Anti-Locality Explains the Restricted Interaction of Subjects and Parasitic Gaps

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1. Introduction

This paper examines the interaction between parasitic gaps (PGs) and subjects. This is a multifaceted topic which previous literature has discussed in a scattered fashion.[1] Here I argue here that PGs and subjects interact productively and straightforwardly, except when a constraint on the distance of movement interferes. The nature and limitations of A-bar movement from subject position are central to this paper. In standard English, among other languages, we can clearly see that a *wh*-phrase that originates in a non-subject position must move to the clause edge, with concomitant T to C movement in main clauses:

(1) *Movement required in non-subject wh-questions*

a.	**What**$_1$ will$_2$ you t_2 eat t_1?	*Wh-movement and T to C movement*
b.	* You will eat **what**?	*No movement—possible only as an echo question*

Since this *wh*-movement causes a word order change, its presence is obvious. In contrast, this is not so when the *wh*-phrase is a subject, as (2) shows. In a main clause question, if a subject *wh*-phrase does move, we would expect T to C movement to occur as well. After these movements occur, the subject *wh*-phrase and T would have the same order as before they moved (2a). If T to C movement does not occur here, their relative order would still be no different (2b). Thus, puzzlingly, the surface word order in a subject *wh*-question is also consistent with a derivation in which neither T nor the subject moves at all (2c):

(2) *Potential analyses of subject wh-questions*

a.	[$_{CP}$ **Who**$_1$ will$_2$ [$_{TP}$ t_1 t_2 eat the cake]]?	*Wh-movement and T to C movement*
b.	[$_{CP}$ **Who**$_1$ [$_{TP}$ t_1 will eat the cake]]?	*Wh-movement without T to C movement*
c.	[$_{CP}$ [$_{TP}$ **Who** will eat the cake]]?	*No movement*

Since *wh*-movement of non-subjects is obligatory (1), subject *wh*-movement could be as as well. However, some work argues that there is typically no clause-internal subject A-bar movement (George (1980), Chung & McCloskey (1983), Agbayani (2000), and Brillman & Hirsch (2016)). Using data about PGs, I argue that clause-internal subject A-bar movement is indeed usually impossible.

In particular, I argue that correct predictions about the interaction of subjects and PGs, which align with this proposal about subject A-bar movement, emerge from a hypothesis termed *anti-locality* (Bošković (1997), Ishii (1999), Grohmann (2003), Abels (2012), Erlewine (2015), and Davis (2020)). Anti-locality posits that movements that are too short fail. Several different versions of this constraint have been proposed. I focus on a version of anti-locality stating that movement from one specifier to another must cross over at least one intervening phrase (Bošković (2005), Brillman & Hirsch (2016), and Erlewine (2015, 2020)). Specifically, this constraint requires movement of a given phrase α from the specifier of some phrase XP to the specifier of another phrase ZP to cross over another phrase that dominates XP (3):

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[1] Much of the data I discuss is cited from previous work, though I have confirmed the contrasts examined here with judgments from 9 English native speakers—all Americans, except for two British speakers and one Australian.

(3) $[_{ZP}$ ✓α Z $[_{YP}$ **Y** $[_{XP}$ t_α X]]] ✓*Movement from spec-XP to spec-ZP crossing YP*

In contrast, if this intervening YP were absent, anti-locality would prevent this movement.

Several of the works just cited argue that such anti-locality prevents clause-internal subject A-bar movement, for the following reason: Subjects must A-move to spec-TP for case/EPP reasons before A-bar moving to spec-CP, but movement from spec-TP to spec-CP is too short, since no XP intervenes between TP and CP. Thus the only option is for a subject *wh*-phrase to remain in spec-TP.

(4) *Prediction of anti-locality: Movement from spec-TP to spec-CP cannot occur*
$[_{CP}$ * $[_{TP}$ **Who** will eat the cake]]?

I argue that PG facts support this analysis of subject A-bar movement.

PGs are, descriptively speaking, "extra" gaps that can occur in constituents crossed-over by an independently well-formed A-bar movement. PGs are very productive in object positions, as we see in (5) below. Here we have PGs in the object position of adjunct clauses, licensed by object *wh*-movement:

(5) *Moved objects licensing object PGs in clausal adjuncts* (Nissenbaum (2000), p. 30)
a. [What movies]$_1$ did Mary [claim she liked t_1 [in order to get you to see **PG**$_1$]]?
b. John's the guy $\varnothing_1$ that they said they'll [hire t_1 [if I criticize **PG**$_1$ publicly]].

