Towards resolving the countercyclicity of the EPP[*]

Thomas McFadden and Sandhya Sundaresan

September 18, 2015

1 Overview

The Extended Projection Principle (EPP) has a rather unique and problematic theoretical status, reflected in the history of its theoretical development. As discussed by Butler (2004), it has undergone an evolution from being a specific condition requiring a subject in each sentence (Chomsky 1981) to being a more abstract feature used to ensure that a head projects a (potentially null) specifier (Chomsky 2001, and subsequent). This modern version of the EPP is arguably the formal feature par excellence, used purely to trigger syntactic operations without being tied to any interface requirements. As such, it is also a thorn in the side of the Minimalist goal to have syntactic computation be solely interface-driven.

In this paper, we return to the original empirical domain of the EPP, i.e. the requirement that certain subject positions be overtly filled, and argue that characterizing it in terms of a syntactic movement-triggering feature is an oversimplification, and indeed is misguided. The phenomenon described by the EPP in fact turns out to be quite challenging from a theoretical standpoint, as its properties look countercyclic under standard Minimalist models of grammatical architecture. The constraint describing the relevant ill-formed structures requires reference to phonological information, yet the mechanism that typically avoids violations of this constraint, i.e. movement to subject position, bears all the hallmarks of being a syntactic operation. Thus it looks like we have a syntactic operation triggered by phonological considerations, which is countercyclic. A novel approach to the EPP is thus required, which can handle its sensitivity to phonological factors, yet still fits in with our broader theory. This paper is intended as an initial contribution in this direction.

2 Background on the EPP and its development

In this section, we consider the basic theoretical motivation for the EPP along with significant developments in the way it is understood over the past 35 years.

2.1 Motivations for the traditional EPP

The original formulation of the EPP (Chomsky 1981, et seq.) was based on the observation that clauses require their subject position (now considered Spec-TP) to be filled. At its base, this includes both overt and covert (traces of A- and Ā-movement, PRO and *pro*) subjects, the choice among which is regulated by other factors. The motivation for the EPP is a series of facts showing that the subject position must be filled even when argument-structural or case factors would not require it.

The pattern in (1) can be explained in terms of the θ-criterion: the verb *mow* has two θ-roles to assign, but only gets to assign one of them, yielding ungrammaticality when the subject is absent/covert:

(1)   *(Dan) mowed the lawn.

However, there are cases where there is no thematic need for a subject, e.g. with verbs that engage in a causative-inchoative alternation like *shatter*. (2a) is a simple transitive sentence built on this verb, with two θ-roles assigned to the subject and object, respectively. (2b) is the intransitive version, where the agent θ-role that was associated with the subject has been left off. (2c) shows, crucially, that the remaining argument, which was the object in the transitive, must surface in subject position — leaving it in its in situ object position where it gets its θ-role is not an option:

(2)   a.   Sandra shattered the pot.
      b.   The pot shattered.
      c.   * Shattered the pot.

Given that (2b) is grammatical, the problem with (2c) cannot be that a θ-role has gone unassigned. Instead, the issue seems to be the lack of a subject. Passive sentences are entirely parallel to this, so we don't walk through the details here. Suffice it to say that, here again, we need something beyond the θ-criterion to ensure that these DPs end up in the overt subject position.

Of course, GB theory and its descendants have another mechanism that could be called on to account for these facts, i.e. Case theory. As per Burzio's Generalization, no accusative Case is available in sentences like (2c), given the lack of an external θ-role, so nominative is the only option. But nominative is only assigned in Spec-IP/TP, thus moving these DPs up to subject position is the only option. The motivation for the EPP on the basis of these examples alone is somewhat limited.

What really sells the EPP is the argument from expletives. Under certain circumstances (related to predicate-class and subject-definiteness), the subject can surface in an unexpectedly low position, following the verb. However, as (3) illustrates, the expletive *there* must, in this instance, fill the normal pre-verbal subject position:

(3) *(There) is an elephant in this sentence.

(3) shows us that, at least sometimes, the needs of the expected subject DP, Case or otherwise, can be met without having it move up to Spec-TP. Nonetheless, Spec-TP must be filled by *something*. A second type of expletive sentence is found with a small group of so-called "weather verbs", like 'raining' or 'snowing' that don't assign any θ-roles. Nonetheless, these verbs cannot simply appear without a subject, but instead require the expletive *it*, as in (4):

(4) *(It) is raining.

Data of this type are not amenable to an account in terms of the Case needs of DPs. With both *there* and *it*, what is at stake is why the expletive must appear, so its own Case needs cannot be at stake — if it didn't appear at all, it wouldn't have any Case needs.

These patterns, taken together, lead to the conclusion that, in addition to the θ-criterion and the Case filter, a third principle is needed to regulate the distribution of DPs, yielding (5):

(5) **The (traditional) EPP**
Every clause must have a filled subject position.

2.2 The traditional EPP and silent subjects

The version of the EPP given in (5) raises a number of important questions. One is how the formulation "every clause" should be understood, since, at least superficially, many types of non-finite clause actually seem to lack a subject. Both (6a) and (6b) have an embedded non-finite clause (delimited with square brackets), neither of which has an obvious subject. Indeed, overt subjects are banned here, as shown:

(6) a. Olga seems [(*Sasha) to like physics].
b. Sasha tried [(*Olga) to like physics].

Thus we might naïvely think that the EPP should be restricted to finite clauses. However, standard analyses posit subjects in these non-finite clauses — they just happen not to be overt. (6a) has a raising infinitive, with *Olga* starting out as the subject of the embedded clause, then moving up to the matrix clause. (6b), on the other hand, has a control infinitive, analyzed as having a null PRO subject in the infinitive, controlled by the matrix subject *Sasha*. Another question raised by this formulation of the EPP is whether and how it is parametrized. Given well-known cross-linguistic differences in word order, an obvious possibility is that languages may vary in whether it makes sense to talk about a specific 'subject' position targeted by the EPP. Even more pressing are the issues presented by the so called pro-drop languages like Spanish, Italian, Tamil, Japanese, among others, — i.e. languages which are fine without a clear overt subject (Biberauer et al. 2010, a.o.).

The difference between languages that disallow pro-drop, like English and those that allow them, like Spanish, could either be that the EPP is parametrized: the former, but not the latter, are sensitive to it. Alternatively, it might have to do with independent

factors (the so called "pro-drop parameter") governing the pronunciation of subjects in (non-)finite clauses, which remain poorly understood (see also Duguine 2013, Sundaresan 2014, a.o. for discussion).

2.3   Reformulations of the traditional EPP

A central problem that has been noted with respect to the traditional EPP is that it is a strangely specific requirement (applying only to subjects) without clear independent motivation. One type of response to this is to argue that there *is* a semantic underpinning to the EPP (see e.g. Heycock 1991, Butler 2004) which we don't discuss here.

A second is to eliminate the EPP entirely, subsuming its apparent effects under independent principles. The 'Inverse Case Filter' (see e.g. Martin 1999, Grohmann et al. 2000, Boeckx 2000), which says that every functional head that *can* assign Case *must* have a DP to assign that Case to, was such an attempt, briefly very popular. However, this approach ran into serious theoretical and empirical problems (see McFadden 2004, for extensive discussion). A different elimination strategy, popular more recently, proposes to replace the EPP with movement that is triggered to ensure structural wellformedness conditions for Agree. E.g. it is assumed that T probes a subject DP for ϕ features, but this DP probes T for Case. At first merge, when the subject is inside *v*P, T asymmetrically c-commands the DP and ϕ-Agree is established unproblematically (since the probe c-commands the goal, as desired). But there is a problem for Case-based Agree, since the probe on the DP does not c-command the goal on T. Bošković (2007) proposes that this is precisely the configuration that leads to movement of the subject to Spec-TP; the EPP is just an epiphenomenon of this. This argumentation is taken over by Zeijlstra (2012), Bjorkman and Zeijlstra (2014), but under the assumption that Agree operates "upwards", with the goal c-commanding the probe.

