Parasitic Gaps Licensed by Elided Syntactic Structure[1]

1.   Introduction

One of the central questions in the study of sluicing (Ross 1969 et seq.) is whether or not the ellipsis site is associated with full-fledged syntactic structure.

(1)   The editor told me that I need to review a book, but I don't remember which book [ellipsis].

Even though many studies have tried to show that the ellipsis site has invisible/inaudible syntactic structure (van Craenenbroeck 2010a, Lasnik 2001, 2005, 2007, in press, Merchant 2001, 2004, 2007, to appear among many others), the issue is still controversial (Barker 2012a, b, Culicover and Jackendoff 2005, Ginzburg and Sag 2000). One of the sources of this contention is the fact that wh-remnants in sluicing constructions do not seem to be constrained by island configurations that appear in the invisible/inaudible structure, as has been known since Ross's seminal work (Ross 1969).

The goal of this study is to provide evidence for a syntactic analysis of sluicing. In particular, we provide an argument that the ellipsis site in sluicing is associated with fully-fledged syntactic structure (Boeckx and Lasnik 2006, van Craenenbroeck 2010a, Fox and Lasnik 2003, Lasnik 2001, Lasnik and Park 2003, Lasnik 2007, in press, Merchant 2001, 2002, 2004, Ross 1969 among others). Our argument is based on the behavior of certain constructions that combine parasitic gaps (PGs; Engdahl 1983) with sluicing. Specifically, we argue that the third gap (__$_3$) in (2) is a PG licensed by a "real gap" inside the invisible/inaudible structure.[2]

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[2] All the data reported here are based on the judgments we collected from 6 native speakers of English. Note, importantly, all the judgments are relative rather than absolute. As usual, it is the relative differences in acceptability that matter. There are cases in which the contrasts are subtle, but all the speakers we interviewed reported the contrasts presented in this study.

(2) a. The editor told me which book I must review __1 soon after receiving __2, but I don't remember exactly how soon after receiving __3.

   b. The school superintendent told me which school just a few attempts to expand __1 ultimately overburdened __2, but I don't remember [exactly how many attempts to expand __3].

We will show that independent generalizations about PG-licensing suffice to straightforwardly account for the third gap in the examples in (2), *if* full-fledged syntactic structure parallel to that of the first clause is assumed to be present in the ellipsis site. We will then provide support for this analysis by showing that it makes correct predictions about other examples that are close variants of those in (2). Essentially, we will show that our analysis correctly predicts which variants of (2) should be acceptable and which should be unacceptable, precisely on the basis of whether these variants are consistent with the existing generalizations concerning PF-deletion and PG-licensing, as they figure in our analysis of (2).

   In section 2 we introduce the crucial properties of the examples in (2), provide a sketch of our analysis, and argue on the basis of its correct empirical predictions that this is the only feasible analysis of these constructions. In section 3 we present the analysis in more detail, and discuss a number of interesting theoretical consequences, including issues relating to island repair and analyses of ellipsis.

2. Parasitic Gaps Under Sluicing

2.1 Descriptive generalizations concerning parasitic gaps

   In order to examine whether the gap in question should be analyzed as a PG or not, let us first summarize some crucial properties of PGs. In (3), PGs are hosted inside a temporal adjunct clause and an infinitival clause in the subject.

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(3)   a.   The editor told me which book I must review __RG, [soon after receiving __PG].[3]

      a.   The school superintendent told me which school [just a few attempts to expand __PG] ultimately overburdened __RG.

One of the distinguishing properties of PGs in English is that they must be licensed by a real gap left by an overt A-bar movement, with which they are interpreted to co-vary (Bošković 2002, Chomsky 1982, 1986, Culicover 2001, Engdahl 1983, Nunes 2004). Thus, unlike overt wh-movement, covert wh-movement and quantifier raising as in (4b,c) and (5b,c) both do not license PGs.

(4)   a.   Which book must John review __RG soon after receiving __PG?

      b.   *Who must review which book soon after receiving __PG?

      c.   *John must review some books/every book, soon after receiving __PG.

(5)   a.   Which school did just a few attempts to expand __PG ultimately overburden __RG?

      d.   *How many attempts to expand __PG ultimately overburdened which school?

      e.   *Just a few attempts to expand __PG ultimately overburdened some schools/ every school.

It will be useful to establish some terminology for referring back to these generalizations. We will use the term *PG-host* structures to describe the constituents indicated in (6). Thus when we say that something is a PG-host structure we mean roughly that it is a subject or an adjunct that contains a gap (and no corresponding filler). Such gaps are generally illicit, but are unexpectedly licit in (3).

(6)   a.   [soon after receiving ___]adjunct

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[3] We use underscore __ and subscripts RG and PG to indicate the real gap and the parasitic gap respectively in examples.

b. [just a few attempts to expand __]subject

We will use the term *PG-licensor* to describe what must co-occur with a PG-host structure in order to render the latter's gap licit. Thus a PG-licensor is basically a trace left by overt A-bar movement. Finally, we will use the term *PG-locality* for the required configuration that a PG-host and a PG-licensor must stand in: the crucial gap in a PG-host is licit if and only if there is a PG-licensor in a PG-local configuration with the PG-host. This requirement is basically the same as the 0-subjacency requirement on the composite chain that Chomsky (1986) proposed to capture the local relation between the licensing chain and the parasitic chain. For now, we will simply take the two configurations exemplified in (3) as instances of PG-locality: an overt A-bar gap (the PG-licensor) in direct object position of a clause C is PG-local to a PG-host that is the subject of or is adjoined to C. Hence the second gap in (7), for example, is not licit, since although it is part of a valid PG-host structure and the sentence does contain a valid PG-licensor, these two crucial elements do not stand in a PG-local relation.[4]

(7)   *Who did John assure __ that Mary would be surprised [soon after talking to __]?

Implicit in this discussion has been the requirement that a PG is interpreted as co-varying with its PG-licensor. We will confine our attention to interpretations that meet this criterion throughout, manipulating only the syntactic configurations in which the co-varying gaps occur, and therefore will generally continue to leave this requirement implicit.

We do not aim to provide any insight in this paper into the generalizations encoded by our notions of PG-licensor, PG-host and PG-locality. We instead take them to be axiomatic,

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[4] Note that PG-locality must hold "in the right direction": the PG-licensor must be PG-local to the PG-host, and this may well be the case without it also being true that the PG-host is PG-local to the PG-licensor.

well-documented properties of PG-licensing, and we will show that certain other gaps are best analyzed as being licensed by the same mechanism, whatever the underlying nature of this PG-licensing mechanism turns out to be. The status of these other gaps as PGs will constitute evidence that the configurations licensing PGs can be present syntactically in material that is unpronounced in ellipsis.

2.2 The central paradigm

The difficulty of testing whether a gap inside a sluiced structure can license a PG lies in the fact that sluicing may not normally be flanked by other phrases, such as a phrase that potentially contains a PG.[5] Put differently, in cases where we might expect to look for a PG licensed by an elided PG-licensor, the relevant location of the PG (the PG-host structure) will also itself be elided. In (8a), for example, where we elide the structure that could be thought to include the "normal" gap left by *which book* (the PG-licensor), we must also elide the adverbial clause that could potentially contain a PG.

(8)   a.   *The editor told me that I must review a book after receiving it, but I don't remember which book [after receiving it].

       b.   *The school superintendent told me that just a few plans to expand a school ultimately overburdened it, but I don't remember which school [just a few plans to expand it].

Because sluicing requires that we also elide the potential PG-host constituents (the bracketed

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[5] Note that this is not always the case, as multiple sluicing is allowed in English (Bolinger 1978, cf. Lasnik in press and Nishigauchi 1998, who argue against the possibility of multiple sluicing in English). Although it is an interesting question what differentiates multiple sluicing from cases like (8), we set this point aside as it is not central to our discussion.

constituents in (8)), there is no way to test whether a PG can in fact appear inside them.

To work around this problem, we must construct a case where the position of the potential PG is inside the wh-remnant that is left behind by sluicing. A prerequisite for this is that potential PG-host structures can undergo wh-movement; this is established in (9).

(9)   a.   [Exactly how soon after receiving it] should I review the book?

        b.   [Exactly how many attempts to expand the school] eventually overburdened it?

These constituents can serve as wh-remnants in sluicing as well, as shown in (10).

(10)   a.   The editor told me that I must review the book soon after receiving it, but I don't remember [exactly how soon after receiving it].

        b.   The school superintendent told me that just a few attempts to expand a school ultimately overburdened it, but I don't remember [exactly how many attempts to expand the school].

A simple wh-movement configuration (not yet involving PGs) in the antecedent clause does not interfere with the possibility of these constituents serving as wh-remnants, as shown in (11).

(11)   a.   The editor told me which book I must review __ soon after receiving it, but I don't remember [exactly how soon after receiving it].

        b.   The school superintendent told me which school just a few attempts to expand the curriculum ultimately overburdened __, but I don't remember [exactly how many attempts to expand the curriculum].

Consider now adding a PG to the antecedent clauses in (11) (i.e. making the antecedent clauses identical to the sentences in (3)). Notice that these PGs are located inside the constituents to which the wh-remnants left by sluicing are parallel. This lets us construct the crucial examples in

(2) (repeated here as (12)), where the wh-remnants contain the gap that we claim is a PG.[6]

(12)   a.   The editor told me which book I must review ___$_1$ soon after receiving ___$_2$, but I don't remember [exactly how soon after receiving ___$_3$].

   b.   The school superintendent told me which school just a few attempts to expand ___$_1$ ultimately overburdened ___$_2$, but I don't remember [exactly how many attempts to expand ___$_3$].

