

Prosodic EPP, no formal features!

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AG3: What drives syntactic computation? Alternatives to formal features

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1 Overview

- ☞ The Extended Projection Principle (EPP) has a very strange cluster of properties:
 1. It has syntactic properties and LF and PF consequences.
 2. But it is not syntactically or LF-motivated. It is triggered solely for PF reasons.
- ☞ This constellation of properties makes the EPP look like a countercyclic phenomenon.

Perhaps as a result of these properties, a satisfactory explanation of the EPP is still lacking in the literature:

- As discussed by Butler (2004), the EPP has undergone an evolution from a specific condition requiring a subject in each sentence (Chomsky 1981) to a more abstract feature used to ensure that a head projects a (potentially null) specifier (Chomsky 2000, and subsequent).
- This EPP feature is arguably the formal feature par excellence, used purely to trigger syntactic operations without e.g. being tied to any interface requirements.
- As such, it is a thorn in the side of the Minimalist goal to have syntactic computation be solely interface-driven.

In this talk, we return to the core empirical domain of the EPP, i.e. the requirement that certain subject positions be overtly filled, and argue that the apparently counter-cyclic nature of the EPP can be resolved cyclically if we propose the following:

- ☞ A-movement applies freely in the syntax (Minimalist version of Move- α).
- ☞ Unwanted movement is filtered out at the interfaces.
- ☞ The subject requirement/EPP in particular results from a parametrized PF constraint.

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2 Background: prior theories of the EPP

The definition of the EPP itself has undergone changes over the years. We will start with the classic observation and move on to some more recent versions of the principle.

2.1 Classic EPP

- ☞ The original formulation of the EPP (Chomsky 1981, et seq.) was based on the observation that syntactic subjects (in what is now understood to be [Spec, TP]) need to be filled: i.e. clauses require a subject (this encompasses overt subjects, traces of A- and \bar{A} -movement, PRO and *pro*).

This requirement is independent of argument-structural factors – thus, it couldn't be explained in terms of a DP's need to be θ -licensed:

- Thus, overt subjects are required in transitives, unaccusatives and unergatives alike ((1)-(3)).
- In structures where the subject position doesn't correspond to a thematic position, a non-thematic subject (i.e. an expletive) must occur ((4)-(5)).

This yields the grammaticality patterns below:

- (1) *(We) spotted the elephant.
- (2) *(Billy) laughed hysterically.
- (3) *(The pot) shattered into many tiny pieces.
- (4) *(There) is an expletive in this sentence.
- (5) *(There_i) seems [*_i(t_i) to be one here, as well].

- While the impossibility of overt subjects is obvious enough to see, the impossibility of a covert one (like a trace or PRO) can only be shown indirectly.
- But binding diagnostics show that, here too, the EPP (as formulated above), applies: these elements must be present in the structure and cannot be left out altogether.¹
- Similarly, subject agreement triggered on clausemate verbs and general ideas of interpretive wellformedness have supported the notion that *pro* subjects exist.

The binding diagnostics for PRO and A-traces are shown below:

- (6) [_{CP} Sasha_i seems to Olga_j [_{TP} t_i to appear to herself_{i,*j} [_{TP} t_i to like physics]]].
- (7) [_{CP} Sasha_i tries [_{CP} PRO_{i,*j} to like herself_{i,*j}]].

The standard assumption is that an anaphor like 'herself' in English must be locally/clause-internally bound by a c-commanding DP:

- The successful binding of 'herself' in (6) thus shows that there must be a subject in that same clause (i.e. the trace of A-movement in the raising complement) that binds it.
 - Similarly, the successful binding of 'herself' in (7) shows that there must be a c-commanding element in the same clause (here, the PRO subject in the control complement) to bind it.
- ☞ The obligatory presence of an A-trace in raising complements (like that in (6)) also showed that the EPP could not be explained in terms of Case-licensing: after all, the DP subject was held to raise precisely because it couldn't get Case in its in situ position.
- ☞ We thus seemed to have a requirement that didn't boil down to θ -licensing or Case-licensing: it was thus treated as a separate primitive requirement, called the EPP.

¹The θ -criterion would be another way to motivate the presence of a PRO in the control complement, but this is more controversial, given more recent ideas (Hornstein 1999, Ramchand 2008) that the θ -criterion doesn't hold.

