

Towards resolving the countercyclicity of the EPP

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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), and even to being a general movement trigger, driving head movement as well. 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 \bar{A} -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:

- (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 as well, we will 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 therefore 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

69 be filled by *something*. A second type of expletive sentence is found with a small group
70 of so-called “weather verbs”, like *rain* or *snow* that don’t assign any θ -roles. Nonetheless,
71 these verbs cannot simply appear without a subject, but instead require the expletive *it*,
72 as in (4):

73 (4) *(It) is raining.

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

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

80 (5) **The (traditional) EPP**

81 Every clause must have a filled subject position.

82 2.2 The traditional EPP and silent subjects

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

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

89 b. Sasha tried [(**Olga*) to like physics].

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

102 The difference between languages that disallow pro-drop, like English and those that
103 allow them, like Spanish, could be that the EPP is parametrized: the former, but not the
104 latter, are sensitive to it. Alternatively, it might have to do with independent factors (the
105 so called “pro-drop parameter”) governing the pronunciation of subjects in (non-)finite
106 clauses, which remain poorly understood (see also Duguine 2013, Sundaresan 2014, a.o.
107 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, Bošković 2002, Castillo et al. 2009), 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 vP , 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 have been abandoned, as was the associated idea that movement applies freely (subject to constraints on its output). 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 have *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

148 conditioning the EPP are phonological, it triggers operations that are syntactic. Thus,
149 phonology seems to feed syntax in a way that is clearly countercyclic. Accounting for
150 the EPP properly thus runs into serious issues relating to (standard notions of) the ar-
151 chitecture of the grammar.

152 3 The EPP must hold at PF

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

157 3.1 The role of overtness

158 The simplest indication that the EPP has a phonological side comes from the fact that,
159 in languages like English, the prototypical finite subject really must be overt:¹

- 160 (7) a. I like beans.
161 b. * Like beans. (under the interpretation ‘I like beans’)
162 c. * *pro* like beans.
163 (8) a. It is raining.
164 b. * Is raining.
165 c. * *pro* is raining.

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

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

178 Specifically, given standard views of grammatical modularity, a full account of these
179 facts simply cannot be implemented entirely in the Narrow Syntax. Whether a DP and
180 its subparts have any overt phonology is at least in part a phonological fact. If such

¹For the moment we are abstracting away from cases like long distance *wh*-extraction of embedded subjects, where this is not strictly true. We will discuss such examples in detail over the course of the paper and see how the restrictions placed on them fit in with the phonological side of the EPP.

181 information only plays a role on the PF branch, and the syntax has no access to the
182 phonological properties of the elements it manipulates, it will be impossible to phrase
183 a constraint that refers to overtness within the syntax. Instead, any requirement for
184 overtness must be stated at a stage in the derivation where phonological information is
185 available, i.e. somewhere on the PF branch.

186 3.2 An argument from ellipsis

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

- 191 (9) a. * Which Marx brother_i is [a biography of t_i]_j going to appear t_j this year?
192 b. A biography of one of the Marx brothers is going to appear this year, but I
193 don't know which (Marx brother).

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

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

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

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

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

210 3.3 Connections to the *that*-trace effect

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

- 213 (12) a. Who_i do you think [(that) Beau nudged t_i]?
214 b. Who_i do you think [t_i is stupid]?
215 c. * Who_i do you think [that t_i is stupid]?

216 When the object is *wh*-extracted from an embedded clause into the matrix in English as
217 in (12a), the complementizer *that* is optional. But when the subject is extracted from such
218 a clause, *that* must suddenly be dropped as it is in (12b). (12c) shows that when *that* is
219 present, sharp ungrammaticality results. We will see in Sections 6.3 and 6.5 that there is
220 good reason to connect the *that*-trace effect to the EPP. For now, simply note that both
221 involve ungrammaticality arising from an empty subject position.

222 Crucially, evidence has mounted recently that *that*-trace effects are not actually syn-
223 tactic, as was long thought, but rather involve something phonological or prosodic (see
224 e.g. Kandybowicz 2006, Bruening 2009, McFadden 2012, Salzmann et al. 2013). First, in
225 parallel to what we saw above for the EPP, ellipsis seems to eliminate the effect (Merchant
226 2001):

227 (13) John said that someone would write a new textbook, but I can't remember
228 who_i John said that t_i would write a new textbook.

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

231 (14) ? Who_i does John doubt whether and Bill suspect that t_i cheated?

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

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

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

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

245 **4 The operations the EPP triggers are syntactic**

246 If, as we have just argued, the EPP acts by placing restrictions that must be stated at PF,
247 an obvious thought would be that it triggers argument-movement and insertion of ex-
248 pletives at PF. However, at least in the case of movement, it is clear that this is incorrect.
249 EPP-driven movement shows clear syntactic properties in its application, and further-
250 more yields LF effects in addition to the obvious PF ones. Given standard assumptions
251 about the architecture of the grammar, we are left to conclude that EPP-driven displace-
252 ment 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. $[_{DP_1} [_{DP_2} \text{The man}] [_{PP} \text{with the pointy green hat}]]_i$ seemed $[_{TP} t_i \text{ to be insane}]$.
 b. * $[_{DP_2} \text{The man}]_i$ seemed $[_{TP} [_{DP_1} t_i [_{PP} \text{with the pointy green hat}]] \text{ to look insane}]$.
 c. * $[_{N} \text{man}]_i$ seemed $[_{TP} [_{DP_1} [_{DP_2} \text{the } t_i] [_{PP} \text{with the pointy green hat}]] \text{ to look insane}]$.
 d. * $[_{D} \text{the}]_i$ seemed $[_{TP} [_{DP_1} [_{DP_2} t_i \text{ man }] [_{PP} \text{with the pointy green hat}]] \text{ to look insane}]$.