In these examples, a PG (in (12a), the second gap ___$_2$; and in (12b), the first gap ___$_1$) is licensed by the real gap (___$_1$ in (12a); ___$_2$ in (12b)) in the antecedent clause. In the ellipsis clause, a temporal clause and subject containing an infinitive clause are serving as the wh-remnants and they contain a gap (___$_3$, the third gap). The third gap in both of the examples is in a position parallel to the parasitic gap in the antecedent clause (the second gap in (12a) and the first gap in (12b) are in an adjunct clause and in an infinitive clause inside the subject, respectively), except that its PG-host has undergone wh-fronting. Finally, the three gaps in the examples in (12) all co-vary with the wh-phrase in the antecedent clause.

   Our specific hypothesis is that the third gap is a PG licensed by a gap inside some full-

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[6] Note that the potential PG-host can indeed be fronted even if, unlike those in (9), it indeed contains a PG. For example, (i) contains a PG in the fronted PG-host, which is licensed by the RG left by heavy NP shift (this possibility was suggested by Marcel den Dikken, *p.c.*).

(i)   [Exactly how soon after receiving ___$_{PG}$] should I review ___$_{RG1}$ for your journal [the book that you had asked me to write a review article on]$_1$?

The availability of PGs in wh-phrases was also noted by Pesetsky (2000:33):

(ii)   Which girl did you persuade [which friend of ___$_{PG}$] to congratulate ___$_{RG}$?

fledged syntactic structure which undergoes ellipsis.[7] The relationship between this gap in the ellipsis site and the mysterious third gap in the wh-remnant is directly analogous to the relationship between the licensing gap and the PG inside the antecedent clause: the ellipsis site contains a PG-licensor gap in the second clause's object position, and the wh-remnant (a PG-host) occupied the PG-local subject or adjunct position of this second clause before it underwent wh-movement. We now begin to present evidence that this is the only feasible analysis.

2.3   Supporting evidence

A first piece of evidence that this is the only feasible analysis of the examples in (12) comes from the following examples in (13). Here the first clause is unchanged from (12), but the fronted wh-phrases containing the crucial gaps are not wh-remnants of sluicing; there is distinct overt material in the second clause. In this situation, we predict that the crucial gaps are not licensed, and these examples are clearly less acceptable than the examples in (12).

(13)   a.   *The editor told me which book I must review __$_1$ soon after receiving __$_2$, but I don't remember [exactly how soon after receiving __$_3$] I must review it.

        b.   *The school superintendent told me which school just a few attempts to expand__$_1$ ultimately overburdened __$_2$ but I don't remember [exactly how many attempts to expand __$_3$] overburdened the school.

This strongly indicates that it is not possible to maintain an analysis of (12) according to which the crucial third gap is somehow parasitic on a gap in the antecedent clause (or licensed in any

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[7] We do not consider explicitly the non-elided version of (12) for now, because it involves an additional complication: it turns out this non-elided version is not acceptable, because the movement of the wh-phrase that becomes the remnant constitutes a wh-island violation. We return to this issue in a later section.

way solely by material in the antecedent clause). For example, it is not feasible to expand the definition of PG-locality in a way that allows the A-bar trace in the object position of the first clause to license both of the two other gaps in (12).[8] On any such analysis, the third gaps in the examples in (13) would also be licensed. The unacceptability of the examples in (13) follows straightforwardly from our analysis, however, since the unpronounced structure that we claim licenses the third gaps in (12) is not present in (13).

The examples in (13) therefore show that by modifying (12) in a certain way that makes it impossible for the sentence-final gaps to be licensed according to the generalizations introduced in section 2.1, we indeed produce an unacceptable result. All of the evidence that follows has this form. There are basically three kinds of scenarios that we consider: we show that the crucial examples become unacceptable (i) if no PG-licensor is present, (ii) if the wh-remnant is not a PG-host structure, or (iii) if PG-locality fails to hold between the PG-licensor "real" gap and (the pre-wh-movement position of) the PG-host wh-remnant.

Exactly which of these three patterns best describes (13) is perhaps debatable: the object gap in the first clause is of course a PG-licensor, and so one might think of (13) as a failure of PG-locality between this PG-licensor and the PG-host wh-remnant (type (iii)). From a different viewpoint, in constructing (13) we have added overt material in the second clause that "replaces" the relevant PG-licensor in (12), and since this overt material is not a PG-licensor one can think of (13) as an instance of type (i). In any case, the following examples are all more clearly classifiable: we are generally leaving the ellipsis site from (12) intact, which means that when we

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[8] Note that there is nothing in general preventing a single A-bar trace from independently licensing two distinct parasitic gaps, as illustrated by the following example:

(i)   Which book did [the author of __] ask you to review __ [soon after receiving __]?

manipulate the overt material in the first clause, we are also manipulating the unpronounced content of the ellipsis site as well.[9] Using this strategy, we show that the relationship between the gap in the wh-remnant and the content of the ellipsis site behaves according to the generalizations of PG-licensing introduced in section 2.1.

As a first instance of evidence of type (i), i.e. showing that unacceptability results when there is no PG-licensor present, consider (14). In order for the argument based on this data to go through, there is in fact an additional assumption required that we have not yet established. We will return to this shortly, but will focus on the overall logic of the argument for now.

(14)   a.   *The editor told me that I must review a book soon after receiving it, but I don't remember [exactly how soon after receiving __].

       b.   *The editor told me who must review which book soon after receiving it, but I don't remember [exactly how soon after receiving __].

       c.   *The school superintendent told me that just a few attempts to expand a school ultimately overburdened it, but I don't remember [exactly how many attempts to expand __].

       d.   *The school superintendent told me how many attempts to expand the curriculum ultimately overburdened which school, but I don't remember [exactly how many attempts to expand __].

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[9] We assume syntactic/structural identity. We make no claims about whether a semantic identity condition could also be formulated that gets these facts right, but to the extent that the relevant factor distinguishing pairs like (12a) and (14b) really is the overt/covert nature of (the movement that creates) the potentially-licensing gap, it seems most easily accounted for on a syntactic/structural identity approach.

Here we have eliminated the PG-licensor in the first clause: it no longer contains a gap left by overt A-bar movement. Hence, due to the parallelism required by ellipsis, the unpronounced structure in the second clause also no longer contains a PG-licensor, and so the examples are correctly predicted to be bad.[10] Put differently, the examples in (14) are unacceptable variants of (12) in precisely the same way that the examples in (15) are unacceptable variants of the basic PG examples in (3).

(15)   a.   *The editor told me that I must review a book soon after receiving __.

       b.   *The editor told me who must review which book soon after receiving __.

       c.   *The school superintendent told me that just a few attempts to expand __ ultimately overburdened a school.

       d.   *The school superintendent told me how many attempts to expand __ ultimately overburdened which school.

As mentioned above, however, this argument does not yet go through. The reason is that as things stand, one might suspect that the unacceptability of (14) derives not from a failure of PG licensing as just outlined, but rather from a lack of parallelism between the PG-host wh-remnant and its correlate in the first clause: the adjunct/subject in the first clause contains a pronoun (*it*), but the wh-remnant in the second clause contains a gap in its place. Of course, establishing this parallelism by placing a gap instead of the pronoun in the antecedent clause is no use, since then

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[10] We can also imagine an attempted derivation of the sentences in (14) where the bracketed constituents are wh-remnants of a sluicing operation that elided valid PG-licensor material (namely exactly the material that is elided in our analysis of (12)). On such a derivation, the crucial third gap is licensed by an appropriate elided PG-licensor, but this elided PG-licensor is not itself licensed because it fails to satisfy parallelism with the antecedent clause.

the antecedent clause would just be identical to the unacceptable (15): the whole point is that these antecedent clauses do not contain a PG-licensor A-bar gap. So this is a general problem that will apply to any variant of (12) which, like (14), does not license a PG in the antecedent clause: we would like to argue that it is this lack of PG-licensing in the first clause (and therefore, by parallelism, in the second clause too) that rules out the PG-containing wh-remnant in examples like (14), but in such cases there can be no PG-containing constituent in the antecedent clause for the wh-remnant to be parallel to. This might independently rule out the examples in (14), in which case the data would be irrelevant for our case.

To avoid this objection, we will argue that in fact there is no parallelism requirement applying to the wh-remnant in examples like (14); note that these wh-remnants are precisely the parts of the second clause that do not undergo ellipsis. Hence the supposed independent problem does not exist. In what follows we will take a detour to discuss sprouting, to show that no such parallelism requirement exists. Then, with that hole in the argument patched up, we will return to present more arguments for our analysis analogous to the one based on (14).

2.4   PGs in Sprouting remnants

The sprouting-type sluicing construction is analogous to so-called merger-type sluicing (which we have up to this point referred to simply as "sluicing"), except that the antecedent clause contains no *correlate* of the wh-remnant (Chung, Ladusaw & McCloskey 1995, 2010, Merchant 2001, van Craenenbroeck 2010 among others). For example (16a), which is an instance of merger-type sluicing, has *somewhere* as the correlate of the wh-remnant *where*. In contrast (16b), which is an instance of sprouting-type sluicing, does not have a correlate of the wh-remnant (Chung Ladusaw & McCloskey 1995, 2010). For simplicity, we will continue to call merger-type sluicing *sluicing* and will call sprouting-type sluicing *sprouting* when this does not create

confusion.

(16)   a.   John ran somewhere, but I don't know where.

       b.   John ran, but I don't know where.

The lack of a correlate for the wh-remnant in sprouting generally means that the wh-remnant will be an adjunct phrase. It is also possible to "sprout" implicit/optional arguments, but we will leave such cases (which may behave somewhat differently from the adjunct cases: see Chung, Ladusaw & McCloskey 1995 for detailed discussion) aside.

The existence of the sprouting phenomenon shows that in previous examples such as (12a), (13a) and (14a), the presence of the *soon after ...* adjunct in the antecedent clause was actually unnecessary: without yet thinking about PGs, we can observe that it is possible to "sprout" the crucial PG-host *how soon ...* adjunct anyway, as shown by (17).

(17)   The editor told me which book I must review, but I don't remember how soon after receiving it.

