

WH-Nonmovement*

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To appear in a special issue of *Gengo Kenkyu*

Abstract

This paper compares transformation-based and constraint-based treatments of unbounded filler-gap dependencies. Careful examination of recent proposals to deal with parasitic gaps in terms of null pronominals and ‘empty operators’ are shown to be empirically inadequate. Multiple filler-gap dependencies exhibit a uniformity that is naturally explained by the constraint-based analysis we examine, which associates the relevant syntactic and semantic properties of a ‘filler’ constituent with those of one or more gap positions via simple conditions of identity that must be simultaneously satisfied. Thus far from being ‘notational variants’, as is often asserted but has never been substantiated, transformational and constraint-based approaches to filler-gap dependencies make radically different empirical predictions. While transformational approaches cannot even adequately describe the appropriate generalizations, constraint-based analysis allows these generalizations to be explained in terms of simple, general, and local conditions of identity.

1 Introduction

A central task facing syntacticians is to provide concise and empirically adequate accounts of dependencies holding between two (or possibly more) structural positions in syntactic representations. Much effort has been expended in particular on providing such accounts

*We would like to thank a number of people, discussions with whom have had an influence on the ideas presented here. These include John Beavers, Emily Bender, Mike Calcagno, Jonathan Ginzburg, Takao Gunji, Tom Hukari, David Johnson, Shalom Lappin, Carl Pollard, Tom Wasow, and two anonymous reviewers. A special thanks is due Gerald Gazdar, whose ideas we have built on in fundamental ways. Finally, this paper was prepared while Sag was a Fellow at the Center for Advanced Study in the Behavioral Sciences, supported by a grant (# 2000-5633) to CASBS from The William and Flora Hewlett Foundation.

for dependencies in which the positions linked by the dependency are separated by arbitrarily large domains, so-called unbounded dependency constructions (UDCs). There are two principal ways in which the necessary linkage between positions C_1 and C_2 in UDCs is enforced:

- on the one hand, through MOVEMENT, whereby a single syntactic category C , specifying a packet of information, moves from C_1 to C_2 through successive positions in the structure. The two positions are bridged by appeal to a sequence of sentence structures, each of which differs from the previous one in virtue of the position occupied by C . In the final structure of the derivational sequence, C_1 and C_2 wind up sharing information content in virtue of the movement that has taken place in the previous structures of the derivation; and
- on the other hand, a set of constraints applying to a single syntactic structure which together ensure identity of feature values among syntactically related positions. This FEATURE MATCHING approach (often informally spoken of as ‘percolation’) ensures that C_1 and C_2 are informationally identical by requiring feature specifications of intervening positions in the structure to match in relevant ways, with no actual movement taking place.

These alternatives might appear to be equivalent, and claims along these lines have sometimes been made; they have also been challenged, from both sides in the monos-tratal/representational tradition.¹ We argue directly, however, that there are significant

¹Chomsky himself has argued both positions. In Chomsky 1981 (pp. 89–92), he compares a skeletal GB theory with an alternative in which the ‘base generates S-structures directly’ and relations between antecedents and empty categories are ‘established by new interpretive rules of the LF component’ (p. 90). He affirms without argument the ‘virtual interchangeability’ of this and the transformational formulation of GB and asserts that the problem of choosing between them is a fairly marginal one’. Chomsky apparently maintained this position over a considerable period of time; thus, we find it echoed in the strange claim in Chomsky 1995 (p. 403) that not only does ‘every theory of language’ contain an encoding of the displacement phenomenon, but that all such encodings are ‘transformational devices (whether one chooses to call them that or not)’, an assertion which is provably false on the basis of elementary results in formal language theory and complexity theory. Chomsky (2002) offers the diametrically opposite view that ‘recourse to any device to account for the displacement phenomena... is mistaken, unless it is independently motivated (as is internal merge)’ and is alleged to reflect, as has become familiar in Chomsky’s writings since 1995, ‘a kind of conceptual necessity’. The clear implication to be drawn is that the difference between derivational and feature-matching approaches is fundamental.