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):²

- (17) a. $[_{DP_1} \text{The hungry man}]_i$ will t_i devour $[_{DP_2} \text{the soup}]$.
 b. * $[_{DP_2} \text{The soup}]_i$ will $[_{DP_1} \text{the hungry man}]$ 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 eligible 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):³

- (18) a. $[_{DP_1} \text{A relative of } [_{DP_2} \text{Matilda }]]_i$ arrived t_i .
 b. * $[_{DP_2} \text{Mathilda}]_i$ arrived $[_{DP_1} \text{a relative of } t_i]$.

²We are abstracting away from concerns for a simple minimality approach that arise under analyses where *wh*-movement of objects always passes through Spec-*vP*, which might imply that such objects would be closer to Spec-TP than the subject in a lower specifier of *vP*. As noted by an anonymous reviewer, proposals to ensure that it is still the subject that raises to Spec-TP in such configurations are all implemented syntactically, so the general point remains that EPP movement is syntactic.

³The most widely adopted analysis of quantifier float (Sportiche 1988, etc.), does involve the extraction of a DP out of a larger DP also eligible to be moved, but this is clearly subject to heavy restrictions which must somehow be implicated in whatever it is that keeps the general minimality restriction from blocking it. In any case, the special flexibility of quantified NPs does not affect the general point being made here that movement to subject position is subject to syntactic restrictions.

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

- 290 (19) a. $[_{DP} \text{Matilda}]_i$ seems $[_{TP} t_i$ to be lazy].
291 b. * $[_{DP} \text{Mathilda}]_i$ seems $[_{CP} \text{that } t_i$ is lazy].

292 Such sensitivity to minimality and locality would be unexpected if EPP-driven move-
293 ment were actually implemented at PF. This holds even under a framework like Dis-
294 tributed Morphology where a portion of the post-syntactic PF derivation can involve
295 movement on partially hierarchical structures. These post-syntactic movements are
296 heavily restricted in ways quite different from syntactic movement and would predict
297 patterns quite different from what we've seen here for EPP movement (see especially
298 Embick and Noyer 2001, for discussion). Abstracting away from the expectations of
299 particular theories regarding PF movement, there is no evidence for the relevance of
300 prosodic or phonological wellformedness conditions (e.g. linearity, adjacency, stress-
301 placement and phonotactics) for EPP-driven movement. EPP-driven movement in an
302 English-like language bears the fingerprint of a (narrow-)syntactic operation, not of a
303 morpho-phonological one.

304 4.2 LF effects of EPP-movement

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

- 310 (20) a. * It seems to herself_i $[_{CP} \text{that every girl}_i$ is silly].
311 b. Every girl_i seems to herself_i $[_{TP} t_i$ to be silly].

312 (20b) is largely parallel, except that *every girl* raises out of the embedded clause, satisfying
313 the matrix EPP, and ending up in a position where it does c-command *herself*. The
314 sentence is grammatical under the interpretation indicated by the coindexation, which
315 tells us that binding has succeeded. Since *every girl* started out in a position from which
316 precisely that binding was ruled out in (20a), we can conclude that it is the EPP-driven
317 movement that feeds the binding. While we can debate whether the relevant stage for
318 binding is LF itself or some earlier stage in the syntactic derivation, what is clear is that
319 it cannot be anywhere along the PF branch, since binding feeds into the determination
320 of reference, which clearly is an LF issue.

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

- 322 (21) a. It seems to some girl [_{CP} that every boy stinks]. ($\exists \gg \forall$; $*\forall \gg \exists$;)
 323 b. [Every boy]_i seems to some girl [_{TP} t_i to stink]. ($\exists \gg \forall$; $\forall \gg \exists$)

324 In (21a), no EPP-driven movement has occurred in the matrix clause, with the EPP sat-
 325 isfied rather by expletive *it*. The only available scopal reading is the surface one ($\exists \gg$
 326 \forall), namely that there is a single girl who has the impression that all of the boys stink.
 327 In (21b), the matrix EPP is satisfied instead by raising the embedded subject into matrix
 328 Spec-TP. In this position, *every boy* c-commands *some girl*, and as a result we get the ad-
 329 ditional interpretation $\forall \gg \exists$; i.e. for every boy, there seems to be some girl who thinks
 330 he stinks, but there may be several different girls for the different boys. Again, under
 331 the standard assumption that scope relations are determined based on c-command at
 332 LF, this tells us that the EPP-driven movement feeds into LF, thus cannot take place on
 333 the PF branch.⁴

334 While EPP-driven movement affects LF, it nevertheless clearly does not occur on the
 335 LF branch itself. First, EPP-driven movement obviously has PF effects — *every boy* is
 336 pronounced earlier in the string in (21b) where it has undergone EPP-driven movement
 337 into the matrix clause than in (21a) where it has not. Under the modular architecture of
 338 the grammar assumed here, anything that affects both LF and PF must happen in the
 339 narrow syntax, which feeds into both. Purely LF operations, on the other hand, should
 340 be invisible to PF.

