

MULTIPLE-GAP CONSTRUCTIONS

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“Parasitic” gap constructions are constructions in which one filler corresponds to more than one gap. In LFG, there is nothing particularly strange about this, as there is no reason to expect a one-to-one relationship. The anti-c-command constraint is not really based on c-command. Instead, there are two constraints, one disallowing gaps in reflexive environments, and the other disallowing the function SUBJ as an f-commanding structure-sharing function. Parasitic gaps in adjuncts are the result of the islandhood of adjuncts not being realized when a discourse-prominent element is shared with the body of the clause, while those in subjects are a loophole to circumvent the joint effect of subject islandhood and weak crossover.

1. Multiple Gap Constructions

1.1. Overview

Much attention has been paid over the years to long-distance dependency (LDD) constructions in which more than one gap corresponds to the same element.¹ Some examples of such sentences (drawn from Engdahl 1983, Chomsky 1986) are:

- (1) a. Which articles did John file _ without reading _?
b. This is the kind of food you must cook _ before you eat _.
c. Which boy did Mary’s talking to _ bother _ most?
- (2) a. Which men did the police warn _ that they were about to arrest _?
b. Who did you tell _ that you would visit _?
c. Which girl did you send a picture of _ to _?

These constructions are often referred to as “parasitic gap” constructions, a term which is more appropriate to (1) than to (2). In (1), one of the gaps cannot stand alone without the other gap, and in this sense it is parasitic on the other gap.

- (3) a. *What/Which articles did John file the book without reading _?
b. What/Which articles did John file _ without reading the book?

However, in (2) each gap can stand on its own.

- (4) a. Who/Which friend did you tell _ that you would visit your brother?
b. Who/Which friend did you tell your brother that you would visit _?

For this reason, despite terminology dating back to the seminal paper by

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Engdahl (1983) I will use the term “multiple-gap” construction² to refer to the totality of the phenomenon, and restrict the term “parasitic gap” to those cases where one of the gaps is ungrammatical alone. Parasitic gaps will be marked with a subscripted p .

My basic analysis of multiple-gap constructions will be presented in §2. In §3, I will discuss constraints on multiple-gap constructions, in particular what has come to be known as the anti-c-command constraint. In §§4 and 5, I will turn to the specifically parasitic varieties of the construction and speculate on what makes them possible, first those in adjuncts, and then those in subjects.

1.2. Assumptions about LDD Constructions

The version of LFG I will be assuming is one in which both inside-out and outside-in licensing exist: fronted elements which bear the SUBJ function are licensed outside-in while non-SUBJ elements are licensed inside out from a c-structure gap. This position is proposed by Falk (2006) as part of a theory of subjecthood, and confirmed by Falk (2007), where it is demonstrated that c-structure gaps are present for non-subjects but not for subjects.³

- (5) a. $(\uparrow \text{DF}) = (\uparrow \text{GF}^* \text{SUBJ})$
 b. $\uparrow = ((\text{GF}^* \uparrow) \text{DF})$

((5b) does not explicitly state that the lower GF cannot be SUBJ; I will return to this later.) The restriction of (5a) to SUBJ completely parallels the fact that functional controlees are limited to SUBJ:

- (6) $(\uparrow \text{SUBJ/OBJ}) = (\uparrow \text{XCOMP SUBJ})$

The other thing that needs to be mentioned is the *wh*-path. In the first place, some languages have special marking (morphology, word order, tone changes) on the *wh*-path (Zaenen 1983). For this reason, it has been hypothesized that there is a special feature (variously referred to in the literature as BND, LDD, and WHPATH) in f-structures along the path. Given the variety of markings, it is proposed by Falk (2009) that the WHPATH feature distinguishes between the top of the *wh* path (with the value [+T]) and the rest of the path ([-T]). A well-formed *wh*-path has the feature [WHPATH [+T]] at its topmost layer and [WHPATH [-T]] elsewhere.

The other reason for the importance of the *wh*-path is that constraints on the path are responsible for island phenomena. According to the approach of Falk (2009), islands are essentially the result of extrasyntactic properties, such as a requirement that fronted elements be pragmatically prominent. In

²Although almost all examples that have appeared in the literature involve two gaps, it is possible to have more. The term “multiple-gap construction” is also used by Alsina (2008).

³In this paper, I will mark gaps for subjects as well for readability, even though technically there is no empty category in the subject position.

some cases, the syntax enforces the pragmatic requirement, resulting in an inviolable (or at least less easily violable) island constraint. For example, Complex NP Constraint violations are possible (in English) under certain pragmatic conditions when the NP-internal clause is a complement but not when it is a relative clause; this is attributed to the relative clause island, but not the complement island, being enforced syntactically. The syntax enforces such islands by not allowing the *wh* path to pass through a particular element (such as a relative clause). Formally, this is achieved through the *WHPATH* feature: disallowing a particular layer of f-structure from bearing the feature [*WHPATH* [-T]] renders it an island.

In LDD constructions of the familiar type, the multifunctional element is realized in the canonical position of the high function (the discourse function); however, there is nothing in principle requiring this. Realization of the multifunctional element in the canonical position of the lower function results in such constructions as in-situ questions and internally-headed relative clauses. (On relative clauses, see Falk 2010.) In most cases, such constructions are also subject to islands, although there appear to be no cases of marking of the path.