2.2 The EPP updated

- ☞ A somewhat recent attempt to refactor the EPP was based on interaction with Case.
 - Bošković (2002, among others), argued that the EPP can be dispensed with under what’s sometimes called “The Inverse Case Filter”.
 - This is the idea that a functional head which can assign Case must assign Case.
 - Thus, if [Spec, TP] remains empty, nominative Case fails to be assigned and ungrammaticality results.
- ☞ However, this hypothesis has been argued against on both empirical and theoretical grounds (see e.g. McFadden 2004).
- ☞ More recent observations, which potentially constitute another counter-argument to the “Inverse Case Filter” idea, suggest that the EPP is not a universal phenomenon but a parametrized one.

It has been argued, for instance, that German lacks the EPP, on the basis of sentences like the one below (Wurmbrand 2006):

- (8) [_{vP} Einer Frau ein Orden verliehen] wurde noch nie.
[[a woman].DAT [a medal].NOM awarded] was yet never
“It has never happened that a woman has been awarded a medal.”

- In (8), the (nominative) subject is part of a constituent that is fronted to [Spec, CP] (to satisfy V2).
 - A commonly assumed restriction is that complements of phase-heads (e.g. TPs) cannot be fronted (Abels 2003).
 - Thus, the fronted constituent in (8) cannot be a TP, but must be a *vP*.
 - In other words, the subject can’t have moved out of the *vP* to [Spec, TP] (notice also that the oblique object precedes the subject).
 - German also lacks null expletives (unlike e.g. Romance *pro*-drop languages), thus, the subject in [Spec, TP] in a sentence like (8) must be empty: in other words, the EPP must not be a requirement in this language.
- ☞ In more recent Minimalist work, there has also been a move from the EPP to EPP features (Chomsky 2001).
 - ☞ I.e. the EPP is not treated as a representational well-formedness condition but as a condition on well-formed derivations involving a syntactic EPP feature that triggers movement.

3 Motivated at PF, not in the syntax

In this section we argue that the original domain of the EPP, i.e. the requirement for a subject in languages like English, should really be understood as a PF condition.

3.1 Evidence for the relevance of overttness

The simplest argument comes from the fact that, in languages like English, the subject of a normal declarative clause really has to be overt:

- (9) a. I like beans.
b. **pro* like beans.

- The standard response to the ungrammaticality of sentences like (9b) is not that they violate the EPP, since the subject position is filled syntactically.
- Rather, the problem is taken to be that English is not a *pro*-drop language, and the special silent pronominal normally referred to as *pro* is the only kind of silent DP that could occur in this position.
- But of course, that's not really an explanation. In order to make it work, we need not only a good theory of the distribution of *pro* drop, but also of why all other DPs that show up in this position happen to have overt forms in English.

Now, if we adopt a fairly standard view of modularity, the account for these facts simply cannot be implemented in the Narrow Syntax:

- ☞ Whether the elements of a DP are overt or not is a phonological fact, not a syntactic one.
- ☞ If phonological information only comes in after Spellout, and the syntax knows nothing about the phonological properties of the elements it manipulates, it will be impossible to phrase a constraint that refers to overttness within the syntax.
- ☞ Instead, any requirement for phonological overttness must be stated at a stage in the derivation where phonological information is already available, i.e. somewhere on the PF branch.

A second argument that the EPP applies at PF comes from weird effects with ellipsis (Merchant 2001, van Craenenbroeck and den Dikken 2006, building on earlier work). It's a bit complicated, but here's the quick version:

- In languages like English, extraction from surface subjects is generally ruled out (10), but seems to be possible if the extraction side is elided (11):

- (10) * Which Marx brother_{*i*} is [a biography of t_{*i*}]_{*j*} going to appear t_{*j*} this year?

(11) 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 only applies to subjects that have moved out of their base position, presumably to Spec-TP, as moved elements are islands.
- He proposes then that in examples like (11), the subject never moves from its in situ position before extraction, which we would expect to lead to an EPP violation.
- We can make sense of the fact that no such violation occurs if the EPP is a PF constraint. Due to ellipsis, the configuration that would violate the EPP, though present in the syntax, is gone by PF.

Another argument comes from connections with the so-called *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, the complementizer *that* is optional, just like when there is no extraction.
- But when the subject is extracted from such a clause, *that* must suddenly be dropped. When it is overtly present, a surprising degree of ungrammaticality results.

We will see below that there is good reason to connect this with the EPP. For now just note the following:

- ☞ Both the *that*-trace effect and the EPP involve ungrammaticality resulting from an empty subject position.
- ☞ Indeed, Salzmann et al. (2013) and others have argued for an account of *that*-trace effects in terms of a version of the EPP.

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, Dobashi and Sato 2014):

1. Ellipsis eliminates 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.~~

2. 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?