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

- 343 (22) a. There_i seems [_{TP} t_i to be no one here.]
 344 b. * There seems [_{TP} [no one]_i to be t_i here.]

345 (22a) involves an expletive subject *there*, which undergoes EPP-driven movement from
 346 embedded subject position in the raising complement to matrix Spec-TP. Evidence that
 347 *there* really did start out in the embedded clause comes from (22b). We might expect the
 348 embedded subject *no one* to raise from its post-verbal first-merge position to the embed-
 349 ded Spec-TP to satisfy the EPP there, with *there* subsequently being merged directly in
 350 the matrix Spec-TP, but this is clearly ungrammatical. The fact that *no one* must remain
 351 in situ suggests that *there* is first merged in Spec-TP of the embedded clause, satisfies the
 352 EPP there, and then raises up to satisfy the EPP in the matrix clause. If this is correct,
 353 then the movement we see in (22a) cannot be driven by any semantic/thematic/other LF
 354 requirements, because the expletive has no interpretive content of its own.⁵

355 5 Interim Summary

356 The data up to this point show that the EPP has the rather puzzling constellation of
 357 properties in (23):

⁴Of course, the inverse scope of $\exists \gg \forall$ is still available due to scope reconstruction at LF.

⁵Note, incidentally, that a straightforward Case-theoretic story doesn't work here either since *there*-type expletives are not generally thought to get Case.

358 (23) EPP-driven movement bears the structural hallmarks of a narrow-syntactic oper-
359 ation. The output of this movement also feeds LF and PF interpretation, further
360 underscoring its narrow syntactic status. Nevertheless, this movement is trig-
361 gered by purely phonological factors.

362 (23) would seem to imply that syntactic operations can be sensitive to phonological in-
363 formation. However, in the standard Y-model and its descendants, the syntax is assumed
364 not to have access to the phonological properties of the structures it manipulates, either
365 as a general principle of modularity (e.g. the Principle of Phonology-Free Syntax Miller
366 et al. 1997), or because those structures literally lack phonological content, which is in-
367 serted “late” at PF (Halle and Marantz 1993). The EPP thus seems to involve an element
368 of countercyclicity or look-ahead. Something needs to happen at an earlier stage of the
369 derivation based on information that should only be available at a later stage.

370 We are by no means the first to arrive at this conclusion. Landau (2007) and Salzmann
371 et al. (2013) are two proposals that attempt to reconcile the countercyclicity issue by
372 having the EPP be implemented at PF in different ways. Nevertheless, for both, the EPP
373 still essentially involves a syntactic feature. Because of this, they are forced to adopt
374 unorthodox assumptions that we would like to avoid, involving the effects that syntactic
375 features can have or about the timing of feature checking.

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

386 6 Implementing the EPP as a PF-constraint

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

395 6.1 Singling out the subject position

396 So, what is special about Spec-TP from a PF point of view that should lead to it being
397 singled out by the EPP? We propose that we can get the special status of TP with respect
398 to the EPP out of standard assumptions about phased-based derivations, building on
399 work on the relationship between syntactic structure and prosodic domains by e.g. An
400 (2007) and Kandybowicz (2009). Under standard phase theory (Chomsky 2001, etc.),
401 what is sent to the interfaces is a phase domain, i.e. the complement of the phase-defining
402 head (including the edge of the next phase down). Assume that these domains serve as
403 the basis for the construction of phonological and prosodic domains. Given that C is a
404 phase-defining head, TP will be the domain of a complete CP phase, and thus will be an
405 important unit for the construction of prosodic domains. An (2007) proposes specifically
406 that TPs typically form the basis for constructing Intonational Phrases (IntP). This means
407 that Spec-TP will typically fall at the left edge of an IntP, and as a result will play an
408 important role in the definition of prosodic domains in a clear sense.

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

411 (24) **Constraint on the left edge of IntP (Prosodic EPP):**

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

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

420 6.2 The basics of overt and non-overt subjects

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

- 426 (25) a. [A book]_i is t_i on the shelf.
427 b. There is a book on the shelf.
428 c. * Is a book on the shelf.

429 Spec-TP is at the left edge of the IntP in these examples and thus, according to (24),
430 must contain overt material, either a raised subject as in (25a) or expletive *there* as in
431 (25b). (25c) violates (24) and is thus correctly excluded.

432 One crucial difference between an EPP formulated as a requirement for a filled Spec-
433 TP and one formulated as a requirement for an overtly pronounced left edge of IntP is

434 in the treatment of non-overt subjects. An unpronounced lower movement copy, PRO or
435 little *pro* in Spec-TP will satisfy the former but violate the latter precisely because it is
436 silent. We must thus carefully consider clauses with non-overt subjects to see whether
437 our prosodic EPP can be extended to cover them. Note, first of all, that a parse of (25c)
438 with either a PRO or *pro* subject will be correctly ruled out, without needing recourse to
439 any specific theory of control or pro-drop.

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

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

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

451 For the control example, things are more complicated, since unlike raising infinitives,
452 control infinitives are normally assumed to be CPs and hence phases. Thus under our
453 approach, the TPs they contain would build IntPs. If this is so, we would falsely predict
454 that the silence of the subject in a control example like (26a) would lead to a violation
455 of (24). While we will not defend a specific proposal on how to deal with this issue, we
456 will briefly discuss three options that could be pursued here. Considerations that arise
457 subsequently will hopefully help us decide among them.

