Spell-Out of Intermediate Projections*

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1.   Introduction

It has been widely assumed since Chomsky (2000) that the notion of phase plays a prominent role in the syntactic computation. One of its functions is to trigger the operation Spell-Out, which sends syntactic structures created by Merge in a bottom-up fashion to the sensorimotor interface.   The application of Spell-Out makes its target inaccessible to syntactic operations at later stages (Phase-Impenetrability Condition (Chomsky (2000))) and, therefore, cyclicity effects are derived as a consequence of the multiple Spell-Out model adopted in the current minimalist theorizing. Moreover, the Phase-Impenetrability Condition succeeds in reducing computational burden because search space can be limited by Spell-Out.

This paper makes a proposal on the domain of Spell-Out, which is standardly assumed to be the complement of a phase head, as schematized in (1) (Spell-Out domains are shaded).

(1)   [$_{XP}$ ZP [$_{X'}$ X [$_{YP}$ …]]]   X: phase head

I argue that a traditional 'intermediate projection' undergoes Spell-Out if a phase head is in a spec-head agreement relationship, as shown in (2).

(2)   [$_{XP}$ ZP [$_{X'}$ X [$_{YP}$ …]]]   X: phase head

I show that my proposal becomes feasible under a labeling algorithm proposed in Chomsky (2013), according to which a feature becomes a label of the syntactic object consisting of XP and YP when it is the prominent one both in XP and YP.   My proposal is supported by three kinds of linguistic phenomenon: drop phenomena in matrix clauses, distinctness effects, and sluicing.

First, I analyze aux drop and topic drop in terms of Spell-Out, following Fitzpatrick (2006) and Rizzi (2005).   I show that my proposal correctly predicts the size of unpronounced elements in these constructions.

Second, my proposal solves a problem with the standard version of Spell-Out, and derives parts of the Case Resistance Principle (Stowell (1981)), assuming Richards' (2010) Distinctness Condition to the effect that the same kind of functional categories cannot exist in a single Spell-Out domain.

Third, my proposal derives Merchant's (2001) Sluicing-COMP generalization, assuming a direct connection between Spell-Out and ellipsis.

This paper is organized as follows. Section 2 reviews Chomsky's (2013) proposal on labeling, and clarifies its differences from previous analyses.   Section 3 presents my proposal.   Section 4 discusses two types of drop phenomenon observed in matrix clauses. Section 5 shows consequences my proposal brings to the Distinctness Condition.   Section 6 derives Merchant's (2001) Sluicing-COMP generalization.   Section 7 is a conclusion.

2.   On Labeling: Chomsky (2013)

For syntactic objects to be interpreted at the interfaces, labels are needed.   In the early minimalist program (Chomsky (1995)), the operation Merge was responsible for identifying labels.   Thus, applied to two objects α and β, Merge forms the new object K, of the form {γ, {α, β}}, where γ is its label.   This form of

Merge is no longer available in Chomsky (2013), where Merge is defined in the simplest form: Merge (α, β) = {α, β}. He argues that labels are determined at the phase level by a fixed labeling algorithm, which is just minimal search. Thus, for a syntactic object comprising H, a head, and XP, not a head, the labeling algorithm selects H as its label. In cases where XP and YP are merged, on the other hand, minimal search fails to determine the label of the syntactic object created, because it is ambiguous, finding the heads X and Y. Chomsky (2013) argues that this problem does not arise when XP and YP share the same prominent feature because the labeling algorithm finds it in both terms and can take that to be the label, creating an exocentric structure.

Let us see how this labeling mechanism works and compare it with previous accounts, using the following indirect question.

(3) They wondered [$_\alpha$ in which Texas city [$_\beta$ C [JFK was assassinated]]]

(Chomsky (2013: 45))

In the traditional accounts, the structure of the embedded clause is as in (4a). On the other hand, Chomsky's (2013) system requires it to be labeled as shown in (4b), where a shared prominent feature, an interrogative feature Q, has become the top label.