A third response is to generalize the EPP so that it can do more work in the theory. Under Minimalism, many GB-style derivational filters and the representational levels where these could be stated, had been abandoned, as was the idea that movement could apply freely. With the introduction of Agree (Chomsky 2001), features could be checked independent of movement, as long as requirements of c-command, locality and minimality were met. Chomsky thus proposed that movement is parasitic on Agree, but whether or not it actually must occur in a given situation is encoded by an additional "EPP feature". The EPP is thus reformulated from being a surface wellformedness condition to being a second-order feature on whatever feature triggered Agree. Furthermore, reference to subjects and to specific syntactic positions is replaced by the possibility that *any* Agree relationship may be accompanied by movement. It thus becomes possible to generalize the EPP to all kinds of movement.

2.4   Where we're headed

As a result of these theoretical developments, discussions of the EPP invoke two distinct strands of ideas. One is the general, and more recent, need for something to trigger movement or, more generally, Merge. But there's another issue, which gets back to the

original purview of the EPP: this is the requirement, in languages like English, that prototypical finite clauses require *overt* subjects. This narrower, more traditional sense of the EPP will be the focus of much of this paper. We will show that, while the factors conditioning the EPP are phonological, it in turn triggers operations that are syntactic. Thus, phonology seems to feed syntax in a way that is clearly countercyclic. Accounting for the EPP properly thus runs into serious issues relating to (standard notions of) the architecture of the grammar.

3 The EPP must hold at PF

We will now commence our investigation of the properties of the traditional EPP. In this section we argue that the requirement for a subject in languages like English must be understood as at least involving a PF condition, before turning in Section 4 to the evidence that the EPP nonetheless triggers operations that occur in the narrow syntax.

3.1 The role of overtness

The simplest indication that the EPP has a phonological side comes from the fact that, in languages like English, the prototypical finite subject really must (phonologically) overt:

(7) a.   I like beans.
     b.   * Like beans. (under the interpretation 'I like beans')
     c.   * *pro* like beans.
(8) a.   It is raining.
     b.   * Is raining.
     c.   * *pro* is raining.

More or less any version of the EPP will rule out sentences like (7b) and (8b), as they lack any representation of a subject. The interesting question is why the same surface strings are ungrammatical with the analyses in (7c) and (8c), where we posit silent *pro* subjects. The standard understanding would be that they do not violate the EPP, but English is not a pro-drop language, so such structures are ruled out independently.

However, this falls short of an adequate explanation on multiple grounds. First of all, it presupposes a satisfactory theory of the distribution of pro-drop to account for why it isn't available in English. In addition, we need a theory of why *pro* is the only silent DP that could occur in this position. In other words, why is it that all of the DPs that are licensed to appear here happen to have overt forms in English? The point is not that such accounts don't exist or are impossible, but rather that in order to cover everything, they will have to have certain properties.

Specifically, given standard views of grammatical modularity, a full account of these facts simply cannot be implemented entirely in the Narrow Syntax. Whether a DP and its subparts have any overt phonology is at least in part a phonological fact. If such information only plays a role on the PF branch, and the syntax has no access to the phonological properties of the elements it manipulates, it will be impossible to phrase

5

a constraint that refers to overtness within the syntax. Instead, any requirement for overtness must be stated at a stage in the derivation where phonological information is available, i.e. somewhere on the PF branch.

3.2 An argument from ellipsis

A second argument that the EPP applies at PF comes from surprising effects with ellipsis, discussed e.g. by Merchant (2001), van Craenenbroeck and den Dikken (2006). They show that, in languages like English, extraction from surface subjects is generally ruled out (9a), but is possible if the extraction site is elided (9b):

(9) a. * Which Marx brother$_i$ is [a biography of t$_i$]$_j$ going to appear t$_j$ this year?
   b. A biography of one of the Marx brothers is going to appear this year, but I don't know which (Marx brother).

Merchant argues that the ban on extraction applies to subjects that have moved out of their base position, under the hypothesis that moved elements are islands. In examples like (9b), he proposes, extraction is possible because the subject never moves. I.e. the correct structure is (10):

(10) A biography of one of the Marx brothers is going to appear this year, but I don't know [$_{CP}$ [which (Marx brother)]$_i$ is [$_{TP}$ going to appear [a biography of t$_i$] this year]].

Of course, (10) should lead to an EPP violation, since the embedded clause doesn't have an overt Spec-TP. Indeed a version where we can see the subject staying in situ is ruled out:

(11) * I don't know [which Marx brother]$_i$ is going to appear a biography of t$_i$ this year.

Merchant argues that we can make sense of this situation if the EPP applies only at PF. (10) is grammatical because the configuration that would violate the EPP, though present in the syntax, has been eliminated by ellipsis before the EPP gets to apply. In (11) on the other hand, the configuration makes its way to PF, leading to an EPP violation.

3.3 Connections to the *that*-trace effect

A third type of argument comes from connections between the EPP and the *that*-trace effect, demonstrated in (12):

(12) a. Who$_i$ do you think [(that) Beau nudged t$_i$]?
   b. Who$_i$ do you think [t$_i$ is stupid]?
   c. * Who$_i$ do you think [that t$_i$ is stupid]?

When the object is *wh*-extracted from an embedded clause into the matrix in English as in (12a), the complementizer *that* is optional. But when the subject is extracted from such a clause, *that* must suddenly be dropped as it is in (12b). (12c) shows that when *that* is

present, sharp ungrammaticality results. We will see in Sections 6.3 and 6.5 that there is good reason to connect the *that*-trace effect to the EPP. For now, simply note that both involve ungrammaticality arising from an empty subject position.

Crucially, evidence has mounted recently that *that*-trace effects are not actually syntactic, as was long thought, but rather involve something phonological or prosodic (see e.g. Kandybowicz 2006, Bruening 2009, McFadden 2012, Salzmann et al. 2013). First, in parallel to what we saw above for the EPP, ellipsis seems to eliminate the effect (Merchant 2001):

(13)   John said that someone would write a new textbook, but I can't remember who$_i$ ~~John said that t$_i$ would write a new textbook~~.

Second, the intonational break created by Right Node Raising, while not completely removing the effect, greatly improves things (de Chene 1995):

(14)   ? Who$_i$ does John doubt whether and Bill suspect that t$_i$ cheated?

Third, the effect can be substantially ameliorated by having an adverbial intervene between the complementizer and the presumed position of the trace (Bresnan 1977, and others):

(15)   Who$_i$ do you think [that, against doctor's orders, t$_i$ drank the hot sauce]?

Such types of evidence, among others, have been taken to indicate that the *that*-trace effect reflects a ban, not on a particular syntactic operation or representation, but rather on a particular prosodic configuration, applying at PF. The *that*-trace effect and the EPP thus involve a common core: if the former applies at PF, then the latter must, as well.

The discussion in this section leads us to the conclusion, in partial agreement with Merchant (2001), van Craenenbroeck and den Dikken (2006), Landau (2007), Salzmann et al. (2013), that the traditional EPP is not a narrow syntactic condition, requiring that a particular syntactic position be filled at some point in the derivation, but a PF condition requiring the presence of an overt element.

4   The operations the EPP triggers are syntactic

If, as we have just argued, the EPP acts by placing restrictions that must be stated at PF, an obvious thought would be that it triggers argument-movement and insertion of expletives at PF. However, at least in the case of movement, it is clear that this is incorrect. EPP-driven movement shows clear syntactic properties in its application, and furthermore yields LF effects in addition to the obvious PF ones. Given standard assumptions about the architecture of the grammar, we are left to conclude that EPP-driven displacement is not a PF operation, but quite standard (narrow-)syntactic movement.