458 One possibility is to argue that control infinitives do not count as independent phases
459 after all, thus their TPs don't form IntPs, and like raising infinitives don't come under
460 the purview of (24). This has some plausibility, given the sense that prototypical control
461 infinitives are smaller than typical finite clauses (see e.g. Wurmbrand 2001, McFadden
462 2014). A second possibility depends on the idea that, for the purposes of (24), the left
463 edge of IntP includes not just the specifier of the phrase that IntP it is built on, but also
464 its head, as proposed by An (2007). This means that what (24) typically requires is that
465 either Spec-TP or T itself contain overt material. Since the infinitive marker *to* is presu-
466 mably in T, it can thus suffice to satisfy this prosodic version of the EPP. A third possibility
467 exploits the indirectness of the relationship between syntactic and prosodic structures.
468 The default is that the phase domain will serve as the basis for an IntP, but under cer-
469 tain circumstances, it is possible for what would normally be an independent IntP to be
470 parsed as part of an adjacent IntP. While root clauses and certain other kinds of con-
471 stituents are apparently obligatorily parsed as separate IntPs, it is commonly assumed
472 that certain kinds of complement clauses may be included in the IntP of the matrix clause
473 (see Selkirk 1986, and much following work). We may then be able to argue that control
474 infinitives, while phases, do not necessarily build their own IntPs, hence (24) does not
475 apply to them.

476 6.3 Interactions with *wh*-movement

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

478 (27) Who punched Alex?

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

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

- 489 (28) a. *Who_i Alex punched t_i?
490 b. Who_i did Alex punch t_i?
491 c. Who punched Alex?
492 d. *Who_i did t_i punch Alex?

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

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

- 500 (29) a. Who did you say [t_i punched Alex?]
501 b. *Who_i did you say [that t_i punched Alex?]
502 c. Who_i did you say [Alex punched t_i?]
503 d. Who_i did you say [that Alex punched t_i?]

504 The grammaticality of (29c) and (29d) is straightforward. In both, it is the embedded
505 object that has moved, so the embedded subject surfaces in Spec-TP, and there is no
506 danger of violating (24). The ungrammaticality of (29b) is also expected based on (24):
507 the embedded subject has *wh*-moved from embedded Spec-TP into the matrix clause.
508 Hence the IntP corresponding to the embedded clause has no overt left edge, violating
509 (24).

510 The question is how we keep (24) from ruling out (29a). Here we also have *wh*-
511 movement of the embedded subject, hence an empty embedded Spec-TP and an IntP
512 with no overt material in its left edge. Yet somehow, in a way that must be related to the
513 fact that there is no overt embedded complementizer, the sentence is grammatical. As
514 with the control infinitives, we can imagine different options for how to deal with this.

515 It could again be that when there is no overt complementizer, even finite clauses can
516 avoid counting as phases, hence not yield an IntP that would have a problem with (24).
517 Alternatively, we could imagine that the embedded clause is being integrated into the
518 IntP of the matrix clause, as laid out as the third option for (26a) above, again eliminating
519 the violating edge. This idea has some appeal because we could extend it to explain the
520 other patterns here. The intervening overt complementizer would prevent this incorpo-
521 ration in (29b), yielding the *that*-trace effect, whereas the silent complementizer in (29a)
522 would be ignored by what is after all a prosodic operation. The *that*-trace effect would
523 then amount to the following. *Wh*-extraction of the subject out of an embedded clause
524 creates a tricky prosodic configuration. If there is no overt complementizer, then there is
525 an available parse that is prosodically well-formed. If, however, the complementizer is
526 pronounced, this specific parse is blocked, and there is no other parse available that can
527 satisfy the relevant prosodic conditions.

528 6.4 Interactions with *for*

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

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

537 Again, this falls directly out of (24), which started as an updated version of the EPP, but
538 we now see turns out to have broader coverage. (30c) causes no problems, since having
539 the overt embedded subject means there is no empty edge of IntP. (30a) has an empty
540 subject, but as with (29a) above, we can argue that the lack of an overt complementizer
541 means that the embedded clause either isn't a phase, or can incorporate into the IntP
542 of the matrix clause. In (30b) with its overt complementizer, entirely in parallel with
543 (29b), neither of these analytical options is available. There must be a phase here, and
544 the presence of the overt complementizer prevents this from being incorporated into the
545 preceding IntP, so we have an independent IntP with an empty left edge that will violate
546 (24). We can thus deal with this along the same lines discussed for (29b) above.

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

- 549 (31) a. Who_i did you say [Alex punched t_i?]
550 b. * It's a bit awkward [you to talk about him when he's right there].

551 (31a), repeated from earlier, is grammatical with a silent complementizer followed by an
552 overt subject in an embedded finite clause. (31b), on the other hand, shows that the same

553 configuration is ungrammatical in a non-finite clause. It would seem to be a problem for
554 our account that (24) cannot straightforwardly rule out (31b).

