

EPP at the Syntax-Phonology Interface

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ABSTRACT. The Extended (part of) Projection Principle (EPP) has been formulated in various ways since Chomsky (1981,82), but its “interpretation” is still not well understood. This paper explores how the EPP is interpreted at the interface under the research strategy of the minimalist program which attempts to attribute the genetic basis of language ability to general principles and interface conditions that are not language-specific (Chomsky 1995 et seq.). Since it is clear that EPP cannot be attributed to theta theory due to the presence of expletives, it is not appropriate to seek semantic motivation for EPP. This paper argues that EPP is phonologically motivated.*

Keywords: EPP, syntax-phonology interface, expletives, feature agreement

1. Introduction

Although various formulations of EPP, i.e. the fact that English sentences have a subject, have been attempted since Chomsky (1981, 1982), its “interpretation” is still not well understood.

- (1) a. Chomsky (1981: 2, 1982: 8)
S → NP INFL VP
- b. I will henceforth refer to the Projection Principle along with the requirement that clauses have subjects as the *Extended Projection Principle*. (Chomsky 1982: 10)

In (1a) for example, the phrase structure rule for S states that S has the subject NP. Chomsky (1981) says that the rule (1a) may be in part a language-particular rule of English (Chomsky 1981: 29). Chomsky (1982) introduces the term Extended Projection Principle (EPP) in referring to the fact that clauses have subjects, as shown in (1b).

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This paper explores how EPP is interpreted at the interface. Specifically, it will refer to, and modify, Radford's (2009: ch.7, henceforth R) feature agreement-based analysis of three types of examples (2)-(4), where expletives are involved.

- (2) An example that does not include an expletive; the DP moves to [Spec, TP] in the main clause.

[Several riots] are believed to have occurred in Hong Kong.

- (3) An example that includes an expletive/expletives; the DP stays in its base position.

a. *[There] are believed to have occurred [several riots] in Hong Kong.*

b. *??-*[It] is believed [there] to have occurred [several riots] in Hong Kong.*

c. *??-*[There] are believed [there] to have occurred [several riots] in Hong Kong.*

- (4) An example that includes one expletive; the DP moves to intermediate [Spec, TP]

a. **[It] is believed [several riots] to have occurred in Hong Kong.*

b. *?-?* [There] are believed [several riots] to have occurred in Hong Kong.*

Since the existence of subject expletives suggests that it should not be plausible to seek for semantic motivation for EPP, I will focus on the phonological side of the interfaces and argue that EPP is phonologically motivated, as in (5).

- (5) [*EPP*] is phonologically realized as the phonological phrase (ϕ) at the left-edge of CP.

2. Assumptions

In the analysis of (2)-(4), we adopt R's assumptions (6) and (7) below.

- (6) Assumptions about features (Radford 2009: ch.7)¹

a. Regular T has [**Tns (Tense)**], [*u(ninterpretable)-Pers(on)*], [*u-Num(ber)*], and [*EPP*] features.²

b. Defective T (including *to* involved in long-distance passive) lacks [*u-Num*], and hence cannot value [*u-Case*].

c. Expletive *there* has [*u-3Pers*], and lacks [*u-Case*].

d. Expletive *it* has [*u-3Pers*] and [*u-SgNum*], and lacks [*u-Case*].

¹ Uninterpretable features are shown in *italics*; and interpretable features are shown in **bolds**. For empirical evidence supporting the assumptions, in (6), please refer to Radford 2009: ch.7.

² [*EPP*] here can be regarded as identical with "strong D-feature on T that must be checked in overt syntax" (cf. Chomsky 1995).

- (7) Assumptions about feature agreement (Radford 2009: 244-246)
- a. An uninterpretable feature is deleted immediately after any operation it is involved in applies, and is thereafter invisible in the syntactic and semantic component (but visible in the PF component). (Radford 2009: 244 (14), based on Chomsky 2007)
 - b. The deleted features will remain visible in the PF component and spelled out in an appropriate way. (ibid.:244-246, based on Chomsky 2007)

The assumptions in (6) are about features. For (6b), we leave R (cf. pp.263-264) and argue that the defective T lacks [*u-Pers*] as well as [*u-Num*]. This is reasonable given the semantic property of defective T, and we will see that it can provide a more unified explanation in the analysis of (2) and (3) than R.

The assumptions in (7) are about feature agreement. Given the assumption in (6a) that EPP is driven by the uninterpretable [*EPP*] feature on T, and that in (7b) that deleted features are visible in the PF component, the question arises of how [*EPP*] gets spelled out in the PF component; that is to say, how EPP is interpreted phonologically.