3. At least for some speakers, using heavily reduced pronunciations of the complementizers can lessen the effect (Kandybowicz 2006):

(15) The author_i that the editor predicts *that/?th't t_i will be adored.

4. The effect can be substantially ameliorated by having an adverbial intervene between the overt complementizer and the presumed position of the trace before the verb (Bresnan 1977, and others):

(16) Who_i do you think [that, against doctor's orders, t_i drank the hot sauce]?

Now, if the *that*-trace effect and the EPP reduce to a single principle, and the *that*-trace effect applies at PF, then the EPP must apply at PF as well.

3.2 Alternative approach: the EPP is PF-motivated

We are thus led to the following conclusion:

- ☞ The EPP is not a narrow syntactic condition requiring that a particular syntactic position have something merged into it at some point in the derivation.
- ☞ Rather, it is a PF condition, requiring the presence of an overt element in a particular prosodically defined configuration.

We are by no means the first to come to this conclusion.

- Merchant (2001) and van Craenenbroeck and den Dikken (2006) argue that the EPP must apply at PF based on the ellipsis facts, but don't really propose an account of how it should work.
- Landau (2007) also argues for a PF EPP, but, following ideas from Holmberg (2000), proposes a new operation called p-selection to implement it, which is similar to s-selection, but applies at PF rather than LF.
- Salzmann et al. (2013), also adopting ideas from Holmberg (2000), propose a P feature on the relevant functional head, which triggers syntactic movement, but cannot be checked until PF. This ensures that whatever moves to subject position stays there, and is actually pronounced.

While we think that this work is on the right track in recognizing that the EPP applies at PF, the implementations proposed raise questions:

- ☞ For both Landau (2007) and Salzmann et al. (2013), while the EPP applies at PF, it still essentially involves a syntactic feature.
- ☞ Because of this, they are forced to adopt unorthodox assumptions about the effects that syntactic features can have or about the timing of feature checking.

In Section 6 we will offer a new way to formulate the EPP as a PF requirement that we think has the advantage of being more clearly phonological.

- ☞ First, however, we must tie up a loose end regarding where the hallmarks of the EPP are implemented.

4 Implemented in the syntax, not at PF

- ☞ The discussion above has shown that the EPP (formulated again, as a constraint on the overtiness of subjects, in languages like English) is a PF-motivated phenomenon.
- ☞ An obvious solution would thus be to also implement this restriction post-syntactically – specifically, at the level of PF.

However, there are reasons to reject this strategy:

- i. EPP movement looks syntactic, not prosodic.
 - ii. EPP movement yields LF (as well as PF) effects.
- ☞ Claiming that the EPP is prosodically implemented would be countercyclic in the face of such evidence.
 - ☞ A cyclic treatment thus needs to maintain that the EPP is (narrow-)syntactically implemented.

4.1 Syntactic properties of EPP-driven movement

Here, we present evidence to show that EPP-driven movement is a kind of syntactic movement:

4.1.1 The moved element must be the entire subject DP

- ☞ The first piece of evidence has to do with the fact that moved elements must be syntactic (not prosodic) constituents.
- ☞ Furthermore, the moved constituent must be the entire (derived or basic) DP subject.

This is shown below:

- (17) $[_{DP_1} [[_{DP_2} \text{The man}] [_{PP} \text{with the pointy, green hat}]]]_i$ seemed $[_{TP} t_i \text{ to be quite insane}]$.
- (18) * $[_{DP_2} \text{The man}]_i$ seemed $[_{TP} [_{DP_1} t_i [_{PP} \text{with the pointy green hat}]] \text{ to look quite insane}]$.
- (19) * $[_{PP} \text{With the pointy, green hat}]$ seemed $[_{TP} [_{DP_1} [_{DP_2} \text{the man}] t_i] \text{ to look quite insane}]$.

- The raising construction in (17) is grammatical because the complex DP subject is moved in its entirety to matrix [Spec, TP].
- (18) is ungrammatical because only part of the subject (namely, the sub-constituent DP_2) is raised to [Spec, TP] stranding the rest of the subject in situ in the embedded clause.
- (19) is ungrammatical, again, because only part of the subject (in this case, the sub-constituent PP) is raised to matrix [Spec, TP], stranding the rest of the subject in situ.²
- Crucially, furthermore, such structures are not redeemable even if the raised element counts as a constituent in the prosodic sense: e.g. Utterance, Prosodic Phrase, Intonational Phrase, Prosodic Word, Foot, and Syllable (Selkirk 1986).
- What count are syntactic constituency and syntactic categories.