555 However, this problem is only apparent. What is relevant for the distinction between
556 (31a) and (31b) are the conditions on the overtiness of complementizers, not the condi-
557 tions on the overtiness of subjects. In typical complement clauses, we do not actually
558 expect this to be regulated by (24), since the C head will be part of a higher spell-out
559 domain, hence not at the left edge of any IntP. This means that, under our analysis, (24)
560 need not, and in fact should not, rule out (31b). As discussed above, the overtiness of a
561 complementizer can affect the prosodic parsing of its broader context and thus play a
562 role in whether the following subject position will be subject to (24), but its overtiness is
563 not regulated by (24) directly. We will not attempt an account of the additional principles
564 that *do* constrain the overtiness of complementizers here, directing the reader instead to
565 Pesetsky and Torrego (2001), An (2007), McFadden (2012) and sources cited therein for
566 extensive discussion.⁶

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

- 573 (32) a. $C_{\emptyset} DP_{\emptyset}$
574 b. $*C_{\text{overt}} DP_{\emptyset}$
575 c. $C_{\emptyset} DP_{\text{overt}}$
576 d. $C_{\text{overt}} DP_{\text{overt}}$

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

581 6.5 The EPP, subjects and pro-drop

582 In this subsection, we will consider two predictions made by our implementation of the
583 EPP in terms of the PF constraint in (24), both of which ultimately involve the irrelevance
584 of the notion of ‘subject’. Note, first, that we predict a negative correlation between a
585 language having the EPP and it allowing pro-drop. Our implementation of the EPP
586 requires overt material in a certain position at PF, not on having Spec-TP filled in the
587 narrow syntax. Hence *pro*, as a silent pronoun, will not be able to satisfy it and every

⁶Descriptively, the problem with (31b) seems to be that *for* cannot be silent inside an adjectival comple-
ment. 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”).

588 run-of-the-mill pro-drop root clause like Spanish (33) should be a violation of this kind
589 of EPP:

590 (33) *pro* hablo español.

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

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

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

602 Strikingly, these languages also don't seem to be subject to the *that*-trace effect (Rizzi
603 1982):

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

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

608 (36) Gianni pensa di PRO conoscerlo bene.
Gianni thinks C PRO to.know=it well
609 'Gianni thinks he knows it well.'

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

614 This could be because (24) itself is parametrized somehow, but a more interesting
615 possibility, building on ideas of Alexiadou and Anagnostopoulou (1998), is that some
616 languages have a different way of satisfying the constraint than through an overt sub-
617 ject. Alexiadou and Anagnostopoulou (1998) proposed that the EPP boils down to the
618 checking of a nominal feature of AGR, which can be achieved in one of two ways. One
619 is to have a subject in Spec-TP, as in languages like English. The other, which for them
620 characterizes (at least one class of) pro-drop languages, is to move V to T, where the re-
621 quired nominal feature is included in the makeup of the agreement morphology on the
622 verb. Under our proposal, there is a straightforward way to make sense of how V-to-T
623 movement provides an alternative way to satisfy the EPP. Again, if we follow An (2007)

624 in defining the left edge of IntP to include both the specifier and the head of the relevant
625 syntactic phrase, overt material in T will fulfill the requirements of (24) just as well as
626 overt material in Spec-TP. The idea then would be that (the relevant class of) pro-drop
627 languages *are* subject to (24), but do not have an overt subject requirement because V-to-
628 T movement already satisfies (24) independently, so classic EPP and *that*-trace effects do
629 not obtain.

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

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

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

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

647 We could also use it as a way to understand some strange facts about what are typi-
648 cally regarded as sentential subjects, i.e. embedded clauses that appear in what looks like
649 the subject position of the matrix clause. According to various diagnostics, these don't
650 actually seem to behave like real subjects in Spec-TP. For example, they don't partici-
651 pate in subject-auxiliary inversion (Adger 2003), and in fact can't appear in interrogative
652 matrix clauses:

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

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

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

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

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

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

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

671 7 The countercyclicity problem again

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

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

691 7.1 Phonology in the syntax

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

700 each other.

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

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

726 **7.2 Overgenerate and filter**

727 The second possibility is the general recourse available in cases where we want later
728 stages of the derivation to constrain earlier ones without technically introducing any
729 look-ahead. The broad idea is that the syntax is set up to overgenerate, i.e. to deliver an
730 array of structures involving different permutations of the available operations, includ-
731 ing ones that are destined not to result in any convergent output. These structures are
732 then fed into a restrictive phonological component, which filters out structures that do
733 not yield PF representations satisfying various restrictions. At least some ‘ungrammati-
734 cal sentences’ then correspond to structures that are well-formed as far as the syntax is
735 concerned but ruled out for PF reasons. In the case of the EPP, we could assume that
736 A-movement can apply (or not apply) freely, approximately a minimalist revival of the
737 GB idea of Move α . Various PF constraints, including our version of the EPP, would then
738 filter out most of these structures, leaving only those which are grammatical.

739 Consider how this would resolve our apparent paradox. We can retain the architec-

740 tural assumption that the syntax precedes PF and has no access to phonological infor-
741 mation. As far as the syntax is concerned, there is no EPP, just the options of moving
742 something to Spec-TP or not, both of which are in fact pursued in different derivational
743 paths. The phonological component then eliminates those structures where there is an
744 IntP with a left edge that has no overt material (as per (24)). What survives are the struc-
745 tures where expletive insertion or movement of a subject to Spec-TP happen to have
746 taken place, but there is no sense in which those operations were actually triggered in
747 order to satisfy the EPP. This approach lets us have our cake and eat it too: the EPP
748 can simultaneously be syntactically implemented and phonologically driven without us
749 having to modify our grammatical architecture.

