On parasitic gaps, anti-locality, and the distribution of subject movement*

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1 Introduction

- Here I argue that parasitic gaps teach us something about subject movement—a topic that is an active area of debate.

- In many languages, English among them, it is clear that a *wh*-phrase that originates in a non-subject position must move (ignoring multiple-*wh* questions):

(1) *Obligatory non-subject wh-movement*
  a. **What**$_1$ will you eat t_1?
  b. * Will you eat **what**?

- However, when the *wh*-phrase is the subject, there would be no change in word order whether it moves or not:[1]

(2) *Two potential analyses of subject wh-phrases*
  a. [$_{CP}$ **Who**$_1$ [$_{TP}$ t_1 will eat the cake]]?
  b. [$_{CP}$ [$_{TP}$ **Who** will eat the cake]]?

! For reasons like this, subject A-bar movement is often tricky to see clearly.

- Since *wh*-movement is obviously required from non-subject positions (1), it is often assumed that *wh*-movement also occurs from subject positions (2a).

- However, some work argues that there is typically no clause-internal subject A-bar movement, as in (2b) above (George 1980; Chung and McCloskey 1983; Agbayani 2000; Brillman and Hirsch 2016; Carstens et al. 2017; Gallego 2017; Erlewine 2017, 2020).

★ Using data about parasitic gaps, I will argue that **clause-internal subject A-bar movement is indeed (usually) impossible**.

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[1] Such structures also never use *do*-support, making their nature even more mysterious.

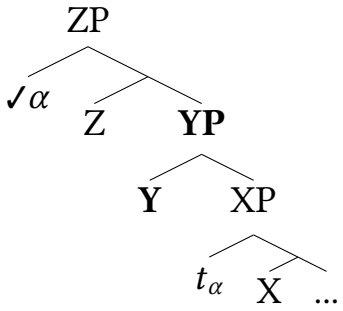
- I will explore this topic from the perspective of a hypothesis about the limitations of movement termed ***anti-locality*** (Bošković 1997; Ishii 1999; Grohmann 2003; Abels 2003; Erlewine 2016, 2017, 2020, and more).

  ▹ This hypothesis states that movements that are **too short** fail, though several different versions of this constraint have been proposed.

- I will focus on a version of anti-locality stating that movement from one specifier to another must **cross over at least one phrase** in order to succeed (Bošković 2005; Brillman and Hirsch 2016; Erlewine 2020, a.o.).

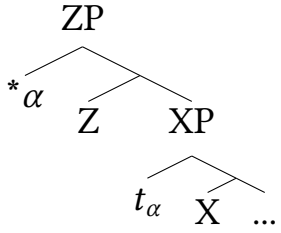
  ▹ Given this constraint, it is possible for a phrase α to move from spec-XP to spec-ZP in the following schema, since YP sits between XP and ZP:

  (3) *A schema for movement that is long enough*



  ▹ But if YP were absent, this movement would fail due to being too short:[2]

  (4) *A schema for movement that is too short*



- Several of the works cited above argue that this constraint is responsible for preventing clause-internal subject A-bar movement in many contexts.

! Why? If subjects must move to spec-TP for case/EPP reasons before A-bar moving to spec-CP, that A-bar movement will fail since movement from spec-TP to spec-CP is too short:

[2]To be more precise, if α inhabits spec-XP and XP is the sister of Z, movement of α to spec-ZP would violate anti-locality. If a phrase YP intervenes between XP and ZP such that YP dominates XP but not ZP, this movement of α succeeds. See Erlewine (2020) for additional discussion of and recent citations for this proposal.

(5) *Prediction of anti-locality: Movement from spec-TP to spec-CP cannot occur*

a. * $[_{CP}$ **Who** $[_{TP}$ *t* will eat the cake]]?

b. ✓ $[_{CP}$ $[_{TP}$ **Who** will eat the cake]]?

★ As mentioned, my exploration of anti-locality and the nature of subject movement uses facts about **parasitic gaps**, henceforth PGs (Engdahl 1983; Nissenbaum 2000; Culicover and Postal 2001; Nissenbaum and Schwarz 2011, a.o.).

- PGs are, roughly speaking, "extra" gaps that can occur in constituents crossed-over by an A-bar movement.

  ▹ PGs are productive in object positions:

  (6) *Object PGs in clausal adjuncts*

  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]]. (Nissenbaum 2000, p. 30)

  ▹ **Importantly**, I observe that PGs in subject positions are often unacceptable:

  (7) *New observation: 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.]

  c. What$_1$ will you eat t_1 [if **it**/***PG**$_1$ is confirmed to be healthy]?

  ▹ However, it will also be important that subject PGs **sometimes succeed**, as we'll see.

☑ I will argue that the facts about PGs and subjects support the proposal that a principle such as anti-locality bans clause-internal subject A-bar movement.

  ▹ Anti-locality is not the only way to account for the basic patterns I focus on, but I argue that it helps predict certain details that we will see later.

  ▹ In particular, the hypothesis that string-vacuous movement is banned (George 1980; Chomsky 1986, a.o.) would also predict at least some of the facts I will discuss today. I will set aside the exploration of such an analysis for another time.

→ Next I will provide background on anti-locality and the properties of PGs, before discussing the main facts and their analysis.

2 Some pertinent evidence for anti-locality

- While the PG evidence will suggest that clause-bounded A-bar movement of subjects usually doesn't occur, it is clear that **cross-clausal** subject A-bar movement does:

(8) *Subject wh-movement from a lower clause*
Who$_1$ did you say [t_1 is silly]?

▹ 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* (Perlmutter 1968; Pesetsky 2017).

(9) *The that-trace effect*
a. **Who**$_1$ did you say [**(*that)** t_1 is silly]?
b. That's the person **who**$_1$ I think [**(*that)** t_1 should leave]

- In contrast, cross-clausal movement of a non-subject does not force the complementizer to be absent.

(10) *Complementizer allowed with non-subject movement*
a. **What**$_1$ did you say [$_{CP}$ **(that)** you want t_1]?
b. **Where**$_1$ do you think [$_{CP}$ **(that)** we should go t_1]?

- Therefore it is clear that this restriction is specifically about subject movement.

! Bresnan (1977) observed that there is a way around the *that*-trace effect—adding an adverb after the complementizer:

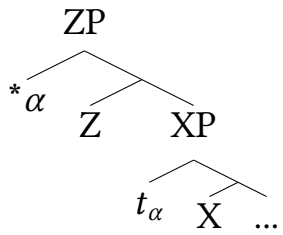
(11) *Additional adverb repairs the that-trace effect*
a. **Who**$_1$ did you say [$_{CP}$ **(that)** unfortunately t_1 is not very smart at all]?
b. That's the person **who**$_1$ I heard [$_{CP}$ **(that)** just yesterday t_1 bought a duck]

★ Several recent works have argued that the *that*-trace effect, and its repair by the addition of an adverb, is attributable to the anti-locality constraint I introduced above (Brillman and Hirsch 2016; Erlewine 2017, 2020).