4.1.2 EPP-movement obeys syntactic locality and minimality

- ☞ The second piece of evidence for syntactic implementation has to do with the fact that EPP-movement is sensitive to constraints that are held to operate in the Narrow Syntax: e.g. syntactic locality and minimality.
- ☞ Prosodic wellformedness constraints, like linearity and adjacency, don't matter (and cannot redeem a violation of these syntactic wellformedness constraints).

This is illustrated below:

- (20) * $[_{DP_2} \text{The soup}]_i, [_{DP_1} \text{the hungry man}]$ devoured t_i .
- (21) * $[_{DP_2} \text{Mathilda}]_i$ arrived $[_{DP_1} \text{a relative of } t_i]$.
- (22) * $[_{DP_1} \text{Mathilda}]_i$ seems $[_{CP} \text{that } t_i \text{ is lazy}]$.

- The sentence in (20) is ungrammatical because the object DP has been fronted to clause-initial position across the intervening subject DP.

²Note, incidentally, that such a sentence would be grammatical in a V2 language like German. But the reading of such a grammatical sentence would crucially be one where the PP adjunct modifies the matrix verb, not one where it modifies, and is thus moved from, the embedded subject.

- Notice that fronting the entire VP – which would preserve linear adjacency of the object with the verb – would yield ungrammaticality as well.
 - The sentence in (21) also violates Relativized Minimality since the possessor DP is moved out of object into subject position.
 - If we believe that DPs are phases (Svenonius 2004), then (21) also violates phase-locality.
 - Finally, (22) instantiates non-local EPP-movement out of a CP phase and is ungrammatical.³
- ☞ The adherence to such locality and minimality principles would be unexpected for PF movement even under a framework where the post-syntactic PF module is seen as being endowed with a certain level of hierarchical structure (as e.g. in Distributed Morphology).
 - ☞ The kinds of post-syntactic movement operation allowed in DM, like Lowering and Local Dislocation, are heavily restricted and rather different from the kinds of movement illustrated above.
 - ☞ EPP movement of the kind discussed here thus really bears the fingerprint of a syntactic operation, and so we take it as uncontroversial that the EPP involves syntactically implemented form of A-movement.

4.1.3 The EPP is not syntactically motivated

- ☞ The EPP; as we understand it here, is a condition on the overt Spell-Out of a DP in [Spec, TP].
- ☞ But under the Y-modular architecture of the Minimalist grammar (where the syntactic computational system is seen as feeding the effects at LF and PF) that we are assuming here, the syntax should not care about the effects of Spell-Out.
- ☞ Thus, while the EPP is syntactically implemented, it cannot be syntactically motivated.

4.2 LF effects of EPP-movement

- ☞ Further evidence in support of the hypothesis that EPP-movement obtains in the Narrow Syntax comes from the fact that such movement also has effects on interpretation, i.e. at LF.
- ☞ However, such movement can again be shown to not be LF motivated.

³Standard theories would attribute this ungrammaticality to Case reasons: i.e. the embedded subject would already get Case-licensed in situ, thus would have no reason to A-move to matrix subject position.

4.2.1 EPP-movement feeds LF-interpretation

Here, we illustrate this with two pieces of evidence:

- i. EPP movement affects possibilities for anaphoric binding.
- ii. EPP movement affects possibilities for scope.

Evidence from anaphoric binding:

(23) Jill_i seems to herself_i [_{TP} t_i to be silly].

(24) *It seems to herself_i [_{CP} that Jill_i is silly].

- In (23), the anaphor *herself* is bound at LF by the DP *Jill* which has undergone raising to the c-commanding subject position to satisfy the EPP.
- I.e. the EPP movement feeds LF binding.
- In (24), the DP *Jill* stays in situ in embedded subject position and the EPP is satisfied by an overt expletive in matrix subject position.
- The ungrammaticality of the sentence can be explained by proposing that the anaphor is not locally c-commanded by the intended antecedent *Jill*.

The same argumentation can be made with respect to changes in scope, induced by EPP movement:

(25) It seems to some girl [_{CP} that every boy stinks]. ($\exists \gg \forall$; $*\forall \gg \exists$;))

(26) [Every boy]_i seems to some girl [_{TP} t_i to stink]. ($\exists \gg \forall$; $\forall \gg \exists$)

- In (25), no EPP movement has occurred: the EPP is satisfied by an expletive in matrix subject position.
- In this sentence, the only available scopal-reading is the surface one, where the oblique object c-commands the embedded subject, yielding $\exists \gg \forall$.
- In (26), the EPP is satisfied, not by expletive insertion, but by EPP movement of the universally quantified DP out of the raising complement.
- This movement feeds LF scope interactions: (26) is scopally ambiguous. In addition to the original scope reading of $\exists \gg \forall$, there is an additional reading of $\forall \gg \exists$, reflecting the (new) surface scope.

