DELETION BY PHASE AND ITS CONTRIBUTION TO NON-CONSTITUENT DELETION

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The purpose of this paper is to seek theoretical and empirical consequences stemming from Chomsky’s (2000) Cyclic Spell-Out. As a consequence of Cyclic Spell-Out, I propose that deletion can optionally apply phase by phase (Deletion by Phase Hypothesis, DBPH), and argue that the DBPH makes it possible to derive non-constituent deletion without appealing to movement feeding constituent deletion. As a case study, this paper mainly deals with Gapping.*

Keywords: Cyclic Spell-Out, deletion by phase, non-constituent deletion, Gapping

1. Introduction

In this short article, I would like to put forward the Deletion by Phase Hypothesis (DBPH) as a consequence of Chomsky’s (2000) Cyclic Spell-Out:

(1) Deletion by Phase Hypothesis (DBPH)
Deletion can optionally apply phase by phase.

The DBPH states, in effect, that whether a Spell-Out domain is deleted or pronounced is determined upon an operation Spell-Out. In this paper, I will assume with Merchant (2008), among others, that PF-deletion is sufficient and indeed desirable to deal with ellipsis phenomena in natural lan-

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guage. Thus, in what follows, I will not assume LF-copying that is often suggested in various forms in the literature (see Saito (2007) and references cited therein). The DBPH can be taken as a minimalist approach to the question of when and how a deletion site is determined. It will be shown that the hypothesis is deeply rooted in minimalism.

This paper is organized as follows: we will first see how the DBPH is obtained in the framework of the minimalist program that adopts *Cyclic Spell-Out* (Chomsky (2000, 2001)), and how it is implemented under a phase-based approach to deletion advocated by Takahashi (2002) (Section 2). It will be shown that the DBPH makes it possible to derive *non-constituent deletion* without appealing to movement that feeds constituent deletion. Then, taking up *Gapping* as a case study, which has long been analyzed as involving the movement of a remnant that feeds constituent deletion (Coppock (2001), Johnson (2009)), we will see how it is derived by the DBPH without appealing to such movement (Section 3). It will be demonstrated that the DBPH-based analysis of Gapping resolves “word-order problems” that perplexed Johnson (2009), and it can elegantly account for “locality effects” in Gapping that were found by Neijt (1979) but have resisted explanation under any of the existing theories. Then, I will briefly discuss some implications of the DBPH for Sluicing with particular reference to Kimura’s (this volume) non-movement analysis (Section 4). Lastly, I will conclude the paper by enumerating the results the DBPH brings and the prospects the DBPH offers (Section 5).

2. Deletion by Phase Hypothesis as a Consequence of Cyclic Spell-Out

2.1. Spell-Out and Deletion: Theoretical Assumptions

Since Chomsky (2000), it has been assumed that an operation *Spell-Out* takes place at a phase level to send the complement of a phase to the PF and LF interfaces. Thus, given that X is a phase head and YP is its complement, it follows that YP undergoes Spell-Out, as in (2) (the Spell-Out domain is boxed):

(2) \([XP \ldots X\{YP \ldots\}]\)

Interestingly, noticing that a Spell-Out domain crucially corresponds to a deletion site, Takahashi (2002) claims that only complements of phase heads can undergo deletion. Building on and articulating the insights of the phase-based approach to deletion, I follow Abe and Tancredi (2012) in assuming that Spelled-Out materials are exploited in deriving deletion phenomena. Hence, given that X is a phase head and YP is its complement,
it follows that YP can undergo deletion, as in (3) (strike-through indicates deletion):

(3) \[ XP \ldots X [\overline{YP \ldots}] \]

Specifically, if C, v, and D are phase heads and TP, VP, and NP are their complements (Chomsky (2007) among others), it is expected that TP, VP, and NP can undergo deletion. This expectation is, indeed, borne out by Sluicing, VP-deletion, and NP-deletion:

(4) a. John met someone, but I don’t know [\overline{CP who_1 [C \overline{TP John met \ldots}]}].

b. John likes Mary and Peter; \[_{\overline{VP t_1 [v \overline{NP like Mary}]]}} \] too.

c. John likes Bill’s car, and Mary likes [\overline{DP Peter’s [D \overline{NP ear}]}].

In (4), the deletion sites all correspond to the relevant Spell-Out domains, as expected. Note that since deletion is, by definition, optional, the elements inside the Spell-Out domains may remain undeleted, meaning that they are freely pronounced in those domains:

(5) a. John met someone, but I don’t know [\overline{CP who_1 [C \overline{TP John met \ldots}]}].

b. John likes Mary and Peter; \[_{\overline{VP t_1 [v \overline{NP likes Mary}]]}} \] too.

c. John likes Bill’s car, and Mary likes [\overline{DP Peter’s [D \overline{NP ear}]}].

This fact seems to be trivial, but it indicates the important nature of deletion: it is \textit{optional}. In relation to this, it might be worth noting that the optionality in question ultimately leads to the question of the creative aspects of what we (do not) say and why we (do not) say it, which is well known as Descartes’s problem. Thus, further investigations of the optionality itself might shed light on this long-standing problem, but obviously such a discussion is beyond the scope of this paper. Thus, I will take it as an accepted fact in the following discussion.