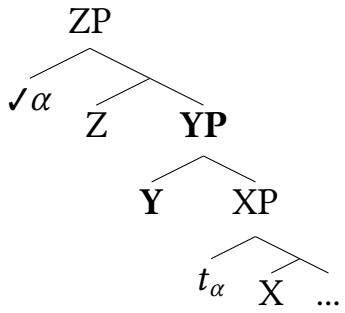
- This constraint is illustrated again below:

(12) *Anti-locality*

a. *A movement that is too short*



b. *Movement made possible by crossing more structure*



- This account of the *that*-trace effect, like much work using anti-locality, depends on the interaction of anti-locality and *phase theory* (Chomsky 2000, 2001, 2008, and many more).

  ▹ The essence of phase theory is that syntactic structures are built in a "chunk-by-chunk" manner, due to the way that the syntactic derivation is related to the other components of the grammar (phonology, semantics, etc).

  ▹ Such chunks are termed "phases", widely regarded to include CP, vP, and often DP.[3]

- One of the characteristic properties attributed to phases is that, when something moves from a phase, it must **reach the phase edge** before moving further.

- If CP is a phase, it is thus necessary for movement to reach spec-CP before exiting CP:

(13) *Movement to CP edge feeds further movement*

✓ What did you say [$_{CP_{[Phase]}}$ t that [$_{TP}$ you ate t]]?

! Importantly, when we attempt to extract the subject of an embedded CP, anti-locality and phase theory predict a conflict.

  ▹ If movement of a *wh*-subject through spec-CP is required, but anti-locality prevents movement from spec-TP to spec-CP, then we expect the derivation to fail:

[3]Though there are many unresolved issues about which phrases count as phases. See Davis (2020a,b) for discussion.

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

▹ This prediction fits the description of the *that*-trace effect.

- If embedded clauses without *that* are bare TPs (Doherty 1997; Brillman and Hirsch 2016), then for such clauses both the phase problem and the anti-locality problem are irrelevant.[4]

▹ In this case, we correctly predict that the embedded subject can be extracted:

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

? What about the fact that the addition of an adverb circumvents the *that*-trace effect?

- If the addition of an adverb below C introduces **more structure** between TP and CP, then we predict that anti-locality will not prevent movement from spec-TP to spec-CP in this situation (Brillman and Hirsch 2016; Erlewine 2017, 2020).

(16) *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 the beans]]]?

★ We now have a theory for the *that*-trace effect and its avoidance.

- This analysis will be very relevant to the facts about PGs that I am going to discuss later in this presentation.

→ Before that, it will be necessary to make clear why PGs are relevant in the first place.

[4] Erlewine (2017) offers an alternative version of this account in which CP is not necessarily absent, but must be silent in order to prevent a linearization problem, in the vein of Fox and Pesetsky (2005).

3 Why parasitic gaps are relevant

- PGs have a special name because they are not the same as "normal" gaps.

- Typical phrasal movement leaves behind an obvious corresponding gap, which is often marked *t* for "trace":

  (17) *Typical movement leaves behind a gap*
  What$_1$ did you eat t_1?

- A characteristic property of syntactic movement is that it cannot exit certain constituents, which are termed "islands":

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

  ▹ This means that we typically do not expect to see a moved phrase and its corresponding gap separated by an island.

- For my purposes it is convenient to focus on clausal adjuncts, which are often islands.

- Some of these are stronger islands than others, but nevertheless, many of them indeed clearly block or degrade movement:

  (19) *Clausal adjunct islands*
  a. *?? Tell me [**which paper**]$_1$ you ate fried chicken for lunch [after giving them comments on $\boldsymbol{t}_1$].
  b. *?? [**What assignment**]$_2$ did you go home [because you need to finish $\boldsymbol{t}_2$ tonight]?
  c. *?? I think I know [**what kind of pet**]$_3$ you'd move out of town [if your roommate bought $\boldsymbol{t}_2$].

! However, if there is a well-formed A-bar movement elsewhere in the structure, it is often possible for an island in that structure to have a gap co-referent with the moved phrase.

✓ This is exactly what a PG is.[5] PGs are very productive in clausal adjuncts:

[5] PGs do not occur only in islands, but using an island makes it clear that a given gap is indeed parasitic.

(20) *PGs in clausal adjuncts*

a. Who$_1$ did you forget about t_1 [after talking to PG$_1$]?

b. [What kind of cake]$_3$ would you eat a piece of t_3 [if I decided to bring PG$_3$ to the party]?

c. Who$_1$ did you tell t_1 about our idea [in order to impress PG$_1$]?

d. Tell me [which paper]$_1$ I should read t_1 [before giving you comments on PG$_1$]

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

? Why can a PG, and the moved phrase that it is associated with, be separated by an island?

▹ Much previous literature has argued that this is because PGs do not involve movement from an island...

▹ ...but rather A-bar movement of a null operator within the island (Contreras 1984; Stowell 1985; Chomsky 1986; Browning 1987; Nissenbaum 2000, a.o.).[6]

▹ This means that what we call a PG is just the **trace of a silent operator**'s movement:

(21) *Operator movement within containing island forms PG*
Who$_1$ did you forget about t_1 [OP after talking to t_{OP}(=PG$_1$)]?

? How do we know that this operator actually moves inside the island?

- If it does need to move, we predict that a PG will fail if we place another island inside of the first, in such a way that it would block the operator's movement.

- In other words, while we have seen that an island can separate a PG from the moved phrase that it matches, we expect that a PG cannot be separated by more than one island.

▹ Many previous works have shown that this is indeed the case (Kayne 1983; Chomsky 1986; Cinque 1990; Postal 1994), as the following example shows by combining an adjunct and relative clause:

(22) *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)]]?

[6] 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 and Schwarz (2011) discuss, asymmetries in reconstruction for principle A, principle C, and variable binding all show that PGs involve a separate operator, and are thus not reducible to ATB extraction configurations. Additionally, as Culicover and Postal (2001) discuss, there is a consensus in the literature that at least in English PGs are nominals, though ATB movement is not category-specific in this way, further supporting the distinctness of PGs and ATB gaps. Munn (2001) argues for a unification of PGs and ATB contexts that makes a different distinction: Munn proposes that PGs involve null pronominals (equivalent to the null operators mentioned above), and that some instances of ATB movement are in fact PG-like null pronoun configurations.

▹ Here are a few more relevant examples:

(23) *PG licensing across multiple islands fails*

a. *Relative clause island plus adjunct island*
* Who$_1$ did you talk to t_1 [after meeting someone [who knows PG$_1$]].

b. *Subject island plus adjunct island*
* Durian is a fruit [which$_1$ I tried t_1 for the first time [after [every variety of PG$_1$] was sent to me by someone who really likes them]].

c. *Adjunct island in adjunct island*
* Guess who$_1$ I ironically ran into t_1 [after taking the other hallway [because I wanted to avoid PG$_1$]].

☑ I will thus assume that PGs require movement of a null operator within the island.

- By exploring the constraints on PGs, we can find out whether this phrase's movement verifies the predictions of anti-locality or not.

- Before we do that, though, it will be useful to say a little more about the motivation for the operator movement that facilitates PGs.