4.2.2 The EPP is not LF motivated

☞ While EPP movement feeds LF, it is not LF-motivated.

- Under the modular architecture of the grammar assumed here, LF and PF modules don't communicate with one another directly, but indirectly through the syntax.

- This means that overt movement cannot obtain at LF (since such movement would happen too late to feed the PF effect of overt-SpellOut).
- For this reason, LF movement (like quantifier-raising) is typically assumed to be strictly covert.
- This already entails that EPP movement of the kind discussed here cannot obtain at LF.
- Since it is an operation that affects both LF and PF, it must obtain in the Narrow Syntax.

Additional evidence showing that EPP movement is not LF-motivated comes from sentences like (27):

(27) There_{*i*} seems [_{TP} t_{*i*} to be no end to the loud people in this room.]

- (27) involves an expletive subject which undergoes EPP movement from embedded subject position in the raising complement to matrix [Spec, TP].
 - Since the moved element is an expletive, its movement cannot possibly have been driven by any semantic/thematic/other LF requirements.
 - The EPP driving such movement must thus not be understood as semantically motivated.⁴
- ☞ The data above shows that EPP movement feeds LF interpretation, thus again it cannot obtain in the PF module.
- ☞ The expletive structures, on the other hand, show that the movement cannot be motivated at LF.
- ☞ And since the movement also has a PF effect, it cannot happen as late as LF, but must be in the Narrow Syntax.

5 Interim Summary

Before we proceed to our analysis, let us lay our pieces on the table:

- ☞ The EPP seems to involve a phenomenon that is prosodically motivated – the need to have an overt subject in some languages.
- ☞ At the same time, movement due to the EPP is syntactic in nature: it obeys derivational constraints on syntactic well-formedness (locality and minimality) and respects constituency and syntactic categorization.

⁴Note, incidentally, that a Case-licensing story for movement doesn't work here either since "there" expletives are typically not expected to need Case.

- ☞ In addition, EPP movement has LF as well as PF consequences.
- ☞ This is a rather strange state of affairs because it looks counter-cyclic.

The central puzzle is this:

- ☞ How do we deal with a movement that is triggered at PF, but happens in the Narrow Syntax, under a Y-modular architecture of the grammar?

This will be the focus of the rest of the talk.

6 Proposal: prosodically motivated, syntactically implemented

What we need then 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.
- The operation that fills Spec-TP must, however, occur in the narrow syntax, since it obeys syntactic restrictions and has consequences for LF as well as PF.

In this section we will lay out such an account and show how it derives the basic patterns.

6.1 The broad strokes

First, we have the problem of apparent look-ahead:

- ☞ Both movement and insertion of expletives to satisfy the EPP must occur in the narrow syntax.
- ☞ Yet the motivation for them is apparently only implemented at PF, not within the syntax itself.
- ☞ Under normal assumptions about the order of operations, this should be impossible, since the syntactic operations would need to ‘look ahead’ to PF to see that they were needed.

We propose to implement this without actual look-ahead using an ‘overgenerate and filter’ approach:

- We must assume that movement (at least A-movement) and the insertion of expletives apply freely in the narrow syntax and are not driven by formal features (a minimalist version of move- α).

- This will necessarily overgenerate, so that unwanted structures will have to be filtered out at the interfaces, presumably both of them.
- The EPP then should be stated as a well-formedness condition applying in some languages that filters out a particular ill-formed configuration at PF.

Now, if the EPP is actually a PF constraint, it will have to be formulated rather differently than it traditionally has been:

- ☞ At PF, purely syntactic information like grammatical category and perhaps certain aspects of hierarchical structure should not be relevant.
- ☞ Thus the EPP should not actually be a condition requiring a filled Spec-TP, since this would really just be a syntactic condition.
- ☞ Instead, it should refer to categories and units relevant to the construction of phonological and prosodic domains and structures.

So our job is to figure out how to single out Spec-TP in phonological/prosodic terms, and ideally to come up with a phonological/prosodic reason for why it should have to be filled.

- ☞ Fortunately, the fact of having an actual non-zero pronunciation presumably **is** something that is implemented and thus visible at PF, whereas it would not be in the narrow syntax.
- ☞ We should expect, in any case, that a prosodically defined condition won't pick out exactly Spec-TP, since Spec-TP is syntactically defined, so we should get a bit of non-overlap between the two notions.
- ☞ Ideally, we'll be able to use the distinctions between what the prosodic and syntactic versions of the EPP identify to make predictions to help us choose between them empirically.