4.1   Syntactic properties of EPP-driven movement

Movement-to-subject shows all the hallmarks of syntactic movement. First, what actually undergoes movement is a syntactic constituent, a DP in its entirety:

(16)　a.　$[_{DP_1}$ $[_{DP_2}$ The man] $[_{PP}$ with the pointy green hat]]$_i$ seemed $[_{TP}$ t$_i$ to be insane].

　　b.　* $[_{DP_2}$ The man]$_i$ seemed $[_{TP}$ $[_{DP_1}$ t$_i$ $[_{PP}$ with the pointy green hat]] to look insane].

　　c.　* $[_N$ man]$_i$ seemed $[_{TP}$ $[_{DP_1}$ $[_{DP_2}$ the t$_i$] $[_{PP}$ with the pointy green hat]] to look insane].

　　d.　* $[_D$ the]$_i$ seemed $[_{TP}$ $[_{DP_1}$ $[_{DP_2}$ t$_i$ man] $[_{PP}$ with the pointy green hat]] to look insane].

The raising construction in (16a) is grammatical because the complex DP subject of the embedded clause is moved in its entirety to matrix Spec-TP. The versions in (16b)-(16d) are ungrammatical because they try to move some sub-part of that constituent, stranding the rest. What must be raised here, and in general with EPP-driven movement, is a syntactically defined unit, a phrase of a particular syntactic category, not a phonologically or prosodically defined one, like a syllable, foot, prosodic-word or intonational phrase (i.e. categories from the prosodic hierarchy, as in Selkirk 1986).

　　Second, EPP movement is sensitive to syntactic constraints like locality and minimality. (17) illustrates a basic minimality contrast. *The hungry man* starts out closer to the landing site of EPP movement in Spec-TP than *the soup* does, and so it is the former that must move there (17a), not the latter (17b):

(17)　a.　$[_{DP_1}$ The hungry man]$_i$ will t$_i$ devour $[_{DP_2}$ the soup].

　　b.　* $[_{DP_2}$ The soup]$_i$ will $[_{DP_1}$ the hungry man] devour t$_i$.

A different type of minimality effect is shown by the pair in (18). *Matilda* is contained within the larger DP *a relative of Matilda*. Since the larger DP is itself elligible to move to Spec-TP to satisfy the EPP, as in (18a), *Matilda*, though of the right syntactic category, may not be sub-extracted to do so, yielding ungrammaticality in (18b):

(18)　a.　$[_{DP_1}$ A relative of $[_{DP_2}$ Matilda]]$_i$ arrived t$_i$.

　　b.　* $[_{DP_2}$ Mathilda]$_i$ arrived $[_{DP_1}$ a relative of t$_i$].

Both (17b) and (18b) violate relativized minimality. If we accept that DPs are phases (e.g. Svenonius 2004), then (18b) also violates locality – specifically, the Phase Impenetrability Condition (PIC). Another locality contrast is seen in (19). Raising succeeds in (19a), which we can attribute to the raising infinitive being a TP, hence not a phase. On the other hand, raising is impossible in (19b), where the embedded clause is finite, hence a CP and a phase. A-movement out of it from embedded Spec-TP thus violates the PIC, yielding ungrammaticality:

(19)　a.　$[_{DP}$ Matilda]$_i$ seems $[_{TP}$ t$_i$ to be lazy].

　　b.　* $[_{DP}$ Mathilda]$_i$ seems $[_{CP}$ that t$_i$ is lazy].

　　Such sensitivity to minimality and locality would be unexpected if EPP-driven movement were actually implemented at PF. This holds even under a framework like Distributed Morphology where a portion of the post-syntactic PF derivation can involve movement on partially hierarchical structures. But these post-syntactic movements are heavily restricted in ways quite different from syntactic movement including we've seen

here for EPP movement (see especially Embick and Noyer 2001, for discussion). Abstracing away from the expectations of particular theories regarding PF movement, there is no evidence for the relevance of prosodic or phonological wellformedness conditions (e.g. linearity, adjacency, stress-placement and phonotactics) for EPP-driven movement. EPP-driven movement in an English-like language bears the fingerprint of a (narrow-)syntactic operation, not of a morpho-phonological one.

4.2   LF effects of EPP-movement

Further evidence that EPP-driven movement takes place in the narrow syntax comes from the fact that it has consequences at LF. First, it affects anaphoric binding possibilities, yielding the contrast in (20). In (20a), *every girl* is in an embedded clause and hence does not c-command the anaphor *herself* in the matrix. Since there is no other c-commanding potential antecedent, the sentence is ruled out.

(20) a. * It seems to herself$_i$ [$_{CP}$ that every girl$_i$ is silly].
      b.   Every girl$_i$ seems to herself$_i$ [$_{TP}$ t$_i$ to be silly].

(20b) is largely parallel, except that *every girl* raises out of the embedded clause, satisfying the matrix EPP, and ending up in a position where it does c-command *herself*. The sentence is grammatical under the interpretation indicated by the coindexation, which tells us that binding has succeeded. Since *every girl* started out in a position from which precisely that binding was ruled out in (20a), we can conclude that it is the EPP-driven movement that feeds the binding. While we can debate whether the relevant stage for binding is LF itself or some earlier stage in the syntactic derivation, what is clear is that it cannot be anywhere along the PF branch, since binding feeds into the determination of reference, which clearly is an LF issue.

Similar arguments can be made with respect to changes in scope relations:

(21) a. It seems to some girl [$_{CP}$ that every boy stinks]. (∃ » ∀; *∀ » ∃;)
      b. [Every boy]$_i$ seems to some girl [$_{TP}$ t$_i$ to stink]. (∃ » ∀; ∀ » ∃)

In (21a), no EPP-driven movement has occurred in the matrix clause, with the EPP satisfied rather by expletive *it*. The only available scopal reading is the surface one (∃ » ∀), namely that there is a single girl who has the impression that all of the boys stink. In (21b), the matrix EPP is satisfied instead by raising the embedded subject into matrix Spec-TP. In this position, *every boy* c-commands *some girl*, and as a result we get the additional interpretation ∀ » ∃; i.e. for every boy, there seems to be some girl who thinks he stinks, but there may be several different girls for the different boys. Again, under the standard assumption that scope relations are determined based on c-command at LF, this tells us that the EPP-driven movement feeds into LF, thus cannot take place on the PF branch.[1]

While EPP-driven movement affects LF, it nevertheless clearly does not occur on the LF branch itself. First, EPP-driven movement obviously has PF effects — *every boy* is pronounced earlier in the string in (21b) where it has undergone EPP-driven movement

---

[1] Of course, the inverse scope of ∃ » ∀ is still available due to scope reconstruction at LF.

into the matrix clause than in (21a) where it has not. Under the modular architecture of the grammar assumed here, anything that affects both LF and PF must happen in the narrow syntax, which feeds into both. Purely LF operations, on the other hand, should be invisible to PF.

We can also make an argument from sentences like (22a) that EPP movement cannot be *driven* by LF concerns:

(22) a.   There$_i$ seems [$_{TP}$ t$_i$ to be no one here.]
      b.   *There seems [$_{TP}$ [no one]$_i$ to be t$_i$ here.]

(22a) involves an expletive subject *there*, which undergoes EPP-driven movement from embedded subject position in the raising complement to matrix Spec-TP. Evidence that *there* really did start out in the embedded clause comes from (22b). We might expect the embedded subject *no one* to raise from its post-verbal first-merge position to the embedded Spec-TP to satisfy the EPP there, with *there* subsequently being merged directly in the matrix Spec-TP, but this is clearly ungrammatical. The fact that *no one* must remain in situ suggests that *there* is first merged in Spec-TP of the embedded clause, satisfies the EPP there, and then raises up to satisfy the EPP in the matrix clause. If this is correct, then the movement we see in (22a) cannot be driven by any semantic/thematic/other LF requirements, because the expletive has no interpretive content of its own.[2]

5   Interim Summary

The data in this section show that the EPP has the rather puzzling constellation of properties in (23):

(23)   EPP-driven movement bears the structural hallmarks of a narrow-syntactic operation. The output of this movement also feeds LF and PF interpretation, further underscoring its narrow syntactic status. Nevertheless, this movement is triggered by purely phonological factors.

(23) would seem to imply that syntactic operations can be sensitive to phonological information. However, in the standard Y-model and its descendants, the syntax is assumed not to have access to the phonological properties of the structures it manipulates, either as a general principle of modularity (adopted under rather different architectural assumptions Miller et al. 1997), or because those structures literally lack phonological content, which is inserted "late" at PF (Halle and Marantz 1993). The EPP thus seems to involve an element of countercyclicity or look-ahead. Something needs to happen at an earlier stage of the derivation based on information that should only be available at a later stage.

