), that an adjunct may be merged postcyclically within each phase. This allows merger of an adjunct (not merger of an argument) to be interweaved with PF-Transfer and LF-Transfer within a phase.[i] As an illustration, let us consider (1):

(1)   John deliberately broke the rules.

During its derivation, we construct the vP phase. According to our analysis, the arguments *John* and *the rules*, whose merger is triggered by their selector, must be merged cyclically. On the other hand, the adjunct *deliberately*, whose merger is not triggered by any probe or selector, may be merged either cyclically or postcyclically. Suppose that the adjunct *deliberately* is merged postcyclically. Then, the derivation of the vP phase of (1) proceeds as shown in (2). It should be noted that this paper assumes that complements are sisters to the head X whereas adjuncts are adjoined to XP:

(2)   a.   [$_{v}$P John [$_{v}$ [$_{VP}$ break the rules]]]
      b.   [$_{v}$P John [$_{v}$ [$_{VP}$ **deliberately** [$_{VP}$ break the rules]]]]

As shown in (2a), the arguments *John* and *the rules* are merged cyclically; the VP-adjunct *deliberately* is merged (more specifically, adjoined to VP) postcyclically, as shown in (2b). It should be noted that the vP phase has already become "saturated" at stage (2a). Hence, PF/LF-Transfer may apply either at stage (2a), *i.e.*, before postcyclic merger of *deliberately*, or stage (2b), *i.e.*, after postcyclic merger of *deliberately*. In the former case, merger of the adjunct *deliberately* is interweaved with PF/LF-Transfer within a phase. In this case, the interweave of Merge and Transfer does not have any effect. I will argue, however, that there are cases where the interweave of Merge and Transfer does have an effect. It is shown that our interweave analysis can account for hitherto unexplained puzzling PF-LF mismatch phenomena. This paper discusses two PF-LF mismatch phenomena, *i.e.*, *do so* and *one* anaphora and radical reconstruction with Japanese scrambling. I will argue that these two phenomena, which have been assumed to be totally unrelated to each other, can be given a unified account in a principled way.

   The organization of this paper is as follows. Section 2 investigates anaphoric expressions *do so* and *one*. It is first shown that contrary to the widely accepted view, the antecedents of *do so* and *one* are not necessarily continuous parts of sentences, which is one instance of PF-LF mismatch phenomena. I will then

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explicate Culicover and Jackendoff's (2005) analysis of *do so* and *one* anaphora, and show that their analysis cannot account for argument/non-argument asymmetries regarding the antecedents of *do so* and *one*. I will argue that the interweave of Merge and Transfer within a phase gives us a principled account of *do so* and *one* anaphor facts. Section 3 is concerned with radical reconstruction phenomena with Japanese scrambling, which is another instance of PF-LF mismatch phenomena. It is shown that given that Japanese scrambling is an optional movement, as argued by, among others, Fukui (1993) and Saito and Fukui (1998), the interweave of Merge and Transfer within a phase can account for radical reconstruction phenomena.

2   *Do So* and *One* Anaphora

2.1   Culicover and Jackendoff's (2005) Analysis

There are a number of traditional diagnostics of constituent structure, one of which relates to phenomena of substitution. The basic assumption behind substitution tests is that a particular string of words must be a constituent if it can be substituted (replaced) by something else. This paper is concerned with the anaphoric expressions *do so* and *one*, which have been used as diagnostics of constituent structure. More specifically, it has been widely assumed that *do so* substitutes a VP constituent, functioning as a VP anaphor.   Following Fromkin et. al. (2000) and Hornstein, Nunes, and Grohmann (2005), this paper assumes for expository purposes that what *one* replaces is an NP constituent, and thus *one* is an NP anaphor. Let us explicate a traditional analysis of *do so* and *one*, taking (3, 4) as examples:

(3)   a.   John <u>bought bread</u> in the supermarket, and Bill **did so** in the corner shop.   [*do so* = buy bread]
       b.   John <u>bought bread in the supermarket</u>, and Bill **did so** too.
            [*do so* = buy bread in the supermarket]