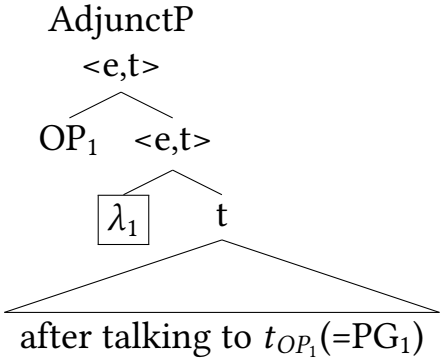
3.1 The operator must move for semantic reasons

- Nissenbaum (2000) argues that PG-formation requires the operator to move to the edge of the island for semantic reasons.

▹ Specifically, Nissenbaum argues that this movement must occur in order to trigger the semantic rule of Predicate Abstraction (Heim and Kratzer 1998).

▹ Though the operator is itself semantically content-less, when it moves and triggers this rule, it makes the island into an unsaturated predicate:

(24) *Semantic effect of operator movement for an adjunct island*



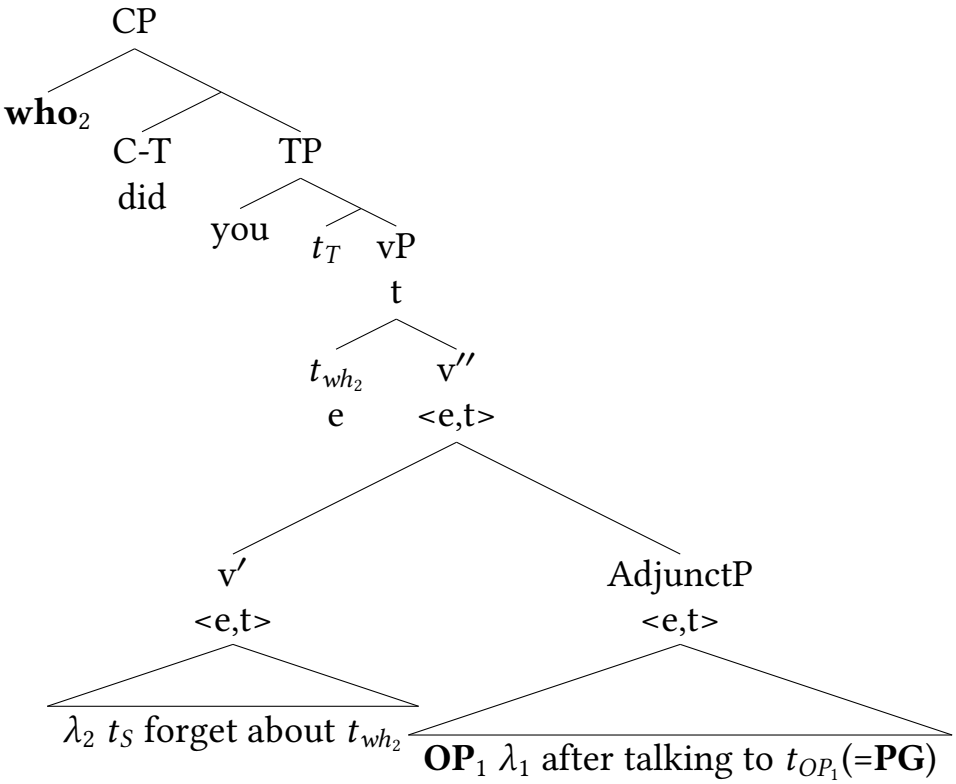
- When this constituent merges in a context containing an independently well-formed movement chain, that moved phrase can saturate this predicate.

- This results in the trace of the operator becoming co-referent with the normal gap, creating what we call a PG.

- Nissenbaum argues at length that clausal adjuncts with PGs merge in the edge of the vP phase after successive-cyclic movement through it, as shown below.

  ▹ This derivation relies on the same principles as the analysis of relative clauses in Heim and Kratzer (1998): operator movement, Predicate Abstraction, Predicate Modification, as well as a few other syntactic details.

  (25) *Syntactic/semantic derivation for a PG in a clausal adjunct*



  ▹ I show this for the sake of thoroughness, though I won't go over the details, since they don't matter for this presentation.

★ Just be aware that there is a semantic reason why PG formation requires the null operator to reach the edge of its island.

- **Prediction:** If the movement of the operator to the edge of the island would conflict with anti-locality, we expect the corresponding PG to be unacceptable.

☑ I argue that the facts about how PGs and subjects interact verify this prediction, in such a way that indicates that clause-internal subject A-bar movement is usually banned.

4 Analyzing the interaction of subjects and parasitic gaps

- Culicover and 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 the very first article on PGs—Engdahl (1983).

- Engdahl pointed out that, assuming that *wh*-subjects do undergo some clause-internal A-bar movement, it does not appear that such movement can license PGs:

  (26) *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 1983, ex. 53)
  - b. * That's the person [$_{CP}$ who$_1$ t_1 fired me [because I insulted PG$_1$]]
  - c. * Tell me [$_{CP}$ what$_1$ t_1 scared you [when you found PG$_1$ under the bed]]

  ▹ If anti-locality bans such movement, then we correctly make the prediction that PGs here should fail.

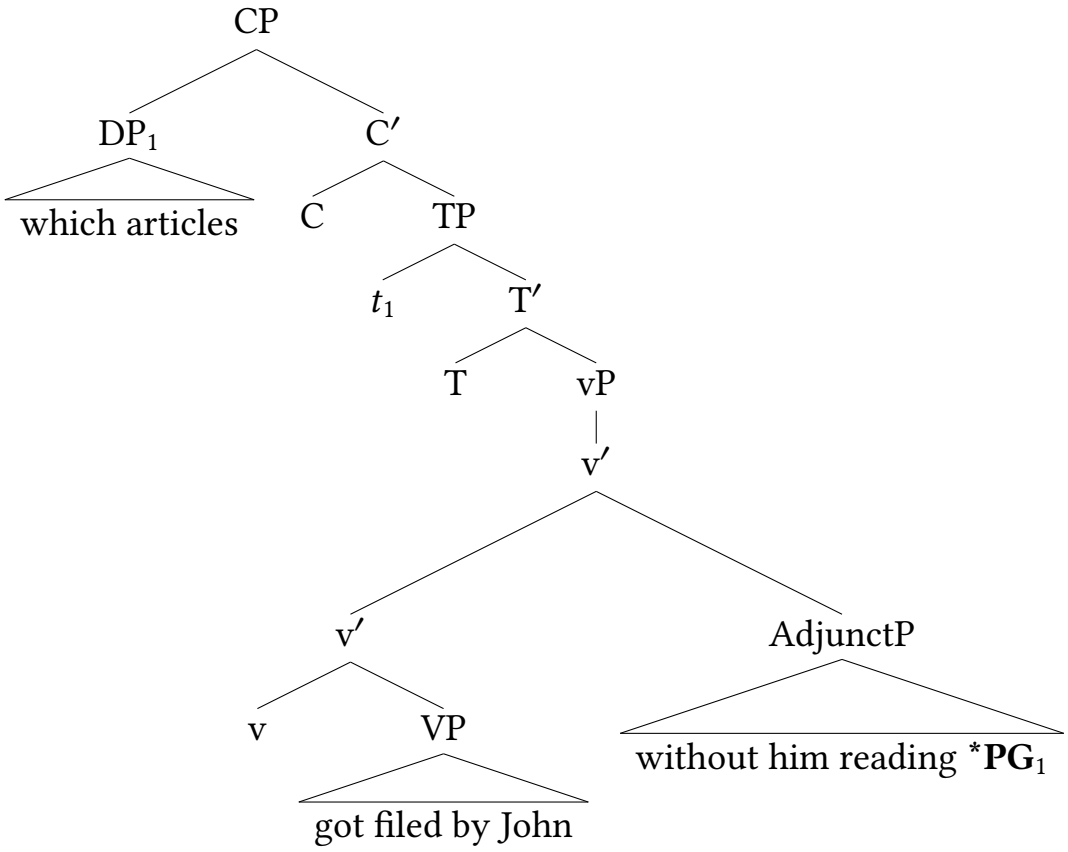
  ▹ However, Engdahl identifies another reason why PG licensing should not work here.