(4) a. [$_{CP}$ in which Texas city [$_{C'}$ C [JFK was assassinated]]]

   b. [$_Q$ in which Texas city [$_{CP}$ C [JFK was assassinated]]]

It is clear from this illustration that the sister of PP *in which Texas city* has a different status in these implementations. It is regarded as an intermediate projection C′ in (4a), whereas it is a maximal projection CP in (4b).

More generally, Chomsky's (2013) analysis differs from the previous ones in that the sister of 'specifier,' a traditional intermediate projection, becomes a maximal projection when

'spec-head agreement' occurs, as represented in (5).

(5) a. [$_{XP}$ ZP [$_{X'}$ X [$_{YP}$ …]]]

   b. [$_F$ ZP [$_{XP}$ X [$_{YP}$ …]]]   X: phase head

Then, it is predicted in (5b) that the sister of 'specifier' may undergo some syntactic process. This prediction does not arise in (5a), because intermediate projections are assumed to be invisible to syntactic operations (Chomsky (1995)). Therefore, as long as there is evidence for applying syntactic operations to 'intermediate projections,' Chomsky's (2013) approach to labeling is supported. In the following sections, I present such evidence using Spell-Out.

3.   Proposal

I propose that possible Spell-Out domains are phases themselves and their complements, i.e. XP and YP in (6).

(6)   [$_{XP}$ X [$_{YP}$ …]]   X: phase head

They are given a privilege status as Spell-Out domains because of their close relationship with a phase head that is a trigger of Spell-Out.

First, suppose that a phase head is introduced into the derivation and there is no Merge to the phase edge.

(7)   [$_{XP}$ X [$_{YP}$ …]]   X: phase head

XP (a phase) cannot be a target of Spell-Out in this case, because it is the topmost category necessary for continuing higher derivations. Therefore, YP (a phasal complement), undergoes Spell-Out.

Let us turn to a case where some element is moved to the phase edge and enters a 'spec-head relationship' with the phase head.

(8) [$_F$ ZP [$_{XP}$ X [$_{YP}$ …]]]   X: phase head

Since XP, a phase, is not the top category, it is a possible candidate for Spell-Out domains in (8). I argue that XP, rather than YP, is spelled out in this case because Spell-Out of the former is more economical given that the more structures are spelled out at a phase level, the less domains

are searched at the next phase level due to the Phase-Impenetrability Condition (Chomsky (2000)). Recall that this possibility is unavailable in the traditional accounts. Since intermediate projections cannot be a target of syntactic operations (Chomsky (1995)), X′ fails to be a potential Spell-Out domain.

In summary, this section has proposed that there are two possible Spell-Out domains: phases themselves and their complements. I have argued that under the framework of Chomsky (2013), a traditional 'intermediate projection' undergoes Spell-Out when a phase head undergoes a spec-head agreement. In the following sections, I present three kinds of consequence of my proposal.

4. Drop Phenomena in Matrix Clauses

This section discusses aux drop (Fitzpatrick (2006)) and topic drop (Rizzi (2005)). Following previous researches, I analyze missing elements in these phenomena as ones that do not undergo Spell-Out. I show that my proposal provides a correct characterization of the size of unpronounced elements.

Both of the phenomena mentioned above are observed in main clauses, and unpronounced elements would be at the front of the pronounced structures.

First, aux drop is a phenomenon where fronted auxiliaries are not pronounced in questions in English and German. Descriptively, aux-drop is possible only when the missing auxiliary has been raised at the root level and would be left-most in the pronounced structure (Fitzpatrick (2006: 402)).

(9) a. Anybody want a hot dog?
    b. Anyone seen John today?
                    (Fitzpatrick (2006: 400))

(10) a. Who *(does) everyone like?
     b. Only Mary *(does) everyone like.
                    (Fitzpatrick (2006: 402))

(11) German
     (Hat) irgendwer gestern   Spiderman
     (Has) anyone   yesterday Spiderman
     gesehen?
     seen
     '(Did) anyone see Spiderman yesterday?'
                    (Fitzpatrick (2006: 400))

Second, topic drop, observed in colloquial German, refers to situations in which a subject or a topicalized object is unpronounced (Rizzi (2005) and references cited therein).