(4)   John likes the Italian <u>student of English</u>, but not the Spanish **one**.
      [*one* = student of English]

The structures of *buy bread in the supermarket* and *the Italian student of English* are as follows:

(5)   [$_{VP}$ [$_{VP}$ buy bread] [in the supermarket]]
(6)   [$_{DP}$ the [$_{NP}$ Italian [$_{NP}$ student of English]]]

In (5), the complement *bread* is the sister to the verb *buy*; the adjunct *in the supermarket* is adjoined to VP. The VP anaphor *do so* can replace either *buy bread* or *buy bread in the supermarket*, both of which are VPs. In (6), the complement *of English* is the sister to the noun *student*; the adjunct *Italian* is adjoined to NP. In (4), the NP anaphor *one* replaces the NP *student of English*.

It has been pointed out by Radford (1981) and Culicover and Jackendoff (2005) (C&J), however, that the antecedents of *do so* and *one* are not necessarily continuous parts of sentences, as shown below:

(7)　a.　Robin <u>slept</u> for twelve hours <u>in the bunkbed</u>, and Leslie **did so** for eight hours.　[*do so* = sleep ... in the bunkbed]
　　b.　Robin <u>cooked Peking duck</u> on Thursday <u>in order to impress Ozzie</u>, and Leslie **did so** on Friday.
　　　　[*do so* = cook Peking duck ... in order to impress Ozzie]
　　　　　　　　　　　　　　　　(Culicover and Jackendoff 2005: 285)

(8)　a.　I put that silly <u>picture of Robin</u> from Mary <u>that was on the table</u> next to this artful **one** from Susan.
　　　　[*one* = picture of Robin ... that was on the table]
　　b.　I put that <u>silly picture of Robin</u> from Mary <u>that was on the table</u> next to this **one** from Susan.
　　　　[*one* = silly picture of Robin ... that was on the table]
　　　　　　　　　　　　　　　　(Culicover and Jackendoff 2005: 137)
　　c.　Jane has a <u>big</u> black <u>dog</u>, and Jean has a brown **one**.
　　　　[*one* = big ... dog]　　　　(Radford 1981: 117)

In (7a, b), the antecedents of *do so* are *sleep in the bunkbed* and *cook Peking duck in order to impress Ozzie*, respectively. However, they are not continuous parts of the sentences. Similarly, in (8a-c), the antecedents of *one* are *picture of Robin that was on the table*, *silly picture of Robin that was on the table*, and *big dog*, respectively; they are not continuous parts of the sentences, either.

Based on these facts, C&J claim that the *do so* and *one* substitution operations do not count as constituency tests or provide any evidence for the internal structures of VP and DP. They claim that syntactic structures are "flat" in the sense that there is no hierarchical distinction within VP and DP (more generally, XP). Under their analysis, the antecedents of *do so* and *one* are not determined by structural conditions, but rather by what they call indirect licensing (IL). The indirectly licensed constituent is taken as anaphoric to the antecedent in that its interpretation is constructed on the basis of that of the antecedent. Their formulations of *do so* anaphora and *one*-anaphora are given below (Culicover and Jackendoff 2005: 289, 292):

(9) *Do so* anaphora
　　Syntax: [$_{VP}$ [$_V$ do][$_?$ so] < YP$_i$ORPH>]^{IL}
　　CS: [$_{Action}$ F (...); ... <Y$_i$> ...]

(10) *One*-anaphora
　　Syntax: [$_{DP}$ <Det/NP$_i$ORPH1> < YP$_j$ORPH2> one < ZP$_k$ORPH3>]^{IL}
　　CS: [F (...); ... <X$_i$> <Y$_j$> <Z$_k$>...]

Putting the details aside, what (9) says is that in Syntax, a VP consisting of *do so* and an optional orphan YP (abbreviated as YP with superscript ORPH) is connected to an antecedent by IL. IL also connects the orphan YP to a target within the antecedent. After we establish the antecedent, the function F in the Conceptual Structure (CS) is constructed by reference to the antecedent. Let us consider (3a) (repeated here as (11)) as an example:

(11) John <u>bought bread</u> in the supermarket, and Bill **did so** in the corner shop.