Now, it turns out that PGs are licensed not only inside sluicing remnants, as we have discussed above, but also inside analogous sprouting remnants.[11] An example is (18a): while this is somewhat odd compared to (17), it is substantially better than (18b),[12] (18c) and (18d).

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[11] Note that it is also possible to have PGs in the remnant of contrast sluicing (Merchant 2001) where the remnant and the correlate are contrastively focused.

(i)   The editor told me which book I must review [soon after *receiving__*], but I don't remember [how soon after *discussing __*].

[12] Some speakers (3 out of 6 in our sample) recognize a slight improvement of this example if the pronoun *it* is replaced by an epithet like *the damn thing*:

(18) a. The editor told me which newly published book I must review, but I don't remember how soon after receiving ___PG.

b. *The editor told me which newly published book I must review, but I don't remember how soon after receiving ___PG I must review it.

c. *The editor told me that I must review a newly published book, but I don't remember how soon after receiving ___PG.

d. *The editor told who must review which newly published book, but I don't remember how soon after receiving ___PG.

The bad examples here are analogous to earlier unacceptable sluicing examples we presented. In (18b), as in (13) earlier, the second clause contains no ellipsis site, and so it does not contain the syntactic structure that is necessary to license the gap. In (18c) and (18d), the ellipsis site is intact and so, by parallelism, will mirror the contents of the first clause; but this first clause contains no PG-licensor. This argument based on (18c) and (18d) mimics the one we sketched earlier based on (14), but importantly, the potential objection discussed earlier no longer holds. Since we are dealing with sprouting now, there is no correlate of the PG-host *how soon ...* clause at all in the first clause in (18). Therefore the pronoun/gap mismatch inside the PG-host adjuncts in (14a) and (14b) cannot have been the source of their unacceptability. Although it is not possible to sprout a subject, we also conclude by analogy that the pronoun/gap mismatch inside the PG-host subjects in (14c) and (14d) cannot have independently ruled out those examples either.

(i) The editor told me which newly published book I must review, but I don't remember how soon after receiving ___PG I must review the damn thing.

Although this is an interesting pattern, it is not clear to us what the relation is between epithets and PGs. We leave this point open for the further research.

2.5   Interim summary

We presented the hypothesis that the third gaps in the examples in (12) are in fact PGs licensed by a real gap inside syntactic structure that is elided, or present but inaudible, in the second clause. On such an account, an ungrammatical result is predicted if we modify (12) in a way that prevents PG-licensing from taking place in accordance with the generalizations in section 2.1. The first such modification was illustrated in (13) with sluicing, and in (18b) with sprouting: in these examples, the second clause contains overt non-PG-licensor structure in place of the crucial unpronounced PG-licensor structure that exists in (12). A second modification that disrupts the licensing of the crucial gap was illustrated in (14) with sluicing and in (18c) and (18d) with sprouting: these examples do not have a PG-licensor in the first clause, and therefore by parallelism do not have one in the ellipsis site either. One way to think of this is that the crucial gap in (12) is indirectly dependent, via a combination of parallelism and PG-locality, on the presence of a PG-licensor gap in the first clause's object position.

Presenting evidence of this second sort – i.e. examples where the first clause does not contain a PG-licensor – required that we bring sprouting under consideration. The reason was that in such cases, the first clause obviously cannot contain a PG, and one might wonder whether the lack of a PG in the first clause somehow independently rules out the possibility of a PG in the second clause. But this concern has been put to rest by the acceptability of the sprouting example in (18a), and so these arguments based on (14) and (18c) and (18d) now go through. In the following subsection we will present further examples using this same logic: leaving the indirect dependence between the wh-remnant and the first clause intact, we will show that this indirect dependency conforms to the generalizations concerning PG-licensing.

2.6   More restrictions on PG-licensing

Besides the requirement of overt A-bar movement introduced in section 2.1, there are further restrictions on PG-licensing that we can use as a probe, in the same way that the overt A-bar movement requirement was used in the previous subsections. In each of the following four subsections, we note a particular existing generalization concerning PG-locality, PG-licensor-hood or PG-host-hood beyond those already noted in section 2.1, and then show that this generalization applies in the expected way to the sluicing/sprouting examples we are addressing.

2.6.1   The anti-c-command condition on PG-locality

We noted in section 2.1 that PG-locality essentially holds between the object and the subject of a given clause, or between the object of a given clause and a VP-adjunct attached to it, but said nothing about any other potential PG-local configurations. The unacceptability of (19b) shows that a subject gap is not PG-local to a VP-adjunct attached to the same clause; this is an instance of the so-called anti-c-command condition (Chomsky 1986, Engdahl 1983 among many others).[13]

(19)   a.   The editor told me which newly published book I must review __$_{RG}$ soon after
           he receives __$_{PG}$.

       b.   *The editor told me which newly published book __$_{RG}$ must be reviewed __, soon
           after he receives __$_{PG}$.

If we are correct in supposing that the crucial gap in (12) is licensed according to "normal" PG-locality requirements, then the sluicing and sprouting examples we have been considering should be sensitive to this. This prediction is borne out, as illustrated by the unacceptability of (20b) in

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[13] We have switched to using a finite adjunct clause here, rather than adjunct control as in previous examples based on (3), to avoid complications that might arise from having no overt controller for an adjunct clause's PRO in passive cases like (19b).

contrast to (18a) (which is repeated here as (20a)). In (20b), the wh-phrase in the first conjunct A-moves to the subject position and A-bar movement starts from the subject position. Hence in the unpronounced structure in the second clause, the PG-licensor A-bar trace is in subject position, which is not PG-local to the VP-adjoined base position of the wh-remnant.[14]

(20) a. The editor told me which newly published book I must review __, but I don't remember how soon after he receives __$_{PG}$.

      b. *The editor told me which newly published book __$_{RG}$ must be reviewed __, but I don't remember how soon after he receives __$_{PG}$.

Note that these are instances of sprouting, and that it would not be possible to construct relevant examples to demonstrate the same point with sluicing. A sluicing version would have to contain, in its first clause, a correlate of the wh-remnant PG-host adjunct; and this would independently rule out, purely on the basis of the first clause, the crucial (20b) where the first clause, by design, contains no appropriately-positioned licensor for the PG inside this adjunct.

2.6.2 Wh-PP traces are not PG-licensors

It has also been noted that PG-licensing can apply only to DP gaps, not PP gaps (Aoun and Clark 1985, Browning 1987, Chomsky 1982, 1986, Cinque 1990, Emonds 1985, Engdahl 1983,

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[14] The unacceptability of example (20b) supports the position that sluicing does not tolerate voice mismatch (Merchant 2008, 2013). If, in (20b), the elided TP could be active voice as illustrated in (i) (as it is in (20a)), then there would be a PG-local A-bar gap to license the PG. Thus the violation of the anti-c-command condition could be circumvented. The fact that (20b) is unacceptable argues against the possibility of such voice-mismatched structure in sluicing.

(i) … but I don't remember [how soon after he receives __$_{PG}$] the editor told me which newly published book __$_{RG}$ I must review __.

Frampton 1990, Hornstein 2001, Koster 1987, Lasnik and Saito 1992, Nissenbaum 2000, Nunes 2004, Postal 1993). This is illustrated by the contrast in (21): (21a) differs from previous examples only in that the gaps are in complement-of-PP positions rather than direct object positions, and is acceptable; but (21b), where the preposition is pied-piped and so the gaps occupy PP positions, is not.[15]

(21) a.   The editor told me which book I must write about __RG soon after talking about

__PG.

   b.   *The editor told me about which book I must write __RG soon after talking __PG.

This generalization can be encoded by saying that (i) only A-bar gaps left by overt movement of DPs are PG-licensors, and (ii) the gap in a PG-host must be a DP gap. This constraint on the category of PGs extends to sluicing/sprouting cases as we would predict.

(22) a.   The editor told me which newly published book I must write about __RG, but I

don't remember exactly how soon after talking about __.

   b.   *The editor told me about which newly published book I must write __RG, but I

don't remember exactly how soon after talking __PG.

2.6.3   PG-host structures cannot contain additional islands

Another established property of PGs is that they cannot be embedded inside an additional island

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[15] The two sentences in (21) differ in two (arguably independent) respects: first, the category of the "real gap" differs, and second, the category of the potentially-parasitic gap differs. Examples where the categories of the two gaps do not match are also unacceptable. It is arguably unclear whether this should be taken as a fact specifically relating to PG-licensing, or whether it reflects some more general property of perhaps subcategorization and/or chain uniformity. In any case, this pattern also carries over to the sluicing/sprouting cases.

(Chomsky 1986, Hornstein 2001, 2002, Kayne 1983, Kennedy 2003, Nissenbaum 2000, Nunes and Uriagereka 2000, Nunes 2004). By "additional island", we mean a further island in addition to the PG-host itself, the adjunct island/subject island that is the normal location for a PG and does not render the PGs illicit in the basic examples in (3). This property is illustrated in (23).

(23) a. *The editor told me which book I must review __ [soon after he calls me

[when the secretary has received ___]].

b. The editor told me which book I must review __ [soon after he tells me

[that the secretary has received ___]].

The example in (23a) shows that the additional adverbial adjunct island, inside the adjunct island that is present in (3), leads to unacceptability; this is substantially worse than the analogous example in (23b) where a non-island clause is added instead.

Put differently, what (23) demonstrates is that the following structure is not a PG-host (compare with (6)).

(24) [soon after he calls me when the secretary has received ___]$_{adjunct}$

The gaps that we argue are parasitic on elided syntactic structure also conform to this generalization about PG-hosts. This is illustrated in (25).

(25) a. *The editor told me which book I must review __$_1$, but I don't remember exactly

[how soon after he calls me [when the secretary has received ___]].

b. The editor told me which book I must review __$_1$, but I don't remember exactly

[how soon after he tells me [that the secretary has received ___]].

2.6.4 PG-host subjects must be non-finite

As the following pair of examples indicates, PGs are not licensed in a finite clause inside a subject (Kayne 1983, Phillips 2006 among others).