(12) a. (Ich) habe es gestern   gekauft
        I   have it yesterday bought
     b. (Das) habe ich t_{das} gestern
        this have I   yesterday
        gekauft
        bought   (Rizzi (2005: 533))

It is impossible in the middle field ((13a)), or in the embedded clause ((13b, c)).

(13) a. Gestern   habe *(ich) es gekauft
        yesterday have I   it bought
     b. Hans glaubt *(ich) habe es
        Hans believes I   have it
        gestern   gekauft
        yesterday bought
     c. Hans glaubt dass *(ich) es
        Hans believes that I   it
        gestern   gekauft habe
        yesterday bought have
                    (Rizzi (2005: 533))

Fitzpatrick (2006) and Rizzi (2005) both propose that what is missing in these constructions is what escapes Spell-Out. Within the standard version of current phase theory (Chomsky (2000 et seq)), Spell-Out cyclically applies to the complement of a phase head. Therefore, at the point where the topmost phase is introduced, elements in the edge do not undergo Spell-Out. If they remain unspelled out, then, it is predicted that they are unpronounced. This account of drop phenomena straightforwardly derives the fact that unpronounced elements must be at the front of root clauses.

Inheriting the insights of the previous

studies, I make the following analyses.

(14) a. Aux drop

[$_{CP}$ does [$_{TP}$ anybody t_T want a hot dog]]]

pronounced

b. Topic drop

[$_{Top}$ ich [$_{CP}$ habe [$_{TP}$ t_{ich} t_T es gestern gekauft]]]

pronounced

In (14a) Aux sitting in T has moved to C, and TP has been spelled out. The rest of the structure is not spelled out and therefore Aux is dropped. In a similar vein, topic drop involves Spell-Out of CP. As a consequence, the topic sitting in the traditional specifier position is not pronounced, but C has phonetic realizations.

Note that in explaining these constructions, the size of Spell-Out domains plays an important role. If TP were Spell-Out domains in (14b), we would not expect that only the specifiers remain silent. Then the question arises especially as to why CP, not TP, is spelled out in topic drop. My proposal gives an answer to this question. The derivation of aux drop involves no spec-head agreement with C, and therefore TP is spelled out.[1] On the other hand, it is plausible to assume that [Top]-features trigger spec-head agreement in the derivations of topic drop. Then, the present analysis correctly predicts that traditional 'intermediate projections' undergo Spell-Out in topic drop.

5. Distinctness Effects

Richards (2010) proposes the Distinctness Condition, which rejects self-contradictory instructions to make nodes precede themselves.

(15) *Distinctness*

If a linearization statement <α, α> is generated, the derivation crashes.

He assumes, following Chomsky (1995, 2000), that trees created by syntax do not have information on linear order, and they are linearized via a version of Linear Correspondence Axiom (Kayne (1994)) at the point

when Spell-Out applies. He adopts the framework of Distributed Morphology (Halle and Marantz (1993)), where functional heads undergo Late Insertion. This framework makes it possible to postulate that, when linearization occurs, we cannot distinguish different functional heads of the same type due to their scarcity of features that may be useful to differentiate them from each other. As a consequence, the Distinctness Condition forbids the same kind of functional categories to be in the same Spell-Out domain.

The Distinctness Condition has implications for a wide range of linguistic phenomena. One of them is Case Resistance, which is illustrated by facts like (16) (Stowell (1981)).

(16) * They're talking about [that they need to leave] (Richards (2010: 137))

Richards (2010: 137) suggests that Case Resistance is an instance of Distinctness, if we assume, following Emonds (1985), that prepositions and complementizers belong to the same category. He assigns the following structure to part of (16).

(17) [$_{PP}$ about [$_{CP}$ that [$_{TP}$ the Marines went to China]]]

When a phase above CP induces Spell-Out, P and C are linearized in the same Spell-Out domain. Therefore, if P and C are of the same type, they cannot be linearized, causing a violation of Distinctness.

The Case Resistance Principle does not apply to interrogative clauses, as Richards (2010: 139) notes.