It is also possible for what appear to be in-situ questions or internally-headed relative clauses to not have the properties of LDD constructions. For example, English in-situ questions do not obey island constraints, and Choctaw internally-headed relative clauses are not islands for LDD constructions (Broadwell 1985a, Broadwell 1985b).⁴ In such cases, the most natural conclusion is that despite their superficial similarity to LDD constructions, they are formally not LDDs. There are no syntactic *FOCUS* or *TOPIC* functions in such constructions, no long-distance dependencies, and no *wh*-path.

2. The Basics of Multiple-Gap Constructions

What makes multiple-gap constructions interesting is the fact that under fairly standard transformational approaches to the syntax of LDD constructions their existence is unexpected.

In LFG, the situation is somewhat more complex. From the representational point of view, there is no reason a single element could not have three functions instead of two. There is therefore no representational bar to multiple-gap constructions. However, the direction of licensing needs to also be considered. If the licensing is inside-out, there can be no restriction on number of gaps associated with a single fronted element; since each gap is generated independently, there is no bar to more than one gap. On the other hand, if the licensing is outside-in, only one gap can be licensed by the licensing equation. An alternative approach proposed by Alsina (2008) allows free association of

⁴Choctaw internally headed relative clauses also show signs of being bare CPs, rather than CPs embedded in nominal phrases; in particular, they use switch-reference markers and lack the nominal marking that is typical of internally-headed relative clause constructions.

an element bearing a grammaticized discourse function with another grammatical function: this approach also allows multiple gaps. As noted above, I am assuming a hybrid system in which subject LDD constructions are licensed outside-in, and others inside-out. Under this view, multiple gap constructions should be possible as long as there is no more than one SUBJ gap. As will be seen in §3.1, multiple SUBJ gaps are indeed impossible.

Ignoring subjects, then, multiple-gap constructions are unremarkable under my assumptions. The example (2b), for example, has the c-structure represented by the bracketing in (7a) and f-structure (7b), in which the fronted *who* is both OBJ of *tell* and OBJ of *visit*.

(7) a. $[_{CP} \text{ who did } [_{S} \text{ you } [_{VP} \text{ tell } e [_{CP} \text{ that } [_{IP} \text{ you would } [_{VP} \text{ visit } e]]]]]]]$

b.
$$\left[\begin{array}{l} \text{FOCUS} \quad f \\ \text{SUBJ} \quad [“\text{you}”] \\ \text{TENSE} \quad \text{PAST} \\ \text{PRED} \quad ‘\text{tell} \langle (\uparrow \text{SUBJ})(\uparrow \text{OBJ})(\uparrow \text{COMP}) \rangle’ \\ \text{OBJ} \quad f \\ \text{COMP} \quad \left[\begin{array}{l} \text{SUBJ} \quad [“\text{you}”] \\ \text{TENSE} \quad \text{CONDIT} \\ \text{PRED} \quad ‘\text{visit} \langle (\uparrow \text{SUBJ})(\uparrow \text{OBJ}) \rangle’ \\ \text{OBJ} \quad f \end{array} \right] \end{array} \right]$$

$f = [“\text{who}”]$

Of course, there are constraints on these constructions, and the interaction with islandhood (resulting in truly parasitic gaps) needs to be considered, but the basic multiple-gap construction is formally unproblematic.

There is, however, another consideration: processing. It has been well known for a long time (at least as early as Wanner and Maratsos 1978) that LDD constructions impose a burden on processing. It is plausible, therefore, that the parser would disprefer multiple gaps, happy to retire a fronted element as soon as it has found one gap in which to place it. This point is reinforced by theories of filler-driven parsing, in which the parser attempts to place the filler as early as possible in the parse (Frazier and Flores d’Arcais 1989). Thus, while the grammar might allow multiple-gap constructions, they might be harder to process and thus be more marginal in actual language use. This, in fact, seems to be the correct status of multiple-gap constructions. As has often been reported, speakers disagree on how acceptable multiple-gap constructions are, some being more tolerant than others. A theory in which they are essentially grammatical but difficult to process seems to be a solid basis for the kind of

uncertainty one finds in the literature.

3. Constraints on Multiple Gap Constructions

3.1. Anti-C-Command

As originally proposed by Engdahl (1983), it is generally believed that one of the gaps in a multiple-gap construction cannot c-command the other. This is taken by Culicover (2001) to be one of the “current consensus positions” on multiple-gap constructions.⁵ Some examples follow:

- (8) a. *Who did you tell about ?
b. *Who did the story remind of ?
c. *Who read a book about ?
- (9) a. *Who did you say convinced you [should pass the course]?
b. *Which articles got filed without you reading ?
c. *This is the kind of food that must be cooked before you eat .
d. *Who did you say claimed that you should exempt from Introduction to Linguistics?

In each of these cases, the first gap c-commands the second gap; this is alleged to explain their ungrammaticality.

An anti-c-command constraint would be unexpected in LFG. However, as has been noted in the literature, there are good reasons to doubt that what is involved here is a constraint involving c-command. In the examples in (8), the second gap is in a position where a reflexive anaphor would be possible. Engdahl (1983: 24) observes that cases where a reflexive is possible do not allow multiple gaps even if there is no c-command relation.

