Multiple Spell-Out and PF Adjacency

Masao Ochi
University of Connecticut

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0.   Introduction

Recent development in the generative enterprise often referred to as Minimalism (cf. Chomsky 1993, 1995) involves some critical changes from the Extended Standard Theory of Chomsky (1981), one of which is the overall architecture of the computational system. D-structure and S-structure have been eliminated (mainly) on the grounds that postulating such internal interface levels is beyond virtual conceptual necessity (cf. Chomsky 1993). Instead, Generalized Transformation (GT), which was originally proposed in Chomsky (1955), has been revived (under the new name Merge) as an operation for concatenating phrase markers. With regard to branching to PF and LF, the operation Spell-Out is postulated to apply at an arbitrary point in the derivation, stripping away the features relevant for phonology and sending them off to PF (cf. Chomsky 1993 and 1995).

As Uriagereka (to appear) points out, one stipulation in this new picture is that Spell-Out applies only once. If Spell-Out is an operation, Uriagereka reasons, nothing in principle bans its repeated application in a single derivation (although its application may as well be subject to economy considerations). Chomsky (1997, 1998) and Uriagereka (to appear) propose to dispense with this stipulation by reviving an old idea entertained in the seventies: cyclic access to PF (cf. Bresnan 1971), and what amounted to the precursor of LF at that time (cf. Jackendoff 1972 and Lasnik 1972).

For instance, Chomsky (1997) suggests that Spell-Out operates iteratively in the course of a derivation, applying as part of the checking of an uninterpretable feature.[1] He suggests that this type of model overcomes a problem with a single Spell-Out model noted in Chomsky (1995: Chapter 4, fn. 50), namely, the fact that uninterpretable features may have a PF reflex even when checked and erased in overt syntax.[2] For instance, the fact that

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[1] See also Epstein et al. (1998) for a strictly derivational approach.

[2] Uriagereka (to appear) proposes the multiple Spell-Out model in connection with Kayne's (1994) Linear Correspondence Axiom (LCA). The LCA will be discussed in section 3.

we hear the nominative Case of the embedded subject in (1) is puzzling under the (standard) single Spell-Out model (Chomsky 1995), since it would mean that the uninterpretable Case feature can be accessed by the computational system at the point of Spell-Out, although it is already erased in overt syntax.

(1)   Mary thinks that he left.

The multiple Spell-Out model offers a solution. At the point in the derivation where the Case feature of the embedded subject is checked off (by fronting the pronoun to the spec of the embedded IP), Spell-Out applies as part of the uninterpretable feature checking and the relevant structure is sent to PF before the feature in question is erased.

(2)   a.   he INFL $[_{VP}$ (he) left]   -> Spell-Out
      b.   Mary thinks that he INFL $[_{VP}$ (he) left]   -> Spell-Out

In the following, I argue that this hypothesis, coupled with a specific assumption about how cyclicity and adjunction operations interact (cf. Lebeaux 1988), offers a solution to a problem for a PF merger account of constructions such as English verbal morphology (cf. Bobaljik 1994, 1995, Halle and Marantz 1993, and Lasnik 1995, based on Chomsky (1957)) and the curious correlation between V-raising and object shift (OS) in Germanic languages (i.e., Holmberg's (1986) generalization). The paper is organized as follows. In section 1, I first summarize the PF merger approach to English verbal morphology and the correlation between V-raising and OS in Germanic (known as Holmberg's generalization). In section 1.3, a potential problem for this account is presented. In section 2, I demonstrate how the multiple Spell-Out model offers a solution. Some questions regarding the proposed account are addressed in section 3. Concluding remarks are given in section 4.

1.   Germanic verbal morphology and PF merger

In this section, I summarize a PF merger account of verbal morphology in Germanic languages. The reader is referred to Bobaljik (1994, 1995) and Lasnik (1995) for a comprehensive discussion of this issue.

1.1   English verbal morphology

Bobaljik (1994, 1995) and Lasnik (1995) offer a PF merger account of English verbal morphology.[3] As Chomsky (1957) originally showed, one environment in which *do*-support applies is when *not* is present, intervening between INFL and the main verb, as shown in (3b-c).[4]

(3)   a.   John left.
      b.   *John not left.
      c.   John did not leave.

Bobaljik (1994, 1995) and Lasnik (1995) propose that INFL in English is affixal and hence must merge with a verb under adjacency at PF. The following statement is from Lasnik (1995).

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[3] Their PF merger account is based on Chomsky (1957), although Chomsky has a transformational rule (affix hopping) instead of PF merger. See also Halle and Marantz (1993) for a PF merger account of English verbal morphology couched in terms of distributed morphology.

[4] In Section 3, I will discuss another environment in which *do*-support applies, i.e., when subject-aux inversion occurs.