- To paraphrase, A-bar movement of the subject from spec-TP to spec-CP would not actually structurally cross over the adjuncts in (26), assuming that they attach to the VP (in the updated theory in Nissenbaum (2000), the vP).

  ▹ As Nissenbaum discusses in detail, the PG-containing island needs to be attached within the movement path of the licensing phrase, otherwise semantic composition will fail.[7]

[7] Engdahl argued that it is important that the "true" gap does not c-command the PG. This constraint has come to be known in the literature as the *anti-c-command condition*. This condition is subject to a number of interesting qualifications, as Nissenbaum discusses. In my opinion it is more straightforward to make the generalization that the PG-container must be structurally crossed by A-bar movement of the licenser, since all interpretable PG structures I know of fit this description.

(27) *A-bar movement doesn't cross island → No PG*



- If PG-containing adjuncts merge in the vP, we predict that we should be able to get subject A-bar movement to license a PG by doing the following:
  - ▹ Build a bi-clausal structure, where the PG-containing adjunct attaches to the higher vP.
  - ▹ Extract the lower subject into the edge of the main clause, thus crossing that adjunct.
- Engdahl reports an example that verifies this prediction, and based on my research so far, such configurations do generally seem acceptable:

(28) *Cross-clausal subject extraction licenses a PG in the main clause's adjunct*

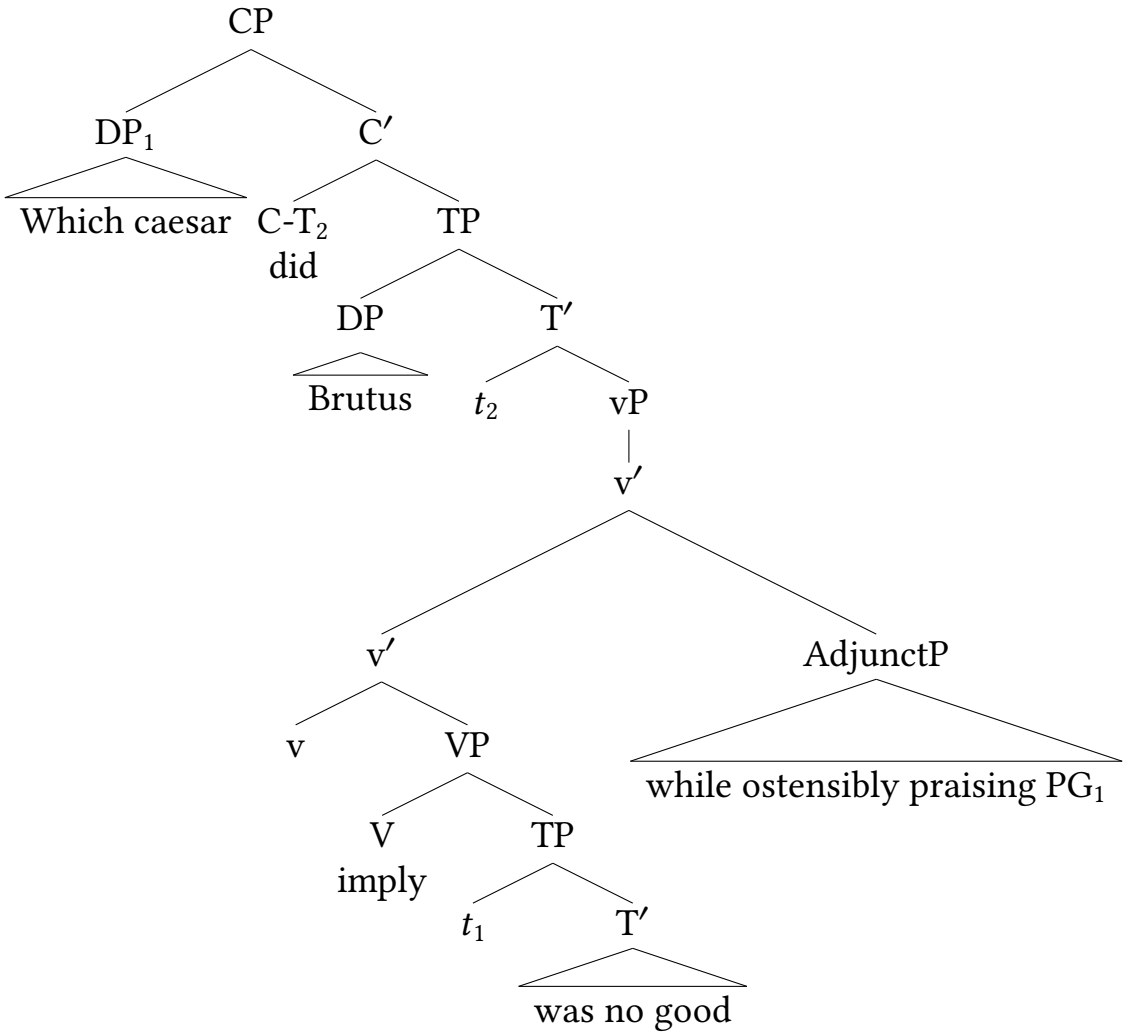
a. [Which caesar]$_1$ did Brutus [imply [t_1 was no good] [while ostensibly praising PG$_1$]]?
(Engdahl, ex. 60)

b. Remind me who$_1$ you [found out [$_{TP}$ t_1 likes cats] [after talking to PG$_1$ about animals]]

c. This is the guy who$_1$ I [said [$_{TP}$ t_1 is stupid] [because I wanted to insult PG$_1$]]

- ▹ Here's a tree to illustrate:

(29) *Successful PG licensing in main clause by cross-clausal subject extraction*



✓ If clause-bounded subject A-bar movement is banned, then it is expected that cross-clausal movement will be the only way for a subject to license a PG.

- So far in this presentation, all PG examples have involved non-subject PGs.
- We've seen that (when the structure is right) such PGs can be licensed either by non-subject movement (20) or subject movement (28).

! Next let's examine PGs in subject positions, which are more significant.

  - ▹ While PG-licensing by subject movement is possible in principle, we've seen that it is more restricted.
  - ▹ Therefore in order to achieve licensing of a subject PG, the safest strategy will be to first attempt licensing by movement of a non-subject.

- I observe that non-subject A-bar movement cannot license a PG in the subject position of a mono-clausal adjunct:

(30) *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. What$_1$ will you eat t_1 [if **it/*PG**$_1$ is discovered to be healthy]?

c. 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, it has been observed that there is a requirement for a PG, and the moving phrase that licenses it, to match in case / semantic role.