We are by no means the first to arrive at this conclusion. Landau (2007) and Salzmann et al. (2013) are two proposals that attempt to reconcile the countercyclicity issue by having the EPP be implemented at PF in different ways. Nevertheless, for both, the EPP

---

[2]Note, incidentally, that a straightforward Case-theoretic story doesn't work here either since *there*-type expletives are not generally thought to get Case.

still essentially involves a syntactic feature. Because of this, they are forced to adopt unorthodox assumptions that we would like to avoid, involving the effects that syntactic features can have or about the timing of feature checking.

What we need is an account with the following characteristics. It needs to ensure that, for languages like English, Spec-TP is filled at PF by an overtly pronounced element, but the operation that fills Spec-TP must apply in the narrow syntax. There are two problems to solve here. One is to come up with a workable PF characterization of the EPP. This is tricky because the relevant configuration still seems to be partly syntactic, involving apparent reference to a subject position like Spec-TP. The other problem is to integrate this PF characterization of the EPP with the syntax, so that the right kinds of movement and other operations can be triggered, without violating our assumptions about the architecture of the grammar. The next two sections will be devoted to tackling these two questions in turn.

6   Implementing the EPP as a PF-constraint

If we conclude that the EPP, as a requirement for subjects in languages like English, actually involves a constraint at PF, rather than being purely syntactic, then we face a challenge in formulating that constraint. The part of the EPP that involves a non-zero pronunciation in a particular position is presumably the sort of thing that works at PF. Identifying that position through direct reference to Spec-TP, on the other hand, is clearly syntactic, and thus ruled out for PF. So we need a way to define the 'subject' position targeted by the EPP in phonological/prosodic terms, and ideally come up with a phonological/prosodic reason for why it should have to be filled.

6.1   Singling out the subject position

So, what is special about Spec-TP from a PF point of view that should lead to it being singled out by the EPP? We propose that we can get the special status of TP with respect to the EPP out of standard assumptions about phased-based derivations, building on work on the relationship between syntactic structure and prosodic domains by e.g. An (2007) and Kandybowicz (2009). Under standard phase theory (Chomsky 2001, etc.), what is sent to the interfaces is a phase domain, i.e. the complement of the phase-defining head. Assume that these domains serve as the basis for the construction of phonological and prosodic domains. Given that C is a phase-defining head, TP will be the domain of a complete CP phase, and thus will be an important unit for the construction of prosodic domains. An (2007) proposes specifically that TPs typically form the basis for constructing Intonational Phrases (IntP). This means that Spec-TP will typically fall at the left edge of an IntP, and will thus be prosodically prominent in a clear sense.

We can thus propose the following constraint, based on An (2007)'s Intonational Phrase Edge Generalization, as a prosodic interpretation of the EPP:

(24)   **Constraint on the left edge of IntP (Prosodic EPP):**
        The left edge of IntP must be marked by the presence of overtly pronounced

material.

The EPP can then be construed as a sub-case of this constraint. Note, crucially, that (24) makes no direct reference to Spec-TP or any other syntactic position. Rather, it is phrased entirely in terms that should be interpretable at PF. Nonetheless, a clear connection to the syntactic configuration we thought was relevant for the EPP is maintained, via the idea that, by default, prosodic domains are built out of syntactic domains of particular sizes.

6.2   The basics of overt and non-overt subjects

Let us now consider how we can use the constraint in (24) to cover the basic patterns associated with the EPP. Again, we will consider the details of EPP-triggered movement and expletive insertion operations in Section 7. For now, what concerns us is simply ensuring that an account built on (24) can sucessfully identify the ungrammatical structures. Typical finite clauses are straightforward:

(25)   a.   [A book]$_i$ is t$_i$ on the shelf.
       b.   There is a book on the shelf.
       c.   * Is a book on the shelf.

Spec-TP is at the left edge of the IntP in these examples and thus, according to (24), must contain overt material, either a raised subject as in (25a) or expletive *there* as in (25b). (25c) violates (24) and is thus correctly excluded.

One crucial difference between an EPP formulated as a requirement for a filled Spec-TP and one formulated as a requirement for an overtly pronounced left edge of IntP, is in the treatment of non-overt subjects. An unpronounced lower movement copy, PRO or little *pro* in Spec-TP will satisfy the former but violate the latter precisely because it is silent. We must thus carefully consider clauses with non-overt subjects to see whether our prosodic EPP can be extended to cover them. Note, first of all, that a parse of (25c) with either a PRO or *pro* subject will be correctly ruled out, without needing recourse to any specific theory of control or pro-drop.

Let us then consider infinitives. Spec-TP in the embedded clauses in (26) is filled syntactically — by controlled PRO in (26a) and by the trace of the raised subject in (26b) — but, of course, neither is pronounced overtly:

(26)   a.   Beau tried [PRO to eat the tree].
       b.   Carrie$_i$ seemed [t$_i$ to find the solution].

A traditional EPP account has no problem ruling these sentences in, but our PF story has a bit of work to do. For the raising example in (26b), the solution is fairly clear. Raising infinitives are standardly taken to be TPs that lack a CP above, and in particular to not constitute phases of their own. This means that the embedded clause will not serve as the basis for its own IntP. Therefore, the non-overt subject position in raising infinitives will not actually be at the left edge of IntP, and (24) does not apply to rule it out.

For the control example, things are more complicated, since unlike raising infinitives, control infinitives are normally assumed to be CPs and hences phases. Thus under our

12

approach, the TPs they contain would build IntPs. If this is so, we would predict, falsely, that the silence of the subject in a control example like (26a) would lead to a violation of (24). While we will not defend a specific proposal on how to deal with this issue, we will briefly discuss three options that could be pursued here. Considerations that arise subsequently will hopefully help us decide among them.

One possibility is to argue that control infinitives do not count as independent phases after all, thus their TPs don't form IntPs, and like raising infinitives don't come under the purview of (24). This has some plausibility, given the sense that prototypical control infinitives are smaller than typical finite clauses (see e.g. Wurmbrand 2001, McFadden 2014). A second possibility depends on the idea that, for the purposes of (24), the left edge of IntP includes not just the specifier of the phrase that IntP it is built on, but also its head, as proposed by An (2007). This means that what (24) typically requires is that either Spec-TP or T itself contain overt material. Since the infinitive marker *to* is presumably in T, it can thus suffice to satisfy this prosodic version of the EPP. A third possibility exploits the indirectness of the relationship between syntactic and prosodic structures. The default is that the phase domain will serve as the basis for an IntP, but under certain circumstances, it is possible for what would normally be an independent IntP to be parsed as part of an adjacent IntP. While root clauses and certain other kinds of constituents are apparently obligatorily parsed as separate IntPs, it is commonly assumed that certain kinds of complement clauses may be included in the IntP of the matrix clause (see Selkirk 1986, and much following work). We may then be able to argue that control infinitives, while phases, do not necessarily build their own IntPs, hence (24) does not apply to them.

6.3   Interactions with *wh*-movement

Another non-overt subject configuration is when a subject has undergone *wh*-movement:

(27)   Who punched Alex?

Under the standard analysis, *who* has moved from Spec-TP to Spec-CP. At PF, then, Spec-TP would be empty, yielding an IntP without an overt left edge, and we would expect a violation of (24), contrary to fact. Again, the traditional syntactic version of the EPP has no problem here, since it can be satisfied by the unpronounced copy of *who* in Spec-TP.

An obvious response, which would maintain (24), would be to adopt the minority analysis of subject *wh*-questions in English, that they don't actually involve overt *wh*-movement (see e.g. Chomsky 1986, Brillman and Hirsch to appear). Unlike non-subject *wh*-questions which require T-to-C movement or *do* support, (see (28a) vs. (28b)), subject *wh*-questions lack T-to-C movement and *do* support (cf. (28c) vs. (28d)), so the word-order facts are consistent with the subject's being either in Spec-CP or Spec-TP:

(28)   a.   * Who$_i$ Alex punched t$_i$?
         b.   Who$_i$ did Alex punch t$_i$?
         c.   Who punched Alex?
         d.   * Who$_i$ did t$_i$ punch Alex?