In sum, the phase-based approach to deletion is a natural consequence of Spell-Out: Spell-Out sends the complement of a phase to the interfaces as an output of narrow syntax; hence deletion can take it as its input to the actual implementation at the PF interface. Assuming the coincidence of a Spell-Out domain and a deletion site to be rooted in principled grounds, I will adopt and elaborate a phase-based approach to deletion.

2.2. Cyclic Spell-Out and Deletion by Phase: A Proposal

One unclear issue of the phase-based approach to deletion is when and how deletion is applied under \textit{Cyclic Spell-Out}. In fact, it has been assumed since Chomsky (2000, 2001) that syntactic derivation proceeds \textit{phase by phase} to reduce memory load in computation, and Spell-Out takes place
cyclically to send the complement of a phase to the interfaces. Thus, given that W, Z, and X are phase heads, and ZP, XP, and YP are their complements, it follows that Spell-Out applies three times to YP, XP, and ZP from bottom-up:

(6) \[ \text{WP } \ldots \text{ W } [\text{ZP } \ldots \text{ Z } [\text{XP } \ldots \text{ X } [\text{YP } \ldots ]]] \]

Such a model is called Cyclic Spell-Out (see Uriagereka (1999) for a theoretical precursor). As we have just seen above, it is clear how the phase-based approach can determine a deletion site in a single phase level, but it is still unclear when and how a deletion site is determined beyond phases while derivation proceeds phase by phase with Spell-Out applied cyclically.

Then, I would like to put forward the Deletion by Phase Hypothesis (DBPH) stated in (7), which is originally suggested by Goto (2012), and propose to implement it under the mechanism of (8), borrowed from Abe and Tancredi (2012) who adopt the DBPH:

(7) Deletion can optionally apply phase by phase.

(8) At a phase level, the phase head assigns a [+Delete] feature to its complement upon Spell-Out.
   a. At the PF side, all the elements inside a [+Delete]-marked phrase get deleted.
   b. At the LF side, the whole phrase must be properly identified as GIVEN in the sense of Schwarzschild (1999). An utterance U counts as GIVEN iff it has a salient antecedent A and modulo ∃-type shifting, A entails the Existential F-Closure of U. *Existential F-Closure of U* = df the result of replacing F-marked phrases in U with variables and existentially closing the result, modulo existential type shifting.

As noted at the outset of this paper, the DBPH states, in effect, that whether a Spell-Out domain is deleted or pronounced is determined upon Spell-Out. As clearly attested in (4) and (5), deletion of a Spell-Out domain is optional. Thus, when the phase head \(v\) assigns [+Delete] to its complement, this gives rise to VP-deletion, as in (4b); and when the phase head does not assign this feature to its complement, this gives rise to VP-pronunciation, as in (5b). Under our analysis, therefore, so-called VP-deletion elides VP, not \(vP\). Given that T is not a phase head, as often suggested in the literature, it straightforwardly follows that the complement of T (\(vP\)) cannot be the relevant target. This is just a theoretical consequence; whether there is any strong empirical evidence for this has to await future research. Likewise, when the phase heads C and D assign [+Delete] to their complements, these give rise to TP-deletion, i.e. Sluicing, as in (4a), and NP-
deletion, as in (4c), respectively; and when the phase heads do not assign this feature to their complements, these give rise to TP-pronunciation, as in (5a), and NP-pronunciation, as in (5c), respectively. In this way, (4) and (5) can be derived appropriately by the DBPH (I will discuss more carefully how Sluicing is derived under the DBPH in Section 4).\(^1\) Incidentally, one might conceive that [+Delete]-feature-assignment proposed here looks like φ-feature-inheritance proposed by Chomsky (2007, 2008) in that it is ultimately assigned to (or inherited by) the complement of a phase. Given that relevant operations are initiated when feature-inheritance takes place, it may be true to say that deletion is also initiated when [Delete]-feature-assignment/inheritance takes place from phase heads to non-phase heads. For exploration of such a unified treatment of the relevant features under feature-inheritance, see Goto (2011b).

With respect to NP-deletion, an anonymous EL reviewer points out that if various functional heads such as n, D, etc., may be involved in the nominal projection, then the question arises of which functional head can potentially hold a [+Delete] feature within that projection. In this paper, I will not distinguish n and D in phasehood, and instead assume that n-D can be a phase head under Bošković’s (2012) “highest-phrase-is-a-phase” approach, where a head of the highest phrase counts as a phase head. As often suggested in the literature, given that n-D occupies a structurally higher position than N, then it is natural to assume that n-D is a phase head in accord with the highest-phrase-is-a-phase approach. Thus, in this paper, I will assume that n-D can potentially have a [+Delete] feature in the nominal projection, while NP constitutes its complement.\(^2\)

Another anonymous EL reviewer points out that a [+Delete] feature in itself needs justifying. With respect to this, there is strong justification for postulating such a feature in the syntax. As implicitly assumed in the

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\(^1\) Obviously, given the phase-based approach to deletion, the notion of Spec-Head Agreement in the sense of Lobeck (1990) is unnecessary to determine the relevant deletion sites—it is the complement, not Spec, that is ultimately most relevant to deletion. In fact, given that the notion of Spec is unformulable under the phase-based system (see Chomsky (2008) among others), the phase-based approach to deletion is arguably on the right track.