  ▹ See for instance Kiss (1985) on Hungarian, and Franks (1992, 1993, 1995) on Russian and other Slavic languages.

- If this is also true for English, then perhaps the configuration in (30) above is no good due to the mismatch between subject and non-subject.

- However, Engdahl shows that for English there are acceptable examples like (28a) above, repeated below, where subject movement licenses a non-subject PG.

(31) *A PG succeeding despite subject / non-subject mismatch*
[Which caesar]$_1$ did Brutus imply [t_1 was no good] while ostensibly praising PG$_1$?

▹ If a mismatch in case or semantic roles were the issue with the examples in (30) above, we would expect the configuration in (30) to improve when we try to license the subject PG with subject A-bar movement.

▹ To give this configuration the best chance of succeeding, we should use cross-clausal subject movement, which we've seen in (28) above can license at least non-subject PGs.

- Even when we control for these factors, a PG in the subject position of a mono-clausal adjunct fails:

(32) *Subject movement cannot license subject PG in a mono-clausal adjunct*

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

b. That's the guy who$_1$ I will suspect [t_1 hates dogs] [if **he/*PG**$_1$ turns out to have a cat].

c. Remind me what$_1$ you told us [t_1 is a bad idea to eat] [after **it/*PG**$_1$ gave you a stomachache]

! Since it is clear that a matching violation is not responsible for this unacceptability, we have good reason to instead look for a **structural problem**.

- Recall that as described in the previous section, PGs are formed by movement of an operator from the PG position, to the edge of the island:

(33) *Operator movement within containing island*
Who$_1$ did you forget about t_1 [OP after talking to t_{OP}(=PG$_1$)]?

- In the case of a PG in the subject position of a mono-clausal adjunct, it would be necessary for the operator to move from spec-TP to the edge of the island.

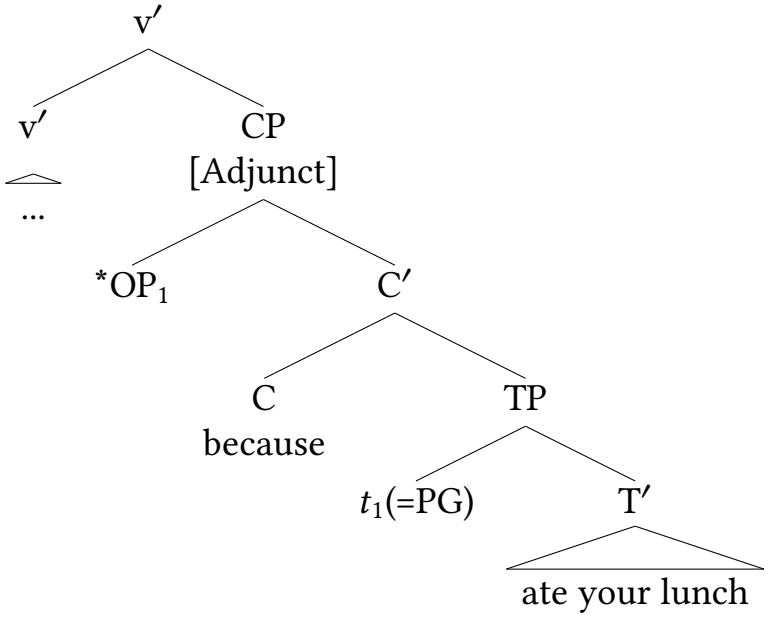
▹ I hypothesize that such clausal adjuncts are CPs, which are headed by words like *because, after, if* and so on.

- 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:

(34) *Operator movement from subject position within island is impossible*
* Who$_1$ did you [$_{vP}$ say [$t_1$is a jerk] [$_{CP}$ OP because [$_{TP}$ t_{OP}(=PG$_1$) ate your lunch]]]?

★ Thus anti-locality accurately predicts the unacceptability of PGs in the subject position of mono-clausal adjuncts.

(35) *Anti-locality blocks subject operator movement in mono-clausal adjunct*



- This theory predicts that subject PGs should succeed when the PG is the subject of an embedded clause in a bi-clausal adjunct.

▹ This is because operator movement from the lower TP to the higher CP in a bi-clausal adjunct would not violate anti-locality (assuming no CP in the embedded clause).

- There are a few examples from previous literature which fit this description:

(36) *PGs in embedded subject position*

a. ? This is the student $\varnothing_1$ everyone thinks t_1 is clever [because John said PG_1 was clever]
(Engdahl, ex. 59)

b. ?? the person $\varnothing_1$ that you consulted t_1 [because you thought PG_1 understood the problem]
(Browning 1987)

- Though complex, at least some instances of this configuration seem acceptable, clearly more so than examples with PG subjects in mono-clausal adjuncts.

(37) *More PGs in embedded subject position*

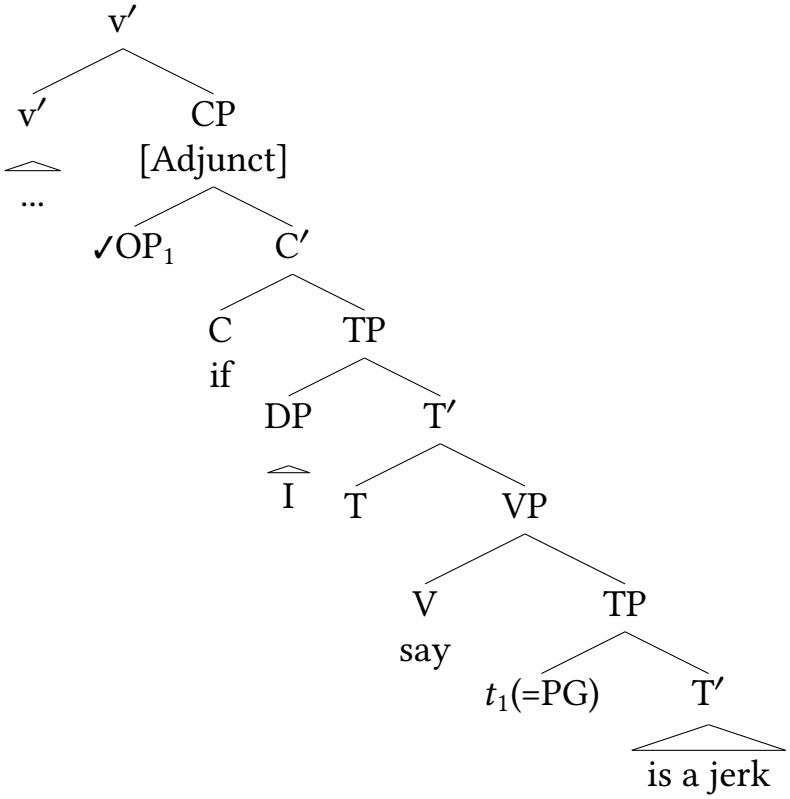
a. Who_1 will you think t_1 is a jerk [if I say PG_1 is a jerk]?

b. This is a snack $\varnothing_1$ that I eat t_1 every day [because I suspect PG_1 might be good for me]

c. Let me tell you [which students]$_1$ I punished t_1 [after sadly finding out [PG_1 have been stealing my cookies]].