6.2 A prosodic version of the EPP

So, what is special about Spec-TP from a prosodic point of view? Why should it be singled out as the locus of the EPP?

- Let's start with the assumption of a version of the Y model, where the Narrow Syntax crucially provides the input for PF.
- Assume furthermore a phase-based derivation, with chunks of structure being Spelled out cyclically. It is these chunks which will serve as the basis for construction of phonological and prosodic domains.

- Under a standard version of phase theory, what is sent to the interfaces is not a complete phase, but a phase domain, i.e. the complement of the phase-defining head.

That will get us the special status of TP:

- ☞ It is standardly assumed that C is a phase-defining head. TP is the domain of the CP phase, and thus will be shipped as a unit to Spellout and form a key unit for the construction of prosodic domains.
- ☞ Indeed, An (2007) has argued that TPs typically form the basis for Intonational Phrases (henceforth IntP).
- ☞ Spec-TP then typically falls at the left edge of an IntP, and is thus prosodically prominent in a clear sense.

Now we can propose the following:

(28) **Constraint on the left edge of IntP**

The left edge of IntP must be marked by the presence of overtly pronounced material.

- ☞ We can then take the EPP to be a sub-case of the constraint in (28).

6.3 Deriving the basic patterns

Let us now consider how this can derive the basics of the EPP as well as the *that*-trace effect. Normal finite clauses are straightforward:

- (29) a. A book is t on the shelf.
 b. *Is a book on the shelf.
 c. There is a book on the shelf.

- Spec-TP is at the left edge of the IntP in these examples and thus must be filled by (28).
- Raising the subject there as in (29a) or inserting an expletive there as in (29c) satisfies (28).
- Leaving the edge empty, as in (29b), violates (28).

Now, with the EPP recast as a condition, not for a filled Spec-TP, but for an overtly pronounced left edge of an IntP, we have to be concerned about clauses where the subject is not overt. First we have infinitives:

- (30) a. Beau tried [PRO to eat the tree].
 b. Carrie_i seemed [t_i to find the solution].

- ☞ Spec-TP in the embedded clauses here is presumably syntactically filled – by controlled PRO in (30a) and by the trace of the raised subject in (30b). But of course neither of these is pronounced overtly.
- ☞ So while a traditional EPP account has no problem ruling these sentences in, our PF story has a bit of work to do.

For the raising example in (30b), the answer is fairly clear:

- Raising infinitives are standardly taken to be TPs, not CPs, 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, hence the non-overt subject position will not be at the left edge of such an intonational domain, and (28) does not apply.

For the control example, things are a bit more complicated:

- ☞ Unlike raising infinitives, control infinitives are normally assumed to be CPs and to constitute phases.
- ☞ Thus here we might actually expect, counterfactually, a violation of (28) and hence ungrammaticality.

There are a few ways to deal with this:

1. We could argue that such clauses are TPs after all, hence not subject to (28).
2. We could argue that the infinitive marker *to*, which is presumably in T, is sufficiently close to the left edge of the IntP to satisfy (28).
3. We could argue that in such cases the prosodic structure can be readjusted such that the embedded IntP adjoins to and is subsumed by the IntP of the matrix clause (on which see more below).

Considerations that arise in due course will hopefully help us to decide among these possibilities. Another configuration where we have to worry about non-overt subjects is when the subject has undergone *wh*-movement:

(31) Who punched Alex?

- Under the standard analysis of *wh*-movement, *who* should have undergone movement from Spec-TP to Spec-CP in this example.
- At PF, then, Spec-TP would be empty, and we would expect a violation of (28), since we would have an IntP without an overt left edge.

- Again, the traditional version of the EPP would have no problem here, since the EPP would already be satisfied by the initial A-movement of *who* from Spec-vP to Spec-TP before its \bar{A} -movement to Spec-CP.

The obvious response to this is to adopt the minority analysis of subject *wh*-questions in English, which is based on the observation that they lack *do*-support:

- (32) a. Who punched Alex?
 b. *Who_i did t_i punch Alex?
 c. *Who_i Alex punched t_i?
 d. Who_i did Alex punch t_i?

- (32c) and (32d) show the normal state of affairs with non-subject *wh*-questions: T-to-C movement or *do*-support as a last resort are obligatory, showing that the *wh*-element must have moved to Spec-CP.
- But *do*-support is ungrammatical when the *wh*-element is the subject, as in (32b), leaving open the possibility that the *wh*-element doesn't move to Spec-CP when it is the subject.
- In other words, in (32a), *who* is still in situ in Spec-TP, and thus we do not have a configuration violating (28).