While this is not the place to undertake a detailed critique of the logic of Chomsky’s argument, some comments on this particular—essentially purely deductive—defense of the movement approach seem called for. It might be noted at the outset that in spite of Chomsky’s use of the term ‘internal Merge’ (for what once was referred to simply as ‘movement’), this operation is still distinct from the Merge which combines elements in the numeration. The latter does not leave copies; the former does. More importantly, internal Merge repositions elements that have already been related configurationally by Merge. Thus, the givenness

differences between the derivational and the constraint-based approaches just sketched, and that the latter is markedly superior to movement-based accounts.²

and ‘free availability’ of ‘internal Merge’ depends on the assumption that the form of natural language grammars crucially allows a second kind of combinatorial operation in addition to the simple operation by which words are built up into phrases. In other words, Chomsky’s argument here simply begs the question.

There are, in fact, two separate components to Chomsky’s defense of the privileged status of movement. First is his claim that ‘it is hard to think of a simpler approach than allowing internal Merge...’ (p. 7). This assertion is presumably true for those who agree with it, but seems to us to have no consequences whatsoever for the issue of whether or not movement is empirically motivated, particularly in view of its appeal to the somewhat hermetic notions of simplicity and ‘computational efficiency’ and to a notion of the ‘perfection’ of language whose putative validity, as far as we can see, derives solely from Chomsky’s vague remarks connecting it with Galileo’s scientific methodology.

The second aspect of Chomsky’s argument is his assertion that ‘in A-movement, one position is selected for binding and scopal purposes... other devices [than internal Merge] might be employed to indicate scope and discourse-related properties; say extra features or heads. But such devices have no independent motivation...’ It is hard to understand just what kind of support Chomsky is assuming for this claim, but as far as we can see it is totally vacuous. The idea is that movement allows the establishment of scoping relations and other relations which would otherwise be unavailable (hence helping to make the C_{HL} [the ‘computational (system of) human language’ - RDL & IAS] ‘optimal’ in the hermetic sense we have alluded to).

But this idea, to the extent that it has any demonstrable connection with the empirical domain, is false. As Shalom Lappin has pointed out to us (p.c.), natural languages abound in devices (e.g. lexical items denoting generalized quantifiers, or dedicated scope-marking morphemes) which could be employed as part of Merge to demarcate scope automatically. Moreover, in terms of real computational complexity, this alternative would appear to be far more efficient than movement. In appealing to such considerations, Chomsky explicitly invokes the empirically highly dubious account of semantic scope relations presented in Reinhart 1995, Reinhart 1997 and Fox 1995, which appeals to the principle of ‘Have an Effect on Derivations’. But it has been shown by Johnson and Lappin (1999, pp. 34–45) that this economy principle:

1. is motivated by considerations that cannot plausibly be linked to interface conditions at LF,
2. is computationally intractable, and furthermore
3. is actually inconsistent with the rest of the Minimalist Program in the one empirical case where anyone has tried to apply it, namely Fox’s (1995) treatment of VP ellipsis.

Fox (2000) explicitly declines to respond to Johnson and Lappin’s empirical challenge. Hence, Chomsky’s invocation of Fox’s and Reinhart’s appeals to derivation-based economy conditions has little bearing on the issue at hand, Chomsky’s rhetorical stance notwithstanding. On balance, we find virtually nothing in recent minimalist thinking outside the internal assumptions of Chomsky’s quasi-metaphysical speculations that even mildly supports a derivational framework over one that is constraint-based.