▹ That such examples should be better is exactly what we expect:

(38) *Operator movement from embedded subject position respects anti-locality*



★ In summary, we've seen that:[8]

- ▹ PGs fail in the subject position of mono-clausal adjuncts.
- ▹ Anti-locality predicts this fact, since it predicts the impossibility of operator movement from spec-TP to spec-CP within the adjunct clause.
- ▹ This theory also predicts that PGs in embedded subject positions should improve, since operator movement is long enough to be legal in this situation.[9]

4.1 An accurate prediction about anti-locality avoidance

- Above, I summarized a theory where the *that*-trace effect stems from anti-locality, which can be avoided by the inclusion of an adverb:

(39) *The that-trace effect and its repair*
  a. * **Who**$_1$ did you say [$_{CP}$ **that** t_1 is silly]?
  b. **Who**$_1$ did you say [$_{CP}$ **that** unfortunately t_1 is not very smart at all]?

- Recall that the version of anti-locality I have used above predicts that subject movement from spec-TP to spec-CP is banned:

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

[8]The analysis presented here is also compatible with an ATB extraction analysis of PGs. Under such an analysis, the normal gap and PG are both formed by genuine movement paths, which unite at a higher point in the structure, resulting in one moved phrase visible on the surface which corresponds to two gaps. Assuming that CP is a phase, the movement path within the adjunct clause would need to reach spec-CP before moving on out of the adjunct. However, if that movement is initiated from spec-TP, anti-locality will prevent such a derivation from succeeding.

[9]We additionally predict that in examples like (36-37), the *that*-trace effect should apply to the operator movement from embedded subject position, and thus prevent the embedded clause in the adjunct from having a complementizer, unless an adverb is included after that complementizer, as shown below. My own judgments agree with this expectation, but the complexity of the examples poses a challenge. More investigation on this is needed.

(i) a. Who$_1$ will you think t_1 is a jerk [if I say (*that) PG$_1$ is a jerk]?
  b. This is a snack $\varnothing_1$ that I eat t_1 every day [because I suspect (*that) PG$_1$ might be good for me]
  c. Let me tell you [which students]$_1$ I punished t_1 [after sadly finding out (*that) PG$_1$ have been stealing my cookies].

(ii) a. Who$_1$ will you think t_1 is a jerk [if I say (that) most likely PG$_1$ is a jerk]?
  b. This is a snack $\varnothing_1$ that I eat t_1 every day [because I suspect (that) quite possibly PG$_1$ might be good for me]
  c. Let me tell you [which students]$_1$ I punished t_1 [after sadly finding out (that) unfortunately PG$_1$ have been stealing my cookies].

! If adverbs allow circumvention of anti-locality by adding structure, then we expect insertion of an adjunct between TP and CP to make clause-bounded subject movement possible.

▹ Furthermore, if such a configuration actually has subject movement in it, we should be able to detect that movement by placing a PG in the adjunct.

- An example of this sort is reported by Haegeman (1984), and I suspect that this is a productive configuration:

(41) *Adverb facilitating clause-internal subject movement (+PG)*

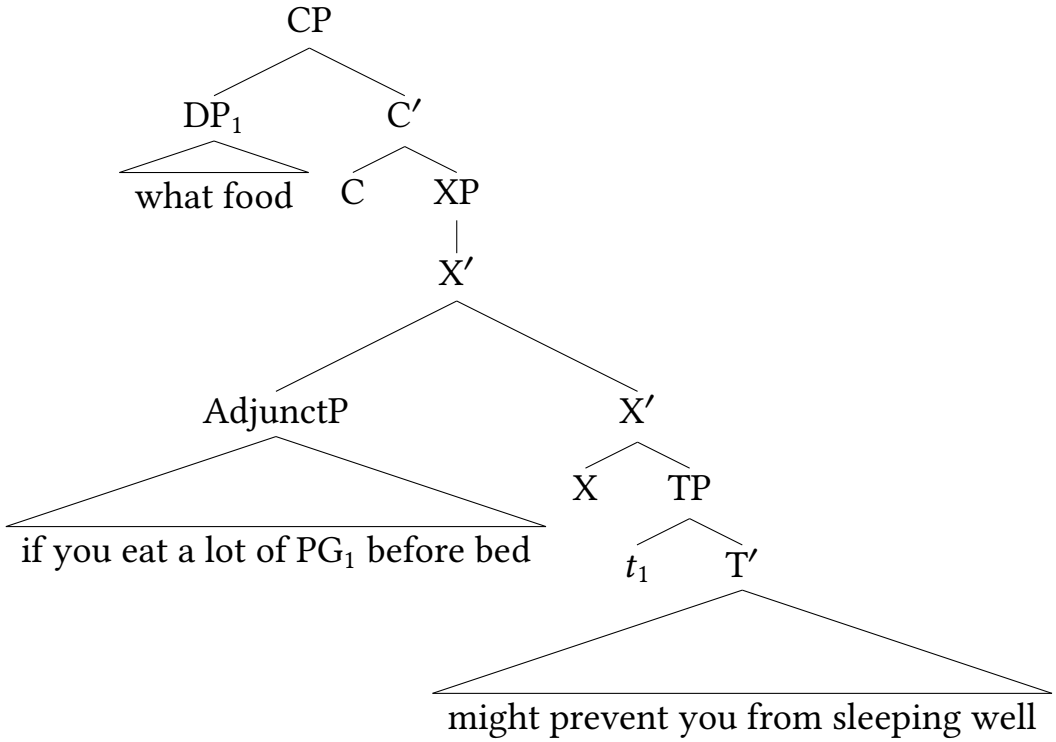
a. a note which$_1$ [unless we send back PG$_1$] t_1 will ruin our relationship (Haegeman, ex. 9)

b. Let me tell you who$_1$, [despite nobody liking PG$_1$ at all], t_1 is probably gonna get promoted.

c. [What food]$_1$, [if you eat a lot of PG$_1$ before bed], t_1 might prevent you from sleeping well?

✓ This is precisely what the anti-locality theory predicts:[10]

(42) *Clause-bounded subject movement permitted by intervening adjunct*



[10] We can imagine a structure like (42), but where the adjunct leans right. This would look just like the unacceptable examples in (26). Similarly, all examples of *that*-trace amelioration by adverb insertion in the literature use left-leaning adverbs, but right-leaning adverbs should also suffice as in (i) below, which I suspect is ungrammatical. Both of these facts favor an explanation for the lack of clause-internal subject A-bar movement involving a ban on string-vacuous movement rather than anti-locality. Alternatively, it may be that right-leaning adjuncts are obligatorily merged clause-medially, rather than peripherally.

(i) * That's the person **who**$_1$ I heard [$_{CP}$ **that** t_1 found a big mushroom just yesterday]

4.2 An incorrect prediction and a potential solution

- I have argued that anti-locality prevents the formation of PGs in the subject position of mono-clausal adjuncts since the needed operator movement would be too short:

  (43) *Failed operator movement from subject position within island*
  * Who$_1$ did you [$_{vP}$ say [$t_1$is a jerk] [$_{CP}$ OP because [$_{TP}$ t_{OP}(=PG$_1$) ate your lunch]]]?