I.e. in (28c), *who* could still be in Spec-TP, and we would not have a configuration violating (24).

Of course, when the *wh*-element is the subject of an embedded clause, and the question has matrix scope, it is clear from the surface order that it must have moved out of Spec-TP. We thus predict that the EPP in the form of (24) should crop up here. Interestingly enough, precisely here is where we find the *that*-trace effect, demonstrated again in (29):

(29) a.　　Who did you say [t_i punched Alex?]
　　　b.　＊Who$_i$ did you say [that t_i punched Alex?]
　　　c.　　Who$_i$ did you say [Alex punched t_i?]
　　　d.　　Who$_i$ did you say [that Alex punched t_i?]

The grammaticality of (29c) and (29d) is straightforward. In both, it is the embedded object that has moved, so the embedded subject surfaces in Spec-TP, and there is no danger of violating (24). The ungrammaticality of (29b) is also expected based on (24): the embedded subject has *wh*-moved from embedded Spec-TP into the matrix clause. Hence the IntP corresponding to the embedded clause has no overt left edge, violating (24).

The question is how we keep (24) from ruling out (29a). Here we also have *wh*-movement of the embedded subject, hence an empty embedded Spec-TP and an IntP with no overt material in its left edge. Yet somehow, in a way that must be related to the fact that there is no overt embedded complementizer, the sentence is grammatical. As with the control infinitives, we can imagine different options for how to deal with this. It could again be that when there is no overt complementizer, even finite clauses can avoid counting as phases, hence not yield an IntP that would have a problem with (24). Alternatively, we could imagine that the embedded clause is being integrated into the IntP of the matrix clause, as laid out as the third option for (26a) above, again eliminating the violating edge. This idea has some appeal because we could extend it to explain the other patterns here. The intervening overt complementizer would prevent this incorporation in (29b), yielding the *that*-trace effect, whereas the silent complementizer in (29a) would be ignored by what is after all a prosodic operation. The *that*-trace effect would then amount to the following. *Wh*-extraction of the subject out of an embedded clause creates a tricky prosodic configuration. If there is no overt complementizer, then there is an available parse that is prosodically well-formed. If, however, the complementizer is pronounced, this specific parse is blocked, and there is no other parse available that can satisfy the relevant prosodic conditions.

6.4　Interactions with *for*

A rather similar configuration appears with *for-to* infinitives (see McFadden 2012, for extensive discussion along the lines covered here): we have an alternation between overt and non-overt complementizers, combined with an alternation betwen overt and non-overt subjects. Furthermore, the patterns of grammaticality are essentially the same — an overt complementizer followed by a covert subject is disallowed:

(30)　a.　It's rude [PRO to cuss with your grandmother here.]
　　　b.　* It's rude [for PRO to cuss with your grandmother here.]
　　　c.　It's rude [for you to cuss with your grandmother here.]

Again, this falls directly out of (24), which started as an updated version of the EPP, but we now see turns out to have broader coverage. (30c) causes no problems, since having the overt embedded subject means there is no empty edge of IntP. (30a) has an empty subject, but as with (29a) above, we can argue that the lack of an overt complementizer means that the embedded clause either isn't a phase, or can incorporate into the IntP of the matrix clause. In (30b) with its overt complementizer, entirely in parallel with (29b), neither of these analytical options is available. There must be a phase here, and the presence of the overt complementizer prevents this from being incorporated into the preceding IntP, so we have an independent IntP with an empty left edge that will violate (24). We can thus deal with this along the same lines discussed for (29b) above.

The only apparent difference between finite *that* clauses and *for-to* infinitives with respect to (24) arises when we have an overt subject with a covert complementizer:

(31)　a.　Who$_i$ did you say [Alex punched t$_i$?]
　　　b.　* It's a bit awkward [you to talk about him when he's right there].

(31a), repeated from earlier, is grammatical with a silent complementizer followed by an overt subject in an embedded finite clause. (31b), on the other hand, shows that the same configuration is ungrammatical in a non-finite clause. It would seem to be a problem for our account that (24) cannot straightforwardly rule out (31b).

However, this problem is only apparent. What is relevant for the distinction between (31a) and (31b) are the conditions on the overtness of complementizers, not the conditions on the overtness of subjects. In typical complement clauses, we do not actually expect this to be regulated by (24), since the C head will be part of a higher spell-out domain, hence not at the left edge of any IntP. This means that, under our analysis, (24) need not, and in fact should not, rule out (31b). As discussed above, the overtness of a complementizer can affect the prosodic parsing of its broader context and thus play a role in whether the following subject position will be subject to (24), but its overtness is not regulated by (24) directly. We will not attempt an account of the additional principles that *do* constrain the overtness of complementizers here, directing the reader instead to Pesetsky and Torrego (2001), An (2007), McFadden (2012) and sources cited therein for extensive discussion.[3]

Our direct concern here is what conditions the overtness of the subject position, the overtness of the preceding complementizer interesting us only insofar as it affects this. Once we abstract away from the independent principles that regulate the complementizer, we arrive at the abstract pattern in (32), which characterizes the possibilities for the (c)overtness of the subject in complement clauses in relation to that of its complementizer:

---

[3]Descriptively, the problem with (31b) seems to be that *for* cannot be silent inside an adjectival complement. We can see that having an optionally silent *for* before an overt subject is not itself ruled out, as this configuration is allowed in the complement of a large class of verbs (E.g. "I wouldn't like (for) you to cuss with your grandmother here").

(32) a. $C_\emptyset$ $DP_\emptyset$
      b. * C_{overt} $DP_\emptyset$
      c. $C_\emptyset$ DP_{overt}
      d. C_{overt} DP_{overt}

(32) applies equally well to *that* and *for*, and is precisely as is predicted by our account in terms of (24). A potential point in favor of our analysis is that this pattern covers facts that have been previously attributed not only to the EPP, but also to the *that*-trace effect and to Case theory, all of which reduce, for us, to the generalization captured under (24).

6.5 The EPP, subjects and pro-drop

In this subsection, we will consider two predictions made by our implementation of the EPP in terms of the PF constraint in (24), both of which ultimately involve the irrelevance of the notion of 'subject'. Note, first, that we predict a negative correlation between a language having the EPP and it allowing pro-drop. Our implementation of the EPP requires overt material in a certain position at PF, not on having Spec-TP filled in the narrow syntax. Hence *pro*, as a silent pronoun, will not be able to satisfy it and every run-of-the-mill pro-drop root clause like Spanish (33) should be a violation of this kind of EPP:

(33) *pro* hablo español.

That such sentences are perfectly fine then suggests that our EPP just doesn't apply in these languages. If we're on the right track, these languages then also shouldn't display the other properties of English discussed above which, while not traditionally subsumed under the EPP, were argued to be derivable from (24).

This actually seems to be essentially correct. We have already noted that Spanish must not have a requirement that the subject be pronounced overtly. But even when the subject is overt, it has commonly been observed that languages like Italian and Spanish allow it to appear post-verbally, i.e. not in Spec-TP, and certainly not at the left edge of an independent IntP (Rizzi 1982):

(34) Sono   cadute alcune pietre.
      are.3PL fallen some   stones
      'Some stones fell down.'

Strikingly, these languages also don't seem to be subject to the *that*-trace effect (Rizzi 1982):

(35) Chi$_i$ credi   che t$_i$ abbia   telefonato?
      who$_i$ think-2SG that t$_i$ has-SUBJ telephoned
      'Who do you think called?'

Furthermore, they have no problem with overt complementizers in non-finite clauses without overt subjects (Rizzi 1997):

(36) Gianni pensa di PRO conoscerlo bene.
      Gianni thinks C PRO to.know=it well

'Gianni thinks he knows it well.'