\(^2\) An anonymous EL reviewer asks why argument ellipsis is impossible in a language like English if [+Delete]-assignment applies freely. Under the present assumptions, there is nothing to preclude such a possibility, so that argument ellipsis should be allowed in principle in a language like English. I leave the why-question for future research because it goes far beyond the scope of this paper.
literature, if there were no connection between LF and PF, and if deletion took place on the basis of LF identity requirements (Ross (1969) among others), then certain instructions for deletion should be given (at the latest) at the point of Spell-Out where a derivation is handed over the LF and PF interfaces. Significantly, as Merchant (2008) argues, postulating such a feature in the syntax can lead to circumventing a potential look-ahead problem of deletion and a desirable simplification of the architecture of grammar; hence there is nothing bad about having such a feature in the syntax. (cf. Merchant’s (2008) [E] feature). Below, I will use [+Delete] for the sake of convenience, but there would be no problem if the readers take that to be a more familiar [E] feature in the sense of Merchant (2008), as I assume their functions are basically the same. The reviewer also asks why a phase head, but not others, needs to take care of such a feature. However, given that all operations are driven by the phase head, and operations are triggered solely by a feature on the phase head (Chomsky (2007, 2008)), it is natural to claim that the phase head bears this feature to determine whether deletion applies or not at the PF interface. Therefore, all ingredients of the DBPH can be deduced from minimalism.

To summarize main points thus far, the phase-based approach to deletion is a natural consequence of Spell-Out. Furthermore, the DBPH is a further natural consequence of phase cyclicity: since Spell-Out sends the complement of a phase to the interfaces cyclically as an output of narrow syntax, deletion can also take it cyclically as its input to the actual implementation at the PF interface. Remarkably, the DBPH tells us that both derivation and deletion proceed phase by phase. In the next section, I show that the DBPH can provide a new departure in the treatment of so-called non-constituent deletion, a long-standing problematic notion in generative grammar.

2.3. Non-Constituent Deletion = Illusion: A Consequence of the DBPH

One striking consequence of the DBPH is that a gap can, in principle, appear sporadically due to deletion by phase, and it is nothing but the result of deletion by phase: non-constituent deletion is obtained by optionally applying deletion phase by phase. To see this, let us consider the following schematic derivation:

\[
\text{(9) } \[ \text{wp} \ldots \text{w} \] \[ \text{z} \ldots \text{z} \] \[ \text{x} \ldots \text{x} \] \[ \text{y} \ldots \text{y} \] \] (phase head = W/Z/X)
\]

In (9), the complement of X (YP) is Spelled-Out and pronounced; the complement of Z (XP) is Spelled-Out and deleted through [+Delete]-assignment; and the complement of W (ZP) is Spelled-Out and pronounced. What we do here is just constituent deletion at the phase level; hence apparent non-
constituent deletion can be regarded as an illusion. In this way, the DBPH can give rise to a particular formalization of non-constituent deletion and make it possible to derive non-constituent deletion without appealing to movement that feeds constituent deletion, so that any approach that assumes such movement invites closer scrutiny from the DBPH perspective.

Thus, given the DBPH, what is deleted or what is pronounced can be determined upon Spell-Out at each phase level. To explain elliptical constructions, all we need is Spell-Out, not movement. To appreciate the consequence further, let us consider Gapping as a case study, because it has long been analyzed as involving movement of the remnant that feeds constituent deletion, an unnecessary operation under the DBPH.

3. Gapping

3.1. Problems with Two Previous Approaches

As concluded just above, the DBPH allows us to yield elliptical constructions in situ, i.e., we do not have to apply movement operations in the course of the derivation. This is, in fact, a significant departure from previous approaches to Gapping, for example; a relevant example is given below:

(10) Some had ordered mussels, and others swordfish.

(Toosarvandani (2012: 1))

Gapping was first discussed by Ross (1967, 1970); since then, a lot of unique properties and possible approaches to them have been explored (see Johnson (2009) among others). Among them, the central question is how to derive the phrase with the gap in the second coordinate (cf. others swordfish in (10)). To derive the phrase with the gap, there has been much controversy whether the derivation involves the across-the-board (ATB) VP-movement, as in (11) (Johnson (2009)) or VP-ellipsis, as in (12) (Coppock (2001)):

3 Note that both approaches are based on the following assumptions: (i) vPs are coordinated; (ii) the subject of the first coordinate can escape from the first coordinate into SPEC-T without violating the Coordinate Structure Constraint; (ii) and the subject of the second coordinate is Case licensed in situ, in SPEC-v. In this paper, I will adopt these assumptions, following Johnson (2009) and Toosarvandani (2012).