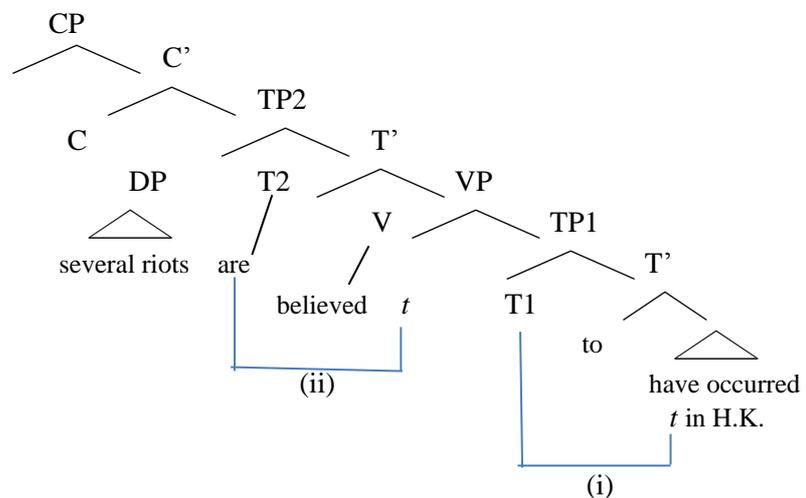
- (8) Question: How is the uninterpretable [*EPP*] spelled out in the PF?

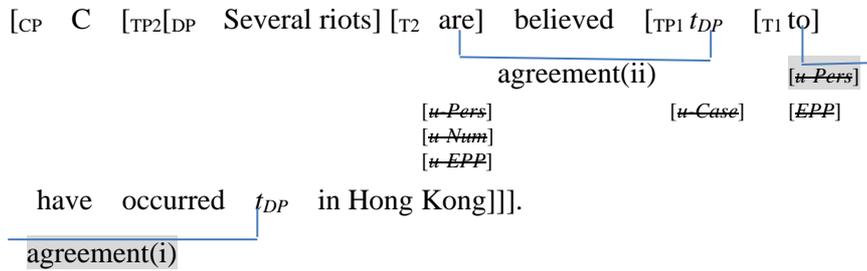
3. Toward a phonological approach to EPP

3.1 Improving on Radford's analysis

First, let us look at R's analysis of the derivation of (2), shown in (2') below.

- (2') Derivation of (2)



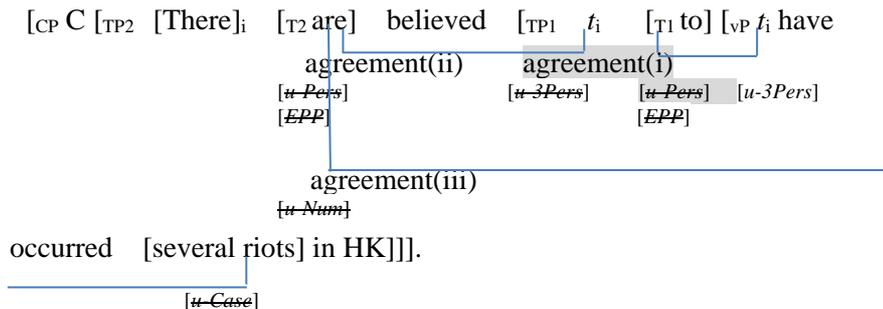


First, T1, as a P(robe), identifies the DP in the base position as a G(oal), and $[u-Pers]$ on T1 is deleted via feature agreement (i). Next, T1's $[EPP]$ induces the movement of DP to [Spec, TP1], and T2's uninterpretable features and DP's $[u-Case]$ are deleted via feature agreement (ii). Finally, T2's $[EPP]$ induces the movement of DP to [Spec, TP2], whereby all the uninterpretable features are deleted and the derivation converges.

Since we assume, unlike R, that T1 lacks $[u-Pers]$ in this paper (cf. section 2) (indicated with shading as $[u-Pers]$), we argue that the movement of DP to [Spec, TP1] is caused purely by the request of $[EPP]$. Therefore, it is assumed that the feature agreement in (i) does *not* occur (indicated as agreement(i)).

Next, let us look at R's analysis of the derivation of (3a), shown in (3'a) below.

(3') Derivation of (3a)



According to R, in (3), the feature agreement (i) between T1 and the expletive *there* merged in [Spec, vP] deletes T1's $[u-Pers]$. Then, T1's $[EPP]$ moves *there* to [Spec, TP1], and hence T2's $[u-Pers]$ is deleted by the feature agreement (ii). Since *there* does not have $[u-Num]$ (cf. (6c)), there occurs multiple feature agreement (iii) between T2 and the DP, whereby DP's $[u-Case]$ is deleted. Finally, T2's $[EPP]$ induces the movement of *there* to [Spec, TP2].