Importantly in contrast, it is unacceptable to place a PG in the subject position of an adjunct clause, as a few previous works have observed (Kayne (1983) and Munn (1992)):

(6) *Unacceptable PGs in subject position*
a. Who$_1$ did you slap t_1 [because **they/*PG**$_1$ ate your lunch]?
b. That's the guy who$_1$ I fired t_1 [after **he/*PG**$_1$ insulted me]

I will argue that anti-locality predicts this fact, which is another instance of the ban on clause-bounded subject A-bar movement. We will see that this analysis also explains a variety of related facts.

1.1. Contents of the paper

Next, section 2 provides background on anti-locality by summarizing its relation to the *that*-trace effect, which will be relevant at several points. Section 3 overviews the basic properties of PGs. Section 4 provides the core analysis, which examines PG licensing by subject and object movement, as well as PGs in subject and object positions. Section 5 addresses a further puzzle about anti-locality and PGs in adjunct clauses, which I argue indicates that their structure is impoverished. Section 6 concludes.

2. Anti-locality and its interaction with movement from TP to CP

Though the PG evidence I will examine corroborates the view that usually there is no clause-bounded A-bar movement of subjects, it is clear that cross-clausal subject A-bar movement does occur. Such movement causes a clear word order change, displacing the subject from its clause of origination:

(7) **Who**$_1$ did you say [t_1 ate all the cake]? *Subject wh-movement from an embedded clause*

However, when the subject of an embedded clause moves away, that clause cannot have an (overt) complementizer. This is known as the *that-trace effect* (see extensive discussion in Pesetsky (2017)):

(8) **Who**$_1$ did you say [**(*that)** t_1 ate all the cake]? *The that-trace effect*

In contrast, cross-clausal movement of a non-subject is compatible with the presence of a complementizer:

(9) **Where**$_1$ do you think $[_{CP}$ **(that)** we should go t_1]? *Complementizer with non-subject movement*

Therefore it is clear that the *that*-trace effect is specifically relevant for subject movement. Furthermore,

Bresnan (1977) observed that this effect is removed by including an adverb after the complementizer:

(10) **Who**$_1$ did you say [$_{CP}$ **(that)** unfortunately t_1 ate all the cake]? *That-trace effect amelioration*

Previous work arguing for the version of anti-locality adopted here proposes that this constraint predicts the *that*-trace effect, and its amelioration, when combined with *phase theory* (Chomsky (2000, 2001), a.o.). In phase theory, structures are built "chunk-by-chunk" due to the way that syntactic derivations are related to the other components of grammar (phonology, semantics, etc.). Such chunks are termed "phases", widely taken to include CP, vP, and often DP. One property of phases is that, when a phrase moves from a phase, it must reach the phase edge before exiting. Thus if CP is a phase, movement must reach spec-CP before leaving CP. Importantly, if movement of a *wh*-subject through spec-CP is required, but anti-locality prevents movement from spec-TP to spec-CP, then the derivation will fail:

(11) *Embedded subject extraction causes a phase/anti-locality conflict*
* **Who**$_1$ did you say [$_{CP_{[Phase]}}$ t_1 **that** [$_{TP}$ t_1 ate all the cake]]?

This prediction fits the *that*-trace effect. If embedded clauses without *that* are bare TPs (Doherty (1997) and Brillman & Hirsch (2016)), then for such clauses both the phase problem and the anti-locality problem are irrelevant. In this case, we correctly predict that the embedded subject can be extracted (12):

(12) **Who**$_1$ did you say [$_{TP}$ t_1 ate all the cake]? *Subject extraction from CP-less clause succeeds*

This anti-locality analysis predicts that the *that*-trace effect should be avoided by adding structure between TP and CP. Above, we saw that the inclusion of an adverb in this position ameliorates the *that*-trace effect. The anti-locality hypothesis predicts this fact if use of an adverb below C entails the presence of an additional phrase between TP and CP (Brillman & Hirsch (2016) and Erlewine (2020)):

(13) *Adverb repairs that-trace effect by introducing more structure*
Who$_1$ did you say [$_{CP_{[Phase]}}$ t_1 **that** [$_{XP}$ unfortunately [$_{TP}$ t_1 ate all the cake]]]?

I label the intervening phrase containing the adverb as XP. The anti-locality analyses in Erlewine (2015, 2020) label this phrase Adv(erb)P, following Cinque (1999) in proposing that adverbs are hosted by dedicated projections. We could also consider this XP to be a phrase in an an extended clausal periphery (Rizzi (1997)). Since the label of this phrase does not affect my analysis, I simply label it XP. Importantly, this XP must be absent when no adjunct is present, since otherwise the *that*-trace effect would never occur. See Erlewine (2020) for further discussion, and additional cross-linguistic evidence for such effects.