An anonymous EL reviewer asks why a modal auxiliary, which is supposed to occur in the T head projection, is missing in Gapping but not in VP-Deletion. The difference is attributed to coordination structures involved. That is, Gapping involves vP-coordination and hence T goes missing in the second coordinate. On the other hand, VP-deletion involves TP-coordination and hence T does not go missing in the second coordinate.
(11) **ATB movement approach**

Some$_i$ had $[\text{Pred } [\text{VP ordered } t_j] [\text{VP } t_i [\text{VP } t_{VP} \text{ mussels}_j]]]$, and $[\text{VP } t_{VP} \text{ swordfish}_j]]$

(12) **VP-ellipsis approach**

Some$_i$ had $[\text{VP } t_i [\text{VP } t_{VP} \text{ ordered } t_j] \text{ mussels}_j]$, and $[\text{VP } t_{VP} \text{ ordered } t_{k} \text{ swordfish}_k]]$

In (11) and (12), the ATB-movement and VP-ellipsis are applied to the relevant VPs, respectively. Of particular importance here is that, irrespective of the meaningful difference between them, both approaches similarly and crucially stipulate movement of remnants to VP. That is, prior to the ATB movement or VP-ellipsis, the remnant swordfish and the correlate mussels have raised rightward from their respective VPs, as emphasized in boldface. Apparently, there is no motivation for this movement except that it feeds a constituent movement/deletion. Hence, it would be better to dispense with it.

Worse, the movement of the remnant gives rise to “word-order problems” (Johnson (2009: 318)). As Johnson states, examples like (13) cannot straightforwardly be explained by either approach:

(13) a. Ice cream gives me brain-freeze and beans give me indigestion.

b. *Ice cream gives me in the morning brain-freeze.

That is, while the ATB movement approach requires a complex suite of movements to derive (13a), the VP-ellipsis approach ends up allowing ungrammatical examples like (13b), contrary to what is desired (see Johnson (2009: 314) for detailed explanation). Noticeably, the main culprit for this problem is clearly the movement of the remnant, as Johnson confesses.

Therefore, previous approaches to Gapping that assume movement of the remnant face not only the triggering problem but also the word-order problem. In what follows, I show that the DBPH allows us to derive Gaping without being troubled by such problems.

### 3.2. The DBPH-based Analysis of Gapping

It is a common observation that the remnants in Gapping contrast with their correlates in the first coordinate; hence I assume that a [+F] feature is freely assigned to any phrase in the course of a derivation, and at the PF side, a phrase marked with [+F] instantiates its effect by accenting it or a certain word included in it; and at the LF side, it undergoes a focus interpretation a la Rooth’s (1992) alternative semantics of focus (cf. Abe and
Tancredi (2012)).

Under this assumption and the DBPH, therefore, Gapping can be derived as follows (here I adopt the \(vP\)-coordination approach; see footnote 3):

\[
\begin{align*}
(14) \quad \text{a. } & [\text{DP } D [\text{NP}[+F] \text{ swordfish}]] \quad \text{(Spell-Out of NP with [+F]-assignment)} \\
\text{b. } & [vP \, v [\text{VP}[+\text{Delete}] \text{ ordered DP}]] \quad \text{(Spell-Out of VP with [+Delete]-assignment)} \\
\text{c. } & [\text{DP } D [\text{NP}[+F] \text{ others}]] \quad \text{(Spell-Out of NP with [+F]-assignment)} \\
\text{d. } & [\&P \, & [vP \, DP \, vP]] \quad \text{(Spell-Out of VP without any feature assignment)}
\end{align*}
\]

First, at the object DP phase level, the complement of D (\(f_{NP}\) swordfish) is Spelled-Out with [+F]-assignment. Second, at the \(vP\) phase level, the complement of \(v\) (\(f_{VP}\) ordered) is Spelled-Out with [+Delete]-assignment. Third, at the subject DP phase level, the complement of D (\(f_{NP}\) others) is Spelled-Out with [+F]-assignment. Lastly, at the \(\&P\) phase level (see Agbayani and Zoerner (2003) for the phasehood of \(\&\)), the complement of \(\&\) (\(vP\)) is Spelled-Out without any feature assignment. As a result, Gapping is derived without appealing to the movement of the remnant; hence the triggering problem does not arise in our analysis.

In the same way, (13a), which brings the word-order problem to the previous analyses, can be easily accommodated in the DBPH:

\[
(15) \quad \ldots [\&P \, & [\text{NP}[+F] \text{ beans} \, [\text{VP}[+\text{Delete}] \text{ give me} [\text{NP}[+F] \text{ indigestion}]])
\]

In our analysis, the word-order in the phrase with the gap is just the same as it would be if there were no gap; hence the word-order problem of (13a) does not arise to begin with. Conversely, the word-order in the phrase without a gap is just the same as it would not be if there were a gap; hence the word-order problem of (13b) does not arise, either.