According to (9), IL connects the VP *do so in the corner shop* to its antecedent *buy bread in the supermarket*, and the orphan *in the corner shop* to its target *in the supermarket* within the antecedent. The content of the function F can be copied from the CS of the antecedent, except that the target *in the supermarket* in the antecedent is substituted by the orphan *in the corner shop*. This provides the correct interpretation, *i.e.*, *buy bread in the corner shop*, for the VP *do so in the corner shop*. Similarly, what (10) says is that a DP consisting of *one* and optional orphans Det/NP, YP, and ZP are connected to an antecedent by IL. Let us consider (4) (repeated here as (12)) as an example:

(12) John likes the Italian <u>student of English</u>, but not the Spanish **one**.

According to (10), IL connects the DP *the Spanish one* to its antecedent *the Italian student of English*, and the orphans *the* and *Spanish* to their targets *the* and *Italian*. The function F can be constructed by reference to the antecedent. This provides the correct interpretation, *i.e.*, *the Spanish student of English*, for the DP *the Spanish one*. It should be noted that since their analysis does not refer to any structural notions, it can also accommodate cases like (7) and (8), where the antecedents of *do so* and *one* are not continuous parts of the sentences.

　C&J's analysis, however, cannot provide a principled account for well-known argument/non-argument asymmetries with respect to orphans. As shown in (3a) and (4), *do so* and *one* allow non-arguments to be their orphans; *in the corner shop* in (3a) and *the Spanish* in (4). On the other hand, *do so* and *one* do not allow arguments to be their orphans, as shown in (13) and (14):

(13) *John bought bread in the supermarket, and Bill **did so** <u>milk</u> in the corner shop.

(14) *John likes the Italian student of English, but not the Spanish **one** <u>of French</u>.

In (13, 14), the orphans include the arguments, *milk* and *of French*; the result is deviant. In order to accommodate this asymmetry, their analysis has to designate the orphan as a non-argument rather than an argument in CS. Under their notation of CS, arguments are placed in parentheses while non-arguments are separated off by a semicolon. In the CSs of (9, 10), the orphans are separated off by a semicolon, and therefore they are restricted to non-arguments. Although this notation makes the distinction between arguments and non-arguments, it only provides a stipulation, not an explanation, for this asymmetry.

Contrary to C&J's analysis, this paper argues that the traditional assumption is correct in claiming that *do so* and *one* can only substitute constituents. I will argue that apparent counterexamples like (7, 8) straightforwardly follow from the interweave of Merge and Transfer within a phase.

2.2 A Proposal

Section 2.1 has pointed out the puzzling fact that the antecedents of *do so* and *one* are not necessarily continuous parts of sentences. In this section, I will argue that the traditional observation that only constituents can function as the antecedents of *do so* and *one* anaphora is correct, and that the puzzling fact can be accounted for by the interweave of Merge and Transfer within a phase.

Let us consider (7a) and (8c) (repeated here as (15) and (16)) as examples:

(15) Robin <u>slept</u> for twelve hours <u>in the bunkbed</u>, and Leslie **did so** for eight hours.

(16) Jane has a <u>big</u> black <u>dog</u>, and Jean has a brown **one**.

This paper assumes that the interpretations of *do so* and *one* anaphora should be determined at LF by copying their antecedent. Let us first consider *do so*, taking (15) as an example. During the derivation of its first conjunct *Robin slept for twelve hours in the bunkbed*, we construct the following *v*P structure, where the argument *Robin* is merged cyclically:

(17) [$_{v}$P Robin [$_{v}$ [$_{VP}$ sleep]]]

It should be noted that this *v*P is "saturated," since it does not contain any probe or selector that needs to be satisfied. Hence, we may apply Transfer at stage (17) or later within the *v*P phase. Suppose that before we apply Transfer, we merge an

adjunct. Since there is no ordering restriction on applications of postcyclic merger of adjuncts, we merge either *for twelve hours* or *in the bunkbed* at this stage. Suppose that we merge *in the bunkbed* first, which yields structure (18):