²Most previous arguments for the theoretical preferability of the constraint-based approach have been based primarily on considerations of conceptual parsimony and computational tractability. An important exception is Johnson and Lappin 1999, which cites a complex network of island effects in Iraqi Arabic as part of a detailed demonstration of the untenability of minimalist claims about the relationship between overt and covert movement. Johnson and Lappin show that a feature-based account with separate restrictions on the percolation of distinct non-local features provides a straightforward, unproblematic account of the Iraqi Arabic data which can in fact be extended to the facts of German partial *wh*-displacement. Their arguments, which convincingly document the empirical advantages of a nonmovement account of the Iraqi

2 The Nature of Filler-Gap Dependencies

In the simplest case, a filler/gap dependency is a relation between two structural positions in a syntactic representation in which an overt element C , the filler, shares certain information with a possibly distant S subdomain of the representation in spite of the fact that C is missing from S . The distance between C and S is potentially unboundedly large:

- (1) a. [_{NP} That book], I should [_{VP} purchase ___].
- b. [_{NP} That book], Leslie thinks I should [_{VP} purchase ___].
- c. [_{NP} That book], Leslie told me she thinks I should [_{VP} purchase ___].

Here $C = \text{NP}$, and S can be taken to be the VP headed by *purchase*, a transitive verb which normally requires requires a nominal object. No nominal object appears in these examples; on the other hand, a nominal filler appears in a position where normally it cannot. The first and most striking aspect of the filler/gap relation, then, is that material that is expected to appear within S fails to appear, material that is not expected to appear elsewhere in the sentence does appear, and both of these anomalies are necessary for a well-formed result:

- (2) a. *I should purchase ___ .
- b. *That book, I should purchase some new skis.

The existence of a filler at the top of the structure and of a gap at the bottom are in a sense mutually licensing, and the obvious question is how the information that both are present is propagated between them. Moreover, as (3) makes clear, there must be a match in category type between the filler and the gap:

- (3) a. I put a book *(on) that table.
- b. [*(on) that table] I put a book ___ .

Furthermore, as shown by (4)–(6), case, person and number specifications must be shared between the filler and gap as well: the filler C must obey whatever requirements would be imposed on it, if it were occupying its normal position within S :

- (4) a. You bet WHO(*M) is coming to the meeting?

Arabic and German data, are however predicated on—and directed against—various specific assumptions of the Minimalist Program: that movement is exclusively motivated by feature-checking requirements, that post SpellOut feature movement independent of constituent movement is possible, and certain other assumptions made in minimalist discussions. In the following discussion we focus exclusively on ‘classical’ transformational theories of movement based on Chomsky 1981.

- b. Who(*m) do you bet __ is coming to the meeting?
- (5) a. I doubt Robin is/*am/*are coming to the meeting.
 b. Robin, I DOUBT __ is/*am/*are coming to the meeting.
- (6) a. I doubt those senators are/*is coming to the meeting.
 b. Which senators do you doubt __ are/*is coming to the meeting?

In all cases, specific properties of the filler obey conditions imposed at the gap site, by whatever principles are responsible for the assignment of accusative case to objects and person/number compatibility between finite verbs and their subjects. Any theory of filler/gap dependencies must therefore, at a minimum, account for this correlation of properties between filler and gap, and for the fact that the correlation persists over arbitrary syntactic distances.

In addition, an adequate theory of filler/gap linkage must provide some account of the fact that the acceptability of such linkages appears to be radically degraded in certain syntactic environments. There is an enormous literature devoted to the precise characterization of such environments, often referred to as ‘islands’, some of which are illustrated in (7):

- (7) a.*Which car do you know the people who sold __ to Robin? (prohibited extraction from relative clause)
 b.*Who do you believe the rumor that Robin spied for __ ? (prohibited extraction from clausal complement to a nominal head)
 c.*Who does Robin watch movies on weekend evenings and Leslie go drinking with __ ? (prohibited extraction from a conjunct)
 d.*What does Robin watch movies and __ ? (prohibited extraction of a conjunct)
 e.*I know which people Robin decided that for Terry to hire __ would be a mistake. (prohibited extraction from a clausal subject)
 f.*I know what Robin talked to Leslie after reading __ . (prohibited extraction from an adjunct clause)
 f.*How awkwardly did you deny that Robin performs introductions __ ? (prohibited adjunct extraction from a negative syntactic environment)