The proposals introduced here will be relevant at several points during the coming analysis. Before that, the next section describes the relevance of PGs to the investigation of anti-locality.

3. Why parasitic gaps are relevant

There are certain configurations which movement cannot exit, known as *islands*. An island cannot separate a moved phrase and its corresponding gap (that is, its *trace*):

(14) a. * [Whose birthday]$_1$ did you cry [because I forgot t_1]? *Adjunct island*
b. * Who$_1$ do [pictures of t_1] scare you? *Subject island*
c. * [How many eggs]$_1$ did you hear a rumor [that I managed to eat t_1]? *Complex NP island*

Importantly, if there is a well-formed A-bar movement in a given structure, it is often possible for an island in it to contain another gap, which co-refers with the moved phrase just as the "main" gap does. The extra gap seems to be parasitic on the typical gap, and is thus called a PG. PGs are very productive in clausal adjuncts, as (15) below shows. Here we see object PGs licensed by *wh*-moved objects:

(15) *Object PGs in clausal adjuncts*
a. Who$_1$ did you tell t_1 about our idea [in order to impress **PG**$_1$]?
b. Tell me [which paper]$_1$ I should read t_1 [before giving you comments on **PG**$_1$]

c. This is a dish [$\varnothing_2$ that I know a lot about t_2 [because I make **PG**$_2$ every week]].

Much previous work has argued that this island-insensitivity reveals that PGs do not involve movement from an island, but rather A-bar movement of a null operator inside the island (Contreras (1984), Chomsky (1986), Browning (1987), and Nissenbaum (2000), a.o.).[2] Under this hypothesis, what we call a PG is just the trace of a silent operator (in essence, a null pronoun):

(16) *Operator movement within containing island forms PG*
Who$_1$ did you praise t_1 [OP in order to flatter t_{OP}(=PG$_1$)]?

If PGs are formed by such island-internal movement of an operator, we predict that a PG will fail if we place another island inside of the first and thus block the operator's movement. Previous works have shown that this is so (Kayne (1983), Longobardi (1984), Chomsky (1986), Cinque (1990), and Postal (1994)). Example (17) demonstrates this by placing a relative clause in a sentential adjunct:

(17) *PG-forming operator cannot move from a second island inside the first*
* Who$_1$ did you insult t_1 [OP after meeting a guy [who likes t_{OP}(=PG$_1$)]]?

Following Nissenbaum (2000), the operator's movement is necessary to turn the sentential adjunct from type t into a predicate of type <e,t> via the semantic rule of Predicate Abstraction (Heim & Kratzer (1998)). Further, he argues that the <e,t> adjunct combines with a v′ node that has also been raised from type t to <e,t>, due to Predicate Abstraction triggered by successive-cyclic movement of the PG-licensing phrase through vP. When these two <e,t> nodes are merged and interpreted via Predicate Modification (Heim & Kratzer (1998)), the moved phrase binds the trace of the operator, which is itself the PG:

(18) *The syntax/semantics of PG-licensing*
Who$_4$ did you [$_{vP}$ t_4 [$_{v'_{<e,t>}}$ λ praise t_4] [$_{AdjunctP_{<e,t>}}$ OP λ in order to flatter $t_{OP(=PG_4)}$]]?

Importantly, if there is indeed a moving operator in PG constructions, we expect the possible landing sites for that operator to be constrained by anti-locality. I argue that this prediction is correct.

4. Analyzing the interaction between PGs and subjects

Here I discuss PG-licensing by movement of subjects and objects, as well as PGs in subject and object positions. I will argue that both PG-licensing by subjects and PGs in subject positions are possible, though constrained by anti-locality. Culicover & Postal (2001) note that there is a tendency in the literature to conclude that subjects and PGs do not interact, or at least do so in a restricted way. Though the discussion of this topic is scattered, important observations about it were made in one of the first articles on PGs—Engdahl (1983). As Engdahl pointed out, assuming that *wh*-subjects do undergo some clause-internal A-bar movement, it does not appear that such movement can license PGs:

(19) *If clause-bounded subject A-bar movement exists, it doesn't license PGs*
a. [Which articles]$_1$ t_1 got filed by John [without him reading them/*PG$_1$]? (Engdahl, ex. 53)
b. * That's the person [$_{CP}$ who$_1$ t_1 fired me [because I insulted PG$_1$]]

If anti-locality bans such movement, then we correctly make the prediction that PGs here should fail. However, Engdahl identifies another reason why PG licensing should not succeed in this situation, which we must avoid in order to better test for PG licensing by subjects.