These connections have of course been noticed before, but our proposal has a straightforward way to tie them together. For us, the EPP, the *that*-trace effect and the ban on null subjects after *for* are all just expressions of (24), so a language that has a way to get around (24) for one of these phenomena can presumably do so for all.

This could be because (24) itself is parametrized somehow, but a more interesting possibility, building on ideas of Alexiadou and Anagnostopoulou (1998), is that some languages have a different way of satisfying the constraint than through an overt subject. Alexiadou and Anagnostopoulou (1998) proposed that the EPP boils down to the checking of a nominal feature of AGR, which can be achieved in one of two ways. One is to have a subject in Spec-TP, as in languages like English. The other, which for them characterizes (at least one class of) pro-drop languages, is to move V to T, where the required nominal feature is included in the makeup of the agreement morphology on the verb. Under our proposal, there is a straightforward way to make sense of how V-to-T movement provides an alternative way to satisfy the EPP. Again, if we follow An (2007) in defining the left edge of IntP to include both the specifier and the head of the relevant syntactic phrase, overt material in T will fulfill the requirements of (24) just as well as overt material in Spec-TP. The idea then would be that (the relevant class of) pro-drop languages *are* subject to (24), but do not have an overt subject requirement because V-to-T movement already satisfies (24) independently, so classic EPP and *that*-trace effects do not obtain.

A more general characteristic of our approach is that the EPP shouldn't really care about subjects, since direct reference to subjects or even to specific syntactic positions like Spec-TP should not be possible at PF. This is why we set up our formulation of (24) in Section 6 in terms of a prosodic unit, the edge of IntP, that bears an indirect relation to, but is not isomorphic with, Spec-TP. We explored there some cases where particular 'subject' positions are ignored by the EPP as (24), because they are not the edge of an independent IntP. A second prediction of our story is that the reverse should also be the case. That is, other overt elements in the left edge of IntP should be sufficient to satisfy the EPP when there is no subject. We've just seen that this may be a way to think analyze pro-drop languages that have V-to-T movement. Here we will look at some suggestive evidence that it is more generally correct, as it should be, even in languages like English.

For one thing, this could be a way to analyze locative inversion, in which a certain class of locative PPs can appear pre-verbally, with the expected subject remaining in a post-verbal position.

(37)   Across the table walked an army of ants.

These are reminiscent of examples with expletive *there*, yet no expletive needs to be inserted, the EPP apparently satisfied by the presence of the PP.

We could also use it as a way to understand some strange facts about what are typically regarded as sentential subjects, i.e. embedded clauses that appear in what looks like the subject position of the matrix clause. According to various diagnostics, these don't actually seem to behave like real subjects in Spec-TP. For example, they don't partici-

pate in subject-auxiliary inversion (Adger 2003), and in fact can't appear in interrogative matrix clauses:

(38) a. [That Medea killed her children] upset Jason.
      b. * Did that Medea killed her children upset Jason?

Nonetheless, these clauses satisfy the EPP for the matrix clause, since no expletive is required (or even allowed) to accompany them:

(39) a. * It/there [that Medea killed her children] upset Jason.
      b. * [That Medea killed her children] it/there upset Jason.

This makes sense under our analysis as long as theses clauses are somewhere in the left edge of the IntP, but not directly in Spec-TP. Finally, our approach may also be a way to understand why no expletive subject is required (or, again, allowed) in certain kinds of parentheticals with *as*:

(40) Venkat was drunk, as (*it) was clear from his slurred speech.

Postal (2004) argues convincingly that *as* isn't the subject here, yet it seems to satisfy the EPP. The grammaticality of (40) follows quite simply from our approach since the left edge of IntP is overtly filled by *as*, satisfying (24).

A traditional version of the EPP which privileges the status of the syntactic subject with respect to overtness would find it much harder to deal with these patterns, all of which involve an overt non-subject. These can, however, be naturally explained under our proposal, as described above.

7   The countercyclicity problem again

We have thus seen that a prosodic characterization of the configuration ruled out by the EPP gets the basic facts right and can also be fruitfully extended to explain other phenomena. However, this still leaves us to deal with the countercyclicity problem laid out in Section 5, and summarized in (23). I.e. we have in the EPP a phenomenon where certain syntactic operations are sensitive to or influenced by phonological concerns, which runs afoul of our architectural assumption that the syntactic portion of the derivation does not have access to phonological information.

We see three potential analytic approaches this problem. The first is to change our theoretical assumptions, such that the syntax *does* have access to the relevant phonological information. The second is to adopt what we can call an 'overgenerate and filter' approach, whereby the syntax produces structures freely, and PF then discards the ones that do not satisfy the EPP. The third is to find and motivate a reanalysis of EPP-driven movement that avoids having syntactic operations make reference to phonology. It is unclear at the moment which of these three avenues is superior, thus we will not work out and defend a specific proposal here. Instead, in the subsections that follow, we will consider each approach in turn, laying out how they might be implemented, what assumptions they require, and noting any relevant prior work we are aware of. Along the way, we will provide critical discussion of the strengths and weaknesses of each approach and indicate ways in which we might ultimately decide among them.

7.1 Phonology in the syntax

We could take the facts surrounding the EPP in languages like English as evidence against standard architectural assumptions about the grammar, and in favor of a different kind of approach to the relationship between syntax and morphology. This could be a relatively minor adjustment, such that the syntax has limited access to restricted types of phonological information — e.g. whether or not some syntactic head has any overt phonology associated with it, but not the specifics of that phonology. Or it could be a more radical break, e.g. having completed phonological representations feed into syntax, or assuming a parallel architecture where syntax and phonology mutually constrain each other.

A concrete example of this kind of approach is recent work by Norvin Richards (Richards 2014). Richards argues that the building of PF representations actually begins already in the syntactic component, and that syntactic operations can thus be sensitive to and even triggered by certain kinds of phonological information. He explicitly presents this as an alternative to positing purely formal features to trigger movement operations. The basic support for such an approach comes from a series of correlations he identifies between whether or not a language has a particular type of movement and certain prosodic/phonological properties of material that is involved. Whether or not a language shows EPP effects, e.g., is related to whether or not it realizes T as a suffix and feeds stress assignment to its verbs. Richards assumes further that phonological information accessible to the syntax is restricted: the aspects of PF that are constructed in the syntax, and which the syntax can thus make reference to, are the structurally regular parts, independent of lexical effects (including irregularities and specific segmental content) which only come in later. This plays an important role in his arguments that what is going on here really is phonological influence on the workings of the syntactic derivation, rather than the application of post-syntactic filters in a final phonological representation.

One simple advantage of this approach is that it allows a fairly direct implementation of our central insight about EPP effects: i.e. we can analyze EPP-driven movement as syntactic movement triggered by phonological considerations without running into a countercyclicity problem. The main concern is that allowing the syntax access to phonological information goes against a long tradition of work arguing for and assuming a stricter modular separation. We thus have to be careful that the changes we make in order to implement the EPP do not have unintended consequences and undermine prior analyses that depended crucially on that separation.

7.2 Overgenerate and filter

The second possibility is the general recourse available in cases where we want later stages of the derivation to constrain earlier ones without technically introducing any look-ahead. The broad idea is that the syntax is set up to overgenerate, i.e. to deliver an array of structures involving different permutations of the available operations, inlcuding ones that are destined not to result in any convergent output. These structures

are then fed into a restrictive phonological component, which filtes out structures that cannot serve as the basis for PF representations meeting various PF restrictions. At least some 'ungrammatical sentences' then correspond to structures that are well-formed as far as the syntax is concerned but ruled out for PF reasons.

In the case of the EPP, we could assume that A-movement can apply (or not apply) freely, approximately a minimalist revival of the GB idea of Move α. Various PF constraints, including our version of the EPP, would then filter out most of these structures, leaving only those which are grammatical.