(18) [*v*P Robin [*v* [VP [VP sleep] **[in the bunkbed]**]]]

At this stage, we apply LF-Transfer in the *v*P phase. Let us assume with Chomsky (2004; 2005; 2006) that PF/LF-Transfer sends the complement of a phase head to the PF/LF component. In the present case, LF-Transfer sends the complement of the phase head *v*, *i.e.* the larger VP *sleep in the bunkbed* to the LF-component, as depicted below:

(19) [*v*P Robin [*v* **[VP [VP sleep] [in the bunkbed]]**]]
⇩
LF-Transfer

The VP anaphor *do so* in the second conjunct copies this LF-transferred VP in the first conjunct, which yields the interpretation that the antecedent of *do so* is *sleep in the bunkbed*. We then adjoin *for twelve hours* to the smaller VP postcyclically, yielding (20):

(20) [*v*P Robin [*v* [VP [VP [VP sleep] **[for twelve hours]**] [in the bunkbed]]]]

At this stage, we apply PF-Transfer in the *v*P phase, which sends the complement of the phase head *v*, *i.e.* the largest VP *sleep for twelve hours in the bunkbed*, to the PF-component:

(21) [*v*P Robin [*v* **[VP [VP [VP sleep] [for twelve hours]] [in the bunkbed]]**]]
⇩
PF-Transfer

This PF-Transferred VP is subject to linearization in the PF-component.[ii] Let us consider how to linearize this PF-Transferred VP, especially the two rightward (right-adjoined) adjuncts.

   This paper basically adopts Kayne's (1994) antisymmetric theory of phrase structure, which is based on the hypothesis that what is structurally higher necessarily precedes what is lower (*i.e.*, the Linear Correspondence Axiom). Following Takano (2003), however, I assume that Kayne's antisymmetric view should be weakened. More specifically, rightward merger (rightward adjunction), which should not be allowed in the antisymmetric hypothesis, is needed to account for rightward adjuncts like *for twelve hours* and *in the bunkbed* in (21); such adjuncts are not subject to the antisymmetric hypothesis. Takano's

argument for positing rightward merger and thus weakening the antisymmetric hypothesis is made on the basis of the following facts (Branigan 1992: 45):

(22) a. John paints pictures **at all** well <u>only rarely</u>.
    b. John tells jokes **with any gusto** <u>only occasionally</u>.

In (22), the adjunct Negative Polarity Items (NPIs) *at all* and *with any gusto* are licensed by the rightmost adjuncts *only rarely* and *only occasionally*, respectively, which indicates that the rightmost adjuncts are located structurally higher than the preceding adjunct NPIs. This has led Takano to conclude that in the case of rightward adjuncts, what is structurally lower precedes what is higher. One might argue that rightward merger is not the only way to derive (22); there is a way of deriving (22) in accordance with the antisymmetric hypothesis. (22a), for example, could be derived by generating the licensing rightmost adjunct *only rarely* in a structurally higher position than the phrase containing the NPI *paints pictures at all well*, and moving *paints pictures at all well* over *only rarely*, as shown in (23). It should be noted that this analysis requires that the NPI *at all* should be licensed by *only rarely* under reconstruction:

(23) a. John only rarely [paints pictures at all well].
    b. John [$_\alpha$ paints pictures at all well] only rarely t_α.

Takano points out, however, that this antisymmetric analysis is untenable, since NPIs cannot be licensed under reconstruction, as observed by, among others, Laka (1990) and Phillips (1996):

(24) a. *[Buy **any records**]$_i$ she did<u>n't</u> t_i.   (Laka 1990: 195)
    b. *[Whose theory about **anything**]$_i$ does John <u>not</u> like t_i?
                                            (Phillips 1996: 53)

Given this property of NPIs, (22a) cannot involve derivation (23). Hence, the rightmost licensing adjuncts in (22) must be merged rightward (right-adjoined to VP) in a structurally higher position than the preceding NPIs. According to this "weakly antisymmetric" hypothesis, the PF-Transferred VP, *i.e.*, the largest VP, in (21) is correctly assigned the linear order *sleep for twelve hours in the bunkbed*. Hence, the interweave of Merge and Transfer within a phase enables us to account for (15), where the antecedent of *do so* is *sleep in the bunkbed*, which is a discontinuous part of the sentence.