Engahl proposed that a PG-containing constituent cannot be c-commanded by the trace of the PG-licenser. This is known as the *anti-c-command condition*. Further, as Kayne (1983) and Longobardi (1984)

[2] The null operator approach to PGs is in contrast to "shared antecedent" theories, for which PGs involve genuine extraction of a variety resembling the Across-The-Board (ATB) movement from coordinate structures. As Nissenbaum (2000) and Nissenbaum & Schwarz (2011) discuss, asymmetries in reconstruction for binding show that PGs involve two separate movements, and are thus not reducible to ATB configurations. However, the insights of this paper are not dependent on the operator theory of PGs, as footnote 6 below discusses.

observed, the PG-containing constituent must be structurally crossed by movement of the licenser. These requirements are not met in (19) above. Here the gap of the subject's A-bar movement left in spec-TP c-commands the PG-containing adjunct, assuming as Engdahl does that such adjuncts merge to VP (or vP as Nissenbaum (2000) argues). Thus the adjuncts are not crossed by movement of the PG-licenser. Nissenbaum argues that these constraints have a semantic explanation: if the PG-containing island is not structurally between the licensing phrase and its trace, then the PG-container cannot possibly have been merged to the vP that was the site of the licenser's successive-cyclic movement, which as described above is essential for PG interpretation. This illicit configuration is illustrated more precisely in (20):

(20) *Licenser's movement doesn't cross island → PG unacceptable* [=(19a)]
[$_{CP}$ [Which articles]$_1$ [$_{TP}$ t_1 [$_{vP}$ [$_{v'}$ [$_{v'}$ got filed by John] [without him reading ***PG**$_1$]]]]]?

Since this configuration is ruled out for an independent reason, in order to find PGs licensed by subjects we must consider different structures that do not have this problem.

4.1. PG-licensing by cross-clausal subject movement

If PG-containing adjuncts merge in the vP, we can ensure that subject A-bar movement crosses the PG-containing constituent by using a bi-clausal structure: We must merge the PG-containing adjunct in the vP of the main clause, and then A-bar move the subject of the embedded clause to the spec-CP of the main clause. Such movement thus crosses the adjunct, and should license a PG in it. Engdahl reports an example that verifies this prediction (21a), and speakers I have consulted agree that this is acceptable:

(21) *Cross-clausal subject extraction licenses object PG in main clause's adjunct*
a. [Which caesar]$_1$ did Brutus [imply [t_1 was no good] [while ostensibly praising PG$_1$]]? (Engdahl, ex. 60)
b. This is the guy who$_1$ I [said [$_{TP}$ t_1 is stupid] [because I wanted to make fun of PG$_1$]]

We thus find that subjects can license PGs when the structure is right, as shown more precisely below:

(22) *Successful PG licensing in main clause by cross-clausal subject extraction*
[$_{CP}$ [Which caesar]$_1$ did$_2$ [$_{TP}$ Brutus t_2 [$_{vP}$ [$_{v'}$ [$_{v'}$ [$_{VP}$ imply [$_{TP}$ t_1 was no good]]] [$_{AdjunctP}$ while ostensibly praising PG$_1$]]]]]?

So far in this paper, nearly all PG examples have involved PGs in object positions. We've seen that, in a proper structure, object PGs can be licensed either by object movement (5) or subject movement (21). Next let's examine PGs in subject positions, which I argue are possible, but restricted by anti-locality.

4.2. When anti-locality prevents subject PGs

Though PG-licensing by subject movement is possible, we've seen that it requires a bi-clausal structure. Therefore to attempt licensing of a subject PG, the simplest strategy is to use A-bar movement of a non-subject. It turns out that non-subject A-bar movement cannot license a PG in the subject position of a mono-clausal adjunct, as (23) shows again. This fact is observed by Kayne (1983) and Munn (1992), and speakers I have consulted agree that such examples are unacceptable:

(23) *Non-subject movement fails to license PG in subject of mono-clausal adjunct*
a. Who$_1$ did you slap t_1 [because **they/*PG**$_1$ ate your lunch]?
b. That's the guy who$_1$ I fired t_1 [after **he/*PG**$_1$ insulted me]

While I will argue that anti-locality predicts this fact, first I will consider a potential confound.