Of course, when the *wh*-element is the subject of an embedded clause, and the question has matrix scope, it is clear that it must have moved out of Spec-TP. But precisely here is where we find the *that*-trace effect:

- (33) 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?]

Now, from our perspective, the grammaticality of (33c) and (33d) is completely expected:

- In both, it is the embedded object that has undergone long-distance *wh*-movement.
- This means that the embedded subject surfaces in Spec-TP, and thus there is no danger of running afoul of (28).

The ungrammaticality of (33b), the sentence violating the *that*-trace filter is also expected, independent of us needing to assume any such filter:

- ☞ The embedded subject has undergone *wh*-movement into the matrix clause, meaning that it is not pronounced anywhere in the embedded clause, including crucially Spec-TP.

- ☞ This means that the IntP corresponding to the embedded clause has no overt left edge, violating (28) and leading to ungrammaticality.

But then what about (33a)?

- ☞ Here we also have *wh*-movement of the embedded subject into the matrix clause, and hence an empty embedded Spec-TP. Hence we would expect ungrammaticality again due to (28).
- ☞ And yet, somehow due to the fact that the embedded complementizer is not pronounced, the sentence remains grammatical.

Again, as with the control infinitives, we can imagine different options for how to deal with this:

1. It could again be that when there is no overt complementizer, even finite clauses can be bare TPs, hence not phases, hence yield no IntPs that could have a problem with (28).
2. Alternatively, we could imagine that the lack of the overt complementizer allows the IntP of the embedded clause to be incorporated into that of the matrix clause, again eliminating the potentially violating edge.

A rather similar configuration appears with *for-to* infinitives (McFadden 2012):

- Here again, we have an alternation between overt and non-overt complementizer combined with an alternation between overt and non-overt subject.
- And the patterns of grammaticality are crucially essentially the same – what is disallowed is an overt complementizer followed by a covert subject:

- (34) a. It's a bit awkward [PRO to talk about him when he's right there.]
b. *It's a bit awkward [for PRO to talk about him when he's right there.]
c. It's a bit awkward [for you to talk about him when he's right there.]

Again, this falls directly out of (28), which started as an updated version of the EPP, but we now see has broader coverage.

- ☞ (34c) causes no problems under (28), since the overt subject means no empty edge of IntP.
- ☞ (34a) has an empty subject, but as with (33a) above, we can argue that the lack of an overt complementizer means either that the embedded clause isn't a CP, hence not a phase, or that the IntP of the embedded clause can incorporate into that of the matrix.

- ☞ In (34b) with its overt complementizer, neither of these analytical options is available. There must be a phase here, hence an IntP, and the presence of the overt complementizer prevents this from being incorporated, hence its empty left edge will violate (28)

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

(35) Who_i did you say [Alex punched t_i?]

(36) * It's a bit awkward [you to talk about him when he's right there].

But this difference is only apparent:

- ☞ What is relevant here are the restrictions on overtness of complementizers, which are of course not regulated by (28).
- ☞ The problem with (36) is that *for* can't be silent in a clause that's the complement of an adjective. In the complement of at least certain verbs, that kind of embedded clause is just fine:

(37) I would like [(for) you to talk about him when he's right there].

- ☞ The restrictions on dropping *for* are broadly quite similar to those on dropping *that*, but a bit stronger (Pesetsky and Torrego 2001).
- ☞ Once that's corrected for, the distribution of overt and covert subjects following overt and covert complementizers is the same, and is what we would expect based on (28):

- (38)
- a. C_∅ DP_∅
 - b. *C_{overt} DP_∅
 - c. C_∅ DP_{overt}
 - d. C_{overt} DP_{overt}

7 Predictions of the proposal

Now let's consider some of the predictions that our proposal makes and how it relates to certain additional phenomena that go beyond the purview of the traditional EPP.

7.1 The connection between *pro*-drop and the EPP

We predict a clear cross-linguistic correlation between having the EPP and allowing *pro*-drop.

- Our implementation of the EPP explicitly depends on having overt material in a certain position at PF, not just having Spec-TP filled in the narrow syntax.

- This means that little *pro*, a silent pronoun, will not be able to satisfy it.
- Essentially every run of the mill *pro*-drop clause in a language like Italian or Spanish like (39) would be a violation of this kind of EPP.

(39) *pro* hablo español.

- Hence, whatever underlies cross-linguistic variation in this new EPP must ensure that it doesn't apply in these languages.