- g.*How awkwardly did you regret that Robin performed the introductions __ ?
 (prohibited adjunct extraction from a factive syntactic environment)
- h.*How awkwardly did you wonder whether/when Robin performed the
 introductions __ ? (prohibited adjunct extraction from a *wh*-environment)

From Chomsky 1964 on, considerable effort and ingenuity has been devoted to deriving these effects from a small set of increasingly abstract syntactic principles. Nonetheless, there is now increasing evidence that a good number of these phenomena are due not to constraints of grammar, but rather to processing, pragmatic, and discourse effects that can be manipulated in such a way as to ameliorate the severe unacceptability exhibited by the examples in (7). (See, for example, Kroch 1989, Kluender 1998, Hawkins 1999 and Kehler 2002 for important contributions along these lines.) The full range of island phenomena and the relative weighting of given effects will ultimately be explained by some combination of grammar-internal and extragrammatical factors whose precise delineation is yet to be determined.

An extra layer of complexity arises in the filler/gap linkage question when multiple-gap constructions are considered. In some cases, these constructions amount to nothing more than a combination of individual filler/gap constructions:

- (8) a. [Which people]_{*i*} do you never know what_{*j*} to say ___{*j*} to ___{*i*} .
- b. [Our neighbors' bizarre driving behavior]_{*i*} is a topic that I'm always unsure who_{*j*} I should talk to ___{*j*} about ___{*i*} .

Such examples exhibit nonoverlapping (or 'nested') filler(F)/gap(G) linkages $F_i \dots F_j \dots G_j \dots G_i \dots$, where both $F_i \dots G_i$ and $F_j \dots G_j$ are UDCs of the sort illustrated in (3)–(6) above.

But there are other cases in which multiple gaps are linked to a SINGLE overt filler, and such cases raise special problems. Examples of single filler/multiple-gap constructions include so-called parasitic gap constructions, exhibited in (9), and coordinate extractions of the sort illustrated in (10):

- (9) a. Which article did Robin file __ without reading __ ? (main clause object gap, legal gap in adjunct clause.)
- b. Which of the dignitaries do you think my talking to __ would bother __ ?
 (VP object gap, legal gap in subject constituent)
- c. Robin is the kind of person that anyone who meets __ immediately likes __ .
 (VP object gap, legal gap in subject constituent and relative adjunct clause)

- (10) a. Paris is one city that most people like __ but Terry hates __ .
- b. Which book did they reveal that Sandy had bought __ and Leslie had taken __ out of the library?

As shown in (7), both adjunct clauses and subject constituents constitute relatively strict islands for filler/gap linkages; yet the presence of an independently legal gap, as in the examples in (9), appears to ameliorate these extractions to a significant degree, so much so that in (9c), a gap can be linked with a filler across two island borders.

Such constructions confront us with an immediate problem—how can a single filler be linked to two gaps? The following logical possibilities exist:

- there is a single linkage mechanism that enforces the sharing of information about relevant properties with all gaps in the multiple-gap construction;
- there is a single linkage mechanism that enforces the sharing of information about relevant properties with exactly one gap, so that multiple-gap constructions must include two or more such linkages, only one of which involves an overt filler;
- there is more than one linkage mechanism between fillers and gaps, only one of which necessarily enforces the sharing of the key properties discussed above.

All of these possibilities have been suggested at one time or another in the literature, along with various hybrid proposals that combine features of two of these analyses. We argue in the following discussion that nonmovement, constraint-based analyses of multiple-gap phenomena, instantiating the first of these possibilities, have significant advantages over movement-based theories—both on empirical and conceptual grounds.