In some languages, a PG and the moving phrase that licenses it must match in case and/or semantic role. See Kiss (1985) on Hungarian, and Franks (1993) on Russian and other Slavic languages. If this is also true for English, then (23) above would be no good due to the mismatch between subject and non-subject, which differ in semantic roles as well as structural case. However, Engdahl shows that for English there are acceptable examples like (21a) above, where subject movement licenses a non-subject

PG. Thus Engdahl argues that English does not require a PG and its licenser to match in this way.[3]

To rule out a matching problem in examples that attempt subject PG licensing like (23) above, we can modify them to attempt licensing of subject PGs by movement of subjects, using cross-clausal subject movement for clarity. Even when we do this, a PG in the subject position of an adjunct fails:

(24) *Subject movement cannot license subject PG*

a. Who$_1$ did you say [t_1 is a jerk] [because **they/*PG**$_1$ ate your lunch]?

b. That's a guy who$_1$ I suspect [t_1 is unusual] [since **he/*PG**$_1$ has five cats].

Since a matching violation is not responsible for this unacceptability, I argue that we should instead appeal to a structural factor—anti-locality.

Recall that PGs are formed by movement of an operator from the PG position, to the edge of the island. To form a PG in the subject position of a mono-clausal adjunct, an operator must move from spec-TP to the edge of the island. I hypothesize that such clausal adjuncts are CPs, which are headed by words like *because, after, if* and so on. To form a subject PG in such adjunct CPs, it would be necessary for an operator to move from spec-TP to spec-CP. However, such movement is banned by anti-locality:[4]

(25) *Operator movement from subject position within island is impossible*

* Who$_1$ did you [$_{vP}$ say [$_{TP}$ t_1 is a jerk] [$_{CP}$ OP because [$_{TP}$ t_{OP}(=PG$_1$) ate your lunch]]]?

Thus anti-locality straightforwardly predicts the unacceptability of PGs in the subject position of mono-clausal adjuncts. However, subject PGs are not totally ruled out, as we will see next.

4.3. PGs are permitted in embedded subject position

The above analysis predicts that subject PGs should succeed when the PG is the subject of an embedded TP in a bi-clausal adjunct. This is because operator movement from the lower TP to the higher clause's CP would not violate anti-locality. Engdahl (1983), Browning (1987), and Munn (1992) show examples that fit this description. These works report such examples as at least somewhat marked, and speakers I have consulted agree that this is so, but maintain that there is a clear contrast between these and the totally unacceptable subject PG examples like those in (24) above which use mono-clausal adjuncts.

(26) *PGs in embedded subject position*

a. ?This is the student $\varnothing_1$ everyone thinks t_1 is clever [because John said [$_{TP}$ PG$_1$ was clever] (Engdahl, ex. 59)

b. ??the person $\varnothing_1$ that you consulted t_1 [because you thought [$_{TP}$ PG$_1$ understood the problem]] (Browning (1987))

The relative acceptability of such examples is what we expect, since here operator movement from the embedded TP to the specifier of the CP in the clause above crosses over at least the higher VP and TP.

The PGs in the configuration just shown are the subjects of embedded TPs. In section 2, we saw that subject extraction from embedded TPs is permitted, but not from embedded CPs headed by the overt complementizer *that*. We expect this *that*-trace effect to also apply to movement of PG operators: operator movement from an embedded CP should have an anti-locality issue, just as movement of an overt phrase does. Munn (1992) reports an example that verifies this prediction, shown in (27) below. Speakers I have consulted generally agree with this judgement:[5]

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[3] Franks (1993) and Asarina (2011) show that in Slavic, multi-gap constructions like PGs, ATB movement, and right node raising require all gaps to match in case. Importantly, these languages have rich case morphology, and mismatches in case in such constructions are tolerated when the cases are syncretic. This suggests that such matching is a concern of morpho-phonology, and thus irrelevant in English, which lacks case marking in typical DPs.

[4] It would not matter if words like *after* and so on are in fact instances of P in these structures, since movement from spec-TP to the specifier of an immediately dominating PP would still be banned by anti-locality.

[5] Though one speaker reports that such examples are unacceptable with or without the complementizer. More puzzlingly, another states that they generally lack the *that*-trace effect, but detect it in examples like (27).

(27) *That-trace effect for embedded subject PG* (Adapted from Munn 1992, ex. 49a)
Who$_1$ did John support t_1 [after Mary said [(*that) PG$_1$ would win]]?

This fact demonstrates yet another way in which operator movement respects anti-locality.

We have now seen that both subjects and objects are capable of PG-licensing when the structure is right. We have also seen that both subject and object PGs are possible, though subject PGs require a bi-clausal structure to avoid anti-locality.[6] In the next section, I show another correct prediction of the anti-locality hypothesis, regarding the licensing of PGs by subjects.