  ▹ We predict that the addition of an adverb between TP and CP in the PG-containing adjunct should facilitate the needed operator movement.

- This prediction does not seem right:

  (44) *No PG in subject position, even with intervening adverb*
  a. * Who$_1$ did you slap t_1 [because **unfortunately PG**$_1$ ate your lunch?]
  b. * What$_1$ will you eat t_1 [if **eventually PG**$_1$ is confirmed to be healthy]?
  c. * That's the guy who$_1$ I fired t_1 [after **surprisingly PG**$_1$ insulted me]

- Adverbs seem to be possible in the needed position, as we can see by replacing the PGs with pronouns:

  (45) *High adverbs allowed in clausal adjuncts*
  a. Who$_1$ did you slap t_1 [because **unfortunately they**$_1$ ate your lunch?]
  b. What$_1$ will you eat t_1 [if **eventually it**$_1$ is confirmed to be healthy]?
  c. That's the guy who$_1$ I fired t_1 [after **surprisingly he**$_1$ insulted me.]

  ▹ So this is indeed a puzzle for the anti-locality approach I've adopted here.

- I suggest that this fact stems from a difference in the internal structures possible for typical CPs headed by *that*, versus the sorts of adjunct CPs that can host PGs.

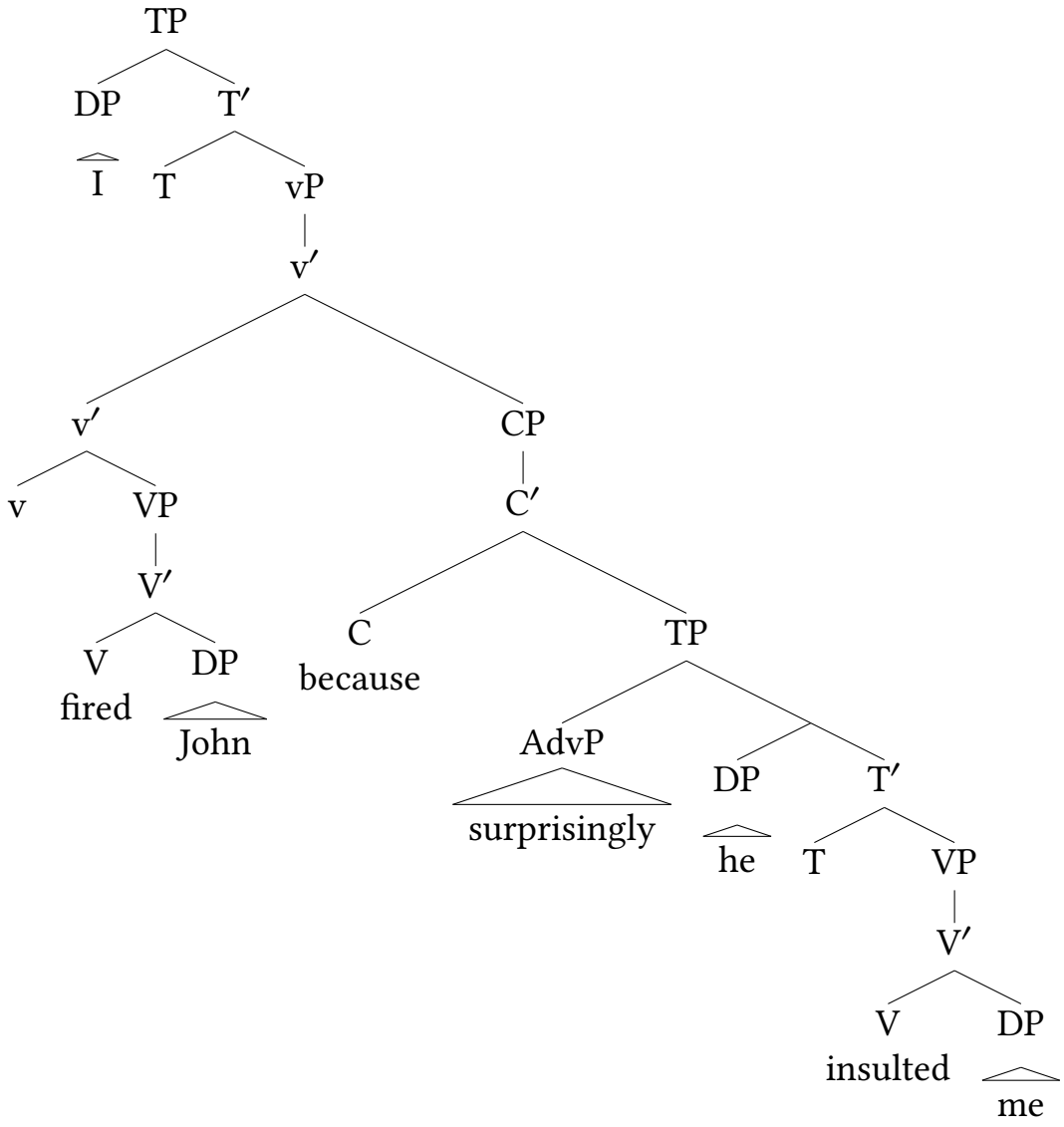
- As mentioned above, several relevant works argue that adverbs ameliorate the *that*-trace effect due to introducing additional structure between TP and CP:

  (46) *Adverb resolves that-trace effect by introducing more structure*
  Who$_1$ did you say [$_{CP}$ t_1 **that** [$_{XP}$ unfortunately [$_{TP}$ t_1 ate all the beans]]]?

- In the above structure, the presence of the XP containing the adverb is what is vital.