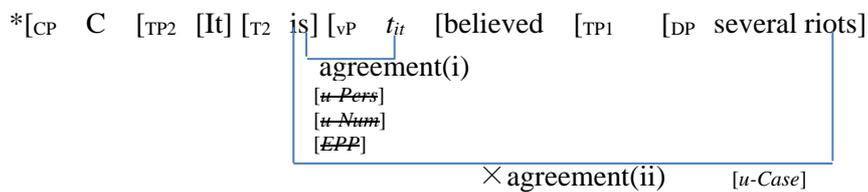
The role of $[u-3Pers]$ in the expletive *there* is worth noting here. R assumes the Completeness Condition, which states that “an interpretable case/agreement feature on a constituent α is deleted when α agrees (in respect of one or more ψ features) with a ϕ -complete

constituent β ,” (p.268 (69)). R argues that the [*u-3Pers*] of *there* is not deleted via feature agreement in (i), and therefore it is targeted by T2’s [*EPP*] (p.268). In this connection, R points out that if [*u-3Pers*] of *there* is deleted via (i) and *there* gets frozen in place, the example such as (3b, c) will be erroneously generated.

However, if we assume that the defective T does not have [*u-Pers*], the feature agreement (i) does not occur, and hence the above problem is avoided. Furthermore, we will see that the unacceptable examples in (3b, c) are independently excluded without assuming the Completeness Condition.

Lastly, let us think about the derivation of ungrammatical sentences in (4), shown in (4’), which R does not discuss.

(4’) Derivation of (4a)



[_{T1 to}] have occurred *t_{DP}* in HK]]]]].

[*EPP*]

First, T1’s [*EPP*] induces the movement of DP into [Spec, TP1]. Next, there occurs feature agreement (i) between T2 and the expletive *it* which is merged into the matrix [Spec, vP], whereby T2’s uninterpretable features are deleted. Therefore, no feature agreement is possible between T2 and the DP, and hence the remaining DP’s [*u-Case*] causes the derivation to crash.

On the other hand, in (4b), which involves the expletive *there* with [*u-3Pers*] only, the feature agreement should occur between T2 and the DP (in the same way as (3a)), and it is wrongly predicted that the sentence should be grammatical. In fact, the acceptability of (4b) *does* vary among the informants (indicated as “?-?*) and it is not completely excluded. However, it is clearly degraded compared with (3a), which still needs an explanation. Hence, we have the remaining question:

(9) Remaining Question: What is wrong with (4b)?

3.2 What does EPP do?

In order to examine what is wrong with (4b), let us focus on the role which [*EPP*] plays.

(10) Generalizations

- a. In grammatical sentences (e.g. (2), (3a)), the final landing site of the [*EPP*]-driven movement is [Spec, TP₂], i.e. the specifier of the main clause.
- b. In ungrammatical sentences (e.g. (3b, c), (4a, b)), the final landing site of the [*EPP*]-driven movement is [Spec, TP₁], i.e. the specifier of the embedded clause.

As the examples (11) show, the final landing site of the moved element *can* be the specifier of the embedded TP when it has a CP layer.

- (11) a. [CP₂ [TP₂ It is believed [CP₁ that [TP₁ there have occurred several riots in Hong Kong]]]]. (cf. ??*(3b))
- b. [CP₂ [TP₂ It is believed [CP₁ that [TP₁ several riots have occurred in Hong Kong]]]]. (cf. *(4a))

Therefore, we assume that [*EPP*] is the property of “C,” and if it is shared by the following T, it can make the [Spec, TP] the final landing site of the moved element. On the other hand, [*EPP*] on T that is not immediately dominated by CP (C’) can only induce movement and does not allow the moved element to stay in its specifier. In a nutshell:

- (12) The final landing site of the element whose movement was induced by T’s [*EPP*] is [Spec, TP] of C-T[*EPP*].

This is indeed the case of feature inheritance in the phase-based derivation (Chomsky 2007, 2008): for example, “T only carries a complete set of (person and number) agreement features in a clause where T is selected by C, not in a defective (CP-less) clause” (Radford 2009: 340).

Thus, (12) suggests that feature inheritance is extended to [*EPP*]. I propose that (12) is reduced to the EPP’s interface role described in (13) (= (5)):

- (13) [*EPP*] is phonologically realized as the phonological phrase (ϕ) at the left-edge of CP.