4.4. PG-licensing by subjects through adjunct amelioration

In (19) above, we saw that clause-internal subject A-bar movement from spec-TP to spec-CP, if it even occurs, cannot license PGs. As discussed, this is expected given that a PG-containing constituent must be structurally crossed by movement of its licenser, assuming that PG-containing adjuncts are merged below TP (in VP/vP). The facts about PGs in subject positions analyzed above are consistent with theories in which movement from spec-TP to spec-CP is impossible anyway, due to anti-locality. If this is so, then in examples like (19) we even more so do not expect PG-licensing by the subject to succeed, since these subjects are frozen in place. However, if such clause-internal subject A-bar movement from spec-TP to spec-CP is banned by anti-locality, then we expect the inclusion of more structure between TP and CP to facilitate such movement. As shown in section 2, patterns of this sort have been observed for the *that*-trace effect, which is ameliorated by adding an adjunct between TP and CP. Therefore we expect clause-bounded subject A-bar movement to also be facilitated by use of an adjunct in this way. If such a configuration actually has subject A-bar movement, we should be able to detect it by placing a PG in the intervening adjunct. This is because, as discussed above, a PG is only possible when the constituent that contains it is structurally crossed by the licensing phrase. Haegeman (1984) reports an example that fits this description (28a), and the speakers I have consulted agree that this is productive:

(28) *Intervening adjunct facilitating clause-internal subject A-bar movement and PG licensing*
a. a note which$_1$ [unless we send back PG$_1$] t_1 will ruin our relationship (Haegeman, ex. 9)
b. Let me tell you who$_1$, [despite nobody liking PG$_1$ at all], t_1 is probably gonna get promoted.

This is precisely what the anti-locality theory predicts. While anti-locality normally bans subject movement from spec-TP to spec-CP as in (19), the intervening adjunct in (28) makes this movement possible. Since this movement structurally crosses the adjunct, the subject can license a PG in it, as we expect. This fact thus shows us yet another way that anti-locality predicts the interaction between subjects and PGs.

5. No anti-locality circumvention in adjunct clauses

I have argued that anti-locality prevents the formation of PGs in the subject position of mono-clausal adjuncts, since this would require operator movement from spec-TP to spec-CP. We predict that placing an adjunct between TP and CP in the adjunct clause should facilitate such operator movement, yielding a subject PG. However, speakers that I have consulted agree that adjunct amelioration fails here:

(29) *No PG in subject position, even with intervening adjunct*
a. * Who$_1$ did you slap t_1 [because **unfortunately PG$_1$** ate your lunch]?
b. * That's the guy who$_1$ I fired t_1 [after **surprisingly PG$_1$** insulted me]

These examples would be unacceptable, regardless of whether anti-locality is violated or not, if the relevant adjuncts cannot actually be attached in this position. However, these adjuncts seem to be acceptable in of themselves. We can see this by taking the above PG examples and replacing the PGs with pronouns:

[6] My proposal is also compatible with an ATB extraction analysis of PGs. Under such an analysis, a normal gap and PG are both formed by typical movements (with no operator), which unite at a higher point in the structure, resulting in one moved phrase on the surface which corresponds to two gaps. To form a PG in the subject position of a mono-clausal adjunct, the subject moving from the adjunct would need to reach spec-CP before moving on out of the adjunct. However, since that movement is initiated from spec-TP, anti-locality correctly blocks this derivation.

(30) *High adverbs allowed in clausal adjuncts*

a. Who$_1$ did you slap t_1 [because **unfortunately they**$_1$ ate your lunch]?

b. That's the guy who$_1$ I fired t_1 [after **surprisingly he**$_1$ insulted me]

I suggest that this further PG fact stems from a difference in the structures of the left periphery of CPs headed by *that*, versus the adjunct CPs that can host PGs. As mentioned above, several works argue that adverbs ameliorate the *that*-trace effect due to adding a phrase between TP and CP, which I have labeled XP. I propose that this XP can be merged in *that*-CPs, but not adjunct CPs. However, if this intervening XP cannot be merged in adjunct clauses, we must ask why the high adverbs in examples like (30) are possible. I argue that the high adjuncts in such examples are in the TP edge, rather than being hosted by a separate phrase. This is shown in (31) below, which diagrams the adjunct clause of (30a) above:

(31) *High adjunct attached in TP in adjunct clause*

... [$_{CP}$ because [$_{TP}$ unfortunately they [$_{vP}$ ate your lunch]]]