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4 An anonymous EL reviewer points out that [+F] is typically realized as a pitch accent but not always: sometimes it shows up only as lengthening (cf. Abe and Tancredi (2012)). Thus, for gapping, as the reviewer correctly points out, this can be seen in examples like the last sentence of: “SOME ordered MUSSELS, and OTHERS SWORDFISH. In fact MANY others swordfish.”

5 With respect to the underlying structure of the double object construction, I assume that an indirect object occupies a position higher than a direct object within the VP domain. See Larson (1988) among others for justification.

An anonymous EL reviewer asks whether the following sentences are acceptable. If not, how are they ruled out?

(i) a. Ice cream gives John brain-freeze and beans give Mary indigestion.
   b. Ice cream gives John brain-freeze and beans give John brain-freeze.
In this way, the DBPH-based analysis of Gapping faces neither the triggering problem nor the word-order problems: in our analysis, deletion and pronunciation are two sides of the same coin, and hence there is no room for movement to enter the derivation of Gapping. Our analysis is indeed superior to the previous analyses in that we can derive Gapping without appealing to the problematic movement of the remnant. In what follows, I would like to make a further departure from the previous studies by showing that we can also account for locality effects in Gapping that have resisted explanation under any of the existing theories.

3.3. Locality Effects in Gapping

The proposed analysis of Gapping under the DBPH straightforwardly explains why Gapping is insensitive to the Left Branch Condition (LBC), a condition that is imposed on movement. The LBC is formalized as follows (Ross (1967)):

(16) No NP that is the left most constituent of a larger NP can be reordered out of this NP by a transformational rule.

The ungrammaticality of (17) indicates that the LBC is indeed a condition on movement:

(17) *How tall, did the Lakers hire [t_i a forward]?

(Coppock (2001: 142))

Of particular importance here is the fact that Gapping is insensitive to the LBC:

(18) a. I make too strong an espresso, and Fred too weak.

(Coppock (2001: 143))

b. Mary wrote too long a paper, and Suzy too short.

(Coppock (2001: 143))

To capture this fact, the previous approaches stipulate a condition on lin-

According to my informant, (ib) is completely ungrammatical, and (ia) could be grammatical with heavy stress on Mary. (ib) is easy to account for. Regardless of the formal reason, it could be ruled out, as there simply is not enough information to recover who or what is being talked about. On the other hand, (ia) is much trickier. My informant told me that if the dative alternation occurs, as in (ii), then the sentence is improved:

(19) Ice cream gives brain freeze to John, and beans give indigestion to Mary.

This makes me wonder whether (ia) is really ungrammatical or if the reason for its marginality is just phonological. Note that Jayaseelan (1990) judges the same type of sentences as (ii) as ungrammatical. The fact may suggest that nP-DP constitutes a phase optionally. I have to leave open for future research to clarify why such a variation should exist.
earization of a degree phrase (Johnson (2009: 321)) or a repair strategy on *-assignment (Coppock (2001: 143)). These stipulations may make sense in each analysis, but advocates of such devices necessarily bear a heavy burden of proof; hence they pose a serious question as to why there exist such devices. In fact, such a restricted condition on a degree phrase is clearly an ad hoc solution, and *-assignment raises an issue with respect to the inclusiveness principle (cf. Chomsky (2008)).

By contrast, there is nothing special to be said in our analysis: Gapping is insensitive to the LBC, because the remnant does not move, period. To see this more specifically, let us consider the following derivation, for example, which is assigned to (18a) under the DBPH:

\[(19) \quad \ldots \left[\&P\ &\left[\left[\left[\left[\left[\left[\left[\left[\left[\text{NP}\left[+\text{F}\right]\text{Fred}\left[\text{VP}\left[+\text{Delete}\right]\text{make}\left[\text{XP}\left[+\text{F}\right]\text{too weak}\left[\text{NP}\left[+\text{Delete}\right]\text{an}\text{espresso}\right]\right]\right]\right]\right]\right]\right]\right]\right]\right]\right]\right]\right]\right]\right]
\]

Here, I assume that XP may constitute a degree phrase (cf. Kennedy and Merchant (2000)) or a part of nominal projections such as nP and DP. Whatever the ultimate status of the phrase, the complement of D (NP) can be Spelled-Out with [+Delete]-assignment at the DP phase level for the same reasons as in (14) and (15), so that the remnant too weak does not move, and an LBC violation is not triggered.