750 Nonetheless, this option comes with problems of its own. One is the quite general
751 concern with overgenerate-and-filter approaches, that they are rather inefficient com-
752 putationally, generating a large (potentially infinite) number of structures that are ul-
753 timately destined to be filtered out (see Frampton and Gutmann 2002, for related dis-
754 cussion). There is also a more specific challenge:⁷ if A-movement applies freely, it is
755 not obvious how to implement feature-driven restrictions like Relativized Minimality
756 (see again Section 4). Achieving this effect while having EPP-driven A-movement apply
757 freely will require some additional mechanism. For these reasons, this second option
758 should probably be regarded as a last resort to pursue if the other two cannot be made
759 to work.

760 **7.3 Separating the syntax and the phonology of movement**

761 The third avenue to pursue is to look for a way to refactor EPP-driven movement that
762 avoids having syntactic operations make reference to phonology. We might be able to
763 do this by splitting traditional movement into two parts, separating the clearly syntactic
764 and phonological aspects from each other and then distributing them to the appropriate
765 modules. A concrete proposal along these lines was made by Bobaljik (2002) when pre-
766 sented with a problem strikingly similar in its structure to ours. Bobaljik was concerned
767 with the proper treatment of Holmberg’s Generalization (Holmberg 1999), according to
768 which overt object shift in Scandinavian is only possible if the main verb raises out of
769 the VP. He argues that the problem with the blocked configurations is actually a mor-
770 phophonological one — if the object raises across the verb, it intervenes and blocks the
771 morphological merger of the verb with a (tense or participial) suffix realizing a higher
772 functional head. The problem is, this merger is a PF operation, requiring adjacency
773 rather than a structural syntactic notion, yet the movement that would get the object into
774 the offending position is clearly syntactic. A movement operation clearly occurs in the
775 syntax, but whether or not it should apply depends on information that is only available
776 on the PF branch: a situation entirely parallel to that with the EPP.

777 Bobaljik (2002) offers a solution to this problem based on a specific refactoring of
778 movement, explicitly arguing that it is superior to overgenerate-and-filter approaches

⁷Thanks to Fabian Heck (p.c.) for pointing this out.

779 along the lines of what we have just described. The refactoring depends crucially on
780 the copy theory of movement (Chomsky 1993, and following),⁸ with the appearance of
781 displacement coming from the fact that, normally, only the highest copy is pronounced.
782 Chomsky motivated this proposal as a way to deal with reconstruction effects, which
783 he argued result when a lower copy is interpreted at LF. Bobaljik simply extends this
784 idea to the PF branch: just as LF can decide to interpret either a higher or a lower copy,
785 PF can decide to pronounce either a higher or a lower copy. The various logical com-
786 binations of these possibilities yield the typology of interactions between pronunciation
787 and interpretation, including standard movement (high pronunciation, high interpreta-
788 tion), reconstruction (high pronunciation, low interpretation) and covert movement (low
789 pronunciation, high interpretation). Bobaljik argues that the fourth possibility, with low
790 pronunciation and low interpretation, is attested in certain expletive constructions.

791 This theory deals with problematic interactions between syntax and PF by virtue of
792 splitting up traditional movement into two components. First, there is an abstract oper-
793 ation in the narrow syntax that associates a syntactic object with an additional structural
794 position.⁹ This operates on purely syntactic structures, respects syntactic principles like
795 locality and minimality and has no access to phonological information. Then, as part
796 of the PF component, there is a procedure that determines which position each syntac-
797 tic object should be pronounced in. This operates on a morphophonological structure
798 which has access to (at least some) phonological information and follows principles of
799 morphophonology rather than syntax. For Holmberg's Generalization, Bobaljik pro-
800 poses that objects with the relevant syntactic properties obligatorily undergo syntactic
801 object shift, regardless of where the verb is. The structure shipped to the interfaces then
802 has copies in both a high and a low position. At PF, the algorithm applies to determine
803 which of these to pronounce. There is a preference to pronounce the highest copy when-
804 ever possible, but this can be overridden if the result would be morphophonologically
805 ill-formed. In particular, if the higher copy would disrupt the required adjacency be-
806 tween the main verb and the higher functional head destined to be its suffix, then the
807 lower copy must be pronounced instead. Holmberg's Generalization is thus not about
808 the syntactic movement involved in object shift being blocked, but rather about whether
809 that movement is reflected in the resulting pronunciation.

810 Something entirely analogous can be proposed to deal with our EPP concerns. We
811 can assume that A-movement of an appropriate DP occurs obligatorily in the syntax,
812 perhaps universally. This is completely standard syntactic movement, driven by syn-
813 tactic features, respecting constituency, locality and minimality, and completely blind
814 to phonological information. This yields a structure with both high and low copies
815 of the moved element, and one of the jobs of PF will be to determine which of these
816 copies will be pronounced. The algorithm for that determination will operate based on

⁸Later 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.

⁹We can think of this as copy + merge, re-merge, internal merge, chain formation or any of a number of other possibilities. For present purposes the differences don't really matter.

817 morphophonological structure and be sensitive to morphophonological information, in-
818 cluding, crucially, overtness and prosodic domains, and will have some version of (24)
819 built into it. This will ensure that the higher copy is pronounced and is overt in the
820 relevant cases in languages like English, while in pro-drop languages, it will allow the
821 lower copy to be pronounced under relevant circumstances, or for all copies to be silent
822 (pro-drop itself). This solves the countercyclicity issue in that movement always applies
823 in the relevant contexts, with no reference to the EPP and indeed no consideration of
824 any phonological information. The EPP itself is entirely a matter of the PF branch, not
825 doing any actual syntactic work, but rather determining what to do with the material
826 handed over by the syntax.