Let us look at the schematic examples in (14), which are based on the externalization mechanism (15) proposed by Dobashi (2017 and subsequent work).

- (14) a. [ϕ (C) DP][T...]
 b. [ϕ (C) *expletive*-T][...]
 c. [ϕ C *expletive*/DP][T...]³
 d. * $[\phi$][T...]

(15) Syntax-Phonology Asymmetry (SPA)

Syntactically inert elements receive interpretation in the processes of externalization

Φ . (Dobashi 2017: 4)

The schematic example (14a) describes the case where a full DP moves to [Spec, TP] of C-T, where the DP forms a phonological phrase on its own (cf. Nespor and Vogel 1986, Sato and Dobashi 2016, Dobashi 2017, 2020a,b). (14b) describes the case where an expletive moves to [Spec, TP] of C-T, where the expletive forms a phonological phrase with the following verb (e.g. *there's*). (14c) describes the case where there is an overt complementizer (e.g. (11)). If nothing fills in [Spec, TP] of C-T as in (14d), a phonological phrase cannot be formed at the left edge of the CP.

This is compatible with the visibility of an uninterpretable feature at PF in (7b), and answers the question (8) (repeated below).

- (8) Question: How is the uninterpretable [*EPP*] spelled out in the PF component?

The fact that EPP has captured that “clauses must have subjects” is thus recast in terms of how syntactic structures are interpreted phonologically, as in (13).

Going back to ungrammatical sentences (3b, c) and (4a, b), they are derived by moving the expletive *there* or the DP *several riots* from their base position to [Spec, TP1] of the embedded clause. These examples fail to satisfy (12) because the embedded clause has a defective T and no CP layer. In the case of (4a), which is unacceptable, the acceptability does not improve much even if the embedded clause is a CP, as shown in (16).

- (16) ^{?*}It is believed for several riots to have occurred in Hong Kong.

³ Normally, an expletive does not carry stress and forms a prosodic word or a prosodic phrase with the following verbal element (e.g. *There's...*). We will not go into the details of the *right*-edge of a phonological phrase here.

Therefore, we can say that T1 of the embedded clause in (4a) does not have [*EPP*] in the first place (as in Chomsky 1998) and the DP *several riots* cannot move.

If defective T1 does not have [*EPP*], then in the acceptable (2) and (3a), we would say that the DP *several riots* or the expletive *there* are induced to move long-distance across the embedded clause TP1 by the [*EPP*] of the main clause T2. The verification of the adequacy of this claim is left for future work.⁴

In summary, (i) regular T in English has [*EPP*] but defective T does not, (ii) EPP has a phonological interpretation in (13), and (i) and (ii) determine the acceptability of (14a-c) and exclude (14d), i.e. the acceptability of the three types of examples in (2)-(4).

3.3. Consequences and implications

In the previous section, I argued that EPP is phonologically interpreted as in (13).

(13) [*EPP*] is phonologically realized as the phonological phrase (ϕ) at the left-edge of CP.

This claim was based on an analysis of the long-distance passive examples in (2)-(4). The point of the analysis was to separate EPP from feature agreement, and to have [*EPP*] move the closest DP regardless of the presence or absence of other uninterpretable features. This is natural considering the fundamental difference between the two, that EPP basically targets a single constituent, while feature agreement can target multiple features.

The claim in (13) also derives the phonological property observed in EPP in (17a) and the typological generalization in (17b):

- (17) a. Movement induced by [*EPP*] involves PF pied-piping.
 b. EPP is a phenomenon found only in languages with a DP at the left end of the clause.

When EPP is viewed as a syntactic requirement, as in Chomsky (1981, 1982), it is expected that EPP will be satisfied by any element that does not have a sound form but does have a syntactic feature, e.g. *pro*, PRO. This is not the case in (13).⁵

⁴ Chomsky (2014) comments that the question of whether or not A-movement occurs in a successive cyclic manner is a “tricky” question. For arguments in favor of long-distance A-movement, see Epstein and Seely (1999).

⁵ For related arguments and examples supporting the phonological approach to EPP, see Lasnik 2001, 2003 and Landau 2007.