    Let us next consider *one*, taking (16) as an example. Let us assume with, among others, Chomsky (2006) that in addition to CP and *v*P, DP also counts as a phase. During the derivation of its first conjunct *Jane has a big black dog*, we construct the following DP structure, where *a* and *dog* are merged cyclically:

(25) [$_{DP}$ a [$_{NP}$ dog]]

It should be noted that this DP is "saturated," since it does not contain any probe or selector that needs to be satisfied. Hence, we may apply Transfer at stage (25) or later within the DP phase. Suppose that we merge an adjunct before we apply Transfer. We may merge either *big* or *black* postcyclically at this stage. Suppose that we first merge *big*, as shown in (26). At this stage, we apply LF-Transfer to this DP phase, sending the complement of the phase head D, *i.e.* the larger NP *big dog*, to the LF-component:

(26) [$_{DP}$ a **[$_{NP}$ big [$_{NP}$ dog]]**]   (LF-Transfer)

Then, the NP anaphor *one* copies this LF-transferred NP *big dog* in the first conjunct, which results in the interpretation that the antecedent of *one* is *big dog*. We then merge (adjoin) *black* to the smaller NP postcyclically, yielding (27). At this stage, we apply PF-Transfer, sending the complement of D, *i.e.* the largest NP *big black dog*, to the PF-component:

(27) [$_{DP}$ a **[$_{NP}$ big [$_{NP}$ black [$_{NP}$ dog]]]**]   (PF-Transfer)

Linearization applies to this PF-Transferred NP, yielding the linear order *big black dog*.[iii] Hence, we can account for (16), where the antecedent of *one* is *big dog*, a discontinuous part of the sentence.

   Our analysis can also account for the argument/non-argument asymmetry with respect to *do so* and *one* anaphora, which C&J cannot account for in a principled way. Recall that although *do so* and *one* can co-occur with non-arguments, they cannot co-occur with arguments, as shown in (13) and (14) (repeated here as (28) and (29)):

(28) *John bought bread in the supermarket, and Bill **did so** <u>milk</u> in the corner shop.
(29) *John likes the Italian student of English, but not the Spanish **one** <u>of French</u>.

Let us consider (28) as an example. Under our analysis, the adjunct *in the supermarket* in the first conjunct may be merged before or after PF/LF-Transfer in the *v*P phase. Suppose that it is merged after PF-Transfer and LF-Transfer. The argument *bread*, on the other hand, must be merged cyclically, *i.e.*, before PF-Transfer and LF-Transfer, in the *v*P phase, as shown (30). At this stage, we apply PF-Transfer and LF-Transfer, sending the complement of *v* to the PF- and LF-components:

(30) [$_v$P John [v **[$_{VP}$ buy bread]**]]   (PF-Transfer and LF-Transfer)

The argument *bread*, therefore, must be part of the LF-Transferred VP. This LF-Transferred VP is copied by *do so* in the second conjunct, which yields (31):

(31) ..., Bill Tense **buy bread** milk in the corner shop.

In (31), the verb *buy* would have two objects at LF, *i.e.*, *bread* and *milk*, which violates the θ-criterion; the deviance of (28) follows. (29) can be accounted for in the same way.

2.3   Against "Hidden" Movement Analyses

One might argue that examples like (7) and (8), where the antecedents of *do so* and *one* are not continuous parts of sentences, could be accounted for without recourse to the interweave of Merge and Transfer if we assume "hidden" movement operations. Under "hidden" movement analyses, there would be a stage of derivation where the discontinuous parts are constituents. Let us consider (15) (repeated here as (32)) again as an example:

(32) Robin <u>slept</u> for twelve hours <u>in the bunkbed</u>, and Leslie **did so** for eight hours.