(26) a. The school superintendent told me which school just a few attempts to expand

____$_1$ ultimately overburdened ____$_2$.

     b. *The school superintendent told me which school just a few attempts that

(actually) expanded ____$_1$ ultimately overburdened ____$_2$.

Put differently, the following structure is not a PG-host (compare with (6)).

(27) [just a few attempts that (actually) expanded ____]$_{subject}$

The gaps in sluicing and sprouting remnants also conform to this generalization concerning PG-host structures. In (28b), the clause that hosts the third gap is a finite clause.

(28) a. The school superintendent told me which school just a few attempts to expand

____$_1$ ultimately overburdened ____$_2$, but I don't remember exactly how many

attempts to expand ^{ok}it/^{ok}____$_3$.

     b. The school superintendent told me which school just a few attempts to expand

____$_1$ ultimately overburdened ____$_2$, but I don't remember exactly how many

attempts that (actually) expanded ^{ok}it/*____$_3$.

Notice that in (28b) we have been forced to construct an example where the wh-remnant has a correlate in the first clause, but parallelism does not hold between these two constituents: the subject of the first clause contains a non-finite clause, but the wh-remnant has a finite clause. Since subjects are not optional, it is not possible to use this kind of subject PG-host as a wh-remnant without having some correlate in the first clause (i.e. in contrast to adjuncts, it is not possible to sprout subjects). But still the unacceptability of (28b) cannot be attributed to this lack of parallelism, because we take the existence of sprouting in general to indicate that there is no parallelism requirement imposed on a wh-remnant, no matter what its grammatical function. This is supported by the acceptability of the variant of (28b) that uses a pronoun in place of the gap:

this would be ungrammatical if the finiteness mismatch itself were problematic.

3. The Derivation of Parasitic Gaps under Sluicing and Theoretical Consequences

PGs in English require a real gap left by overt A-bar movement. This means that in examples like those in (12), a real gap and the overt wh-movement that creates the real gap must exist in the second conjunct. Thus, the ellipsis clauses in (12) must have a derivation like (29).

(29) a.

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b.
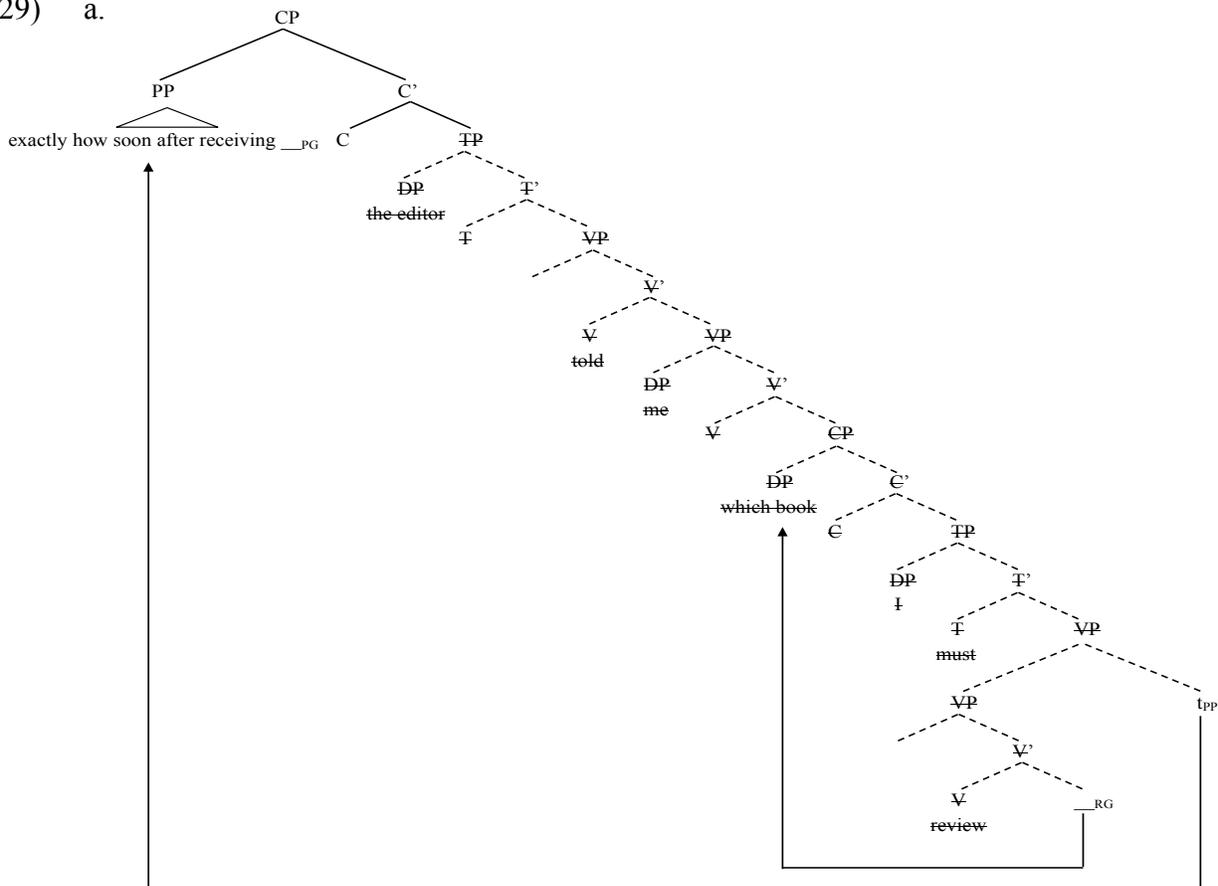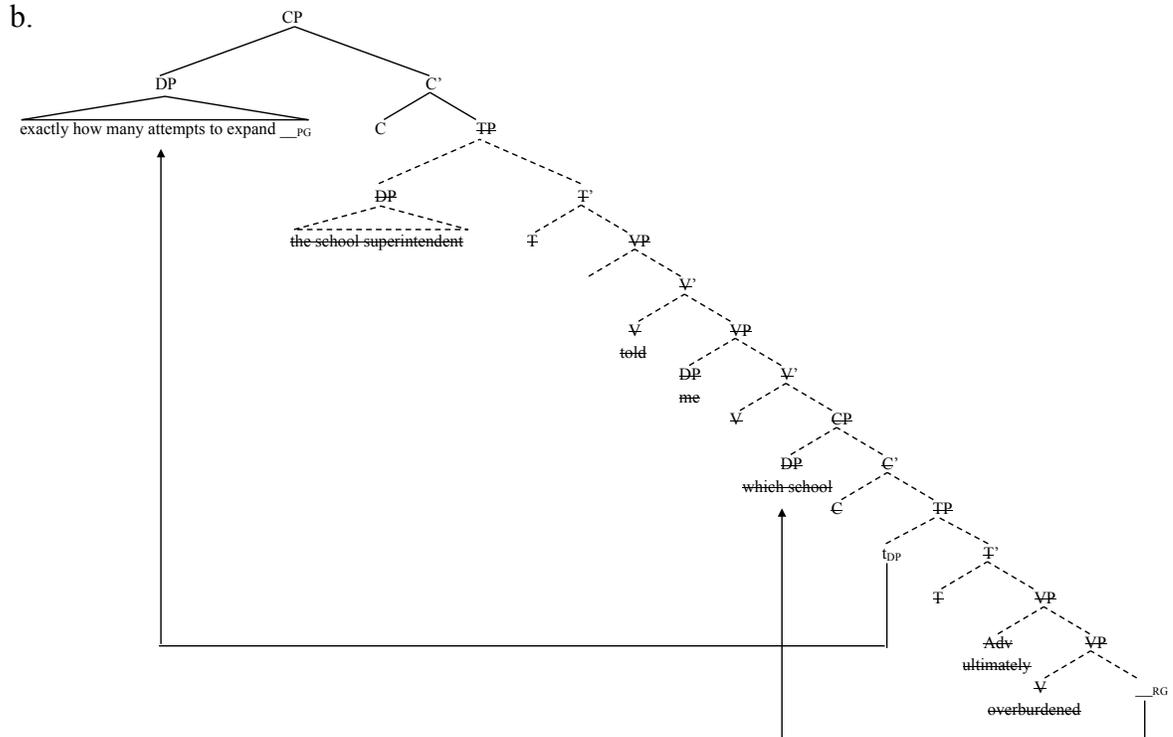
In (29a) the PG in the adjunct clause is licensed by the real gap (__RG). Furthermore, the adjunct clause is moved across the overtly moved wh-phrase (*which book*). Given that there is no place other than the ellipsis site where the structure of the overt wh-movement can exist, and given that only one wh-phrase surfaces in (12), movement across the wh-island is necessary. In the same vein, in (29b), an infinitive clause in the subject DP contains a PG which is licensed by the real gap left by overt wh-movement in the ellipsis site. Again, the wh-movement of the subject containing the PG must move across another wh-phrase.

The partial derivations illustrated in (29) are equally applicable to the sprouting examples we have considered: in such cases, the only difference is that the antecedent clauses, which are not shown in (29), contain no correlate of the wh-remnant.

The analysis illustrated in (29) yields several noteworthy theoretical consequences. Assuming that PG-licensing is syntactic in nature, our diagnosis of these facts suggests that it

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will not be possible to account for them within a theory that posits no syntactic structure at all in ellipsis sites (Barker 2012a, b, Culicover and Jackendoff 2005, Ginzburg and Sag 2000). But besides this general point, there are also other more subtle consequences for exactly in what sense we should understand ellipsis sites to "have" syntactic structure and how this unpronounced syntactic structure interacts with other syntactic phenomena, which we will now discuss.