(4)   Affixal INFL must merge with a V, a PF process (distinct from head movement) demanding adjacency.

Assuming that traces do not disrupt PF adjacency,[5] INFL and the main V are adjacent in (3a), as shown in (5a). Hence PF merger successfully applies in this case. But when *not* is present as in (3b), the PF merger is blocked and *do*-support, a language-specific operation, takes place to save the affixal INFL from violating some condition such as Lasnik's (1981) Stranded Affix Filter (SAF).

(5)   a.   John INFL [$_{VP}$ (John) leave]
               |_____| PF merger
        b.   John INFL not [(John) leave]
               |_____*_____| PF merger blocked

1.2   Holmberg's (1986) generalization

Bobaljik (1995) further extends an application of PF merger to the verbal morphology of other Germanic languages. In particular, he suggests that Holmberg's (1986) generalization, stated below, is deducible from the fact that INFLs in Germanic languages are affixal, thus being required to undergo PF merger.

(6)   Object shift (OS) is possible only if the (main) verb raises out of the VP.
                                                               (Holmberg 1986)

The following set of data illustrates the effect of (6). When the main verb is raised out of the VP, the object NP is free to move out of the VP, as is shown in (7). In cases where the main V does not raise out of the VP, such as in embedded clauses (8), the object cannot shift.[6]

(7)   Á barnum drakk stúdentinn bjórinn stundum   (bjórinn).
        In bar.the drank student.the beer.the sometimes
        'In the bar, the student sometimes drank all the beer.'   (Icelandic)

(8)   a.   Det var godt at   Peter ikke kØbte den.
               it   was good that Peter not   bought it
               'It was good that Peter didn't buy it.'

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[5] This assumption may seem problematic in light of *wanna*-contraction, since it is often assumed (cf. Jaeggli (1980)) that *wanna*-contraction is blocked in examples like (ib) because the copy of *who* intervenes between *want* and *to*, blocking the process of contraction at PF.

(i)   a.   Who do you want PRO to (-> wanna) invite (who)?
        b.   Who do you want (who) to (-> *wanna) invite Mary?

However, there are recent accounts of *wanna*-contraction which do not rely on such an assumption. For instance, Bošković (1997) argues that it is the C head (responsible for Case checking the embedded subject *who*) which blocks *wanna*-contraction in (ib). Bošković argues that there is no embedded CP projection in (ia) (PRO being Case marked by the INFL), thus accounting for the contrast in (i).

[6] It has been a matter of controversy whether OS in Germanic languages is A-movement (cf. Bobaljik 1995 and Holmberg and Platzack 1995 among others). I will assume in this paper that the relevant movement is A-movement into the spec of AGRoP, although the exact nature of the movement does not affect our discussion.

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    b.   *Det var godt at   Peter den ikke kØbte (den).
             it   was good that Peter it   not bought   (Danish)

Bobaljik (1995) suggests that Holmberg's generalization can be derived from the adjacency requirement on PF merger.[7] Let us summarize his analysis below.

We first consider (7), in which both the main verb and the object raise out of the VP. The exact location of the verb *drakk* 'drank' is not of central importance. What matters is that it is located in a fairly high position, preceding the subject NP *stúdentinn* 'the student.' Bobaljik suggests that adjacency required for PF merger between the INFL and the main V is trivially satisfied in this case, since the V has raised to INFL (and presumably the INFL-V complex has raised further) in overt syntax. Hence OS is permitted, as it does not disrupt adjacency between INFL and the main V.

(9)   [In the bar V-INFL [the student (V-INFL) the beer [$_{VP}$ sometimes (V) ..]]]
         ↑_____|↑_____|

Let us now consider (8), in which the main V does not raise out of the VP and, consequently, OS is not allowed. Bobaljik claims that this lack of OS is due to the fact that the object, if shifted into a VP-external position between INFL and the V, would disrupt adjacency necessary for PF merger.

(10)   a.   ... [that Peter INFL [(not) (Peter) buy it]]
                   |_____| PF merger
      b.   *... [that Peter INFL it [(not) (Peter) buy (it)]]
                      |_____*_____| PF merger blocked

To sum up, the PF merger approach is argued to offer a comprehensive account of this aspect of verbal morphology in Germanic languages.

1.3   A problem for PF merger

One potential problem with this PF merger account, as noted by both Bobaljik (1994, 1995) and Lasnik (1995), is that adverbials do not disrupt adjacency required for PF merger. For example, *quickly* in the following English case does not block PF merger, unlike *not*, although it must occur between a verb and INFL as shown in (12).[8]

(11)   a.   John quickly left.
      b.   John INFL quickly (John) leave
                   |_____| PF merger not blocked

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[7] According to authors such as Koopman (1995) and Vikner (1991), Holmberg's generalization obtains in SVO Germanic languages but systematically fails to obtain in SOV Germanic languages. This fact casts doubt on a purely syntactic approach to derive the effect of Holmberg's generalization (cf. Bobaljik and Jonas (1996) among others, based on Chomsky's (1993) 'equidistance'), since it is not immediately obvious under such an account how such a cross-linguistic difference is to be derived.