We would first generate underlying structure (33):

(33) [$_{VP}$ **[$_{VP}$ [$_{VP}$ sleep] [in the bunkbed]]** [for twelve hours]]

The VP-anaphor *do so* would substitute the intermediate VP *sleep in the bunkbed*, which would be a constituent at this stage. In order to derive the surface order, we would either move *in the bunkbed* rightward over *for twelve hours*, as shown in (34), or move *in the bunkbed* leftward followed by remnant movement of the VP, as shown in (35):

(34) [$_{VP}$ [$_{VP}$ [$_{VP}$ [$_{VP}$ sleep] t_α] [for twelve hours]] [$_\alpha$ in the bunkbed]]
(35) [$_{VP}$ sleep t_α for twelve hours] [$_\alpha$ in the bunkbed] t_{VP}

The "hidden" movement analysis is implausible, however, since the "hidden" movement operations involved here are not motivated by any principles, but stipulated simply for the purpose of making the discontinuous parts function as antecedents and yielding the correct surface order. Furthermore, as argued by C&J, there is evidence to cast doubt on the "hidden" movement analysis; there is

a fixed order among modifying adjuncts (C&J 2005: 138; cf. Jackendoff 1977)

(36) a.   the man arrested in the park who was carrying a rifle
     b.   *the man who was carrying a rifle arrested in the park

As shown in (36), when the two adjuncts *arrested in the park* and *who was carrying a rifle* modify the same NP *man*, the former must precede the latter. Let us then consider the following example:

(37) the <u>man</u> arrested in the park <u>who was carrying a rifle</u> and the **one** found
     hiding in the gazebo   [*one* = man who was carrying a rifle]
                             (Culicover and Jackendoff 2005: 138)

In (37), the antecedent of *one* is a discontinuous part of the sentence, *i.e.*, *man who was carrying a rifle*. Under the "hidden" movement analysis, the underlying structure of (37) would be as follows:

(38) [$_{DP}$ the [$_{NP}$ [$_{NP}$ [$_{NP}$ man] [who was carrying a rifle]] [arrested in the
     park]]]

The NP anaphor *one* would substitute the intermediate NP *man who was carrying a rifle*. We would then either move *who was carrying a rifle* rightward over *arrested in the park* or move *who was carrying a rifle* leftward followed by remnant movement of the NP; this would yield the correct surface order. Although it is mechanically possible for the "hidden" movement analysis to arrange a derivation that creates the antecedent *man who was carrying a rifle* for the purpose of the NP anaphora *one*, it would have to assume underlying structure (38), which cannot exist on the surface, as shown by the deviance of (36b). This casts serious doubt on the "hidden" movement analysis. Our analysis, on the other hand, can account for (37) without positing any non-existent structure throughout its derivation, as shown below:

(39) a.   [$_{DP}$ the [$_{NP}$ man]]
     b.   [$_{DP}$ the **[$_{NP}$ [$_{NP}$ man] [who was carrying a rifle]]**]   (LF-Transfer)
     c.   [$_{DP}$ the **[$_{NP}$ [$_{NP}$ [$_{NP}$ man] [arrested in the park]] [who was
          carrying a rifle]]**]   (PF-Transfer)

First, as shown in (39a), *the* and *man* are merged cyclically. We then merge the adjunct *who was carrying a rifle* to the NP, as shown in (39b). At this stage, we apply LF-Transfer, sending the complement of D, *i.e.*, the larger NP *man who was carrying a rifle*, to the LF-component. The NP anaphor *one* in the second conjunct copies this LF-transferred NP in the first conjunct, which correctly

yields the interpretation that the antecedent of *one* is *man who was carrying a rifle*. We then merge the other adjunct *arrested in the park* to the lower NP postcyclically, as shown in (39c). We apply PF-Transfer to (39c), correctly yielding the linear order *man arrested in the park who was carrying a rifle*. It should be noted that under our analysis, at no stage of this derivation do we have to posit structure (38), which cannot exist on the surface.