(18) They're talking about [what they should buy] (Richards (2010: 139))

This fact, however, cannot be accounted for in terms of Distinctness, if we assume the standard version of Spell-Out, because it is incorrectly predicted that P and C induce a contravention of Distinctness in (18).

(19) [$_{PP}$ about [$_{CP}$ what C [$_{TP}$ they should buy]]]

In the same way, the standard version of Spell-Out rules out interrogatives clauses with a PP specifier, contrary to the fact.

(20) a. They don't know [with whom they should discuss this]

(Richards (2010: 137))

b. [$_{VP}$ know [$_{CP}$ [$_{PP}$ <u>with</u> whom] <u>C</u> [$_{TP}$ they should discuss this]]]

My proposal, on the other hand, correctly deals with these cases. Since 'spec-head agreement' occurs in interrogative clauses, 'bar-level' projections are spelled out, as illustrated in (21), where P and C are divided into separate Spell-Out domains.

(21) a. [$_{PP}$ <u>about</u> [$_Q$ what [$_{CP}$ <u>C</u> [$_{TP}$ they should buy]]]]

b. [$_{VP}$ know [$_Q$ [$_{PP}$ <u>with</u> whom] [$_{CP}$ <u>C</u> [$_{TP}$ they should discuss this]]]]

Furthermore, my analysis predicts that Case Resistance effects reappear if a specifier of CP contains a preposition in (21a). This prediction is borne out.

(22) a. * They're talking about [with whom they should discuss this]

(Richards (2010: 137))

b. [$_{PP}$ <u>about</u> [$_Q$ [$_{PP}$ <u>with</u> whom] [$_{CP}$ <u>C</u> [$_{TP}$ they should discuss this]]]]

Thus, my analysis gives an account of the discrepancy between declarative and interrogative clauses with respect to Case Resistance effects.

It should be kept in mind that my analysis allows an interrogative clause to occur as a complement of prepositions not because it is an interrogative clause but because there is a spec-head agreement within it, and that it prevents declarative clauses from occurring as a complement of prepositions not because it is a declarative clause but because there is no spec-head agreement within it. My proposal predicts that prepositions can take a clause as their complement as long as there is a spec-head agreement within it. I corroborate this prediction by seeing additional types of interrogative and declarative clauses.

Kayne (1991) discusses the status of interrogative *whether* and *if* and concludes that the former is a *wh*-phrase in spec and the latter is a kind of complementizer. This conclusion is supported, for example, by the fact that *whether* is like other *wh*-phrases in that it does not have an impact on the finiteness of the clause it selects, whereas *if* only selects finite clauses.

(23) a. I wonder whom I should invite.

a′. I wonder whom to invite.

b. I wonder whether I should go.

b′. I wonder whether to go.

c. I wonder if I should go.

c′. * I wonder if to go.

(Haegeman and Guéron (1999: 175, 176))

This contrast is expected if we assume that *if* is a kind of complementizer, while *whether* is not. Given that heads have sectional properties, it is plausible that only *if* imposes selectional requirements on the finiteness of its following clauses.

Let us adopt Kayne's (1991) conclusion and assign the following structures to interrogative clauses with *whether* and *if*.

(24) a. [$_{PP}$ <u>on</u> [$_Q$ whether [$_{CP}$ <u>C</u> [$_{TP}$ we have enough time left]]]]

b. [$_{PP}$ <u>on</u> [$_{CP}$ <u>if</u> [$_{TP}$ we have enough time left]]]

Under my proposal, CP is spelled out in (24a), whereas TP is spelled out in (24b). Therefore, it is predicted that interrogative clauses headed by *if* cannot be a complement of prepositions, as opposed to those with *whether*. This prediction is correct.

(25) It depends on whether/*if we have enough time left.

(Huddleston and Pullum (2002: 974))

A certain kind of declarative clause can be introduced by *how*, as the translation in (26)

shows.

(26) They told me how the tooth fairy doesn't really exist.