[8] As Howard Lasnik (p.c.) points out, examples such as (i) below from Lasnik (to appear) (see also Oku 1996) may be indicating that manner adverbials can occur above (and hence preceding) INFL in certain cases. If so, the adjacency problem for PF merger does not arise.

    (i)   John partially lost his mind, and Bill completely did.

Given that there is no principled account of the contrast between (12b) and (i), however, I continue to assume that there is an adjacency problem to be solved.

(12)   a.   John [$_I$ will [quickly leave]].
         b.   *John quickly [$_I$ will leave].

Also, for other Germanic cases, the shifted object blocks PF merger when it intervenes between INFL and the main V as we saw above, but elements such as *ikke* 'not' do not.[9]

(13)   Det var godt at   Peter INFL ikke kØbte den.
         it   was good that Peter INFL not   bought it
                                    |_____| PF merger not blocked

Thus, descriptively, presence of an overt lexical element Z (i.e., English *not* and shifted objects in other Germanic languages) disrupts adjacency between X and Y in (14a), unless Z is an adverbial element as shown in (14b).

(14)   a.   ... X Z Y ...   -> PF merger of X and Y blocked by Z
         b.   ... X adverb Y ...   -> PF merger of X and Y not blocked

Bobaljik (1995: 57) speculates that some kind of argument/adjunct asymmetry might play a role in phonology, citing Cheng (1990) and Selkirk (1972) among others, yet does not offer a principled solution to this problem. In the next section, I will explore a possible solution for this problem.

2.   Proposal

In order to offer a solution for the adjacency problem, I adopt the following two hypotheses, which are independently motivated.

(15)   a.   Adjunction operations are not subject to the ·cycle (cf. Lebeaux 1988, Chomsky 1993).
         b.   Spell-Out applies iteratively (cf. Chomsky 1997, 1998, and Uriagereka to appear).

Let us review the motivations for the two hypotheses. First, (15a) is motivated by the following well-known asymmetry with respect to reconstruction effects between complements and adjuncts (cf. Freidin, 1986). (16b), in which the R-expression *John* is contained in an adjunct within the fronted wh-phrase, is fine with *John* and *he* being coreferential. In contrast, (16a) is judged to be ungrammatical under the relevant reading, where *John* is part of the complement clause within the fronted wh-phrase.[10]

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[9] More recently, Holmberg (1997) has provided an alternative way to analyze the nature of Holmberg's generalization. According to Holmberg (1997: 210), OS is a PF-movement, which must be string vacuous (i.e., cannot be across an element which is phonologically overt). Thus, in cases such as (i) below, the PF movement of *den* 'it' is blocked by the presence of the verb *kØbte* 'bought.'

     (i)   *Det var godt at   Peter den ikke kØbte (den).
             it   was good that Peter it   not bought

Note that this account would also face a similar problem in the sense that this PF movement "is not blocked ... by adjuncts (Holmberg 1997: 208)," as shown in (ii).

     (ii)   Á barnum drakk stúdentinn bjórinn stundum   (bjórinn).
             In bar.the drank student.the beer.the sometimes
                                        ↑_____|

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(16)   a.   *[Which claim that John$_i$ was asleep] did he$_i$ deny?
        b.   [Which claim that John$_i$ made] did he$_i$ deny?

Lebeaux (1988) claims that this contrast is accounted for by assuming the following.

(17)   a.   Adjuncts can be inserted acyclically.
        b.   Condition C applies throughout the derivation.

According to Lebeaux, (16a) violates Condition C before wh-movement takes place. Its derivation is illustrated below. Note that the clause *that John was asleep* must be inserted in D-Structure as it is analyzed by Lebeaux (1988) as a complement to N.

(18)   a.   he deny which claim that John was asleep
        b.   Wh-movement
                [which claim that John was asleep] did he deny (which claim that John was asleep)

        In contrast, since adjuncts such as relative clauses need not be introduced cyclically, it is possible for *that John made* in (16b) to be merged into the structure after wh-movement has taken place. There is no Condition C violation in the derivation illustrated below.

(19)   a.   [he deny which claim]
                [that John made]
        b.   Wh-movement of *which claim*
                [[which claim] did he deny (which claim)]
                [that John made]
        c.   Acyclic merger of the relative clause
                [which claim] [that John made] did he deny (which claim)

        Let us turn to (15b). As mentioned before, Chomsky (1997, 1998) motivates the multiple Spell-Out model on the basis of the fact that uninterpretable features may have a PF reflex even when checked and erased in overt syntax. I will thus assume that Spell-Out applies as part of the checking of an uninterpretable feature.