- (10) a. I talked to John_i about himself_i.
b. Who_i did you talk to _j about himself_i/* ?

She also shows that in Swedish, where the distribution of reflexives differs from English, the correlation is still present.

- (11) a. Jag talade med Johan_i om *sig / honom_i.
I talked with Johan about *REFL / him
'I talked to John about himself.' (cf. (10a))
b. Vem brukar du sällan tala med om ?
who be.accustomed you seldom talk with about
'Who do you seldom talk to about himself?' (cf. (10b))

⁵It is usually stated in terms of the real gap not being able to c-command the parasitic gap. However, since not all multiple-gap constructions are parasitic, and anti-c-command is taken to apply even in the non-parasitic cases, I refrain from stating this in terms of parasitism.

- (12) a. Jag såg dig köra Johan_i hem till sig.
 I saw you take John home to REFL
 ‘I saw you take John home to himself.’
 b. Johan_i har jag ofta sett dig köra _ hem till *_ / sig.
 John have I often seen you take _ home to _ / REFL
 ‘John, I have often seen you take home to himself.’

Thus, the relevant constraint here appears to be based not on c-command but rather on the availability of a reflexive. Formally, given a language-specific path for reflexives, this can be expressed by adding the following equation to the gap:

$$(13) \quad \uparrow \neq ((\text{ReflPath } \uparrow) \text{ GF})$$

I conjecture that what motivates such a constraint is a parsing-based phenomenon relating to the usefulness of reflexives in indicating the coreference of (roughly) coarguments. Whether this conjecture is correct or not, examples like (8) do not provide evidence for an anti-c-command condition.

Under closer examination, the examples in (9) also do not involve a c-command-based condition. In all of these cases, the offending first (higher) gap is a subject. C-commanding non-subjects do not block multiple gap constructions, as observed by Chomsky (1986: 61f).

- (14) a. Which men did the police warn _ [that they were about to arrest _]?
 b. Who did you tell _ [that you would visit _]?
 c. Who did you say you convinced _ [_ should fail the course]? (cf. (9a))

In each of these cases, the bracketed clause is an argument rather than an adjunct, and therefore c-commanded by the object; yet the sentences are grammatical. This suggests that the constraint in question refers to higher subjects rather than to c-command. A subject-based constraint also allows the extension of the constraint to languages with different configurational properties. For example, Kiss (2001) argues that subject and object in Hungarian are not distinguished structurally, yet the same “anti-c-command” effects obtain. As we have seen, examples like (9a), with two subject gaps, are already ruled out under my background assumptions. If a subject gap is licensed outside-in, only one such gap is possible. However, this will not help us with the rest of the examples in (9).

As Engdahl (1983: 21) points out, the constraint in question cannot simply be one against SUBJS; non-commanding SUBJS do not block multiple-gap constructions.

- (15) a. Which caesar did Brutus imply $_$ was no good while ostensibly praising $_p$?
 b. Who did you say John's criticism of $_p$ would make us think $_$ was stupid?

Instead, it is SUBJs in a commanding position (presumably f-command).⁶ This can be expressed by adding the following off-path constraint to the *wh*-path expression in the inside-out equation annotated to the gap:

- (16) $(\rightarrow \text{SUBJ}) \neq \uparrow$

This will correctly rule out the sentences in (9b–d); on the other hand, the sentences in (15) are correctly allowed.

The constraint in (16) has an interesting consequence. It is not a constraint on multiple-gap constructions, but on any gap. It therefore applies any time LDD is licensed inside-out. In particular, any attempt to license a SUBJ LDD inside-out will violate (16): the first outward step will lead to the f-structure of which the gap is the SUBJ. This is the correct result under my assumptions. In Falk (2006 : 114) the ability to license subject LDDs inside-out was ruled out by an ad hoc condition. Under the present proposal, it is ruled out by the same constraint that rules out f-commanding subjects in multiple-gap constructions.

One kind of contrast which this account does not explain is exemplified in the following from Chomsky (1986 : 54).

- (17) a. *a man who $_$ looks old whenever I meet $_p$
 b. a man who, whenever I meet $_p$, $_$ looks old

Since *whenever I meet* is an adjunct to the clause headed by *looks* in both versions, the outward path from the gap within that phrase will pass through the clause headed by *looks*, the subject of which is identical to the gap. Both versions should thus be ungrammatical. This example is presented by Chomsky as evidence of the relevance of c-command. However, given the foregoing evidence that c-command does not play a role, there must be another explanation. A different way of approaching this is to say that the preposing of an adjunct clause makes the subject immune to the condition on subjects. A parallel problem emerges in the analysis of the *that*-trace effect proposed by Falk (2006), as pointed out by Asudeh (2009): the inability to account for the Adverb Effect (Culicover 1993).

⁶Alsina (2008) arrives at a similar conclusion. In his approach, the constraint follows from the imposition of the Relational Hierarchy on LDD constructions. He views subjects and discourse functions as being at the same level on the hierarchy, and thus disallows subjects from also bearing discourse functions. While his approach does not account for the same range of data as the one I am proposing, the two proposals bear a certain similarity to each other.

- (18) a. *Who did you say that _ looks old whenever the weather turns hot?
 b. Who did you say that, whenever the weather turns hot, _ looks old?