‘They told me that the tooth fairy doesn't really exist.’ (Legate (2010: 121))

Legate (2010) argues that it is a kind of free relative. As shown in (27), I assume that its head undergoes a spec-head agreement.

(27) [$_{PP}$ about [$_X$ how$_i$ [$_{CP}$ C [$_{TP}$ the tooth fairy doesn't really exist t_i]]]]

My analysis expects that this type of declarative clause may be a complement of prepositions. This prediction is verified.

(28) They told me about how the tooth fairy doesn't really exist. (Legate (2010: 122))

Summarizing, I have shown, relying on the Distinctness Condition, that my proposal is superior to the standard version of Spell-Out in that it can successfully derive the Case Resistance Principle.

6. Sluicing-COMP Generalization

This section derives Merchant's Sluicing-COMP generalization from the proposed mechanism of Spell-Out. In so doing, I assume that ellipsis has a direct connection with Spell-Out domains. Specifically, I assume that phase heads are a trigger of Spell-Out, and ellipsis is the option of not realizing a Spell-Out domain at PF (Gengel (2009), Wurmbrand (2013)).

Merchant (2001) shows that the statement shown in (29) is valid cross-linguistically.

(29) In sluicing, no non-operator material may appear in COMP. (Merchant (2001: 62))

For instance, English and German exhibit verb-second in matrix interrogatives. When sluicing applies in these sentences, the remnant cannot include the auxiliary, validating Merchant's generalization.

(30) a. A: Max has invited someone.
B: Really? Who (*has)? [English]

b. A: Max hat jemand eingeladen.
B: Echt? Wen (*hat)? [German]
(Merchant (2001: 63))

Given the structure shown in (31) and the IP-deletion analysis of sluicing, it is surprising that the auxiliaries must be elided in (30).

(31) [$_{CP}$ who$_2$ [$_{C'}$ has [$_{IP}$ Max t_{has} invited t_2]]]

One may account for the obligatory absence of auxiliaries in sluicing by assuming that deletion of the IP material precedes head-movement to C (Lasnik (1999)). However, the Sluicing-COMP generalization holds even for the material usually analyzed as being base-generated in C. For example, certain varieties of Dutch allow an overt complementizer to co-occur with a *wh*-phrase in [Spec, CP].

(32) Ik   weet niet, wie (of) (dat) hij
I   know not who if   that he
gezien heeft.
seen   has
‘I don't know who he has seen.’
[(esp. Southern) Dutch]
(Merchant (2001: 74))

A grammatical sluiced counterpart of (32), however, involves only the *wh*-phrase.

(33) Hij heeft iemand   gezien, maar ik
he has   someone seen,   but I
weet niet
know not
a.   wie.
b. * wie of.
c. * wie   dat.
d. * wie of dat.
who if that
‘He saw someone, but I don't know who.’
[Dutch]
(Merchant (2001: 75))

My proposal accounts for the Sluicing-COMP generalization by arguing that sluicing is derived through ‘C″’-deletion. The relevant structure of sluicing is represented as follows.

(34) [$_Q$ *wh*-phrase [$_{CP}$ C [$_{TP}$ …]]]
elided

Due to the ‘spec-head agreement,’ the top label

is Q, and the sister of the *wh*-phrase is CP, a maximal projection. As a result, the Spell-Out domain and the elided site are CP, including C. Therefore, the Sluicing-COMP generalization naturally follows from the present analysis.

7. Conclusion

This paper has proposed that under Chomsky's (2013) framework, 'intermediate projections' undergo Spell-Out when phase heads enter a 'spec-head' relationship. I have shown that the proposed analysis accounts for (i) a difference between aux drop and topic drop, with regard to the size of unpronounced elements (Fitzpatrick (2006), Rizzi (2005)), (ii) the Case Resistance Principle (Stowell (1981)) based on Distinctness (Richards (2010)), and (iii) the Sluicing-COMP generalization (Merchant (2001)).

A Footnote

[1] To determine a sentence type, we may have to assume that CP is transferred to the C-I interface (cf. Marušič (2005)). I would like to thank Hisatsugu Kitahara (p.c.) for pointing this out to me.

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