More significantly, if we adopt a condition like (20) (cf. den Dikken et al. (2000)), then locality effects in Gapping (Neijt (1979)), as exemplified in (21), can be explained as a consequence of derivational economy.

\[(20) \quad \text{YP cannot be assigned [+Delete] if the higher phrase XP that contains YP is assigned [+Delete].}\]

\[(21) \quad *\text{Max said that you should buy bread and Peter said that you should buy wine.} \quad (\text{Neijt (1979: 143)})\]

The ungrammaticality of (21) indicates that a phrase with a gap must be minimized (cf. others swordfish in (10)). On the other hand, the condition (20) states, in effect, that deletion should be maximized. Needless to say, we can reasonably conjecture that some general features of minimal computation enter into the principles of the third factor: less is better than more, redundancy is disfavored, maximum effect with least effort is more preferred than least effect with maximum effort, and so on. According to such considerations of computational efficiency, it is not so implausible to claim that deletion is subject to an economy condition like (20).\(^6\)

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\(^6\) An anonymous EL reviewer points out that “it is unclear how to define (20) precisely as an economy condition on derivations, if YP is embedded deeply down below XP and
Then, let us consider what happens if (20) is applied to (21). Applied to (21), it follows that \([CP \text{ that}], [TP \text{ you should}], \text{ and } [VP \text{ buy}]\) cannot be assigned [+Delete], since the higher phrase \([VP \text{ said}]\) that contain them is assigned this feature:

\[(22) \quad \ldots [\&P & [NP[,+F] \text{ Peter]} [VP[,+Delete] \text{ said}] [CP \text{ that}] [TP \text{ you should}] [VP \text{ buy}] [NP[,+F] \text{ wine}]]]]]]\]

In (22), the complement of the lowest D head (\([NP \text{ wine}]\)) is Spelled-Out with [+F]-assignment; the complement of the intermediate v and C heads (\([CP \text{ that}], [TP \text{ you should}], \text{ and } [VP \text{ buy}]\)) are Spelled-Out without any feature assignment; the complement of the highest v head (\([VP \text{ said}]\)) is Spelled-Out with [+Delete]-assignment; and lastly, the complement of the highest D head (\([NP \text{ Peter}]\)) is Spelled-Out with [+F]-assignment. It is important to notice here that while the economy condition dictates that the effect of deletion is to be maximized, Cyclic Spell-Out regardlessly proceeds to reduce memory load in computation. Hence, when deletion applies, the verb said inside the highest VP can be deleted, triggered by the assigned [+Delete] feature, but all other elements inside the intermediate phrases (\([CP \text{ that}], [TP \text{ you should}], \text{ and } [VP \text{ buy}]\)), cannot, because they are already Spelled-Out. That is, it is too late to apply deletion to the elements inside.

is already Spelled-Out when the derivation reaches XP.” However, we can still take that to be a condition on derivations that works when Spell-Out applies if we can show that YP is not Spelled-Out when the derivation reaches XP. In this context, it is important to recall that in Icelandic C-T agrees in number with a Nominative object occupying its base position inside the complement of v (Chomsky (2001, 2008)). Clearly, this indicates that the complement of a lower phase (YP) is not Spelled-Out when the derivation reaches the next higher phase (XP), which arguably means that a representation like (20) is, in principle, available in the course of derivation. Therefore, whatever the ultimate fate of (20) may be, the existence of such an economy condition seems to be reasonable. Thus, in this paper, I take a neutral stand for (20), and assume that it can equally be either a condition on derivations or a condition on PF representations. As suggested by the reviewer, the problem of when (20) applies may be clarified by reinterpreting the condition (20) in terms of phase heads rather than deleted phrases. In fact, such a reinterpretation should be possible under the claim (8). Thus, given that the edge (head/label) of the lower phase head is carried over to the next higher phase for the purposes of Spell-Out (Chomsky (2000, 2001, 2007, 2008)), it follows that (at least) two phase heads always exist in the same derivational workspace. Considering this possibility, it might not be so implausible to imagine that the phase head that applies [+Delete]-assignment is always interacting with the other phase head in such a way that deletion produces maximum effects at the PF interface. Perhaps, the label of the phase head crucially serves to bridge the interaction between the two phase heads. I would like to thank the reviewer for suggesting this possibility. Needless to say, a further investigation of its applicability is necessary. I leave it for future research.
the previously Spelled-Out domains. Consequently, what we can delete here is limited to the verb said inside the highest VP with [+Delete]:

\[
(23) \ldots \text{[NP & [NP+[F] Peter [VP+[Delete] said [CP that [TP you should] [VP buy [NP+[F] wine]]]]]]}
\]

Note that this analysis makes a prediction that (21) is improved if only the verb said is deleted. This prediction is, in fact, borne out:

(24) Max said that you should buy bread and Peter said that you should buy wine.

This seems to be trivial, but as far as I know, this fact seems to be a new finding in the long history of the study of Gapping.

In fact, all relevant constraints on Gapping like “islands” (Neijt (1979)), as exemplified in (25)–(29), can be explained in the same way:

(25) *John wondered [when I had fixed the car] and Bill wondered [when I had fixed the bike]. (Zwart (2009: 4))

(26) *John saw Mary [after he fixed the car] and Bill saw Mary [after he fixed the bike]. (Zwart (2009: 4))

(27) *Alphonse cooked [the rice and the beans] and Harry cooked [the rice and the potatoes]. (Zwart (2009: 4))

(28) *I reviewed the decision to fire the line-workers, and Mary reviewed the decision to fire the inspectors. (Neijt (1979: 143))

(29) *Vivek wanted for Nish to buy the video, and Carrie wanted for Steven to buy the ice cream. (Neijt (1979: 143))

That is, it is too late to apply deletion to the previously Spelled-Out elements. Again, (25)–(29) are improved if only the highest verbs are deleted, as predicted:

(30) a. John wondered when I had fixed the car and Bill wondered when I had fixed the bike.

b. I reviewed the decision to fire the line-workers, and Mary reviewed the decision to fire the inspectors.

c. Alphonse cooked the rice and the beans and Harry cooked the potatoes and broccoli.

d. ?John saw Mary after he fixed the car and Bill saw Jane after he fixed the bike.

e. ?Vivek wanted for Nish to buy the video, and Carrie wanted for Steven to buy the ice cream.