Placing an adjunct above the specifier of TP does not sit well with standard X-bar theory. I assume that specifiers and adjuncts are in fact structurally analogous, as in Bošković (2016), and the *bare phrase structure* theory of Chomsky (1995). Importantly, if the only way to include a high adjunct in the sorts of sentential adjuncts that host PGs is to attach them in the edge of TP as in (31), then we do not predict that anti-locality avoidance will be possible in this case. This is because here the adjunct is not hosted by an additional XP that dominates TP, but is instead contained by TP. Since there is thus no phrase below CP that dominates TP, anti-locality will still ban operator movement from spec-TP to spec-CP:

(32) *High adjunct attached in TP doesn't circumvent anti-locality*

... [$_{CP}$ *OP$_1$ because [$_{TP}$ unfortunately t_1 T [$_{vP}$ ate your lunch]]]

This analysis entails that the left periphery of the relevant adjunct clauses is relatively structurally impoverished. Assuming that *that*-CPs are essentially matrix-like, this result aligns with the known tendency for embedded clauses to allow less syntactic phenomena than main clauses. Ross (1973) termed this the *Penthouse Principle*. See also Hooper & Thompson (1973) for discussion of a variety of syntactic phenomena that distinguish matrix ("root") and embedded clauses.

6. Conclusion

PGs and subjects in English interact productively, except when anti-locality interferes. Anti-locality bans subject PGs in mono-clausal adjuncts, but permits embedded subject PGs.[7] Furthermore, while anti-locality typically prevents clause-internal subject A-bar movement, anti-locality also correctly predicts that such movement can be facilitated by inclusion of a high adjunct—a fact which PGs allow us to verify. Finally, such amelioration by adjunction fails in PG-hosting adjunct clauses, which I argued indicates that such clauses do not allow the merger of the needed additional structure.[8] See Messick (2020) for discussion of another view of subject A-bar movement: that the subject can move to spec-CP directly from spec-vP. I leave this analysis and its relationship to the arguments of this paper to future work.

[7] Munn (1992) proposes that this contrast is due to the Empty Category Principle, which (among other effects) prevents a trace in spec-TP from being appropriately "governed" by an antecedent moved phrase in spec-CP, because C acts as a barrier. See Chomsky (1986) for further discussion. The Empty Category Principle thus correctly rules out clause-internal movement of either an overt phrase, or a PG-forming operator, from spec-TP to spec-CP. However, the Empty Category Principle cannot account for contexts where the addition of an adjunct facilitates movement from spec-TP to spec-CP: even if there is another XP between these two phrases, the result of such movement is that C intervenes between the trace in spec-TP and the moved phrase in spec-CP, which should cause a failure of government.

[8] While PGs are possible in DPs (Chomsky (1986)), if DP is a phase (Bošković (2005, 2016), a.o.), a PG in a DP in a PP should be banned, since this would require operator movement to spec-DP and then to spec-PP, thus violating anti-locality. Tentatively, I suggest that this is so:

(i) a. * This is the guy who$_1$ it seems [to every student of PG$_1$] that I told a very mean joke about t_1

b. * Remind me who$_1$ you told an awful rumor about t_1 [to every friend of PG$_1$]

References

Abels, Klaus. 2012. *Phases: an Essay on Cyclicity in Syntax*. Berlin: De Gruyter.

Agbayani, Brian. 2000. Wh-subjects in English and the vacuous movement hypothesis. *Linguistic Inquiry* 31. 703–713.

Asarina, Alevtina. 2011. *Case in Uyghur and Beyond*. Doctoral dissertation, MIT.

Bošković, Željko. 1997. *The Syntax of Nonfinite Complementation: An Economy Approach*. Cambridge, MA: MIT Press.

Bošković, Željko. 2005. On the locality of left branch extraction and the structure of NP. *Studica Linguistica* 59.

Bošković, Željko. 2016. Getting really edgy: On the edge of the edge. *Linguistic Inquiry* 45.

Bresnan, Joan. 1977. Variables in the theory of transformations. In Peter Culicover, Thomas Wasow & Adrian Akmajian (eds.), *Formal syntax*. Academic Press.

Brillman, Ruth & Aaron Hirsch. 2016. An anti-locality account of English subject/non-subject asymmetries. In Ross Burkholder, Carlos Cisneros & Emily R. Coppess (eds.), *Proceedings of Chicago Linguistic Society 50*. Chicago Linguistic Society.

Browning, M. 1987. *Null Operator Constructions*. Doctoral dissertation, MIT.