        Let us now examine the paradigm in (8), repeated below.

(20)   a.   Det var godt at   Peter ikke kØbte den.
                it   was good that Peter not   bought it
                'It was good that Peter didn't buy it.'   (Danish)
        b.   *Det var godt at   Peter den ikke kØbte (den).
                 it   was good that Peter it   not bought

        We first consider (20a). Recall that the question is why elements like *ikke* 'not' do not disrupt adjacency between INFL and the main V. I assume, crucially, that *ikke* is a (VP-) adjunct and hence has the option of being inserted acyclically. Keeping this in mind, let us consider the following derivation.

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[10] See Kuno (1997), Lasnik (1998), and Postal (1997) for critical discussion of the contrast in (16). Note that Bošković and Lasnik's (to appear) analysis also allows certain cases of acyclic lexical insertion, which would also give us the desired effect. In the text, I will adopt Lebeaux's (1988) analysis mainly because of its familiarity to the readers.

(21)   a.   [$_{vp}$ Peter buy it]
       b.   Lexical insertion of INFL (followed by movement of subject)
           Peter INFL (AGRo) [$_{vp}$ (Peter) buy it]
             |_____| -> Spell-Out (Merger applies)
       c.   Acyclic insertion of *ikke* 'not'
           Peter INFL (AGRo) [$_{vp}$ ikke [$_{vp}$ (Peter) buy it]]

At the point in the derivation shown in (21b), where INFL is merged with the VP (triggering movement of subject), *ikke* 'not' is not yet introduced into the structure. Notice that at this point, INFL and the main V are adjacent, and under the multiple Spell-Out model, such information can be sent off to PF 'on-line.' Thus, merger applies successfully in PF. Later, *ikke* 'not' is inserted acyclically into the position between the INFL and the main V, thus wiping out the adjacency between the INFL and the V, but the PF merger has already applied successfully. Hence this derivational approach to PF merger accounts for the fact that elements like *ikke* 'not' apparently do not block PF merger. According to our analysis, it is sufficient that there is a single point somewhere in the derivation which satisfies the necessary adjacency requirement for PF merger.

Let us turn to (20b). I assume that OS is triggered by the need to check off some strong feature(s) of AGRo, which, according to Chomsky (1995: chapter 4), must be eliminated as soon as it is introduced in the tree.[11] This requirement has the effect of forcing OS before INFL is merged with the rest of the structure (i.e., OS is subject to strict cyclicity). It then follows that, unlike in the previous case, there is no point in the derivation where INFL and the main V are adjacent (even) under the multiple Spell-Out model.

(22)   a.   [$_{VP}$ Peter buy it]
       b.   Lexical insertion of AGRo (followed by OS)
           [$_{AGRoP}$ it AGRo [$_{vp}$ Peter buy (it)]]
       c.   Lexical insertion of INFL (followed by movement of subject)
           Peter INFL [$_{AGRoP}$ it (AGRo) [$_{vp}$ (Peter) buy it]
             |_____*_____| PF Merger blocked

For us, therefore, the curious asymmetry between adverbials and shifted objects under Bobaljik's account is attributed to the distinction between the elements which can be merged acyclically (into a position between INFL and the main V) and those which cannot.

Let us consider the derivation of the English paradigm in (11a), repeated below, under this analysis.

(23)   John quickly left.

At the point of the derivation at which INFL with a strong feature is introduced into the tree, the subject *John* is attracted to check off this strong feature, as shown in (24a-b). Spell-Out applies as part of uninterpretable feature checking, and INFL and the main V undergo merger at PF. The syntactic derivation proceeds further, and the adverb *quickly* is acyclically merged with the VP, as shown in (24c).

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[11] I must leave open the question of why OS need not take place in some cases, as the grammaticality of (20a) apparently shows. See Bobaljik (1995) for a potential solution.

(24) a.   [$_{VP}$ John leave]
      b.   Lexical insertion of INFL (followed by movement of subject)
              John INFL [$_{VP}$ (John) leave]
              |_____| -> Spell-Out (and Merger applies)
      c.   Acyclic insertion of *quickly*
              John INFL [$_{VP}$ quickly [$_{VP}$ (John) leave]]

Thus, PF merger is successfully applied in the PF component at the point of Spell-Out shown in (24b).

      Let us turn to the example in (3b), repeated below.

(25)   *John not left.

If it were possible to insert this element acyclically, then we would get *John not left*.

(26) a.   INFL [$_{VP}$ John leave]
      b.   Lexical insertion of INFL (followed by movement of subject)
              John INFL [$_{VP}$ (John) leave]
              |_____| -> Spell-Out (and Merger applies)
      c.   Acyclic insertion of *not*
              John INFL not [$_{VP}$ (John) leave]
      d.   *John not left.