I propose that (17) and (18) display the same effect. As a preliminary approximation, I would attribute this effect not to the syntax per se, but rather to a parsing effect under which a subject which is significantly far from the beginning of the clause is harder for the parser to identify as a subject. It therefore allows certain violations of grammatical constraints on subjects. Perhaps the sentences in question are not technically grammatical, but accepted by the parser.

3.2. Second Gaps as Pronouns

Contrary to the position taken here that both gaps in a multiple-gap construction are true LDD gaps, it has been proposed (Cinque 1990, Postal 1994, Postal 2001) that the second (“parasitic”) gap is a pronoun. They argue that these gaps are limited to NPs, and are barred from positions in which weak definite pronouns are not permitted. On the other hand, it has been argued by Levine, Hukari, and Calcagno (2001) and Levine and Hukari (2006) that neither of these constraints holds, and that, as in the account proposed here, second gaps are ordinary gaps.

Examples such as the following (from English and Italian) have been presented as evidence that non-NPs cannot be second gaps.

- (19) a. *How sick did John say he felt _ before getting __p?
 b. *Unbearable he is _ even when trying not to seem __p.
 c. *Abuse my ferret, I refused to accept that he could _ even after seeing him __p.
 d. *Quanto importanti si può diventare _ senza sentirsi __p?
 how important REFL can become without to.feel
 ‘How important can one become without feeling?’
 e. *A chi hai lasciato la lettera _ dopo esserti rivolto __p?
 to who you.have left the letter _ after to.be returned
 ‘To whom did you leave the letter after having returned?’

Similarly, the following are among the examples that have been presented to show that second gaps are excluded from positions excluding weak definite pronouns.⁷

- (20) a. *the color that everyone who dyed their sheets __p praised _ (cf. Mirabelle dyed her sheets purple/*it.)
 b. *What your saying the Porsche cost _ led them to try to sell the Jaguar for _ is amazing. (cf. The Porsche cost \$50,000/that

⁷I am using capital letters to indicate focal stress.

- much/*it.)
- c. *How long a time did their saying the concert would last _ make Quentin miss work for _? (cf. The concert lasted for the whole night/two hours/*it/*them.)
- (21) a. *Which child did everyone who believed it was _p that the drug had helped see _ in the hospital? (cf. It was *hĕr/HER that the drug helped.)
- b. *What several facts that meant _p led Mary to claim _ is that he is guilty. (cf. These facts may mean that he is guilty but those facts don't mean that/*it.)
- c. *It was disregard for human rights which the UN criticized _ after the dictator's remarks betrayed _p. (cf. That remark betrays [disregard for human rights]/THEM/*thĕm.)
- d. *What everyone who remarked _p later denied _ was that it was hot. (cf. Tina remarked [that it was hot]/*it.)

On the other hand, as noted above, Levine, Hukari, and Calcagno (2001) bring counterexamples, both of non-NPs and of second gaps in anti-pronominal contexts.

- (22) a. How harshly do you think we can treat THEM _ without in turn being treated _p OURSELVES?
- b. That's the kind of table ON WHICH it would be wrong to put expensive silverware _ without also putting a fancy centerpiece _p.
- c. THAT DRUNK, it would be impossible for ME to get _ without ROBIN getting _p as well.
- d. That Robin is a spy would naturally be difficult to refute ___ without (someone) having first conjectured _p.
- (23) a. Mint green is a color that you might paint your CEILING _ without necessarily wanting to paint the surrounding WALLS _p. (cf. *We painted the walls it.)
- b. Anybody can become a bureaucrat, but a doctor one could spend one's whole life STUDYING to be _ without ever becoming _p. (cf. *Robin wants to be a doctor but I don't think he'll ever become it.)
- c. Which countries do you become a citizen of _ only if you were actually born in _? (cf. *Robin thinks the president was born in Argentina, but I know she wasn't born in it.)

The challenge is to account both for the grammatical examples and the ungrammatical ones.

A perusal of the examples points the general way to an explanation. It

is clear that one parameter which influences grammaticality is stress. Stress is related to pragmatics, suggesting that (most of) the examples in question are all well-formed syntactically but some of them are ruled out on pragmatic grounds. This is precisely what Levine, Hukari, and Calcagno (2001: 218 fn 22) suggest as regards the non-NP cases.

This example [*How harshly will our treating Robin _ lead to our being treated _ ourselves?*—YNF] seems to us syntactically impeccable, but it is semantically very odd indeed; we suspect that this oddness is a symptom of why non-NP P-gaps, particularly those involving predicative categories, have struck some investigators as anomalous. The question corresponds to the pseudological translation, For what degree *x* of harshness will our treating Robin *x* harshly lead to our being treated *x* harshly ourselves? The presupposition involved is pragmatically strange, involving as it does the background assumption that, at a particular unique degree of some gradable property, there is an exact reciprocation between action and reaction involving that property. Because P-gaps that involve predicative filler categories, such as [*wh*-degree] APs, necessarily require that a particular degree of some predicate hold in two different, linked situations, they provide ample opportunity for pragmatic anomaly of this kind.

However, they do not propose an explanation of the anti-pronominal cases.

The anti-pronominal cases are not homogeneous. There are some that are anomalous for the same reason as suggested above for non-NPs. Consider the following from Postal (2001).