Consider how this would resolve our apparent paradox. We can retain the architectural assumption that the syntax precedes PF and has no access to phonological information. As far as the syntax is concerned, there is no EPP, just the options of moving something to Spec-TP or not, both of which are in fact pursued in different derivational paths. The phonological component then eliminates those structures where there is an IntP with a left edge that has no overt material (as per (24)). What survives are the structures where expletive insertion or movement of a subject to Spec-TP happen have taken place, but there is no sense in which those operations were actually triggered in order to satisfy the EPP. This approach lets us have our cake and eat it too: the EPP can simultaneously be syntactically implemented and phonologically driven without us having to modify our grammatical architecture.

Nonetheless, this option comes with problems of its own. One is the quite general concern with overgenerate-and-filter approaches, that they are rather inefficient computationally, generating a large (potentially infinite) number of structures that are ultimately destined to be filtered out (see Frampton and Gutmann 2002, for related discussion). There is also a more specific challenge:[4] if A-movement applies freely, it is not obvious how to implement feature-driven restrictions like Relativized Minimality (see again Section 4). Achieving this effect while having EPP-driven A-movement apply freely will require some additional mechanism. For these reasons, this second option should probably be regarded as a last resort to pursue if the other two cannot be made to work.

7.3 Separating the syntax and the phonology of movement

The third avenue to pursue is to look for a way to refactor EPP-driven movement that avoids having syntactic operations make reference to phonology. We might be able to do this by splitting traditional movement into two parts, separating the clearly syntactic and phonological aspects from each other and then distributing them to the appropriate modules. A concrete proposal along these lines was made by Bobaljik (2002) when presented with a problem strikingly similar in its structure to ours. Bobaljik was concerned with the proper treatment of Holmberg's Generalization (Holmberg 1999), according to which overt object shift in Scandinavian is only possible if the main verb raises out of the VP. He argues that the problem with the blocked configurations is actually a morphophonological one — if the object raises across the verb, it intervenes and blocks the morphological merger of the verb with a (tense or participial) suffix realizing a higher

---

[4]Thanks to Fabian Heck (p.c.) for pointing this out.

functional head. The problem is, this merger is a PF operation, requiring adjacency rather than a structural syntactic notion, yet the movement that would get the object into the offending position is clearly syntactic. A movement operation clearly occurs in the syntax, but whether or not it should apply depends on information that is only available on the PF branch: a situation entirely parallel to that with the EPP.

Bobaljik (2002) offers a solution to this problem based on a specific refactoring of movement, explicitly arguing that it is superior to overgenerate-and-filter approaches along the lines of what we have just described. The refactoring depends crucially on the copy theory of movement (Chomsky 1993, and following),[5] with the appearance of displacement coming from the fact that, normally, only the highest copy is pronounced. Chomsky motivated this proposal as a way to deal with reconstruction effects, which he argued result when a lower copy is interpreted at LF. Bobaljik simply extends this idea to the PF branch: just as LF can decide to interpret either a higher or a lower copy, PF can decide to pronounce either a higher or a lower copy. The various logical combinations of these possibilities yield the typology of interactions between pronunciation and interpretation, including standard movement (high pronunciation, high interpretation), reconstruction (high pronunciation, low interpretation) and covert movement (low pronunciation, high interpretation). Bobaljik argues that the fourth possibility, with low pronunciation and low interpretation, is attested in certain expletive constructions.

This theory deals with problematic interactions between syntax and PF by virtue of splitting up traditional movement into two components. First, there is an abstract operation in the narrow syntax that associates a syntactic object with an additional structural position.[6] This operates on purely syntactic structures, respects syntactic principles like locality and minimality and has no access to phonological information. Then, as part of the PF component, there is a procedure that determines which position each syntactic object should be pronounced in. This operates on a morphophonological structure which has access to (at least some) phonological information and follows principles of morphophonology rather than syntax. For Holmberg's Generalization, Bobaljik proposes that objects with the relevant syntactic properties obligatorily undergo syntactic object shift, regardless of where the verb is. The structure shipped to the interfaces then has copies in both a high and a low position. At PF, the algorithm applies to determine which of these to pronounce. There is a preference to pronounce the highest copy whenever possible, but this can be overridden if the result would be morphophonologically ill-formed. In particular, if the higher copy would disrupt the required adjacency between the main verb and the higher functional head destined to be its suffix, then the lower copy must be pronounced instead. Holmberg's Generalization is thus not about the syntactic movement involved in object shift being blocked, but rather about whether that movement is reflected in the resulting pronunciation.

Something entirely analogous can be proposed to deal with our EPP concerns. We

---

[5]Later developments have refined this approach such that it is the same syntactic object that is merged in a new position rather than a copy. While this has consequences for how to interpret certain details of Bobaljik's proposal, it does not affect the main thrust, so we will set these issues aside.

[6]We can think of this as copy + merge, re-merge, internal merge, chain formation or any of a number of other possibilites. For present purposes the differences don't really matter.

can assume that A-movement of an appropriate DP occurs obligatorily in the syntax, perhaps universally. This is completely standard syntactic movement, driven by syntactic features, respecting constituency, locality and minimality, and completely blind to phonological information. This yields a structure with both high and low copies of the moved element, and one of the jobs of PF will be to determine which of these copies will be pronounced. The algorithm for that determination will operate based on morphophonological structure and be sensitive to morphophonological information, including, crucially, overtness and prosodic domains, and will have some version of (24) built into it. This will ensure that the higher copy is pronounced and is overt in the relevant cases in languages like English, while in pro-drop languages, it will allow the lower copy to be pronounced under relevant circumstances, or for all copies to be silent (pro-drop itself). This solves the countercyclicity issue in that movement always applies in the relevant contexts, with no reference to the EPP and indeed no consideration of any phonological information. The EPP itself is entirely a matter of the PF branch, not doing any actual syntactic work, but rather determining what to do with the material handed over by the syntax.

In principle, this looks like the most appealing of the three strategies for dealing with the apparent paradox we have identified. It accounts for the EPP's peculiar combination of syntactic and phonological properties without violating standard assumptions about cyclicity and modularity, without requiring reimplementations of the architecture of the grammar, and without requiring massive overgeneration and filtering. This does not mean, however, that it is free of concerns and potential disadvantages. For one thing, it commits us to a particular understanding of movement, requiring a version of the copy theory and certain assumptions about the algorithm for determining which copies to pronounce. These assumptions are actually quite popular, but that does not by itself guarantee that they are harmless.

First, if the parametrization of the EPP is really located entirely at PF, with (24) and how it can be satisfied, then we are led to assume that there is consistent and obligatory A-movement to Spec-TP, even in languages that show no surface EPP. This is not an unreasonable position, but it does face certain challenges. The obvious analysis would be that movement applies in such instances, but that it is the lower copy that gets pronounced at PF in the relevant languages. There is some question about how viable this is, however. For example, Wurmbrand (2006) has argued that in a number of relevant cases in German, no movement has happened at all, since the higher position cannot be interpreted at LF either. Of course we could analyze such cases as examples of Bobaljik (2002)'s 'lower right corner' effect, where movement has occurred, but the lower copy is privileged at both LF and PF. The tricky thing is to explain why, in these cases, LF and PF should both be forced to interpret the lower copy in this way. The alternative would be to say that there are two aspects related to the EPP that can be parametrized, the effects of (24) at PF and also the obligatoriness of A-movement to Spec-TP in the syntax. This, however, leads to complications in how the movement to Spec-TP is triggered in the first place, as we will address momentarily.

A second family of issues comes from the fact that splitting up EPP-triggered movement into two parts leaves a number of difficult questions open. For example, it makes

22

it tricky to determine what kind of approach we should take to expletive constructions, which obviously interact with EPP-driven A-movement. We could imagine that the expletives are inserted in the syntax, blocking A-movement, but still yielding a structure that can satisfy (24) at PF, but then it is not clear what would drive the insertion, since there is no syntactic EPP. Alternatively, one might imagine that they are inserted as a last resort at PF, directly to satisfy the EPP, but this also leads to problems. For one thing, the choice between expletives *it* and *there* seems to be determined syntactically, not phonologically, so how does PF know which one to insert? For another, if the expletives are only inserted at PF, then at least the associates of expletive *there* should still undergo syntactic A-movement, yet they systematically fail to show any evidence of such movement, e.g. being obligatorily interpreted low. Finally, as discussed by Butler (2004), there is reason to think that at least *there*-insertion is not without LF-semantic consequences – something that a PF-insertion approach would be unable to capture.