Thus, we must prevent *not* from being inserted acyclically. But how do we distinguish *not* from other adverbials? Following authors such as Iatridou (1990), Pollock (1988) and Potsdam (1997), I assume that *not* in English is not an adjunct but rather is the head of NegP, and hence cannot be inserted acyclically.[12] Still, this begs the question of why this is so, and I do not have a good answer to offer at this point. But whatever an ultimate account would be, something special must be said about *not*, since other negative elements like *never* do not block PF merger, as shown in (27b).[13] Note that negative elements in other Germanic languages (*ikke* in Danish and *ekki* in Icelandic etc.) also do not block PF merger, suggesting that the English *not* is exceptional in this respect.[14]

(27) a.   John did not leave.   (*John not left.)
      b.   John never left.   (*John did never leave.)

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[12] But see Ernst (1992) among others for a critical discussion of this hypothesis.

[13] Note that the distribution of *never* is somewhat freer than that of *not*. In particular, *never* can precede or follow modals like *will*, while *not* necessarily follows them, as shown below. (ib) is of particular interest to us, since, assuming that modals like *will* occupy a position at least as high as INFL, this example shows that *never*, unlike *not*, can optionally appear in a position which does not disrupt adjacency between INFL and the main V. If so, the fact that *never* does not interfere with PF merger is not surprising.

      (i)   a.   John will never leave here.
             b.   John never will leave here.
      (ii)   a.   John will not leave here.
             b.   *John not will leave here.

Of course, our ultimate goal is to explain why there is such a difference in distribution between the two elements.

[14] Another question is whether *not* in constituent negation would block PF merger. This is difficult to test, since clear cases of constituent negation involve modals (as in *John can not talk to Mary*). According to Hiramatsu (1998), declaratives without a modal (such as *John did not talk to Mary*) lack the constituent negation reading. See also Baltin (1993) for much relevant discussion.

3. Theoretical questions

There are many theoretical questions raised by the proposed account. I will discuss three of them in this section.

3.1 Multiple Spell-Out and acyclic insertion

First, recall that our analysis is crucially built on the two independently motivated claims in (15), repeated below.

(28)   a.   Adjunction operations are not subject to the cycle.
          b.   Spell-Out applies iteratively.

While both derivational in character, are these two claims really compatible with each other? For instance, what does it mean to insert an element acyclically when Spell-Out operates (strictly) in a bottom-up fashion?

Let us take a concrete example to address this issue. In the following derivation in (29) for *John completely finished the project*, Spell-Out applies when the subject DP *John* is raised out of the VP into the projection of INFL, as in (29b). Merger applies and the linear order of the sequence is determined in PF: *<John, finish-ed, the, project>*. The syntactic derivation proceeds and *completely* is inserted acyclically. Spell-Out applies again later in the derivation and this time, the linear order should be *<John, completely, finish-ed, the, project>*.

(29)   a.   INFL [$_{VP}$ John finish the project]
          b.   John INFL [$_{VP}$ (John) finish the project]
                |_____| -> Spell-Out (and Merger applies)
                <John, finish-ed, the, project>
          c.   John INFL [$_{VP}$ completely [$_{VP}$ (John) finish the project]]
                <John, completely, finish-ed, the, project>

But these iterative linearization steps may not be possible if we assume 1) Epstein's (to appear) derivational c-command and 2) Chomsky's (1994, 1995) claim that Kayne's (1994) Linear Correspondence Axiom (LCA) applies at PF, mapping the syntactic object into a linear order. In particular, *completely* and *John* would fail to be ordered with respect to each other, since at the point shown in (29b), where *John* is merged with the already-concatenated object, *completely* is yet to be introduced into the structure.[15] Hence, under a strongly derivational approach, it is not clear that an element acyclically inserted can be ordered with other elements.

Although the issue remains unresolved, it should be noted that adjuncts pose a problem for the LCA independently of our approach. For instance, Ernst (1999) among others argues based on scope facts that postverbal adjuncts are right-adjoined, a situation which is not compatible with the LCA.

(30)   He knocked on the door intentionally twice.
          twice > intentionally, *intentionally > twice

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[15] See Collins (1997) and Kawashima and Kitahara (1996) among others for discussion of this issue.

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Thus, more research on the issue of linearization of adjuncts is necessary if we adopt the LCA.[16]

Of course, even if we disregard the linearization problem, questions still remain regarding the status of acyclic insertion within the multiple Spell-Out model. For instance, under Uriagereka's (to appear) analysis, a spelled-out phrase marker is viewed as some object akin to a word or a lexical compound in the sense that its internal information can no longer be accessed by the computation. If this is so, inserting an element (acyclically) into a phrase already spelled-out would be similar to inserting an element inside a word or a compound, an operation which is generally disallowed. Note, however, that there are in fact grammatical morphemes which split up a word or a morpheme (i.e., infixes). Thus there is no a priori reason to ban acyclic insertion into a spelled-out phrase marker, even if we adopt Uriagereka's analysis in its literal sense.