3 Transformational Approaches

The transformational approach to filler-gap constructions, from Chomsky 1955 on, has posited at least two distinct representational stages, the first of which displays a filler constituent C in situ in the site S satisfying applicable selectional constraints, and the second of which manifests the filler in its surface position as a result of a legal application of a movement transformation, which in effect relocates C from S to the location corresponding to its actual pronunciation. In its least constrained formulation, the effect of a movement transformation T is that shown in (11):

$$(11) \quad [{}_S \dots \alpha \dots] \xrightarrow{T} [\alpha [{}_S \dots _ \dots]]$$

Since the early 1970s, this characterization of filler movement has been qualified by the imposition of constraints which interact to ensure that the movement of a filler leaves an ‘empty category’—or *trace*—at each movement site. Any two traces t_i^1 and t_i^2 must respect certain stipulated locality restrictions, which entails that at some fairly shallow level of syntactic representation, there will have to be an actual empty daughter category coindexed with the filler in each clause on the pathway between the filler and the gap site. We briefly consider below the awkward consequences that the existence of these intermediate traces poses for the ‘interface level’, the level at which the syntactic representation is taken over by the human cognitive system responsible for calculating meaning. Our concern in this section is the challenge that multiple-gap constructions pose for the analysis of filler/gap linkage summarized in (11).

Of the logically possible treatments of multiple-gap constructions outlined at the end of sec. 2, the first—that there is a single filler linked to both gap sites—seems most difficult to implement under the movement analysis in (11). Clearly, a single operator cannot move from multiple D-Structure positions,³ so that either an empty operator must be involved or one of the gaps itself must be linked to the filler through some means other than movement. The first of these positions is offered in a basic form in Chomsky 1986, where the parasitic gap is the tail of a parasitic chain whose well-formedness is contingent upon the existence of a ‘true’ chain; the second position is taken in Chomsky 1982 and Cinque 1990, where the parasitic gap is not a trace but a null pronominal. Postal (1994b, 1994a, 1998) proposes a kind of hybrid position in which a null resumptive pronoun appears in the position of the parasitic gap in underlying structure but subsequently moves, entering into a control relation with the overt filler, which heads the ‘true chain’. To overcome various (and in many respect theory-internal) difficulties that such approaches encounter, Frampton (1990) offers an attempt to reconcile a (standard transformational) movement analysis with a view in which parasitic gaps are indeed traces bound by the same filler and stand in exactly the same structural relationship to the filler as true gaps.

What is particularly interesting is that, in spite of the apparent major differences among these various approaches, they all encounter serious empirical and conceptual difficulties that have no analog in the constraint-based approach we discuss in sec. 4 below. Before presenting the constraint-based analysis, however, we will consider three significant empirical domains which, we believe, pose insurmountable difficulties for any transformational account of parasitic gaps, and therefore directly challenge the movement analysis of filler/gap phenomena itself.

³For a critical examination of one attempt to redefine movement transformations so that they might work this way, specifically with regard to ‘across-the-board’ extraction, see Gazdar et al. 1982.

3.1 Nonarguments for Chain Asymmetry

A foundational assumption in the transformational treatments we have cited is the asymmetrical nature of parasitic gap phenomena: there is one ‘true’ chain, holding between the filler and the DS site of origin of the filler, and a second parasitic chain which can only exist through some connection to the legal, stand-alone true chain. This asymmetry persists even in Frampton’s theory, in spite of its treatment of both chains as having the same structural relation to the filler at S-structure, as we discuss below. There are several putative arguments standardly offered in support of this asymmetry. However, on closer inspection, all of these arguments turn out to be based on misleading or seriously incomplete data sets. We consider the principal arguments in turn.

3.1.1 The Kearney Paradigm

The primary argument given for this asymmetry is given in Chomsky 1986, and is worth citing in full:

We have been assuming, following Taraldsen’s [(1981)—RDL & IAS] original study of parasitic gaps, that there is a crucial distinction between the real gap, in the position more accessible to extraction, and the parasitic gap—that these are not simply “multiple gap-” constructions. Evidence for this assumption is provided by Kearney, who notes the following cases:⁴

- (12) a. Which books about himself did John file *t* [before Mary read *e*]?
b.*Which books about herself did John file *t* [before Mary read *e*]?