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

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

853 A second family of issues comes from the fact that splitting up EPP-triggered move-
854 ment into two parts leaves a number of difficult questions open. For example, it makes
855 it tricky to determine what kind of approach we should take to expletive constructions,
856 which obviously interact with EPP-driven A-movement. We could imagine that the ex-
857 pletives are inserted in the syntax, blocking A-movement, but still yielding a structure
858 that can satisfy (24) at PF, but then it is not clear what would drive the insertion, since

859 there is no syntactic EPP. Alternatively, one might imagine that they are inserted as a last
860 resort at PF, directly to satisfy the EPP, but this also leads to problems. For one thing, the
861 choice between expletives *it* and *there* seems to be determined syntactically, not phono-
862 logically, so how does PF know which one to insert? For another, if the expletives are
863 only inserted at PF, then at least the associates of expletive *there* should still undergo
864 syntactic A-movement, yet they systematically fail to show any evidence of such move-
865 ment, e.g. being obligatorily interpreted low. Finally, as discussed by Butler (2004), there
866 is reason to think that at least *there*-insertion is not without LF-semantic consequences –
867 something that a PF-insertion approach would be unable to capture.

868 The most important member of this family of issues is the question of how syntactic
869 A-movement to Spec-TP can be triggered in the first place. Standard theories would do
870 it in terms of a version of the EPP, but we have moved the EPP to the PF component. We
871 could adopt a version of the proposals by Bošković (2007) and Bjorkman and Zeijlstra
872 (2014) discussed earlier, whereby movement is forced by c-command requirements on
873 Agree operations. Or we could of course posit a purely formal feature on T that forces a
874 DP to Merge in its specifier. As noted above, it may well also be necessary to introduce
875 parametrization in the presence of the relevant features. Either way, it should be clear
876 that this amounts to reintroducing something like a traditional syntactic EPP in addition
877 to our phonological one. Perhaps it will turn out that this is empirically motivated,
878 but until and unless that can be clearly demonstrated, it looks like the result will be
879 suspiciously complex.

880 References

- 881 Adger, David. 2003. *Core syntax: a Minimalist approach*. Oxford: OUP.
- 882 Alexiadou, Artemis, and Elena Anagnostopoulou. 1998. Parametrizing AGR: Word or-
883 der, v-movement and EPP-checking. *Natural Language and Linguistic Theory* 16:491–539.
- 884 An, Duk-Ho. 2007. Clauses in noncanonical positions at the syntax-phonology interface.
885 *Syntax* 10:38–79.
- 886 Biberauer, Theresa, Anders Holmberg, Ian Roberts, and Michelle Sheehan, ed. 2010. *Para-*
887 *metric variation: null subjects in Minimalist theory*. Cambridge: Cambridge University
888 Press.
- 889 Bjorkman, Bronwyn, and Hedde Zeijlstra. 2014. Upward Agree is superior. Ms., Univer-
890 sity of Toronto and Universität Göttingen.
- 891 Bobaljik, Jonathan David. 2002. A-chains at the PF-interface: Copies and ‘covert’ move-
892 ment. *Natural Language and Linguistic Theory* 20:197–267.
- 893 Boeckx, Cedric. 2000. EPP eliminated. Ms., University of Connecticut.
- 894 Bošković, Željko. 2002. A-movement and the EPP. *Syntax* 5:167–218.
- 895 Bošković, Željko. 2007. On the locality and motivation of Move and Agree: An even
896 more minimal theory. *Linguistic Inquiry* 38:589–644.
- 897 Bresnan, Joan. 1977. Variables in the theory of transformations. In *Formal syntax*, ed.