- (24) a. Nora spent/stayed that week in Bermuda.
b. Nora spent/*stayed it in Bermuda.
c. the week that Nora spent/stayed _ in Bermuda
d. the week that Nora's planning to spend/*stay _ in Bermuda made Mike want to spend _ there

The ungrammaticality of the multiple-gap construction here has nothing to do with pronouns. Rather, it is because Nora and Mike are not spending the same week. In fact, despite Postal's grammaticality markings, the version with *spend* is not well-formed either.

Some of the anti-pronominal cases, those in (20), are syntactically ill-formed, but not because these are anti-pronominal contexts. In (20a), for example, the same element is intended as the complement of *dye* and *praise*. But these verbs take different kinds of arguments: the relevant argument of *dye* is an open argument while the complement of *praise* is a closed OBJ. An open argument and a closed argument cannot have the same value, since one needs a subject and the other does not. The same thing is true of (20b,c). The reason these are anti-pronominal contexts is related; pronouns cannot stand for predicative NPs. But the anti-pronominal status is not the reason for the ungrammaticality of the multiple-gap constructions.

The more interesting cases are the ones in (21). The clearest of these is (21a). The parasitic gap in this sentence is in a cleft construction. Clefting is a form of focusing. This is why a stressed pronoun is grammatical and an unstressed pronoun is not. Pronouns are typically used for old information (i.e. they are topical, not focal), and therefore are not appropriate in clefts. Contrastive stress allows the pronoun to be used focally. In a multiple-gap construction, only one gap can represent new information: since other gaps are identical to it and thus coreferential with it, they cannot also be new information, and thus must be topical and not focal. Specifically, since a parasitic gap implies the existence of another gap, a parasitic gap cannot appear in a focal position. Therefore, parasitic gaps cannot appear in clefts. The verbs in (21b,c,d) focus their complements, again making them both anti-pronominal and immune to parasitic gaps.

4. Parasitic Gaps 1: Adjunct-internal

While not all multiple-gap constructions involve parasitic gaps, that is, gaps which would not be grammatical without the second gap, it is undoubtedly the case that most examples of multiple-gap constructions that have appeared in the literature are parasitic. More specifically, they usually involve a gap which appears inside an adjunct island. This section will explore those gaps.

In order to understand adjunct-internal parasitic gaps, it is first necessary to understand the nature of the islandhood of adjuncts. As summarized in Falk (2009), the island status of adjuncts is less clear than it first seems. While extraction from adjuncts is sometimes crashingly bad, there are other instances in which it is relatively acceptable.⁸

- (25) a. *Which astronaut did you get to the moon [before _]?
- b. *Which book did you cancel your library card [before reading _]?
- c. *Which cubicle did you read the file [in _]? (cf. ✓*Which cubicle did you put the file [in _]?*, where the PP is an argument)
- d. *Which book did you go to the library [in order to read _]?
- (26) a. Which student is Roger capable of working [independently of _]?
- b. Which people can Robin run [nearly as fast as _]?
- c. Who does Kim write letters [more frequently than _]?
- d. Which book did you go to the library [to read _]?

As noted in §1.2, I take islands to be primarily the result of extrasyntactic factors, such as the ability to be pragmatically prominent. In the case of adjuncts, the motivation for their islandhood is not directly a matter of pragmatic prominence, but rather the result of the looser connection between a

⁸Examples (26a–c) come from Bouma, Malouf and Sag (2001).

clause and its adjunct. This looser connection makes it more difficult, but not impossible, for an adjunct to be pragmatically prominent. Thus, extractions from adjuncts are, in general, difficult but not impossible. The one case that appears to be categorically unacceptable is extraction from adjuncts which are PPs. Falk (2009) therefore proposes that only PP adjuncts are syntactically designated as islands.⁹ Formally:

$$(27) \quad \text{VP} \rightarrow \text{VP} \quad \text{PP}$$

$$\quad \quad \quad \uparrow = \downarrow \quad \downarrow \in (\uparrow \text{ADJ})$$

$$\quad \quad \quad (\downarrow \text{WHPATH}) \neq [-T]$$

Viewed from this perspective, adjunct-internal parasitic gaps are the result of not realizing the islandhood of PP adjuncts under certain conditions, roughly the presence of another gap in the non-adjunct portion of the clause.

This raises the question of why being linked to a gap in the main part of the sentence would affect the islandhood of adjunct PPs. The answer lies in the pragmatic underpinning of adjunct islandhood. As noted above, adjuncts are islands because they are only loosely connected to the clause. Sharing a discourse prominent element ties the adjunct more closely to the clause.

To make this analysis work, we need to take a closer look at the conditions under which PP adjunct islandhood does not obtain. I stated above, following standard views on the subject, that the presence of a gap in the non-adjunct portion of the clause is the trigger. However, there are several reasons that this cannot be correct. The first is formal: there is no way in LFG to ascertain that there is a gap in the clause. Gaps are not identified in f-structure by any particular properties. There are also empirical problems with linking parasitic gaps with other gaps, since parasitic gaps are sometimes licensed by constructions not generally thought to involve (LDD) gaps.