3.1   Sluicing repairs subjacency/wh-island violations

Our analysis indicates that, contrary to some recent studies (Abels 2011, Barros 2012 among others), sluicing can indeed ameliorate island violations[16] (in line with Boeckx and Lasnik 2006, Chung, Ladusaw and McCloskey 1995, van Craenenbroeck 2010a, Fox and Lasnik 2003, Lasnik 2001, 2005, 2007, in press, Merchant 2001, 2004, Ross 1969 among others; also see Bošković 2011 on amelioration of different locality effects). We have argued that the only feasible analysis of (30a) posits an ellipsis site that contains a real gap left by overt A-bar movement of *which book*. Since the filler of this gap is also inside the ellipsis site, the movement of the wh-remnant must cross this filler and therefore violate a wh-island. This is illustrated in (30b), which is the non-ellipsis counterpart of (30a): here the *how soon ...* wh-phrase has crossed the filler *which*

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[16] Movement of an adjunct like *how soon* out of wh-island incurs subjacency problem as well as ECP problem. It has been claimed that PF-island violations, some of which can be subsumed to subjacency violation, can be repaired by ellipsis as ellipsis is understood as PF-deletion (Merchant 2001, Lasnik 2001, 2005, 2007), but it is not clear whether the violation of the ECP, which constrains LF-movement as well as overt movement (Lasnik and Saito 1984, 1992), can be repaired by PF-deletion as well (see Nakao and Yoshida 2007, Nakao 2009 for the related discussion). We discuss the problem of the ECP in section 3.2.

book, violating the wh-island constraint and producing an unacceptable result. This violation is ameliorated by ellipsis in (30a).

(30) a. The editor told me which book I must review __RG soon after receiving __PG, but I don't remember exactly how soon after receiving __PG [the editor told me which book I must review __RG].

  b. *The editor told me which book I must review __RG soon after receiving __PG, but I don't remember exactly how soon after receiving __PG the editor told me which book I must review __RG.

This is in line with well known observation that wh-island violations are acceptable under sluicing as illustrated in (31) (Boeckx and Lasnik 2006, Chung, Ladusaw and McCloskey 1995, Lasnik 2001, 2005, 2007, Merchant 2001, among others).[17]

(31) Sandy was trying to work out which students would be able to solve a certain problem, but she wouldn't tell us which one (*she was trying to work out which students would be able to solve).   (Chung, Ladusaw and McCloskey 1995: 275)

Proponents of the idea that sluicing does not ameliorate island violations have suggested that in cases like (31), the pre-ellipsis structure is not the full structure indicated in parentheses, but rather something smaller that does not include an island violation: either a short extraction source (Merchant 2001) that involves only a subpart of the embedded clause (e.g., *which one they would be able to solve*), or a pseudosluicing structure that involves a reduced cleft/copular structure in

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[17] Note that Ross (1969) does not claim that sluicing completely salvages island violations. He claims, "it is perceived to be less ungrammatical" (Ross 1969: 276). However, in this study, following the standard reported judgment, we assume that island violations are acceptable under sluicing.

the ellipsis site (e.g., *which one it was*) (van Craenenbroeck 2010b, Erteschik-Shir 1977, Merchant 1998, Pollmann 1975, Vicente 2008 cf., Merchant 2001). Notice, however, that in the case of (30a), cleft/copular structures like those in (32) cannot underlie the ellipsis site, because they would not contain the necessary PG-licensor gap.

(32)   a. … I don't remember [$_{CP}$ [exactly how soon after receiving ___] [$_{TP}$ I must review it]].

        b. … I don't remember [$_{CP}$ [exactly how soon after receiving ___] [$_{TP}$ it was]].

Only by supposing that the more complete structure, which causes a wh-island violation in (30b), is present in the ellipsis site, can we account for the possibility of the much-discussed gap in the wh-remnant in (30a). In other words, (30a) provides an argument for the island-repairing ability of sluicing which, unlike the argument based on (31), cannot be circumvented by positing smaller, island-free elided structures.[18]

To avoid this conclusion, supporters of the idea that a shorter, island-free structure underlies the ellipsis site might propose a more elaborate structure along the lines of (33).[19]

(33)   … I don't remember [$_{CP}$ [exactly how soon after receiving ___] [$_{CP}$ which book [$_{TP}$ I must

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[18] Likewise, analyses that tie island-amelioration effects under sluicing to the availability of a resumptive pronoun at the base position of the wh-remnant (Boeckx 2008, Wang 2007 c.f., Rottman and Yoshida forthcoming) are not compatible with examples like (30a). This is because English lacks a resumptive element that can resume an adjunct wh-clause (see Merchant 2001 on the related discussion). Since no possible resumptive pronoun exists to occupy the base position of the sluicing remnant, such an analysis predicts (30a) and similar examples to be ungrammatical, contrary to fact.

[19] The suggestion to consider the possibility that a novel kind of short-source analysis might be available came from an anonymous reviewer.

review ___]]]

For short-extraction analyses, a structure of this sort seems to be the only candidate that would (i) provide the crucial PG-licensor gap, since *which book* has moved (overtly, although to a position that is still inside the ellipsis site) out of the embedded object position, and (ii) avoid moving the *how soon* phrase out of the resulting wh-island (arguably) by moving it only to the left periphery of the same clause. Clearly many serious questions arise about exactly how (33) could be derived: about exactly where the two wh-phrases have moved to, about how ellipsis of a constituent containing only the lower one is licensed, and so on.[20] But we need not investigate in detail the potentially complex arguments for and against the claim that this structure is somehow derivable, because our goal here --- namely, showing that (33) does not underlie (30a) --- is better served by simply showing that (33) would make incorrect predictions even if we grant that the structure itself *were* derivable. (For the sake of our argument we will remain agnostic about the derivability of (33), but to the extent that independent arguments against it exist, so much the worse for that analysis.) The incorrect predictions made by (33) relate to the interpretation of (30a) and to Condition C effects that arise in variants of (30a). We will discuss each in turn.

        First, the interpretation predicted by (33) is not the one speakers assign to (30a): in short,

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[20] Among the many issues, an anonymous reviewer points out that if the ellipsis site is understood as defined by a phase domain (either the phase projection of the complement of phases) (Bošković to appear-a), eliding a segment of CP is not an option. Alternative approaches that do not tie ellipsis to phases, and which adopt a split-CP structure (Rizzi 1997) and assume that sluicing targets the lowest CP projection (Baltin 2010) could propose that the second wh-phrase moves into the lower Spec_CP, and the lower CP, including the second wh-phrase but excluding the first wh-phrase, is elided in sluicing.

(33) predicts a "double question" interpretation involving two paired wh-operators (*how soon* and *which book*), whereas (30a) is understood with only a single *which book* question. To bring out the relevant contrasts, consider the variant of (30a) in (34), for which the analogous supposed underlying source would be (35).

(34)   The editors are arguing about which book I will have to review soon after receiving, but I don't know exactly how soon after receiving.

(35)   … I don't remember [$_{CP}$ [exactly how soon after receiving ___] [$_{CP}$ which book [$_{TP}$ I will have to review ___]]]

What (34) means is that the speaker is ignorant of a certain detail of the editors' argument: whether he/she will have, say, two months available to complete the review, or three months, or four months, etc. Importantly, the speaker does not express ignorance about the outcome of the argument, i.e. about the *which book* question that is occupying the editors, only ignorance about the answer to a *how soon* question.[21]

It is now easy to see that (35) will not produce the desired interpretation. With two wh-phrases at the left periphery of a single clause, the resulting interpretation would presumably be a double-question, paraphrasable along the lines of "I don't know what timespan t and which book b are such that I will have to review b within timespan t after receiving b". But as we noted

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[21] We take this to be the only available reading of (34), but note that if it were shown that (34) has a distinct additional reading that were adequately captured by (35), this would not affect our argument. The existence of the "long" reading that we focus on suffices to establish that the "long source" structure we propose is licit, and therefore that sluicing can repair island violations. A second reading adequately captured by (35) would show only that (34) is ambiguous between this shorter island-free structure and the longer island-repair structure.

above, in (34) the speaker does not express ignorance about any *which book* question, in contrast to this paraphrase. An utterance of (34) is even compatible with a situation where the argument is never resolved and the editors decide not to send the speaker anything, in which case there is no answer to the *which book* question for the speaker to be ignorant of, no "book which I will have to review". We also noted that the speaker's ignorance in (34) concerns a fact about the editors' argument, but there is no editors' argument in the paraphrase just given (nor is there anything that could correspond to a mention of editors or arguments in (35)). These mismatches indicate that the ellipsis site in (34) must, in order to produce the desired interpretation, contain structure corresponding to the matrix clause (*The editors are arguing*), over which *how soon* but not *which book* must take scope, as in our proposed structure in (29a); and this is precisely the configuration that would cause the movement of *how soon* to constitute a wh-island violation. By analogy, the same requirements also hold for the ellipsis site in (30a), although the interpretive differences are more subtle with the matrix verb *tell*.

The second incorrect prediction made by positing (33) as the structure of the ellipsis site in (30a) concerns Condition C effects, and also hinges directly on whether the ellipsis site contains a correlate of the first conjunct's matrix clause. To begin, note that the unacceptability of (36a) indicates that the sprouted *how soon* phrase undergoes obligatory reconstruction into its base position inside the ellipsis site, where the name *John* is c-commanded by the matrix subject pronoun. This appears to be a Condition C effect, since disrupting the c-command relationship in (36b) and (36c) produces acceptable results. [22]

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[22]That these sprouting examples should pattern this way is somewhat surprising, given that in cases such as (i), it is generally accepted that Condition-C reconstruction of adjuncts is optional. Many thanks to an anonymous reviewer for reminding us of this important issue. It is possible

(36)　　a.　　*He$_1$ must review a book, but I don't know how soon after John$_1$ receives it [~~he$_1$~~

~~must review a book~~].

　　　　b.　　John$_1$ must review a book, but I don't know how soon after he$_1$ receives it [~~John$_1$~~

~~must review a book~~].

　　　　c.　　His$_1$ colleagues must review a book, but I don't know how soon after John$_1$

receives it [~~his$_1$ colleagues must review a book~~].