- 898 Peter Culicover, Thomas Wasow, and Adrian Akmajian, 157–196. New York: Academic
899 Press.
- 900 Brillman, Ruth, and Aron Hirsch. to appear. An anti-locality account of English
901 subject/non-subject asymmetries. In *Proceedings from the 50th Annual Meeting of the*
902 *Chicago Linguistic Society*.
- 903 Bruening, Benjamin. 2009. The *That*-trace effect is not about extraction. Slides from
904 presentation at University of Delaware Prosody Meeting.
- 905 Butler, Jonny. 2004. On having arguments and agreeing: semantic EPP. *York Papers in*
906 *Linguistics* 2.
- 907 Castillo, Juan, John Drury, and Kleanthes Grohmann. 2009. Merge Over Move and the
908 Extended Projection Principle: MOM and the EPP Revisited. *Iberia* 1:53–114.
- 909 de Chene, Brent. 1995. *Complementizer-trace* effects and the ECP. *Geneva Generative Papers*
910 3:1–4.
- 911 Chomsky, Noam. 1981. *Lectures on government and binding*. Dordrecht: Foris.
- 912 Chomsky, Noam. 1986. *Barriers*. Cambridge, Mass.: MIT Press.
- 913 Chomsky, Noam. 1993. A minimalist program for linguistic theory. In *The view from build-*
914 *ing 20: Essays in linguistics in honor of Sylvain Bromberger*, ed. Ken Hale and Samuel Jay
915 Keyser. Cambridge, Mass.: MIT Press.
- 916 Chomsky, Noam. 2001. Derivation by phase. In *Ken Hale: A life in language*, ed. Michael
917 Kenstowicz. Cambridge, Mass.: MIT Press.
- 918 van Craenenbroeck, Jeroen, and Marcel den Dikken. 2006. Ellipsis and EPP repair. *LI*
919 37:653–664.
- 920 Duguine, Maia. 2013. Null arguments and linguistic variation: a Minimalist approach
921 to pro-drop. Doctoral Dissertation, University of the Basque country UPV/EHU and
922 Université de Nantes.
- 923 Embick, David, and Rolf Noyer. 2001. Movement operations after syntax. *Linguistic*
924 *Inquiry* 32.
- 925 Frampton, John, and Sam Gutmann. 2002. Crash-proof syntax. In *Derivation and explana-*
926 *tion in the minimalist program*, ed. Samuel Epstein and T. David Seely, 90–105. Oxford:
927 Blackwell.
- 928 Grohmann, Kleanthes, John Drury, and Juan Castillo. 2000. No more EPP. In *Proceedings*
929 *of WCCFL*, volume 19.
- 930 Halle, Morris, and Alec Marantz. 1993. Distributed morphology and the pieces of inflec-
931 tion. In *The view from building 20: Essays in linguistics in honor of Sylvain Bromberger*, ed.
932 Ken Hale and Samuel Jay Keyser. Cambridge, Mass.: MIT Press.
- 933 Heycock, Caroline. 1991. Layers of predication: the non-lexical syntax of clauses. Doc-
934 toral Dissertation, University of Pennsylvania.
- 935 Holmberg, Anders. 1999. Remarks on Holmberg's Generalization. *Studia Linguistica*
936 53:1–39.
- 937 Kandybowicz, Jason. 2006. *Comp-Trace* effects explained away. In *Proceedings of the 25th*
938 *West Coast Conference on Formal Linguistics*, ed. Donald Baumer, David Montero, and
939 Michael Scanlon, 220–228.

- 940 Kandybowicz, Jason. 2009. Embracing edges: syntactic and phono-syntactic edge sensi-
941 tivity in Nupe. *Natural Language and Linguistic Theory* 27:305–344.
- 942 Landau, Idan. 2007. EPP extensions. *LI* 38:485–523.
- 943 Martin, Roger. 1999. Case, the EPP and minimalism. In *Working Minimalism*, ed. Samuel
944 Epstein and Norbert Hornstein. Cambridge, Mass.: MIT Press.
- 945 McFadden, Thomas. 2004. The position of morphological case in the derivation: a study
946 on the syntax-morphology interface. Doctoral Dissertation, University of Pennsylva-
947 nia.
- 948 McFadden, Thomas. 2012. *For* in English infinitives has nothing to do with Case. In *Lin-*
949 *guists of tomorrow: Selected papers from the 1st Cyprus postgraduate conference in theoretical*
950 *and applied linguistics*. Newcastle upon Tyne: Cambridge Scholars Publishing.
- 951 McFadden, Thomas. 2014. On subject reference and the cartography of clause types: A
952 commentary on the paper by Biswas. *Natural Language and Linguistic Theory* 32:115–
953 135.
- 954 Merchant, Jason. 2001. *The syntax of silence: Sluicing, islands, and the theory of ellipsis*.
955 Oxford: Oxford University Press.
- 956 Miller, Philip, Geoffrey Pullum, and Arnold Zwicky. 1997. The Principle of Phonology-
957 Free Syntax: four apparent counterexamples in French. *Journal of Linguistics* 33:67–90.
- 958 Pesetsky, David, and Esther Torrego. 2001. T-to-C movement: Causes and consequences.
959 In *Ken Hale: A life in language*, ed. Michael Kenstowicz. Cambridge, Mass.: MIT Press.
- 960 Postal, Paul. 2004. *Skeptical linguistic essays*. Oxford: Oxford University Press.
- 961 Richards, Norvin. 2014. Contiguity theory. Ms., MIT.
- 962 Rizzi, Luigi. 1982. *Issues in Italian syntax*. Dordrecht: Foris.
- 963 Rizzi, Luigi. 1997. The fine structure of the left periphery. In *Elements of grammar*, ed.
964 Liliane Haegeman, 281–337. Dordrecht: Kluwer Academic Publishers.
- 965 Salzmann, Martin, Jana Häussler, Josef Bayer, and Markus Bader. 2013. *That*-trace effects
966 without traces. an experimental investigation. In *Proceedings of NELS 42*, 149–162.
- 967 Selkirk, Elisabeth. 1986. On derived domains in sentence phonology. *Phonology Yearbook*
968 3:371–405.
- 969 Sportiche, Dominique. 1988. A theory of floating quantifiers and its corrolaries for con-
970 stituent structure. *Linguistic Inquiry* 19.
- 971 Sundaresan, Sandhya. 2014. Making sense of silence: Finiteness and the (OC) PRO vs.
972 *pro* distinction. *Natural Language and Linguistic Theory* 32:59–85.
- 973 Svenonius, Peter. 2004. On the edge. In *Peripheries: Syntactic edges and their effects*, ed.
974 David Adger, Cécile de Cat, and George Tsoulas, 259–287. Netherlands: Springer.
- 975 Wurmbrand, Susanne. 2001. *Infinitives: restructuring and clause structure*. Berlin: Mouton
976 de Gruyter.
- 977 Wurmbrand, Susi. 2006. Licensing case. *Journal of Germanic Linguistics* 18:175–236.
- 978 Zeijlstra, Hedde. 2012. There is only one way to Agree. *The Linguistic Review* 29:491–539.