These are also hitherto unnoticed facts in the literature. The previous approaches that assume movement of the remnant may be able to account for (25) and (26) (where familiar islands such as wh-islands and adjunct islands are apparently involved) by stipulating that the remnant moves up to the
outside of the island (see Zwart (2009) for relevant discussion), but it would be quite difficult for them to rule out (21) and (29), while ruling in (24) and (30), since no islands or the likes are involved in the sentences to begin with.

To sum up, given the DBPH, the locality effects in Gapping can be derived from economy considerations: while Cyclic Spell-Out proceeds to reduce memory load in computation, deletion proceeds to produce maximum effects at the PF interface. Remarkably, both derivation and deletion manage to converge more efficiently and economically, and the locality effects arise only when they work properly. The badness of the sentence does not tell us that the computation is dysfunctional; rather it tells us that it is perfect. The DBPH-based analysis of the locality effects is clearly compatible with minimalism, which is not true of any of the existing theories.7

7 An anonymous EL reviewer asks what guarantees deletion of all the elements in the lower phases in (i) without violating (20) and how a sentence like (ii) is ruled out:

(i) John said that Bill kissed Mary, and George did [\textit{VP say that Bill \_ say that Bill [kiss Mary]}], too.

(ii) *John said that Bill kissed Mary, and George did [\textit{VP say that Bill \_ say that Bill [slapped Mary]}].

To consider these cases, it is probably helpful to note some curious properties of VP-deletion regarding the source of VP-deletion. Consider (iii) and (iv):

(iii) a. *They said Nick heard about a Balkan language but I don't know [\textit{CP which (Balkan language) [\textit{VP they did [\textit{VP Nick [\textit{VP heard about t}}]]]]]}

b. (?) They said Nick heard about a Balkan language but I don't know [\textit{CP which (Balkan language) [\textit{VP he did [\textit{VP heard about t}}]]}] (Vlachos (2010: 17))

(iv) a. *It appears that a certain senator will resign, but [\textit{CP which senator it does [\textit{VP appear that t \_ [\textit{VP will resign]}]}]] is still a secret.

b. It appears that a certain senator will resign, but [\textit{CP which senator will [\textit{VP resign}] is still a secret.} (Fox and Lasnik (2003: 143))

The difference between (iiia)-(iva) and (iiib)-(ivb) is that the source of the elided VP does not include the matrix antecedent VP but only the embedded one, which significantly indicates that the source of VP-deletion favors a more minimal derivation by excluding the matrix VP. This is arguably within (20). If this is the case, then, for whatever reason, (20) would need to be violable under cases like (i) for some reason. More specifically, considering the fact that (i) does not involve A'-movement, while (iii) and (iv) do, it may be true that (20) operates only on cases like (iii) and (iv) and Gapping where A'-movement and [+F]-assignment are crucially involved (see Section 4 for a possibility that [+F]-assignment may be able to substitute for A'-movement in Sluicing). Under this assumption, then, the ungrammaticality of (ii) is accounted for as follows: since [slapped Mary] involves [+F]-assignment, (20) operates on (ii) and [+Delete]-assignment is restricted to the highest VP for the same reasons as (21); hence the elements contained within lower phases cannot survive. The question is, thus, why (20) is operative only when [+F]-assignment is involved. As pointed out insightfully by the reviewer, one pos-
4. A Brief Remark on Sluicing

Note that the DBPH is compatible with Kimura’s (this volume) “non-movement analysis of Sluicing.” Recall that she analyzes (31) as (32) (her (4) and (5)):

(31)  He is writing something, but you can’t imagine what.
(32)  a.  $[CP \ C_{[Q]} \ [TP \ he \ is \ writing \ what_{[+wh]}]]$
     b.  $[CP \ [+wh]+C_{[Q]} \ [TP \ he \ is \ writing \ what]]$
     c.  $[CP \ [+wh]+C_{[Q]} \ [TP \ he \ is \ writing \ what]]$

Following Chomsky (1995), she assumes that overt movement consists of feature movement and category movement, and the former is driven by feature checking requirements. Thus, in (32b), the $wh$-feature and its category are scattered as a result of feature movement. Further, she assumes with Agbayani and Ochi (2006) that a formal feature moved by feature movement and its category must be phonologically adjacent to each other (her (1); the PF Adjacency Condition). Under these assumptions, she claims that the PF Adjacency Condition can be satisfied either by category movement or by deletion of overt interveners, and Sluicing is just a result of the latter strategy. To make the non-movement analysis feasible, she defines Sluicing as follows: “delete all the recoverable elements except a focused phrase inside a TP constituent” (her (9)). Thus, in (32c), deletion is allowed to apply to the material that does not make a constituent to satisfy the PF Adjacency Condition. Importantly, following Agbayani and Ochi (2006), she further assumes that once the PF Adjacency Condition is satisfied by deletion, application of the other strategy, i.e. category movement, is banned by the economy condition which precludes superfluous steps. Thus,
in (32c), overt wh-movement does not take place, contra the standard analysis.