Example (12a) is a normal parasitic gap constructions, but (12b) is ungrammatical. It follows, then, that the *wh*-phrase in (12a), (12b) is extracted from the position of *t*, the real gap, not from the position of the parasitic gap *e*. As Taraldsen had originally assumed, the latter is truly “parasitic”.

Frampton (1990, p. 58) cites the same data in support of Chomsky’s line of reasoning about the source of (12). While hardly transparent, that reasoning appears to be the following: if p-gap constructions were in fact instances of some kind of multiple- (i.e. symmetrical) gap phenomenon, then reconstruction of the filler should proceed symmetrically to yield identical effects in (12a) and (12b). In both cases, the result would be a representation in which an anaphor was compatible with its antecedent in one of the sites but not in the other, Hence, on the crucial assumption that the ill-formedness of (12b) arises from reconstruction of an anaphor into a gap site where only an incompatible antecedent is present, we would expect

⁴We systematically replace the original example numbering with our own here for ease of reference.

(12a)—where *which books about himself* is reconstructed to a site where *Mary* must antecede the anaphor—to be just as bad. But this is not what we find. Rather, the general pattern is that when the anaphor is compatible with a main clause subject antecedent, the result is good, and when it is not, the result is bad. Hence, the simplest conclusion is that the overt filler reconstructs only to the main clause gap site, which must then be its transformational point of origin.

But this conclusion is inconsistent with previously overlooked examples like (13):

- (13) a. There were pictures of herself which, once Mary finally decided she liked __, John would have to put __ into circulation.
- b. There were pictures of himself which, once Mary finally decided she liked __, John would be able to put __ into circulation.

(13a,b) instantiate the ‘fronted adverbial’ p-gap construction discussed in general terms for the first time, to our knowledge, in Haegeman 1984 (two years before the above citation from *Barriers* appeared). Examples like these demonstrate that binding patterns reveal nothing about the extraction site of the *wh*-phrase, even on Chomsky’s own line of reasoning. No matter which gap is taken to be the ‘true’ gap in adverb fronting, the fact that both *John* and *Mary* are possible reflexive antecedents shows that the distinction between true and parasitic gap is irrelevant to the determination of anaphor binding.

These observations, incidentally, are exactly as predicted by the convergent binding theories of Pollard and Sag 1992 and Reinhart and Reuland 1993, who demonstrate that Principle A cannot be the basis for determining the antecedent of anaphors in ‘picture noun’ phrases. Clearly, extragrammatical factors such as point-of view and proximity play a significant role in defining the notion of prominence that determines well-formedness in cases like those we have been looking at. The importance of proximity is underlined by further contrasts like the following, involving across-the-board extraction:⁵

- (14) Which pictures of himself/*herself did John approve of __ and Mary like __ enormously?

This observation about ATB extraction is not inconsistent with the assumption that picture noun reflexives are governed by by extragrammatical factors, as argued at length by Pollard and Sag (1992, 1994). Under the assumptions made by Chomsky or by Frampton, however, these data make no sense whatsoever.

⁵But, interestingly, right-shifted expressions containing reflexives seem to exhibit no such contrasts:

(i) ?*John approved of __ and Mary liked __ enormously, that lengthy description of himself/herself.

3.1.2 (Non)Restrictions on Nominative Subject P-Gaps

A second argument for chain asymmetry is given in Chomsky 1982, Cinque 1990, Frampton 1990 and Postal 1998, based on the supposed ill-formedness of parasitic gaps in finite subject position. The following examples illustrate the claim:

- (15) a.*Jack, who_i I heard about ___i before you said ___i would hire us.... (Frampton 1990, p. 68)
- b.*Someone who_i John expected ___i would be successful though believing ___i is incompetent. (Chomsky 1982, p. 55)
- c.*The militant_i who they arrested ___i after learning ___i was carrying a gun. (Postal 1993a, p.737)

But again, examination of a slightly wider range of data shows that whatever problem such data pose for acceptability, they are hardly representative of finite subject parasitic gaps in the general case. Consider, for example, the data in (16):⁶