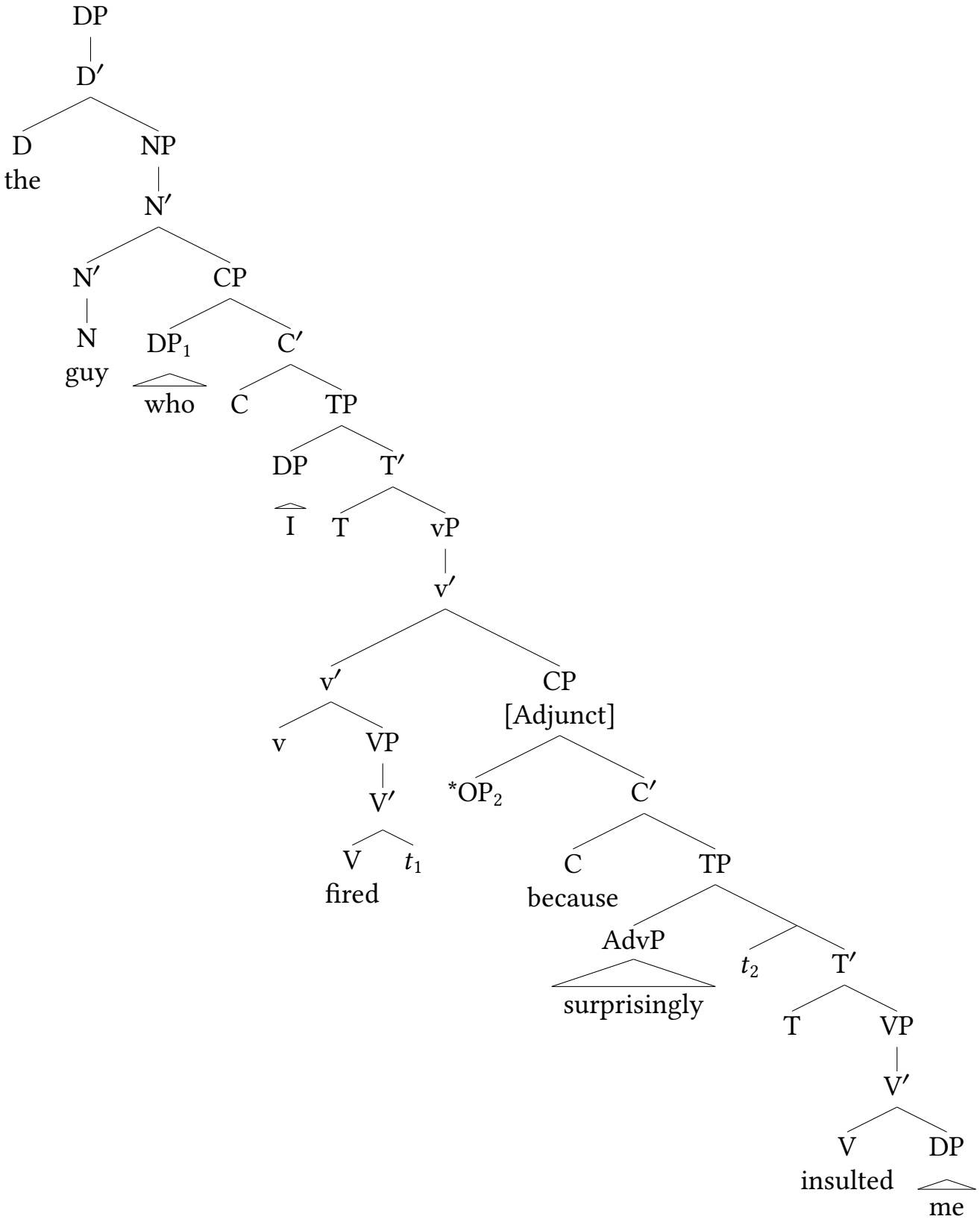
- I suggest that this XP cannot be merged in adjunct CPs. This would entail that when we do see a high adjunct in such CPs as in (45), it sits in the edge of the TP rather than being hosted by an additional projection:

(47) *High adjunct in adjunct CP attached in TP*



★ In this situation, there is no phrase dominating TP but not CP, and thus movement from the specifier of TP to CP will remain banned by anti-locality.

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



= * The guy who I fired because surprisingly PG insulted me

5 Extension: Parasitic gaps in PPs

- In this section, I will show how the concepts discussed above make the right predictions about another configuration, involving PGs in PPs.

- First, note that it is possible to have PGs in DPs:

(49) *PGs in DPs*

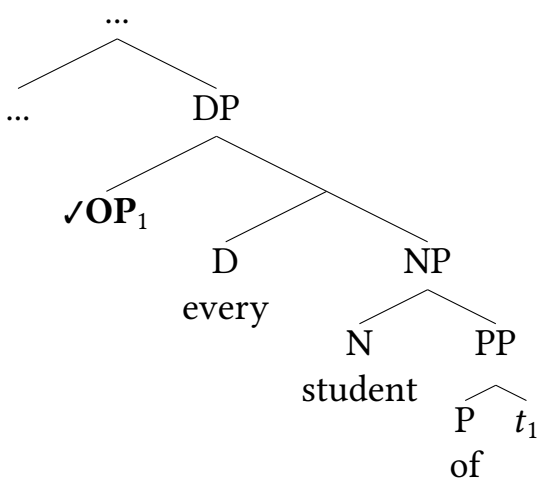
a. Who$_1$ would [every student of PG$_1$] love to throw a pie at t_1?

b. Tell me who$_1$ [a statue of PG$_1$] would surprise t_1

c. John's the guy who$_1$ I showed [the best friend of PG$_1$] a silly picture of t_1.

- Under the operator theory of PGs, the examples above would need to involve movement to spec-DP from the complement of NP, which certainly obeys anti-locality:

(50) *Successful movement of OP within DP*



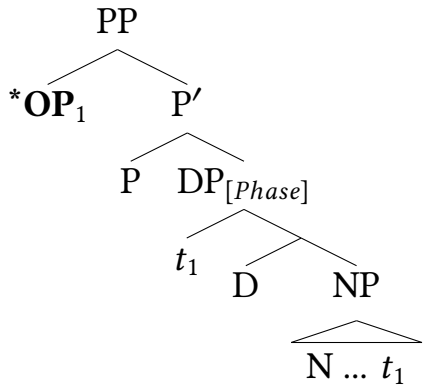
? What if we put a PG inside of a DP that is contained by a PP? Before I show you the facts, let's think about what we might predict.

- It is common to assume that DP is a phase (Bošković 2005, 2016; Newell 2008; Newell and Piggott 2014; Syed and Simpson 2017; Simpson and Park 2019, a.o.).

- If so, a PG-forming operator would need to move through spec-DP on its way to the edge of PP in order to derive a PG in a DP in a PP.

  ▹ However, notice that this movement from spec-DP to spec-PP would violate anti-locality:

(51) *Operator movement from DP edge to PP edge: Predicted to be banned*



▹ Consequently, we predict a PG inside of a DP that is in a PP to be unacceptable.

- I suspect that this prediction is correct, but more research is needed:

(52) *Attempted PGs in DPs in PPs*

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 [which student]$_1$ you told an awful rumor about t_1 [to every friend of PG$_1$]
c. * Tell me [which student]$_1$ you sent an awful picture of t_1 [to every friend of PG$_1$]

6 Conclusion

- I've argued that facts about the interaction of PGs and subjects in English indicate that clause-internal subject A-bar movement is usually banned.

- I pursued an anti-locality approach to this ban, which I argued makes a number of correct predictions about when subject PGs will be either impossible or allowed.

- These results also reveal that subjects and PGs interact in a principled and expected manner, with any gaps in the distribution of their interaction attributable to the independent influence of anti-locality.

- This research will benefit from cross-linguistic data, and more robust English data as well, so I'd be happy to hear your judgments.

6.1 Note about another analysis of subject A-bar movement

- See Messick (2020) and references therein for discussion of the theory that subjects A-bar move directly from their θ-position to spec-CP, without passing through spec-TP.

(53) *Subject A-bar movement directly to spec-CP*
$[_{CP}$ **Who** $[_{TP}$ will $[_{vP}$ *t* eat the cake]]]?

- Such a theory is not obviously compatible with the findings that I have discussed here, but there are nevertheless some interesting arguments that such subjects do indeed make it to spec-CP in at least some contexts.

  ▹ For instance, if A′-movement in relative clauses occurs to trigger Predicate Abstraction which makes the relative CP the right type to combine with NP (Heim and Kratzer 1998), then for semantic reasons the *wh*-subject of a relative clause should be forced to move.

- While this presentation supports a theory in which subjects cannot usually move to spec-CP, it is possible that different A-bar constructions have other properties, and that such movement can be forced under certain conditions.

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