3.2   More on acyclic insertion

Secondly, we must also say something about the ungrammaticality of (31), which would be derived if *quickly* is inserted cyclically (and hence blocking PF merger). How do we account for this ungrammaticality?

(31)   *John did quickly leave.

(32)   a.   [$_{VP}$ John leave]
        b.   Cyclic insertion of *quickly*
                [$_{VP}$ quickly [$_{VP}$ John leave]]
        c.   Lexical insertion of INFL (followed by movement of subject)
                John INFL [$_{VP}$ quickly [$_{VP}$ (John) leave]
                |_____*_____| PF Merger blocked

There are at least two directions that come to mind. One possibility is to pursue the idea that *do*-support is a last resort operation and thus if there is a derivation available which need not employ *do* (i.e., if there is a derivation in which PF merger is successfully applied), that option should be chosen. Then, since there is a derivation in which *quickly* is inserted acyclically (cf. 24), the above derivation is blocked. However, this line of reasoning invokes a global computation, which is generally assumed to be conceptually unappealing. The other direction is to investigate the nature of acyclic insertion. For instance, if we assume with Ishii (1997) and Stepanov (1998) that adjuncts are necessarily inserted acyclically, then we would be able to block the derivation leading to (31) without invoking a global computation.[17]

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[16] In this connection, I note the proposal made by Martin and Uriagereka (1998), according to which adjuncts do not have a label (an idea originally due to Chametzky 1996), and thus cannot be linearized by the LCA (hence their PF order must be decided on the basis of other matters). This potentially gives us some means to circumvent the problem that the proposed analysis faces with the LCA, but it is beyond the scope of this paper to give any substance to this line of proposal.

[17] By forcing adjuncts to be inserted acyclically, the two authors attempt to derive the Adjunct Condition effects shown in (i), which constitute a serious problem for the Attract view of movement (cf. Chomsky 1995: chapter 4). See Ishii (1997) and Stepanov (1998) for more detail.

(i)   *What did John go to bed [after eating t]?

3.3. Subject-auxiliary inversion and *do*-support

Examples such as (33) also pose questions. Under the single Spell-Out model, the affixal INFL is located at the position of the C (as a result of head movement) in overt syntax. Hence, PF merger is blocked, since the subject *John* intervenes between INFL and the main V, and *do*-support is required for this reason.

(33)   Who did John kiss t? (*Who John kissed?)
        a.   Lexical insertion of INFL (followed by movement of subject)
              John INFL [vp (John) kiss who]
        b.   Lexical insertion of C (followed by movement of object and INFL)
              [Who INFL-C [John (INFL) [vp (John) kiss (who)]]]
              |_____*_____| -> PF merger blocked

But let us consider this example under the proposed analysis based on multiple Spell-Out. Supposing that Spell-Out applies as soon as INFL is inserted (and *John* is raised) as shown in (34a), there should not be any need for *do*-support; PF merger has already applied at this point, thus satisfying the affixal property of INFL. But we would then expect **Who John kissed?* instead of *Who did John kiss?*.

(34)   a.   Lexical insertion of INFL (followed by movement of subject)
              John INFL [vp (John) kiss who]
              |_____| -> Spell-Out (and Merger applies)
              <John, kiss-ed, who>
        b.   Lexical insertion of C (followed by movement of object and INFL)
              [Who INFL-C [John (INFL) [vp (John) kiss (who)]]]
              <who, John, kiss-ed>

I suggest, following Bošković (to appear), that the interrogative C as well as INFL in English is a verbal affix.[18] Since there is then no point in the derivation at which the interrogative C and the main V are adjacent (due to the presence of the subject NP), PF merger is blocked. As a result, *do*-support must apply in order to satisfy the affixal nature of the interrogative C.

Nonetheless, the matter is far from settled, for we need to block examples such as (35) from being produced.

(35)   *Who did John kiss<u>ed</u>?   (Who did John kiss?)

(35) would be derived in the following way. Suppose that at the point in the derivation shown in (36), Spell-Out applies, sending the structure to PF, where INFL and the main V are merged (producing *kiss-ed*). The derivation continues and the affixal C is inserted, as shown in (37). PF merger is blocked between the C and the main V (because of the subject *John*). Hence, *do*-support applies to satisfy the affixal nature of the C. But notice that the

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[18] I thank Howard Lasnik (p.c.) for the suggestion. Note that an obvious question under this hypothesis is how to deal with the lack of subject-aux inversion in embedded clauses.