One example of a non-gap construction that licenses parasitic gaps is Heavy NP Shift (Engdahl 1983):

⁹As pointed out to me by Mary Dalrymple and Alex Alsina (personal communication), there are some potential counterexamples to the claim that adjunct PPs are always islands. One such set of cases is the following:

- (i) a. Where did you order the pegs at?
- b. What do you want to find Homer for?

Both of these appear to be idiomatic constructions: *at where* is ungrammatical, and *for what* does not have the same reading as *what...for*.

- (ii) a. *At where did you order the pegs? / *You ordered the pegs at where?
- b. ??For what do you want to find Homer? / ??You want to find Homer for what?

Another potential counterexample is (iii).

- (iii) What language do you want me to write the paper in?

This kind of exception seems to be limited to specialized non-locative uses of *in*. The exceptions exemplified by (i), (ii), and (iii) all seem to be highly lexicalized. It is possible that they involve lexical entries which overrule the specification in the phrase structure rule. I will not pursue the formal consequences of this here. Other potential counterexamples involve elements that may be arguments rather than adjuncts, such as instrumentals:

- (iv) What should I write on the whiteboard with _?

- (28) a. John offended () by not recognizing $_{-p}$ immediately his favorite uncle from Cleveland.
 b. Susan always files () without reading $_{-p}$ properly all the memos from the low-level administration.

While this has sometimes been taken as evidence for treating Heavy NP Shift as an LDD construction (e.g. Chomsky 1982), it does not have the properties of these construction, such as “movement” to the left and unboundedness. More plausibly, particularly in a constraint-based framework like LFG, Heavy NP Shift is the result of allowing processing considerations (in this case, the preference to place heavy elements at the end) to overrule the ordering constraint (or LP rule) requiring objects to precede other complements of the verb (Falk 1983).

In some languages, object pronoun clitics can license parasitic gaps, as in the following Spanish examples from Campos (1991: 118).

- (29) a. *Archivaron el informe sin leer $_{-p}$.
 they.file.d the report without to.read
 ‘They filed the report without reading (it).’
 b. Lo archivaron sin leer $_{-p}$.
 it.ACC they.file.d without to.read
 ‘They filed it without reading (it).’

This is not true in all languages, though. In French, object clitics do not license parasitic gaps (Tellier 1999: 135).¹⁰

- (30) *Vous l’avez rangé sans avoir lu $_{-p}$.
 you it.ACC have put.away without to.have read
 ‘You put it away without reading (it).’

Similarly, in-situ *wh* questions and internally-headed relative clauses license parasitic gaps in some languages but not in others. In Spanish, for example, in-situ questions license parasitic gaps (Campos 1991: 120).

- (31) a. ¿Tú archivaste cuál artículo sin leer $_{-p}$?
 you filed which article without to.read
 ‘Which article did you file without reading?’
 b. ¿Tú mandaste cuál artículo sin revisar $_{-p}$?
 you sent which article without to.proofread
 ‘Which article did you send without proofreading?’

¹⁰The genitive clitic *dont* does license parasitic gaps, but since it is a relativizer an LDD construction is arguably involved.

Culicover (2001: 50) cites the following from Jeddah Arabic (cited from Wahba 1995).

- (32) Mona yaarat min miin řařaan řomar yebya yetjawwaz _{-p}?
Mona was.jealous of who because Omar wants to.marry
'Who was Mona jealous of because Omar wants to marry?'

Another case cited by Culicover (2001: 48) (from Tellier 1989) is Mooré, where internally-headed relative clauses license parasitic gaps.¹¹

- (33) M mii fo sen tō neb ninga n yaol n ka pogl _{-p} wa.
I know you REL insult people RELHD after NEG hurt DET
'I know the people that you insulted without having hurt.'

What these all have in common is that the NPs in question are either focal or topical. In those in-situ questions and internally headed relative clauses which are LDD constructions, the questioned or relativized element bears a grammaticized discourse function even though it does not appear in the discourse-function position and there is no gap. It has long been noted that heavy-shifted NPs are focal (Rochemont 1978).

- (34) a. The preacher sent off to war HIS ONLY SON.
b. Hitler persuaded to join forces with him, MUSSOLINI.

It is plausible that such NPs bear the FOCUS function at f-structure by virtue of their final position. The same is true of arguments extraposed from NP, which also license parasitic gaps, as noted by Fox and Nissenbaum (1999):¹²

- (35) I read a book ₋ before reading an article ₋ about John.

Similarly, pronouns, by virtue of referring to old information, are at least potentially topical; it is plausible that, at least in some languages, pronominal clitics can bear the TOPIC function syntactically.¹³ I propose, then, that what causes the islandhood of (PP) adjuncts not to obtain is not a gap but the presence of some other element which bears a grammaticized discourse

¹¹In-situ *wh* questions, on the other hand, do not. Mooré also has externally-headed relative clauses and *wh*-ex-situ questions, both of which license parasitic gaps. It is possible that in-situ questions are not true LDD constructions.

¹²Fox and Nissenbaum note that this is not true of extraposed adjuncts:
(i) *I read a book ₋ before reading an article ₋ from John's library.
I hypothesize that they do not bear the FOCUS function.