This section was concerned with the PF-LF mismatch phenomena regarding anaphoric expressions *do so* and *one*. I have argued that the interweave of Merge and Transfer within a phase enables us to account for the *do so* and *one* anaphor facts in a principled way. In the next section, I will argue that the interweave of Merge and Transfer can also account for radical reconstruction phenomena with Japanese scrambling, another instance of PF-LF mismatch phenomena.

3 Radical Reconstruction with Japanese Scrambling

Let us first consider the following examples (Saito 1989: 190):

(40) a. [John-ga   Mary-ni   [**dare-ga**   kuru **ka**] osieta] (koto)
            -Nom   -Dat **who-Nom** come **Q** taught (fact)
         'John told Mary Q who is coming.'
      b. *[John-ga   **dare-ni** [Mary-ga   kuru **ka**] osieta] (koto)
            -Nom **who-Dat**   -Nom come **Q**   taught (fact)
         'John told who Q Mary is coming.'

In (40), only the embedded clause, which is marked by the Q-morpheme *ka*, is an interrogative. While the *wh*-phrase *dare-ga* 'who' is contained within the embedded clause in (40a), the *wh*-phrase *dare-ni* 'who-Dat' is not in (40b).   The contrast between (40a) and (40b) indicates that a *wh*-phrase must be contained within an interrogative clause. Let us next look at the following example:

(41) a. [Mary-ga [John-ga   **dono hon-o**   tosyokan-kara karidasita
                 -Nom   -Nom **which book-Acc** library-from   checked-out
            ka] siritagatteiru] (koto)
            Q   want-to-know (fact)
            'Mary wants to know which book John checked out from the library.'
      b. ?[**dono hon-o** [Mary-ga [John-ga *t* tosyokan-kara karidasita **ka**]
            siritagatteiru]](koto)   (Saito 1989: 191-192)

(41b) is derived from (41a) by scrambling of the *wh*-phrase *dono hon-o* 'which book-Acc' to the matrix clause. Although the *wh*-phrase is not contained within the embedded interrogative clause, it can still take embedded scope. Based on

this fact, Saito (1989) argues that scrambling can be undone, *i.e.*, the scrambled phrase can be totally reconstructed, in the LF-component. In (41b), the scrambled phrase is totally reconstructed in the LF-component, and contained within the interrogative clause; this satisfies the licensing condition on *wh*-phrases. It remains an unsettled question, however, why scrambling can be undone. I argue that this property of scrambling straightforwardly follows from the interweave of Merge and Transfer within a phase together with the assumption that scrambling is an optional movement (see, among others, Fukui 1993 and Saito and Fukui 1998). Given that scrambling is an optional movement and thus not triggered by any probe or selector, it should be treated on a par with merger of an adjunct. This allows scrambling to be interweaved with PF-Transfer and LF-Transfer within a phase.

Let us consider (41b). During its derivation, we construct the following *v*P structure cyclically[iv]:

(42) [$_{v}$P John-ga   [[$_{VP}$ dono   hon-o   tosyokan-kara karidasu] *v*]]
          -Nom   which book-Acc library-from   check-out

At this stage, we apply LF-Transfer to (42) in the *v*P phase, sending the complement of the phase head *v*, *i.e.* the VP *dono hon-o tosyokan-kara karidasu* 'which book-Acc library-from check-out' to the LF-component:

(43) [$_{v}$P John-ga   [[**$_{VP}$ dono hon-o   tosyokan-kara karidasu] *v*]]**
          -Nom   **which book-Acc library-from   check-out**

It should be noted that the *wh*-phrase *dono hon-o* 'which book-Acc' is interpreted in-situ at LF before undergoing scrambling. Since it is contained within the embedded interrogative clause, it satisfies the licensing condition on *wh*-phrases. The *wh*-phrase *dono hon-o* 'which book-Acc' gets devoid of its LF-content at this stage. We then apply scrambling to *dono hon-o* 'which book-Acc', which only has its PF-content, and merge it with *v*P postcyclically, yielding (44). We apply PF-Transfer to (44) in the *v*P phase, sending the complement of *v*, *i.e.* the VP *t$_i$ tosyokan-kara karidasu* '*t$_i$* library-from check-out' to the PF-component:

(44) [$_{v}$P dono hon-o$_i$ [$_{v}$P John-ga   [[**$_{VP}$ *t$_i$* tosyokan-kara karidasu] *v*]]]**
          which book-Acc   -Nom   **library-from   check-out**

Linearization applies to this PF-transferred VP, yielding the linear order *tosyokan-kara karidasu* 'library-from check out'. It should be noted that the copy/trace left by scrambling is immune from linearization. The *wh*-phrase *dono hon-o* 'which book-Acc' undergoes successive cyclic movement to its final landing site, *i.e.*, the matrix TP-adjoined position, as shown in (45):

(45) [CP [TP **dono hon-o¡**   [TP **Mary-ga**   [**John-ga ...**
        which book-Acc   **-Nom**   **-Nom**

We apply PF-Transfer as well as LF-Transfer in the matrix CP phase, sending the complement of the phase head C, *i.e.* the larger matrix TP, to the PF- and LF-components. It is important to note that the scrambled phrase *dono hon-o* 'which book-Acc', which has already been transferred to the LF-component in the embedded *v*P phase, is transferred to the PF-component and hence assigned its linear order at this stage. The *wh*-phrase *dono hon-o* 'which book-Acc' receives its LF interpretation in-situ in the embedded *v*P phase (43), and then receives its PF-interpretation at the matrix TP-adjoined position in the matrix CP phase (45). Hence, our analysis can account for the radical reconstruction property of Japanese scrambling.[v]

4. Conclusion

In this paper, I have proposed that merger of an adjunct, but not merger of an argument, may be interweaved with PF-Transfer and LF-Transfer within a phase. It is shown that our analysis gives us a unified account of the two puzzling PF-LF mismatch phenomena which have been assumed to be totally unrelated to each other, *i.e. do so* and *one* anaphora and the radical reconstruction property of Japanese scrambling.

Notes

[i] Assuming the previous minimalist model, Nissenbaum (2000) argues that Spell-Out (PF-Transfer in the present term) may apply before merger of an adjunct and thus merger of an adjunct may be interweaved with PF-Transfer within a phase. Our analysis differs from Nissenbaum's in that not only PF-Transfer but also LF-Transfer may be interweaved with merger of an adjunct within a phase, which enables us to account for PF-LF mismatch phenomena which are to be presented below.
[ii] I argue that the adjunct *for twelve hours*, which has not been transferred to the LF-component in this *v*P phase, undergoes LF-Transfer in the next CP phase. A question arises how the adjunct, which is within VP, is still accessible in the next CP phase. Given the definition of domination based on the category/segment distinction proposed by May (1985), the adjunct *for twelve hours* is not dominated by VP. I argue that those elements like the VP adjunct *for twelve hours* which are not dominated by the transferred domain are still "accessible" and thus may undergo Transfer in the next phase.
[iii] Note that the adjunct *black* undergoes LF-Transfer at the next *v*P phase.
[iv] In what follows, I assume for expository purposes that Japanese is right-headed in its base structure, which is contrary to Kayne's (1994) universal Specifier-Head-Complement word order hypothesis. It should be noted that discussions to follow hold irrespectively of whether Japanese is right-headed or left-headed in its base structure.
[v] Sauerland and Elbourne (2002) claim that scrambling is a PF-movement, which accounts for its radical reconstruction property. Their analysis, however, cannot account for binding facts; there are

cases where scrambled phrases function as antecedents for anaphors and thus have effects on LF. In (i), for example, the scrambled phrase *karera-o* 'they-Acc' functions as an antecedent for the reciprocal *otagai* 'each other'. (Saito 2003: 485):

(i) ?**Karera-o** [[otagai-no sensei]-ga   *t* hihansita] (koto)
     they-Acc   each other-Gen teacher-Nom   criticized (fact)
     'Each other's teacher criticized them.'

For further discussion of binding facts under the analysis proposed here, see Ishii (2007).

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