This actually seems to be essentially correct:

- ☞ Obviously, (39) has no overt subject, so Spanish does not have a requirement that the subject be pronounced overtly.
- ☞ Even when the subject is overt, it has commonly been observed that languages like Italian and Spanish allow it to appear in a post-verbal position, i.e. not in Spec-TP (Rizzi 1982):

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

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

(41) Chi_i credi che t_i abbia telefonato?
 who_i think-2SG that t_i has-SUBJ telephoned
 'Who do you think called?'

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

(42) 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:

- The EPP, the *that*-trace effect and the ban on null subjects after *for* all result for us from (28), so a language that has a way to get around (28) for one of these phenomena can presumably do so for all.

- Indeed, we may even have a way to approach this particular parametrization, if we adapt certain results from Alexiadou and Anagnostopoulou (1998), who argue that languages may satisfy the EPP in two different ways:
 1. By having a subject in Spec-TP (English-like languages)
 2. By having V move to T (*pro*-drop and VSO languages)
- We can actually get this to result from our constraint in (28) if elements moved to T, just like elements moved to Spec-TP, count as being at the left edge of IntP.

7.2 The EPP shouldn't really be about subjects

Somewhat related to the last point, if the EPP is really the result of a constraint applying at PF that refers to prosodic units, it shouldn't really be about subjects:

- ☞ PF presumably doesn't care or even know about specific syntactic categories or about details of structure beyond what is relevant for forming prosodic units.
- ☞ Direct reference to subjects or even to specific syntactic positions like Spec-TP should thus not be possible. So if the EPP really does apply at PF, it must not literally be about subjects or subject positions.
- ☞ Indeed, our formulation in (28) doesn't refer to the subject or Spec-TP, but to the left edge of IntP.

This predicts, then, that other overt elements that can surface in the left edge of IntP should be sufficient to satisfy the EPP, even if no subject is there. There is at least some evidence that this is correct:

- If we accept the arguments from Alexiadou and Anagnostopoulou (1998) mentioned briefly above, then in some languages the EPP seems to be satisfied by moving the verb to T, even if Spec-TP remains empty.
- This could also be a way to think about locative inversion in languages like English, where a certain class of locative PPs can appear pre-verbally, with the subject post-verbal:

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

- We could also use it as a way to understand some strange facts about “sentential subjects”. These actually don't seem to be real subjects in Spec-TP, e.g. because they don't participate in subject-auxiliary inversion (Adger 2003).

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

Yet they do seem to satisfy the EPP, since no expletive is required to accompany them. This makes sense under our analysis as long as they are somewhere in the left edge of the IntP, even if they aren't directly in Spec-TP.

- This may also be a way to understand why no expletive subject is required (or, indeed, allowed) in certain kinds of parentheticals with *as* (see Postal 2004, for arguments that *as* isn't the subject here):

(45) We are tall, as (*it) is clear from our height.

8 Conclusion and open issues

To summarize briefly:

- We have proposed that the EPP (and some related phenomena like the *that*-trace effect) actually result from a PF condition requiring the left edge of IntPs to be marked by overt material.
- This acts as a filter on the output of the Narrow Syntax, where A-movement is allowed to apply freely, ruling out structures where nothing has moved to or been merged in the region at the beginning of the domain of the CP phase.

Note that for the moment we have only claimed that A-movement applies freely. And we have only really discussed movement to subject position, but there does not seem to be any problem in extending this to all instances of A-movement:

- ☞ First of all, most traditionally recognized kinds of A-movement are just movements from different positions to Spec-TP (e.g. in passives, unaccusatives, raising infinitives etc.)
- ☞ For other potential kinds of A-movement, the idea that they apply freely subject to interface filters seems even less controversial.
- ☞ A-scrambling, e.g., is generally thought to be optional, in the sense that it can apply freely subject to discourse-pragmatic constraints.
- ☞ This is a reasonable assumption for object shift as well, despite early Minimalist attempts to analyze it as case-driven, which doesn't seem to have held up to scrutiny.
- ☞ In any case, it is crucial for our story that none of these movement processes should be triggered by formal syntactic features.

This of course leaves open the question of whether the general idea could be extended to \bar{A} -movement.

- Here we are not prepared to make any specific claims, but we will note that some recent work has argued that the difference between *wh*-movement and in situ languages boils down to prosodic differences (Richards 2010, 2014).

Some other open questions and issues:

- Deciding among the various analytic options for control infinitives and long-distance subject extraction, where the surface EPP is circumvented
- Additional loci of parametric variation
- Possibility of anti-EPP effects?
- What might be going on in V2 languages
- Concerns about triggering intermediate movement steps
- What about EPP effects inside the vP phases?

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