¹³Campos also reports that Spanish null objects can license parasitic gaps. Following the usual analysis in the Principles and Parameters tradition, he proposes that null objects are empty operators that undergo *wh* movement. The equivalent in LFG would be to assign them a grammaticized discourse function. They are thus assimilated to the same analysis.

function. Formally:

$$(36) \quad \text{VP} \rightarrow \text{VP} \quad \text{PP}$$

$$\quad \quad \quad \uparrow=\downarrow \quad \quad \quad \downarrow \in (\uparrow \text{ADJ})$$

$$\quad \quad \quad \neg(\text{DF}(\uparrow \text{GF}^+)) \Rightarrow (\downarrow \text{WHPATH}) \neq [-\text{T}]$$

This results in the following f-structure for (1a), repeated here:

(37) a. Which articles did John file _{-p} [without reading _{-p}]?
 b.

FOCUS	<i>f</i>		
WHPATH	[+T]		
SUBJ	[“John”]		
TENSE	PAST		
PRED	‘file $\langle (\uparrow \text{SUBJ})(\uparrow \text{OBJ}) \rangle$ ’		
OBJ	<i>f</i>		
	{	[WHPATH [-T]
		PRED	‘without $\langle (\uparrow \text{OBJ}) \rangle$ ’
ADJ	}	[WHPATH [-T]
		SUBJ	[PRED ‘PRO’]
		PRED	‘read $\langle (\uparrow \text{SUBJ})(\uparrow \text{OBJ}) \rangle$ ’
		OBJ	<i>f</i>
]]
]]

f = [“which articles”]

The bolded WHPATH feature is the one that would normally be blocked by the annotation on the PP adjunct in the phrase structure rule. However, in this case, $(\uparrow \text{OBJ})$, an instance of $(\uparrow \text{GF}^+)$, has the value [“which articles”] (represented as *f*), and an outward path from [“which articles”] through a discourse function (FOCUS in this case) exists. Since the condition that such a path not exist is not met, the constraint blocking [WHPATH [-T]] does not apply.

5. Parasitic Gaps 2: Subject-internal

Another island in which parasitic gaps appear is subject islands (examples from Engdahl 1983, Gazdar, Klein, Pullum, and Sag 1984).

- (38) a. Which boy did Mary’s talking to _{-p} bother _{-p} most?
 b. Kim wondered which authors reviewers of _{-p} always detested _{-p}.

Falk (2009) attributes subject islands to a different source than adjunct islands. Following up on an idea from Kuno (1973) and Grosu (1981), Falk suggests that the islandhood of subjects is the result of a constraint designed to make processing easier by not allowing clause-internal incomplete constituents.

Formally, this is expressed in the syntax in the same way as adjunct islands.¹⁴

$$(39) \quad \text{IP} \rightarrow \begin{array}{ccc} & \text{NP} & \text{I}' \\ & (\uparrow \text{SUBJ}) = \downarrow & \uparrow = \downarrow \\ (\downarrow \text{WHPATH}) \neq [-\text{T}] & & \end{array}$$

Given that the licensing of parasitic gaps in adjuncts was linked to the cause of the islandhood of adjuncts, and that the hypothesized cause of the islandhood of subjects is different, one might expect that the status of parasitic gaps in subjects is different.

It transpires that there is empirical evidence that parasitic gaps in subject islands are different from those in adjunct islands. One of the features of parasitic gaps in adjunct islands is that, aside from the islandhood of the adjunct itself, all island constraints are obeyed. The analysis given above for parasitic gaps in adjuncts accounts for this: the only islandhood that is affected is the islandhood of the adjunct. However, parasitic gaps in subject islands can be contained in relative clauses within the subjects. Engdahl (1983: 17) gives examples in both Swedish and English:¹⁵

- (40) a. This is the type of book that [no one [who has read _{-p}]] would give
 _ to his mother.
 b. Here is the boy who [everyone [who has met _{-p}]] thinks _ is clever.
- (41) a. Kalle är en kille som [ingen [som träffat _{-p}]] kan tåla _.
 Kalle is a guy REL no.one REL met _ can endure
 ‘Kalle is a guy who no one who has met can stand.’
 b. Fattig vill [ingen som någonsin varit _{-p}]] bli _ igen.
 poor wants no.one REL ever was become again
 ‘Poor, no one who has ever been wants to become again.’

Not imposing the islandhood of the subject would not permit a parasitic gap in the relative clause, since relative clauses are themselves islands.

The distinction between parasitic gaps in adjuncts and parasitic gaps in subjects was raised, in a different context, as early as Engdahl (1983: 17f), where it was noted that parasitic gaps in adjuncts can be replaced by pronouns, while those in subjects cannot. Note the following: the examples from (1) with the parasitic gaps replaced by pronouns.

¹⁴Under the standard LFG account (Kroeger 1993), there is a non- \bar{X} category S distinct from IP. The subject positions in the expansions of both IP and S will carry the same annotations.

¹⁵Engdahl notes that the parasitic gap is possible only when the subject NP is indefinite. However, as she and others have pointed out, factors like definiteness and finiteness play a general role in the parasitic gap construction. I will assume here, without argument, that these effects are not syntactic.

- (42) a. Which articles did John file ___ without reading them?
 b. This is the kind of food you must cook ___ before you eat it.
 c. *Which boy did Mary's talking to him bother ___ most?