The most important member of this family of issues is the question of how syntactic A-movement to Spec-TP can be triggered in the first place. Standard theories would do it in terms of a version of the EPP, but we have moved the EPP to the PF component. We could adopt a version of the proposals by Bošković (2007) and Bjorkman and Zeijlstra (2014) discussed earlier, whereby movement is forced by c-command requirements on Agree operations. Or we could of course posit a purely formal feature on T that forces a DP to Merge in its specifier. As noted above, it may well also be necessary to introduce parametrization in the presence of the relevant features. Either way, it should be clear that this amounts to reintroducing something like a traditional syntactic EPP in addition to our phonological one. Perhaps it will turn out that this is empirically motivated, but until and unless that can be clearly demonstrated, it looks like the result will be suspiciously complex.

References

Adger, David. 2003. *Core syntax: a Minimalist approach*. Oxford: OUP.

Alexiadou, Artemis, and Elena Anagnostopoulou. 1998. Parametrizing AGR: Word order, v-movement and EPP-checking. *Natural Language and Linguistic Theory* 16:491–539.

An, Duk-Ho. 2007. Clauses in noncanonical positions at the syntax-phonology interface. *Syntax* 10:38–79.

Biberauer, Theresa, Anders Holmberg, Ian Roberts, and Michelle Sheehan, ed. 2010. *Parametric variation: null subjects in Minimalist theory*. Cambridge: Cambridge University Press.

Bjorkman, Bronwyn, and Hedde Zeijlstra. 2014. Upward Agree is superior. Ms., University of Toronto and Universität Göttingen.

Bobaljik, Jonathan David. 2002. A-chains at the PF-interface: Copies and 'covert' movement. *Natural Language and Linguistic Theory* 20:197–267.

Boeckx, Cedric. 2000. EPP eliminated. Ms., University of Connecticut.

Bošković, Željko. 2007. On the locality and motivation of Move and Agree: An even more minimal theory. *Linguistic Inquiry* 38:589–644.

Bresnan, Joan. 1977. Variables in the theory of transformations. In *Formal syntax*, ed. Peter Culicover, Thomas Wasow, and Adrien Akmajian, 157–196. New York: Academic Press.

Brillman, Ruth, and Aron Hirsch. to appear. An anti-locality account of English subject/non-subject asymmetries. In *Proceedings from the 50th Annual Meeting of the Chicago Linguistic Society*.

Bruening, Benjamin. 2009. The *That*-trace effect is not about extraction. Slides from presentation at University of Delaware Prosody Meeting.

Butler, Jonny. 2004. On having arguments and agreeing: semantic EPP. *York Papers in Linguistics* 2.

de Chene, Brent. 1995. *Complementizer-trace* effects and the ECP. *Geneva Generative Papers* 3:1–4.

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

Chomsky, Noam. 1986. *Barriers*. Cambridge, Mass.: MIT Press.

Chomsky, Noam. 1993. A minimalist program for linguistic theory. In *The view from building 20: Essays in linguistics in honor of Sylvain Bromberger*, ed. Ken Hale and Samuel Jay Keyser. Cambridge, Mass.: MIT Press.

Chomsky, Noam. 2001. Derivation by phase. In *Ken Hale: A life in language*, ed. Michael Kenstowicz. Cambridge, Mass.: MIT Press.

van Craenenbroeck, Jeroen, and Marcel den Dikken. 2006. Ellipsis and EPP repair. *LI* 37:653–664.

Duguine, Maia. 2013. Null arguments and linguistic variation: a Minimalist approach to pro-drop. Doctoral Dissertation, University of the Basque country UPV/EHU and Université de Nantes.

Embick, David, and Rolf Noyer. 2001. Movement operations after syntax. *Linguistic Inquiry* 32.

Frampton, John, and Sam Gutmann. 2002. Crash-proof syntax. In *Derivation and explanation in the minimalist program*, ed. Samuel Epstein and T.D̃avid Seely, 90–105. Oxford: Blackwell.

Grohmann, Kleanthes, John Drury, and Juan Castillo. 2000. No more EPP. In *Proceedings of WCCFL*, volume 19.

Halle, Morris, and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In *The view from building 20: Essays in linguistics in honor of Sylvain Bromberger*, ed. Ken Hale and Samuel Jay Keyser. Cambridge, Mass.: MIT Press.

Heycock, Caroline. 1991. Layers of predication: the non-lexical syntax of clauses. Doctoral Dissertation, University of Pennsylvania.

Holmberg, Anders. 1999. Remarks on Holmberg's Generalization. *Studia Linguistica* 53:1–39.

Kandybowicz, Jason. 2006. *Comp-Trace* effects explained away. In *Proceedings of the 25th West Coast Conference on Formal Linguistics*, ed. Donald Baumer, David Montero, and Michael Scanlon, 220–228.

Kandybowicz, Jason. 2009. Embracing edges: syntactic and phono-syntactic edge sensitivity in Nupe. *Natural Language and Linguistic Theory* 27:305–344.

Landau, Idan. 2007. EPP extensions. *LI* 38:485–523.

Martin, Roger. 1999. Case, the EPP and minimalism. In *Working Minimalism*, ed. Samuel Epstein and Norbert Hornstein. Cambridge, Mass.: MIT Press.

McFadden, Thomas. 2004. The position of morphological case in the derivation: a study on the syntax-morphology interface. Doctoral Dissertation, University of Pennsylvania.

McFadden, Thomas. 2012. *For* in English infinitives has nothing to do with Case. In *Linguists of tomorrow: Selected papers from the 1st Cyprus postgraduate conference in theoretical and applied linguistics*. Newcastle upon Tyne: Cambridge Scholars Publishing.

McFadden, Thomas. 2014. On subject reference and the cartography of clause types: A commentary on the paper by Biswas. *Natural Language and Linguistic Theory* 32:115–135.

Merchant, Jason. 2001. *The syntax of silence: Sluicing, islands, and the theory of ellipsis*. Oxford: Oxford University Press.

Miller, Philip, Geoffrey Pullum, and Arnold Zwicky. 1997. The Principle of Phonology-Free Syntax: four apparent counterexamples in French. *Journal of Linguistics* 33:67–90.

Pesetsky, David, and Eesther Torrego. 2001. T-to-C movement: Causes and consequences. In *Ken Hale: A life in language*, ed. Michael Kenstowicz. Cambridge, Mass.: MIT Press.

Postal, Paul. 2004. *Skeptical linguistic essays*. Oxford: Oxford University Press.

Richards, Norvin. 2014. Contiguity theory. Ms., MIT.

Rizzi, Luigi. 1982. *Issues in Italian syntax*. Dordrecht: Foris.

Rizzi, Luigi. 1997. The fine structure of the left periphery. In *Elements of grammar*, ed. Liliane Haegeman, 281–337. Dordrecht: Kluwer Academic Publishers.

Salzmann, Martin, Jana Häussler, Josef Bayer, and Markus Bader. 2013. *That*-trace effects without traces. an experimental investigation. In *Proceedings of NELS 42*, 149–162.

Selkirk, Elisabeth. 1986. On derived domains in sentence phonology. *Phonology Yearbook* 3:371–405.

Sundaresan, Sandhya. 2014. Making sense of silence: Finiteness and the (OC) PRO vs. *pro* distinction. *Natural Language and Linguistic Theory* 32:59–85.

Svenonius, Peter. 2004. On the edge. In *Peripheries: Syntactic edges and their effects*, ed. David Adger, Cècile de Cat, and George Tsoulas, 259–287. Netherlands: Springer.

Wurmbrand, Susanne. 2001. *Infinitives: restructuring and clause structure*. Berlin: Mouton de Gruyter.

Wurmbrand, Susi. 2006. Licensing case. *Journal of Germanic Linguistics* 18:175–236.

Zeijlstra, Hedde. 2012. There is only one way to Agree. *The Linguistic Review* 29:491–539.