Chomsky, Noam. 1986. *Barriers*. Cambridge, MA: MIT Press. Linguistic Inquiry Monographs.

Chomsky, Noam. 1995. Bare phrase structure. In Gert Webelhuth (ed.), *Government and Binding Theory and the Minimalist Program (Generative Syntax 1)*, 383–439. Cambridge, MA: Blackwell.

Chomsky, Noam. 2000. Minimalist Inquiries. In Roger Martin, David Michales, Juan Urigareka & Samuel Jay Keyser (eds.), *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*, 89–155. MIT Press.

Chomsky, Noam. 2001. Derivation by Phase. In Michael Kenstowicz (ed.), *Ken Hale: A Life in Language*. MIT Press.

Chung, Sandra & James McCloskey. 1983. On the interpretation of certain island facts in GPSG. *Linguistic Inquiry* 14. 704–713.

Cinque, Guglielmo. 1990. *Types of A′-dependencies*. Cambridge, MA: MIT Press.

Cinque, Guglielmo. 1999. *Adverbs and functional heads*. Oxford University Press.

Contreras, Heles. 1984. A note on parasitic gaps. *Linguistic Inquiry* 15. 698–701.

Culicover, Peter & Paul Postal (eds.). 2001. *Parasitic Gaps*. Cambridge, MA: MIT Press.

Davis, Colin. 2020. *The Linear Limitations of Syntactic Derivations*. Doctoral Dissertation, MIT.

Doherty, Cathal. 1997. Clauses without complementizers: Finite IP complementation in English. *The Linguistic Review* 14. 197–220.

Engdahl, E. 1983. Parasitic Gaps. *Linguistics and Philosophy* 6.

Erlewine, Michael Yoshitaka. 2015. Anti-locality and optimality in Kaqchikel Agent Focus. *Natural Language & Linguistic Theory* 34.

Erlewine, Michael Yoshitaka. 2020. Anti-locality and subject extraction. *Glossa* 5. 1–38.

Franks, Steven. 1993. On parallelism in across-the-board dependencies. *Linguistic Inquiry* 24. 509–529.

George, Leland. 1980. *Analogical generalization in natural langauge syntax*. Doctoral dissertation, Massachusetts Institute of Technology.

Grohmann, Kleanthes. 2003. *Prolific domains: On the anti-locality of movement dependencies*. Amsterdam: John Benjamins.

Haegeman, Liliane. 1984. Parasitic Gaps and Adverbial Clauses. *Journal of Linguistics* 20. 229–232.

Heim, Irene & Angelika Kratzer. 1998. *Semantics in generative grammar*. Oxford: Blackwell.

Hooper, Joan & Sandra Thompson. 1973. On the applicability of root transformations. *Linguistic Inquiry* 4. 465–497.

Ishii, Toru. 1999. Cyclic spell-out and the *that*-trace effect. In A. Carnie, J. D. Haugen & P. Norquest (eds.), *Proceedings of WCCFL 18*, 220–231. Somerville, MA: Cascadilla Press.

Kayne, Richard. 1983. Connectedness. *Linguistic Inquiry* 14. 223–249.

Kiss, Katalin. 1985. Parasitic Chains. *The Linguistic Review* 5. 41–74.

Longobardi, Giuseppe. 1984. Connectedness, scope and c-command. *Linguistic Inquiry* 16. 163–192.

Messick, Troy. 2020. The derivation of highest subject questions and the nature of the EPP. *Glossa* 5. 1–12.

Munn, Alan. 1992. A null operator analysis of ATB gaps. *The Linguistic Review* 9. 1–26.

Nissenbaum, John. 2000. *Investigations of covert phrase movement*. Doctoral dissertation, MIT.

Nissenbaum, John & Bernhard Schwarz. 2011. Parasitic degree phrases. *Natural Langauage Semantics* 19. 1–38.

Pesetsky, David. 2017. Complementizer-Trace Effects. In Martin Evearet & Henk van Riemsdijk (eds.), *The Wiley Blackwell Companion to Syntax, Second Edition*. Wiley-Blackwell.

Postal, Paul. 1994. Parasitic and pseudo-parasitic gaps. *Linguistic Inquiry* 25. 63–117.

Rizzi, Luigi. 1997. The Fine Structure of the Left Periphery. In *Elements of Grammar: A Handbook of Generative Syntax*, 281–337. Dordrecht: Kluwer.

Ross, Haj. 1973. The penthouse principle and the order of constituents. In Corum, Smith-Stark & Weiser (eds.), *You Take the High Node and I'll Take the Low Node*, 397–422. Chicago: Chicago Linguistic Society.