Consider now (37). This is structurally analogous to (30a), except that we have sprouted the *how*

soon remnant in order to avoid a Condition C violation in the first clause. As in (36a), however,

this produces a Condition C violation.

(37)　　*He$_1$ told me which book I must review __$_{RG}$, but I don't remember how soon after John$_1$

receives __$_{PG}$ [~~he told me which book I must review __ __$_{PP}$~~].

This suggests that the base position of the sprouted *how soon* remnant, which contains the name

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that this difference between (i) and (36) is a result of the "form-chain" operation, as opposed to

ordinary movement, which produces sprouting under Chung et al.'s (1995) analysis.

(i)　　a.　　How soon after John$_i$ receives the book will he$_i$ review it?

　　　　b.　　How soon after he$_i$ receives the book will John$_i$ review it?

Common analyses of this more familiar pattern in (i) would attribute the optionality of

reconstruction to the fact that the *how soon* clause is an adjunct (rather than a complement)

(Freidin 1986, Lebeaux 1988, 1995; similar observations in an earlier framework are made in

Ross 1969, Lees & Klima 1963 and Langacker 1969), although this generalization has been

questioned (Lasnik 1998, 2003; Kuno 1997) and alternative approaches have been proposed

(Barss 1986, 1988; Huang 1993; Heycock 1995).

John, is c-commanded by a co-indexed pronoun. The subject of the first clause clearly does not stand in the required c-command relationship. With our proposed "full" ellipsis site, the unacceptability of (37) straightforwardly follows from the presence of *he* in the upper clause of the ellipsis site. The distinguishing property of the proposal indicated in (33), however, is that this upper clause is missing from the ellipsis site, and this proposal therefore cannot explain the unacceptability of (37): one would expect (37) to be relevantly similar to (38) which (although it cannot license a PG) does not induce an equivalent Condition C violation because *he₁ told me* is not included in the second conjunct.[23]

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[23] Marcel den Dikken (*p.c.*) pointed out to us that in an example like (i) the coreference of the pronoun *he* and the name *John* is somehow blocked, even though the example does not involve ellipsis and the pronoun and the name do not clearly stand in a c-command relation.

(i)   *He₁ loves her but John₁ doesn't know it yet.

This example may suggest that the contrast in (36) does not stem from a Binding Condition C violation. But this does not seem to be a consistent effect: the following analogous sentences seem to be more acceptable than (i).

(ii)   He₁ loves her but John₁ can't marry her.

(iii)   He₁ loves her but John₁ doesn't know he loves her yet.

In light of (iii), one possible explanation is that the unacceptability of (i) has something to do with the use of the "clausal pronoun" *it*; this would be consistent with the fact that (iv) is also quite degraded.

(iv)   *He₁ loves her and John₁ knows it.

It is not clear to us how the clausal pronoun might be affecting the possibility of coreference, but we tentatively conclude on the basis of (ii) and (iii) that whatever is going wrong in (i) is not a

(38)   He$_1$ told me which book I must review __$_{RG}$, but I don't remember how soon

after John$_1$ receives *(it) I must review it.

The upper clause that (33) omits from the ellipsis site is therefore crucial both for achieving the correct interpretation, as discussed above, and for capturing these Condition C effects.

We therefore conclude that neither the standard "short source" structures in (32) nor the more elaborate candidate in (33) can underlie the ellipsis site in example (30a). Positing the more complete structure, which causes a wh-island violation in (30b), remains the only feasible analysis. So as claimed above, (30a) provides an argument for the island-repairing ability of sluicing which cannot be circumvented by positing a smaller, island-free elided structure.

3.2   Sluicing and ECP violations

The constituent that moves out of the wh-island in examples like (30a) is an adverbial clause (*how soon …*). This creates an interesting question: has there been a repair not only of a wh-island violation, but also of an ECP violation (specifically, due to failure of antecedent government of this adverbial clause's trace)? At first glance the answer would appear to be yes, since extraction of *how soon* creates the harsher unacceptability characteristic of adjuncts such as *how* in standard ECP contexts such as (39).

(39)   a.   ?? What did the editor tell you who must review __ carefully soon?

b.   * How did the editor tell you who must review the book __ soon?

c.   * How soon did the editor tell you who must review the book carefully __?

On the other hand, there is independent evidence suggesting that ECP violations cannot

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factor in (36a), and therefore that the contrast in (36) is indeed due to the Binding Condition C violation.

be repaired under sluicing,[24] which might raise doubts about whether our analysis of (30a) --- involving extraction of *how soon* out of a wh-island, but producing a result that is not noticeably degraded --- could be correct. First, Lasnik and Park (2003: 658) (henceforth L&P), observe that sluicing does not repair the ungrammaticality resulting from the extraction of adjuncts out of NP. They cite the following example and argue that the ECP violation caused by movement of the adjunct is not repaired by PF-deletion.[25].

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[24] A finding that ECP violations are not repaired would receive a straightforward analysis under the T-model of grammar: since the ECP has been thought to be a constraint that applies at LF (Lasnik and Saito 1984, 1992), it is to be expected that ellipsis – taken to be a process of PF deletion – cannot rescue ECP violations. Natural as this picture might be, there is nothing incoherent about supposing that a constraint can both (i) apply to covert movement and (ii) have its violations repaired by ellipsis.

[25] L&P's examples involve sprouting. If the examples are changed to merger-type sluicing with an explicit correlate, the acceptability markedly improves.

(i)   Mary found out who met three teachers from some Midwestern city, but I don't know from which city [~~Mary found out who met three teachers __~~].

Six native speakers we interviewed found that (i) is much more acceptable than (40a). The contrast between (i) and Lasnik and Park's (40a) suggests that sprouting is somewhat more sensitive than merger-type sluicing, as has been noticed before (Chung, Ladusaw and McCloskey 1995, Romero 1998), although the question of why this should be remains open.

Note, the repair effect seen in (i) can also be accounted for by the proposals of Bošković (2005, 2013 to appear), which attempt to exclude the ECP-based explanation of the unacceptability of adjunct extraction from NPs. First, Bošković argues that DP is a phase in

(40) a. *Mary found out who met three teachers, but I don't know from which city [~~Mary found out who met three teachers~~].

b. ?Mary found out who met three teachers, but I don't know of which subject [~~Mary found out who met three teachers~~].

Second, Nakao (2009) (as well as Nakao and Yoshida 2007) has reported that ECP violations caused by movement of *why* and *how* out of islands is not repaired by sluicing, as exemplified by (41) (Nakao 2009: 59). In contrast to the extraction of an argument in (41a), the extraction of *why* and *how* produces unacceptable results in (41b) and (41c).

(41) a. John wants to hire [someone who fixes cars with something], but I don't know what [~~he wants to hire someone who fixed car with~~].

b. *John wants to hire [someone who fixes cars for a certain reason], but I don't know (exactly) why [~~he wants to hire someone who fixed car with something~~].

English, and that adjunct extraction out of NP is excluded because the adjunct cannot move to Spec_DP in the following configuration:

(ii) $[_{DP} \ldots [_{NP} [_{NP} \ldots] [_{PP} \ldots]]]$

In (ii), the movement from the adjunct position to the Spec_DP is too local, as the movement does not cross a full phrasal node (an anti-locality violation: Abels 2003, Bošković 1994, 1997, Grohmann 2003, Saito and Murasugi 1999 among others). As a result, the movement of the adjunct PP must violate the Phase Impenetrability Condition (PIC: Chomsky 2000, 2001). On the other hand, Bošković has independently shown that PIC/anti-locality violation can be rescued by PF-deletion. Therefore, from Bošković's theory of NPs, Phases and Rescue-by-PF-deletion (Bošković 2011, to appear-b), the amelioration effect in (i) follows without appealing to the amelioration of ECP-violations.

c.   *John wants to hire [someone who fixes cars in a certain way], but I don't

(exactly) know how [~~he wants to hire someone who fixed car~~].

These illustrations of ECP non-repair create a certain tension for our analysis of the crucial (30a). If movement of the *how soon ...* clause in (30a) creates an ECP violation (as the status of *how soon* in (39) suggests it would) and such ECP violations cannot be repaired, then we have no account of the near-perfect acceptability of (30a). To account for this near-perfect acceptability, we need to suppose that any violation triggered by the movement of *how soon ...* is repaired, in apparent conflict with what L&P and Nakao report.

Notice however that neither L&P's (40) nor Nakao's (41) involve extractions that are precisely analogous to the one in (30a) that is our main concern. L&P's (40) involves extraction of an NP-adjunct out of a wh-island, and Nakao's (41) involves extraction of a VP-adjunct (or perhaps clausal adjunct) out of a relative clause island; in (30a), we have extraction of a VP-adjunct (or perhaps clausal adjunct) out of a wh-island. It turns out that examples roughly analogous to Nakao's (41) but with wh-islands in place of relative clause islands, as shown in (42), exhibit a different pattern.[26]

(42)   a.   John told her [who fixes cars with something], but I don't know what [~~he told her who fixes cars with~~ __].

       b.   John told her [who fixes cars for a certain reason], but I don't know why [~~he told her who fixes cars~~ __].

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[26] Six native English speakers whom we interviewed reported that in (42b) and (42c) the non-island violating short-source interpretation (*why/how he fixed cars*) is much easier to access than the long-distance reading. However, all the speakers agreed that it is possible to have the long-distance interpretation.

c.   John told her [who fixes cars in a certain way], but I don't know how [~~he told her who fixes cars~~ __].

Here the violations caused by movements of *why* and *how* are repaired, along with that caused by the movement of *what*. The same is true movements of *how soon* and of a full *how soon …* clause that is directly analogous to the moved constituent in our crucial (30a).

(43)   a.   John told her [who will fix the car quite soon], but I don't know how soon [~~he told her who will fix the car~~ __].

        b.   John told her [who will fix the car quite soon after finding it], but I don't know how soon after finding it [~~he told her who will fix the car~~ __].