(I)   I wonder who John will kiss.   (*I wonder who will John kiss.)

Technical details aside, one crucial difference between the matrix C and the embedded C is the presence of a higher verb for the latter (*wonder* in (i)), which may in some way satisfy the affixal property of the C (such as C-to-V movement), as Bošković (to appear) suggests.

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resulting structure should be pronounced as *Who did John kissed? instead of Who did
John kiss?.

(36)   [John INFL [$_{VP}$ (John) kiss who]]
        |_____| -> Spell-Out (and Merger applies)
        <John, kiss-ed, who>
(37)   [Who INFL-C [John (INFL) [$_{VP}$ (John) kiss who]]]
        |_____*_____| PF merger blocked (do-support applies)
        <who, did, John kiss-ed>

Intuitively, what went wrong in this derivation is that features of INFL are realized
in two places: on the V position (via PF merger) and the C position (via do-support). In a
sense, this problem may be a mere fraction of a broader question with which we need to
deal in any case: How are syntactic chains interpreted at PF (for pronunciation purposes,
etc.), once multiple Spell-Out is adopted? Consider (38). Suppose for the sake of
discussion that Spell-Out applies at the VP level, thus linearizing the structure as <arrest,
John> at this point. Crucially, we will not know until later in the derivation that John
should not be pronounced in this position.

(38)   *John was [$_{VP}$ arrested John]. (John was arrested.)

I speculate that whatever answer can be provided for (38) may extend to the derivation
illustrated in (36-37).[19]

4.   Conclusion

In this paper, I have argued that the adjacency problem for the PF merger account
of verbal morphology in Germanic languages receives a promising solution under the
multiple Spell-Out model. According to this proposal, an element does not block PF
merger insofar as it can be inserted acyclically between the two elements undergoing
merger, thanks to the multiple nature of Spell-Out. As seen in the last section, many
theoretical questions arise under the proposed account. Nonetheless, to the extent that the
proposed analysis is successful, it provides firm support for a strongly derivational model
of grammar.

References

Baltin, Mark. 1993. Negation and clause structure. Ms., New York University.
Bobaljik, Jonathan David. 1994. What does adjacency do? In MIT working papers in
        linguistics 22, 1-32.
Bobaljik, Jonathan David. 1995. Morphosyntax: The syntax of verbal inflection.
        Unpublished Ph.D. dissertation, MIT.
Bobaljik, Jonathan David and Dianne Jonas. 1996. Subject positions and the role of TP.
        Linguistic Inquiry 27, 195-236.
Bošković, Željko. 1997. The syntax of non-finite complementation: An economy
        approach. Cambridge, MA: MIT Press.

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[19] In order to keep the picture coherent, it seems necessary to assume that cyclic Spell-Out does not
immediately map to phonology (i.e., structures which are the domain of application of phonological rules)
but rather to some intermediate level of representation which retains the relevant syntactic information, and
phonology can access this information at any point.

Bošković, Željko. to appear. Sometimes in SpecCP, sometimes in-situ. In *Step by step: Essays on minimalism in honor of Howard Lasnik*, ed. Roger Martin, David Michaels, and Juan Uriagereka, Cambridge, MA: MIT Press.

Bošković, Željko and Howard Lasnik. to appear. How strict is the cycle? To appear in *Linguistic Inquiry*.

Bresnan, Joan. 1971. Sentence stress and syntactic transformations. *Language* 47, 257-281.

Chametzky, Robert. 1996. *A theory of phrase markers and the extended base*. Albany: State University of New York Press.

Cheng, Matthew Y. 1990. What must phonology know about syntax? In *The phonology-syntax connection*, Chicago: The University of Chicago Press, 19-46.

Chomsky, Noam. 1955. *The logical structure of linguistic theory*. Chicago: University of Chicago Press (1975).

Chomsky, Noam. 1957. *Syntactic structures*, The Hague: Mouton.

Chomsky, Noam. 1981. Lectures on government and binding. Dordrecht: Foris.

Chomsky, Noam. 1993. A minimalist program for linguistic theory. In *The view from Building 20*, ed. Kenneth Hale and Samuel Jay Keyser, 1-52. Cambridge, MA: MIT Press.

Chomsky, Noam. 1995. *The minimalist program*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1997. Fall class lectures, MIT.

Chomsky, Noam. 1998. Minimalist inquiries: the framework. *MIT Occasional Papers in Linguistics*, MITWPL.

Collins, Chris. 1997. *Local economy*. Cambridge, MA: MIT Press.

Epstein, Samuel David. to appear. Un-principled syntax and the derivation of syntactic relations. In *Working minimalism*, ed. Samuel David Epstein and Norbert Hornstein. Cambridge, MA: MIT Press.

Epstein, Samuel David, Erich M. Groat, Ruriko Kawashima, and Hisatsugu Kitahara. 1998. *A derivational approach to syntactic relations*. Oxford University Press.