Engdahl suggests, plausibly, that this distinction in what she calls obligatoriness of the parasitic gap is a consequence of the weak crossover effect. Following up on this obligatoriness distinction, Engdahl (2001: 144) suggests that optional and obligatory parasitic gaps may not be a uniform phenomenon. I concur.

If both Falk (2009)'s account of subject islands and Engdahl (1983)'s account of the impossibility of pronouns instead of parasitic gaps in subject islands are correct, the crucial point is the linear order of subjects. The subject island combined with weak crossover create a situation where an element within the subject cannot be coreferential with a *wh* element. I propose that the phenomenon of parasitic gaps in subject islands is a way to allow such coreference.¹⁶ Rather than not imposing islandhood, as in the case of adjunct islands, I propose that what is involved in the case of subject islands is a separate LDD. Under this proposal, the f-structure of (1c), repeated here, is as follows:

- (43) a. Which boy did [Mary's talking to ____p] bother ___ most?
 b.

FOCUS	<i>f</i>														
WHPATH	[+T]														
SUBJ	<table style="border-collapse: collapse; margin-left: 2em;"> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">FOCUS</td> <td style="padding-left: 10px;"><i>f</i></td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">WHPATH</td> <td style="padding-left: 10px;">[+T]</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">SUBJ</td> <td style="padding-left: 10px;">["Mary"]</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">PRED</td> <td style="padding-left: 10px;">'talk <((↑ SUBJ)(↑ OBL_{Goal} OBJ))>'</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">OBL_{Goal}</td> <td style="padding-left: 10px;"> <table style="border-collapse: collapse; margin-left: 2em;"> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">WHPATH</td> <td style="padding-left: 10px;">[-T]</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">OBJ</td> <td style="padding-left: 10px;"><i>f</i></td> </tr> </table> </td> </tr> </table>	FOCUS	<i>f</i>	WHPATH	[+T]	SUBJ	["Mary"]	PRED	'talk <((↑ SUBJ)(↑ OBL _{Goal} OBJ))>'	OBL _{Goal}	<table style="border-collapse: collapse; margin-left: 2em;"> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">WHPATH</td> <td style="padding-left: 10px;">[-T]</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">OBJ</td> <td style="padding-left: 10px;"><i>f</i></td> </tr> </table>	WHPATH	[-T]	OBJ	<i>f</i>
FOCUS	<i>f</i>														
WHPATH	[+T]														
SUBJ	["Mary"]														
PRED	'talk <((↑ SUBJ)(↑ OBL _{Goal} OBJ))>'														
OBL _{Goal}	<table style="border-collapse: collapse; margin-left: 2em;"> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">WHPATH</td> <td style="padding-left: 10px;">[-T]</td> </tr> <tr> <td style="border-right: 1px solid black; padding-right: 10px;">OBJ</td> <td style="padding-left: 10px;"><i>f</i></td> </tr> </table>	WHPATH	[-T]	OBJ	<i>f</i>										
WHPATH	[-T]														
OBJ	<i>f</i>														
TENSE	PAST														
PRED	'bother <((↑ SUBJ)(↑ OBJ))>'														
OBJ	<i>f</i>														
ADJ	["most"]														

f = ["which boy"]

Formally, this is achieved by changing the annotation on the subject term in the IP expansion:

¹⁶While this may seem contrived, the fact is that language has constructions that extend the range of what can be expressed, such as pied-piping, which allows sentences that would otherwise be ruled out by island constraints.

$$\begin{array}{ccc}
(44) \quad \text{IP} \rightarrow & \text{NP} & \text{I}' \\
& (\uparrow \text{SUBJ}) = \downarrow & \uparrow = \downarrow \\
& (\downarrow \text{WHPATH}) \neq [-\text{T}] & \\
& (\% \text{ORIG}) = ((\text{GF}^* \uparrow) \text{DF}_x) & \\
& ((\uparrow \text{AF}^*) = \% \text{ORIG} \Rightarrow \% \text{ORIG} = (\downarrow (\text{ADJ}) \text{DF}_x)) &
\end{array}$$

In this rule, %ORIG is a local name for an element bearing a grammaticized discourse function either in the same clause or in a higher clause. In the optional line of the NP annotations, the condition checks if this element also bears some argument function either in the same clause or in a lower clause. If it does, then either the subject itself or an adjunct contained within the subject (such as a relative clause) can contain a copy of the original discourse function. In the current example, %ORIG is [“which boy”], which bears the grammaticized discourse function FOCUS in the same clause as the subject. The same element also bears the OBJ function in the same clause, thus licensing the FOCUS in the SUBJ.¹⁷

6. Conclusion

The existence of multiple-gap constructions is a natural consequence of the basic LFG analysis of LDD constructions, in particular if one assumes inside-out functional uncertainty. The constraints on such constructions are the result of several independent factors: pragmatics, the special status of SUBJ, and the role of reflexive pronouns. The truly parasitic cases are not a uniform phenomenon: adjunct-internal parasitic gaps result from the lower degree of independence that an adjunct has if it shares an element with the clause, while subject-internal parasitic gaps are a device to allow subject-internal elements to be coreferential with subject-external elements.

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¹⁷Louise Mycock points out (personal communication) that languages which mark the top layer of an LDD path differently from other layers would be expected to show different marking in the two types of parasitic gap constructions. Unfortunately, I have been unable to find information about parasitic gaps in such languages.

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