This indicates that when wh-islands are elided in sluicing constructions, the argument/adjunction distinction we observed in (39), with *how soon* patterning with adjuncts such as *how*, does not play a role: at least as a descriptive generalization, all extractions from wh-islands seem to be repairable. This is in keeping with the early observation of Chung et al. (1995), who cite examples like (44) and (45) (Chung et al.'s (89c,b) and (90c,b): 274) as evidence that movement of an adjunct a reason or manner wh-phrase over the wh-island is licit is cases of sluicing, repairing an apparent ECP-violation.[27]

(44)   a.   Sandy is wondering [$_{CP}$ whether [$_{TP}$ there will be students who have to drop the class <u>for a certain reason</u>], but she won't reveal <u>what (reason)</u> [~~she is wondering~~

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[27] Even though we are citing (44a) as an example of an ECP-violation, since this is how Chung et al., (1995) describe it, (44a) is at least not a typical ECP violation. The wh-remnant in (44a) originates as the complement of an adjunct PP embedded inside a complex NP island and a wh-island, so this is actually a case of the violation of the Condition on Extraction Domains (CED: Huang 1982). On the other hand, (44b) does involve the movement of an adjunct wh-phrase *why*.

whether ~~there will be students who have to drop the class for~~].

b. *Why is Sandy wondering [CP whether [TP there will be [DP students who have dropped the class __]]]?

(45) a. Clinton is anxious to find out [CP which budget dilemmas [TP Panetta would be willing to tackle in a certain way]], but he won't say in which (way) ~~[Clinton is anxious to find out [CP which budget dilemmas [TP Panetta would be willing to tackle]]~~

b. *In which way is Clinton anxious to find out which budget dilemmas Panetta would be willing to tackle __?

This generalization, understood at a descriptive empirical level, suffices to back up our analysis of the crucial PG examples such as (30a): if it were not for this fact about wh-islands, one might argue on the basis of L&P and Nakao that the extraction of an adjunct from a wh-island should create an unrepairable ECP violation, and therefore that our analysis of (30a) must be incorrect. The acceptability of examples like (43b), in particular, indicates that the kind of repair that we must invoke in our analysis of (30a), whatever its best theoretical analysis may be, does occur.

As regards the theoretical question of whether ECP violations can be repaired, however, the pattern of facts we have observed clearly creates complications: if L&P's and Nakao's adjunct extractions are not repairable, but adjunct extractions from wh-islands are repairable, then this calls into question the conventional picture which would classify all these cases as ECP violations (in each case, failure of antecedent government).

Finally, recall that sprouting versions of examples like (30a) show the same PG-licensing properties as the merger-type sluicing versions (as discussed in section 2.4), which suggests that

the analysis shown in (29) applies to both versions of the construction. This in turn suggests that whatever island constraint(s) the *how soon ...* remnant violates, these violations are repaired in both merger-type sluicing and sprouting. There are other cases where sprouting seems to be more sensitive to islands than merger-type sluicing (e.g. see footnote 25); whatever the cause of these differences, the particular kind of island repair that we must invoke with merger-type sluicing in our analysis of (30a), for all of the reasons discussed in the last two subsections, appears to occur equally in cases of sprouting.
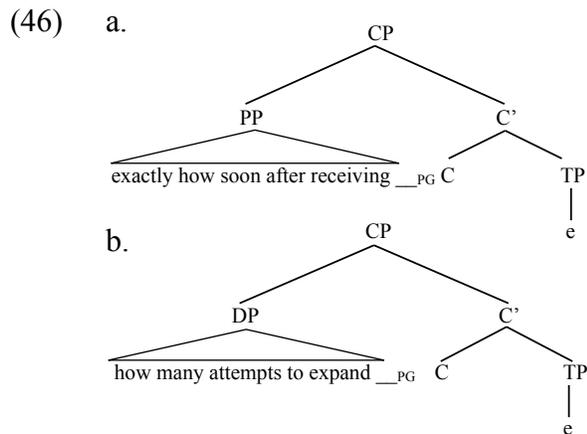
3.3   LF-copying approaches to sluicing

The fact that a PG is licensed in a wh-remnant of sluicing provides a potential argument against LF-copying approaches to sluicing (Chung, Ladusaw and McCloskey 1995, Fortin 2011, Lobeck 1995)[28], provided we adopt one particular view of how it is that the PG-licensing mechanisms are sensitive to the overt/covert distinction (i.e. how it is that only *overt* A-bar movement can license PGs); there are, however, alternative views of how this sensitivity could be encoded that would avoid conflict with LF-copying analyses. We will first present the argument against LF-copying analyses, such as it is, and then return to point out the loophole that it leaves open.

Under LF-copying analyses, the structure of the antecedent clause is copied into the ellipsis site by means of replacing an empty pointer element with the structure of the antecedent clause. The crucial consequence of this is that, under LF-copying analyses, the link between the

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[28] Here we concentrate on the LF-copying approach specifically in the context of sluicing. However, as long as PGs are licensed in other ellipsis contexts (see Kennedy 2003 for discussion on VP-ellipsis and PGs), we believe that the same problem arises with the LF-copying approaches to ellipsis contexts other than sluicing (Fiengo and May 1994, Shopen 1972, Wasow 1972, Williams 1977 among others).

remnant wh-phrase and the gap in the object position of the elided structure (which is an indefinite phrase under Chung, Ladusaw and McCloskey's analysis) is established at LF. Specifically, under Chung, Ladusaw and McCloskey's (1995) original proposal, there is a point in the derivation at which the wh-remnant contains the PG, but the second clause does not yet contain the "real gap" for which the wh-remnant is the filler, before LF-copying takes place. The relevant structures are illustrated in (46).

(46)　a.

```
                         CP
                  _____/  _____
                 PP                C'
           _____/  \_____        _/  \_
  exactly how soon after receiving __PG  C      TP
                                                |
                                                e
```

　　b.

```
                      CP
               _____/  \_____
              DP              C'
         ____/  \____        _/  \_
  how many attempts to expand __PG  C      TP
                                           |
                                           e
```

Under this approach, wh-movement cannot take place in the ellipsis site in the overt component of syntax. Since the gap for which the wh-remnant is the filler is only created in the covert component, it is not a PG-licensor.

However, as mentioned above, there is an assumption in this argument that, while plausible, is not necessary: we assumed that what makes gaps created by overt movement PG-licensors is not that they are different objects from gaps created by covert movement, but rather the fact that they are created *during* the overt component/cycle of syntax. On this view all gaps created by LF-copying are necessarily "covert movement gaps" in the relevant sense, and therefore are not PG-licensors. The alternative, which also seems feasible, is to suppose that there is a contentful difference between overt movement gaps and covert movement gaps themselves (for concreteness: perhaps gaps created by movement during overt syntax get a

[+PG-licensor] feature, whereas gaps created by movement during covert syntax do not), and LF-copying carries over this information into the ellipsis site. On this view, examples like (30a) could be derived: movement in the first clause during overt syntax would create a PG-licensor gap, and the LF-copying operation would copy this gap over into the ellipsis site, along with whatever distinguishing features or properties make it a PG-licensor gap.

We do not attempt to settle this issue here: we simply note that the data we have presented do not seem to be compatible with the combination of *both* (i) the assumption that sluicing occurs via LF-copying, *and* (ii) the timing-based view of what distinguishes overt movement gaps (which license PGs) from covert movement gaps (which do not).

3.4   The single-cycle model of syntax

The data we have discussed raise an interesting problem for the single-cycle or single-output model of syntax (Bobaljik 1995, 2002, Brody 1995, Groat and O'Neil 1996, Hagstrom 1998, Nissenbaum 2000, Pesetsky 1998 among others). This view rejects the traditional idea that syntax proceeds in two cycles, an overt cycle and a covert cycle, where the overt cycle precedes the covert cycle and only the overt cycle affects the object interpreted at PF. The single-cycle view instead supposes that all syntactic operations – even those traditionally analyzed as covert movement – affect a single output representation that is interpreted by both the LF and PF interfaces. The idea is that all movement is "overt movement" (in the sense that the PF interface can see its results) and the distinction between "overt movement" and "covert movement" is simply a matter of whether PF-interpretation mechanisms result in the higher copy or the lower copy of the relevant element being pronounced. Movement operations that are descriptively "overt" or "covert" are not distinguished at all in narrow syntax.

We should stress that the problem we are about to point out only applies to versions of

the single-cycle hypothesis where it is assumed that movement is the only mechanism of long-distance dependency formation. This combination of assumptions entails that any dependency where only the lower link is pronounced will be analyzed as movement (with PF-interpretation mechanisms choosing to pronounce the lower of two copies). It is of course possible to reject the idea of a distinct covert cycle and therefore conform to the "single cycle" label but posit additional dependency-forming operations besides movement, such as Agree (Chomsky 2000), unselective binding (à la Pesetsky 1987), or formal-feature-only movement[29] (Chomsky 1995, Bošković 2002). The problem we discuss will not affect this kind of model, but only those drastically (and appealingly) minimalist versions of the single-cycle model that render *all* long-distance dependencies alike from the point of view of narrow syntax (see Bobaljik 2002, Epstein, Groat, Kawashima and Kitahara 1998, Epstein and Seely 2002, Fox and Nissembaum, Groat and O'Neil, Pesetsky 1998 among others for related discussion). [30]

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[29] Unless otherwise specified, "movement" refers to full phrasal movement, not just movement of formal features.

[30] Bošković (2002) reports other PG data which, admittedly, already pose serious problems for this view: in Romanian, PGs can be licensed by wh-in-situ as well as by overt wh-movement (Bošković 2002: 374-375). This effect carries over to sluicing examples parallel to those we have been considering in English: the PG is licensed not only by the overt wh-movement gap in (ia), but also by the wh-in-situ in (ib).