As discussed by Kimura (this volume), this non-movement analysis of Sluicing can straightforwardly derive a lot of unique properties of Sluicing and related phenomena (see her Article), but it is still unclear why only Sluicing, and more generally, only A'-movement employs such ad hoc descriptive specifics as non-constituent deletion and a PF Adjacency condition. Given the DBPH, however, Sluicing can be derived, as follows, basically in the same way as Gapping:

\[(33) \quad \ldots [\text{CP} \ C \ [\text{TP}] [+\text{Delete}] \ he \ is \ [+\text{F}] \ \text{writing} \ [\text{VP} \ t] \ [\text{NP} [+\text{F}] \ \text{what}]]\]

First, at the DP phase level, the complement of D (NP) is Spelled-Out with [+F]-assignment. Second, at the vP phase level, the complement of v (VP) is Spelled-Out without any feature assignment. It is significant to notice here that [+Delete] is not assigned to VP because the higher phrase TP that contains VP can be assigned this feature in accordance with (20) (see footnote 6 for the question of why [+Delete]-assignment to VP can apply at the CP phase level). Thus, the complement of C (TP) containing vP is Spelled-Out with [+Delete]-assignment at the CP phase level. Here, what we do is just constituent deletion at the phase level; hence we can eliminate the ad hoc definition to ensure non-constituent deletion. Under the DBPH, therefore, Sluicing can be derived by optionally applying deletion phase by phase basically in the same way as Gapping.8

As two anonymous EL reviewers point out, it is important to notice that the analysis of Sluicing proposed by Kimura (this volume) contains comparison of two convergent derivations, one by deletion, and the other by category movement, to satisfy the PF Adjacency Condition, and it seems to be based on a kind of global economy. However, once Sluicing is reanalyzed as in (33), we can eradicate such global comparisons: since the wh-category inside NP is already Spelled-Out at the CP phase level, where TP

8 In (33) the verb writing raises to the v head along the line of the standard analysis, accordingly the relevant TP-deletion becomes possible together with the verb. However, notice that such V-to-v raising is not employed in the derivation of Gapping (cf. (14)); if it were, we could not obtain the desired result. What differentiates Sluicing from Gapping then with respect to the availability of V-to-v-raising? I suggest that the difference comes from the independently motivated generalization that “extraction out of ellipsis is impossible” (Goto (2011a)): in Sluicing, VP is not assigned [+Delete] (cf. (33)); hence V can move out of VP, but in Gapping, VP is assigned this feature (cf. (14)); hence V cannot move out of VP. That is, once a deletion site is determined by [+Delete]-assignment, no element can be extracted from the deletion site.
is assigned [+Delete], there arise no derivations such that two convergent derivations need to be compared in reference to category movement and deletion. As argued above, under the DBPH, there is no room for deletion to compete with movement in the course of the derivation. Therefore, given the DBPH, Sluicing can also be dealt with in a strictly local fashion, phase by phase, based on local economy, without appealing to global economy. An investigation of the more detailed properties of Sluicing-related constructions that Kimura (this volume) discusses and the contribution of the DBPH therein are left for future research.

5. Conclusion

If we adopt the DBPH, then:

(34) a. Non-constituent deletion can be regarded as an illusion.
    b. Movement feeding constituent deletion is unnecessary.
    c. Word-order problems do not arise in Gapping.
    d. Locality effects in Gapping are explained.
    e. Sluicing can be derived without appealing to global economy.

To the extent that these results receive support from empirical data, the strength of the DBPH is corroborated accordingly, and thus any approach that departs from the DBPH will need to reconsider what the empirical bases for these results are. In fact, movement that feeds constituent deletion is unnecessary for the DBPH and hence any approach that assumes such movement will invite closer scrutiny from the DBPH perspective. The following is a list of the most obvious candidates for future research: Sluicing, Swiping, Pseudogapping, etc. Further, given that deletion and pronunciation are two sides of the same coin under the DBPH, the DBPH may have something to say about “non-constituent pronunciation” (cf. properties of Echo Questions; Blakemore (1994)).

There is absolutely no doubt that countless many problems are left for future research, but I nevertheless hope that the theoretical considerations and empirical results that the present study offers may constitute a partial and modest step toward the eventual demonstration of the syntax-PF interface under the theory of phase cyclicity and the eradication of Spec-Head Agreement from the licensing problem. To license a deletion site, all we need is Spell-Out by phase, not Spec-Head Agreement.
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