Ernst, Thomas. 1992. The phrase structure of English negation. *The Linguistic Review* 9-2, 109-144.

Ernst, Thomas. 1999. Adjunct evidence for rightward movement. Talk given at the Annual Meeting of the Linguistic Society of America, Los Angeles.

Freidin, Robert. 1986. Fundamental issues in the theory of binding. In *Studies in the acquisition of anaphora*, ed. Barbara Lust, 151-188. Dordrecht: Reidel.

Halle, Morris and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In *The view from Building 20*, ed. Kenneth Hale and Samuel Jay Keyser, 111-176. Cambridge, MA: MIT Press.

Hiramatsu, Kazuko. 1998. A production/judgment asymmetry in children's negative questions. Ms., University of Connecticut.

Holmberg, Anders. 1986. *Word order and syntactic features in the Scandinavian languages and English*. Unpublished Ph.D. dissertation, University of Stockholm.

Holmberg, Anders. 1997. The true nature of Holmberg's generalization. In *Proceedings of NELS* 27, ed. Kiyomi Kusumoto, 203-317. GLSA.

Holmberg, Anders and Christer Platzack. 1995. *The role of inflection in Scandinavian syntax*. Oxford University Press.

Iatridou, Sabine. 1990. About Agr(P). *Linguistic Inquiry* 21, 551-577.

Ishii, Tohru. 1997. *An asymmetry in the computation of phrase structure and its consequences*. Unpublished Ph.D. dissertation, University of California, Irvine.

Jackendoff, Ray. 1972. *Semantic interpretation in generative grammar*. Cambridge, MA: MIT Press.

Jaeggli, Osvaldo. 1980. Remarks on *to* construction. *Linguistic Inquiry* 11, 239-245.

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Kawashima, Ruriko and Hisatsugu Kitahara 1996. Strict cyclicity, linear ordering, and derivational c-command. In *Proceedings of the fourteenth west coast conference on formal linguistics*, 255-269, Palo Alto, CA: Stanford University Press.

Kayne, Richard. 1994. *The antisymmetry of syntax*. Cambridge, MA: MIT Press.

Koopman, Hilda. 1995. On verbs that fail to undergo V-second. *Linguistic Inquiry* 26, 137-164.

Kuno, Susumu. 1997. Binding theory in the minimalist program. Ms., Harvard University.

Lasnik, Howard. 1972. *Analyses of negation in English*. Ph.D. dissertation, MIT.

Lasnik, Howard. 1981. Restricting the theory of transformations: A case study. Reprinted in: *Essays on restrictiveness and learnability*, 125-145. Dordrecht: Kluwer Academic Publishers.

Lasnik, Howard. 1995. Verbal morphology: Syntactic Structures meets the minimalist program. In *Evolution and revolution in linguistic theory: Essays in honor of Carlos Otero*, ed. P. Kempchinsky and H. Campos, 251-275. Georgetown University Press.

Lasnik, Howard. 1998. Some reconstruction riddles. Talk given at 22nd Penn Linguistics Colloquium.

Lasnik, Howard. to appear. Patterns of verb raising with auxiliary 'be.' To appear in *Proceedings of the 1995 UMass conference on African American English*, ed. K. Broderick and B. Hollebranse.

Lebeaux, David. 1988. *Language acquisition and the form of the grammar*. Ph.D. dissertation, University of Massachusetts, Amherst.

Martin, Roger and Juan Uriagereka. 1998. Collapsed waves in natural languages. Ms., Tsukuba University and University of Maryland.

Oku, Satoshi. 1996. VP-ellipsis and "VP adverb" placement. Ms., University of Connecticut.

Pollock, Jean-Yves. 1989. Verb movement, universal grammar, and the structure of IP. *Linguistic Inquiry* 20, 365-424.

Postal, Paul. 1997. Strong crossover violations and binding principles. Talk given at the Eastern States Conference on Linguistics, 1997, Yale University.

Potsdam, Eric. 1997. NegP and subjunctive complements in English. *Linguistic Inquiry* 28, 533-540.

Selkirk, Elisabeth. 1972. *The phrase phonology of English and French*. Ph.D. dissertation, MIT.

Stepanov, Arthur. 1998. Attract across the ocean: another look at the *adjunct island*. Ms., University of Connecticut.

Uriagereka, Juan. to appear. Multiple spell-out. In *Working minimalism*, ed. Samuel David Epstein and Norbert Hornstein. Cambridge, MA: MIT Press.

Vikner, Sten. 1995. *Verb movement and expletive subjects in the Germanic languages*. Oxford University Press.

Department of Linguistics
University of Connecticut
Storrs, Connecticut 06269-1145

mao94001@uconnvm.uconn.edu