(i)   a.   Ştiu   ce   a   citit Ion înainte să claseze, dar nu ştiu   cu cât   timp

I.know what AUX read Ion before PRT file,   but not I.know with how.much time

înainte să   claseze.

before PRT file

To begin, one puzzle arises as soon as we consider the original PG-licensing generalizations from section 2.1. The wh-chain corresponding to the overtly-moved *which book* in (4a) is in no way distinguished from that corresponding to the covertly-moved *which book* in (4b) in narrow syntax, so the fact that a PG is licensed in only the former case must be derived

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"I know what Ion read before filing, but I don't know how long before filing."

b. Știu cine a citit ce înainte să claseze, dar nu știu cu cât timp

I.know who AUX read what before PRT file, but not I.know with how.much time

înainte să claseze.

before PRT file

"I know who read what before filing, but I don't know how long before filing."

This situation makes sense if the relevant Romanian in-situ wh-phrases are indeed indistinguishable from fronted wh-phrases from the point of view of narrow syntax and simply pronounced in their base positions; but this suggests that in-situ wh-phrases in English cannot be analyzed in this way, since they do not license PGs.

An additional puzzle for analyses of the connection between overt/covert movement and PG-licensing arises from the observation that at least sometimes, English in-situ wh-phrases do seem to license PGs. Nissenbaum (2000:12) cites the following examples.

(ii) a. $^?$*Which senator*$_1$ did you persuade __$_{RG1}$ to borrow *which car*$_2$ after getting an opponent of __$_{PG1}$ to put a bomb in __$_{PG2}$?

  b. **Which senator*$_1$ did you persuade __$_{RG1}$ to borrow *which car*$_2$ after putting a bomb in __$_{PG2}$?

This might be interpreted as evidence that whatever kind of wh-in-situ occurs in Romanian that licenses PGs, can at least sometimes occur in English too.

from the fact that PF-interpretation mechanisms pronounce the top position of the former chain but the lower position of the latter chain.

Whatever the correct details might turn out to be, let us suppose that a solution to this first puzzle concerning (4a) and (4b) can be formulated. The fact that the corresponding contrast also arises in the sluicing cases we have discussed raises an even more serious problem. The relevant examples ((12a) and (14b)) are repeated here. (The portions in parentheses represent correlates of the wh-remnant, which, as we have now seen, are optional and irrelevant.)

(47)   a.   The editor told me which book I must review __ (soon after receiving __), but I

              don't remember [exactly how soon after receiving __].

        b.   *The editor told me who must review which book (soon after receiving it), but I

              don't remember [exactly how soon after receiving __].

Recall that the relevant PG-licensor for the gap in the wh-remnant in (47a) is not in the object position of the first clause, but rather in the parallel object position that is situated inside the second clause's elided structure. The contrast in acceptability shows that whatever is in the corresponding position inside the second clause's elided structure in (47b) is *not* a valid PG-licensor. But notice that nothing is pronounced in this crucial potential-PG-licensor position, in either of the two examples. This indicates that the licensing distinction between a gap created by overt syntax and one created by covert syntax cannot simply be recast as a distinction between an unpronounced tail of a chain and a pronounced tail of a chain. Supposing, for example, that what prevents PG-licensing in (4b) is the fact that the base position is *pronounced* (in contrast to its being unpronounced in (4a)), would predict that both of the examples in (47) should be acceptable.

Stated somewhat more generally, what (47) illustrates is that the possibility of PG-

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licensing is sensitive to the distinction between an "elided overt movement gap" and an "elided covert movement gap".[31] Given that both the overt movement gap and the covert movement gap are in the ellipsis site, a phonologically empty site, a distinction between the two appealing to the *pronunciation* of the chain link cannot be maintained.[32]

An important ingredient in this argument is the assumption that the decision not to pronounce the tail of an overt movement chain (or the head of a covert-movement chain) and the decision not to pronounce some elided structure are both part of the same PF-interpretation process. This PF-interpretation process chooses to pronounce some things, and chooses not to pronounce other things (see the related discussion in Bošković 2002, Hornstein 2001, Nunes 2001, 2004, Richards 2001 among others), but there is no theoretically meaningful distinction between different "ways to not be pronounced": "chain-reduction" and "ellipsis" are just convenient labels. Under this assumption, there is no chance for a PG-licensing mechanism to see whether a movement chain inside an ellipsis site is a pronounce-high (i.e. "overt movement")

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[31] Again we are assuming here that the key issue underlying the contrast between (4a) and (4b) really is the overt/covert distinction. It is possible that the underlying distinction is in fact something else that is confounded with the overt/covert distinction: for example, restricting attention to (4a) and (4b), we can not rule out the possibility that the more accurate generalization is that the object position of a single-interrogative is a PG-licensor whereas the object position of a multiple-interrogative is not.

[32] There have been some attempts to explain "S-structure effects" in PG licensing from the perspective of the Minimalist Program, in which "S-structure" is abandoned as a level of representation (Nissenbaum 2000, Nunes 2001, 2004 among others). However, even within these explanations, the distinction between the overt cycle and the covert cycle is maintained.

chain or a pronounce-low (i.e. "covert movement") chain: clearly no such distinction is visible in the *input* to PF-interpretation, and in the *output* of PF-interpretation both links are rendered silent.

An alternative, more complex, assumption is to suppose that these two kinds of decisions about "what to pronounce" happen in distinct stages: first, a specific derivational step of chain-reduction decides which link in a movement chain will be pronounced, and the resulting "chain-reduced" structure is the input to a separate derivational step that decides which portions of a structure to elide. On this view the intermediate representation will provide the information that the PG-licensing mechanism needs to distinguish (47a) from (47b): it will be possible to read off this intermediate representation which chains' tails are unpronounced (hence are PG-licensors) and which are pronounced (hence not PG-licensors), even when these chains appear inside ellipsis sites.[33]

4.   Other types of "clausal ellipsis" constructions

The analysis that we have proposed for PGs in sluicing remnants predicts that PGs should be possible in the remnants of other kinds of clausal ellipses as well, since the analysis does not depend on any of the features that distinguish sluicing from other kinds of clausal ellipsis. So far we have restricted our attention to sluicing in order to establish the core paradigm of PGs in the remnants of elided clauses, but other clausal ellipsis constructions have been argued to have basically the same type of derivation as sluicing (essentially, TP-ellipsis), such as the Stripping construction (Depiante 2000, Hankamer and Sag 1976, Merchant 2004, Reinhart 1991 among

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[33] This requires, of course, that whatever constraint distinguishes (47a) from (47b) can be stated representationally, rather than being something that is inherently derivational in nature. But we see no reason to doubt that a representational statement of the relevant constraint should be possible.

others, cf. Culicover and Jackendoff 2005, May 1991, Reinhart 1991 among others) and the Why-Stripping construction (Ortega-Santos, Yoshida and Nakao 2012, Yoshida, Nakao and Ortega-Santos 2012). If they really have the same type of derivation as sluicing, we expect that PGs will also be licensed in these constructions.

As the following examples indicate, PGs are indeed licensed in the remnant of Stripping as in (48) and Why-Stripping as in (49) (note that Why-Stripping requires a strong stress on *before* in the remnant).

(48) a. The editor told me which book I must review __RG before receiving __PG, but not after receiving __PG.

      b. A: Which book did John review __RG?

          B: Before receiving __PG, or after receiving __PG?

(49) The editor told me which book I must review __RG before receiving __PG, but I don't understand why BEFORE receiving __PG.

In these constructions as well, the gap in the remnant obeys the PG-licensing conditions. (50) and (51) show that overt wh-movement is required.

(50) A: Who reviewed *Syntactic Structures*?

      B: *Before receiving __PG, or after receiving __PG?

(51) *The editor told me that I must review a book, but I don't understand why BEFORE receiving __PG.

Furthermore, wh-in-situ does not license the gap in the remnants of these constructions as in (52) and (53).

(52) A: Who reviewed which book?

      B: *Before receiving __PG, or after receiving __PG?

(53)   *The editor told me who must review which book, but I don't understand why BEFORE

receiving __PG.

These facts suggest that the gaps in the clausal ellipsis remnants in these examples are PGs like those found in sluicing remnants. The fact that PGs are licensed in these environments supports the hypothesis that the sites of clausal ellipsis involve full-fledged syntactic structure in general, just as in the sluicing cases, and constitutes a counter argument against "non-sentential" analyses for these constructions.

5.   Conclusion

In this paper, we have shown that the properties of parasitic gaps under sluicing support an analysis of ellipsis as PF-deletion which can remedy island and ECP violations. Starting from the novel observation that gaps which resemble PGs are licensed in certain sluicing remnants, we have proceeded to demonstrate that these gaps behave like standardly attested PGs in all relevant respects. They require a well-formed PG-licensor and PG-host in a PG-local configuration, are sensitive to the anti-c-command condition and the finiteness restriction, and are impossible with wh-PPs as attempted PG-licensors or with embedding of the PG inside an additional island. Theoretical parsimony thus recommends assimilating these gaps to normal PGs. This conclusion has several important theoretical implications.

First and most obviously, the availability of PGs in sluicing remnants indicates the presence of fully-fledged unpronounced syntactic structure in the sluice, including A-bar movement and an elided real gap to license the PG. It is not compatible with versions of LF-copying approaches to sluicing which assume overt and covert movement are distinguished only by derivational timing. Moreover, because the full configuration needed to license a PG must be present in the ellipsis site, the availability of PGs in this context indicates that the ability of

ellipsis to ameliorate wh-island violations is not merely an illusion deriving from the availability of a non-island-violating abbreviated source structure in the ellipsis. Somewhat surprisingly, sluicing in this context is found to remedy ECP violations in addition to subjacency violations, and this observation generalizes to more normal cases of sluicing as well, as in (32). Finally, the fact that the overt/covert-movement distinction in PG-licensing obtains even when the licensing clause is unpronounced is difficult to reconcile with some versions of single-output models of syntax that appeal solely to PF to explain this distinction.

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