Next, regarding (17b), according to Dryer and Haspelmath (2013), most languages with obligatory subjects are classified as subject-initial languages, i.e. SVO and SOV languages.⁶ This fact is consistent with the argument made in the previous section that EPP requires a subject DP at the left end of the clause, and thus derives the phonological structure shown in (14a-c). Although (14a-c) assumes the cases of English, an SVO language, it would apply to SOV languages as well, since the key point is that there is an S (subject) at the left end.⁷

4. More recently on EPP by Chomsky and others

4.1. Labeling algorithm

Although EPP was identified in Chomsky (1982) and has been actively discussed and analyzed as a syntactic phenomenon, Chomsky (2013, 2015 and subsequent work) refers to it as “Extended projection Principle (that is, *exceptions* to the Projection Principle)” (Chomsky 2013: 35, emphasis mine), and under the Labeling Algorithm (LA), the effect of EPP is derived without assuming the [EPP] feature.

In the LA-based view of derivation, a Syntactic Object (SO) needs to have a label in order to be “interpreted” (ibid.: 43). The effect of EPP is derived by LA approximately as follows:

- (18) a. $[\alpha \text{ Subj } [_{V-v^*} V-v^* [VP t_V \text{ Obj}]]]$
 α : no label
- b. $[\beta T \quad [\alpha \text{ Subj } [_{V-v^*} V-v^* [VP t_V \text{ Obj}]]]$
 β : no label
- c. $[_\gamma \text{ Subj } [\beta T \quad [\alpha t_{\text{subj}} \quad [_{V-v^*} V-v^* [VP t_V \text{ Obj}]]]]]$
 $\alpha = V-v^*$, $\gamma = \langle \varnothing, \varnothing \rangle$, $\beta = T$

First, when the structure (18a) is created, the label of α cannot be determined because it is an XP-YP structure. Next, when the structure (18b) is created by merging T, the label of β cannot be determined because T is “too weak to serve as a label” (Chomsky 2015). Then, when the structure in (18c) is created by the internal merge of the Subject DP, the XP-YP structure in (18a) is modified and the label of α is determined as $V-v^*$.

⁶ The exceptions are Gaelic, Gude, Roviana (VSO), Anejom, Malagasy (VOS), which are classified as V-initial languages but are said to have obligatory subjects (pronouns) (Dryer and Haspelmath 2013).

⁷ To be more precise, the claim (13) only implies that there should be an “XP” at the left edge of a CP that can constitute a phonological phrase. See Shiobara (2020) for discussion on this, and a supporting argument based on Japanese (SOV) examples.

The label of γ is then $\langle\varphi-\varphi\rangle$ because of the φ feature agreement between T and Subj. The label of β is determined as T because as a result of the feature agreement, T is strengthened and can be a label (Chomsky 2015: 10). Thus, it follows that the subject should be merged into [Spec, TP] for the sake of LA, and [EPP] is no longer needed.

Let us compare this paper's claim (13) above with the LA-based account of the EPP effect. First of all, just as the claim (13) gives EPP a phonological *interpretation* of "being realized as the leftmost phonological phrase of a clause," in an LA-based account, the effect of EPP emerges as the syntactic computation attempts to label and *interpret* SOs. However, it is not clear what kind of "interpretation" Chomsky is referring to here, although it is probably the interface on the meaning side.

Furthermore, in (18c), feature agreement between T and Subj, and the resulting change in the function of T, is required for labeling γ and β . The fact that feature agreement is a prerequisite for labeling is different from the main argument of this paper, which is to separate EPP from feature agreement. In addition, in order for feature agreement to occur in (18c), it is necessarily the subject, not just any XP, that is internally merged (cf. 3.3, n7).

4.2. Kayne's note on expletive *there*

Kayne (2020) provides a morph-phonologically based analysis of the definiteness effect observed with the expletive *there*: The expletive *there* originates DP-internally as an instance of deictic *there* (as in non-standard *that there book*). This is based on the assumption that the expletive *there* and the locative *there* are not accidental homophones, but that they are identical and there is only one (deictic) *there*. Extending Szabolcsi's (1994) analysis of Hungarian possessive DPs, Kayne proposes (19):

- (19) If deictic *there* is (minimally) embedded within an indefinite DP, then that DP must be split apart by movement. (Kayne 2020: 217)

An existential sentence is derived as in (20).

- (20) were [there books] on the table →
 there were [\langle there \rangle books] on the table.

However, a question remains of why such extraction is obligatory (Kayne 2020: 217, n.21), and why it is to the subject position.

5. Conclusion

In this paper, I argued that EPP is phonologically interpreted as in (13).

(13) [*EPP*] is phonologically realized as the phonological phrase (ϕ) at the left-edge of CP.

The point of the analysis presented in this paper was to separate EPP from feature agreement, and to have [*EPP*] move the nearest DP regardless of the presence or absence of other *u*-features. This is natural considering the fundamental difference between EPP and feature agreement, that the former basically targets a single constituent, while the latter can target multiple features.

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