- (16) a. Which people_i did you invite ___i without thinking ___i would actually come? (post-VP adjunct clause)
- b. Jack, who even before you said ___i would hire us, I was favorably disposed towards ___i , is a prince among men.
- c. I had to work for a while with Leslie, who although I at one point suspected ___i was lying to me, I gradually came to trust ___i completely. (pre-VP adjunct clause)
- d. Which book did you file ___i without believing ___i would please Mary? [Judged ungrammatical in Chomsky 1982; judgment questioned by Chomsky (1986: 55)]

Such examples suggest not only the lack of any systematic difficulty with finite subject parasitic gaps, but also the extremely narrow evidence base on which syntacticians all too often base extremely wide-ranging generalizations. It should be noted in connection with the pre-VP adjunct clauses that all of the work arguing against the possibility of nominative subject parasitic extraction appeared well after Haegemann's important paper, yet none of them reflect any effort to apply her discoveries to the claim about subject parasitic gaps they defend.

⁶Note that (16b) is a pragmatically more natural variant of Frampton's example (15a), differing structurally only in that the temporal adjunct is preposed.

3.1.3 The (Non)Antipronominality of P-Gaps

Chomsky (1982) argued that parasitic gaps are in-situ null pronominals (to a large extent on the basis of data whose acceptability he subsequently, and dramatically, changed his views about). This argument was extended by Cinque and, much more extensively, by Postal, who claim that parasitic gaps show an essentially pronominal distribution. For both Cinque and Postal, the underlying structure of parasitic gap constructions is illustrated in (17b) and (18b), where e_i is a phonetically empty resumptive pronoun (henceforth, RP):

(17) a. [Which books] _{i} did you buy ___ _{i} without reading e_i ?

b. You bought [which books] _{i} without reading e_i .

(18) a. [Which authors] _{i} do fans of ___ _{i} idolize e_i fanatically?

b. Fans of [which authors] _{i} idolize e_i fanatically.

Both authors argue that environments which systematically disallow weak definite pronouns (the environments termed *antipronominal* in Postal 1998) also prohibit parasitic gaps. However, as the more detailed examination of the relevant data by Levine et al. (2000) and Levine (2001) reveals, there are many antipronominal environments that appear to admit parasitic gaps. We offer just a few, representative examples illustrating the lack of correlation between parasitic gap and pronoun-friendly environments:⁷

(19) a. Robin wanted to paint her walls green _{i} without, however, wanting to paint her ceiling that _{i} /*it _{i} .

b. Green _{i} is a color you might decide to paint your walls ___ _{i} without necessarily wanting to paint your ceiling e_i as well. (change of color environment)

(20) a. He claimed to be a certain kind of doctor before actually becoming one/*it.

b. [What kind of doctor] _{i} did he CLAIM to be ___ _{i} before actually BECOMING e_i ? (predicate nominal)

In addition, there are many examples of parasitic gaps which occur not only in antipronominal contexts, but which are not even nominal to begin with. A few examples will have to stand in for the many cited in the sources referred to above:

⁷Judgments about such sentences are notoriously labile. Nonetheless, if even a small percentage of the data claims made by Levine et al. (2000) and Levine (2001) are correct, there is little hope of salvaging Postal's claims about antipronominal environments.

- (21) a. How harshly do you think we can treat THEM ____i without in turn being treated e_i OURSELVES? (adverbial p-gap)
- b. This is a cause [TO which] people are ATTRACTED ____i without ever becoming seriously DEVOTED e_i /*there_i. (PP p-gap)
- c. I wonder just how nasty_i you can PRETEND to be ____i without actually BECOMING e_i/*it. (AP p-gap).

Parasitic gaps, but not definite proforms are allowed in these environments, as indicated. Thus, such examples are precisely the kind of data that any contentful proposal to derive parasitic gaps from null resumptive pronouns predicts should be ill-formed.⁸ The relative ease with which good examples to the contrary can be constructed suggests again that there is no empirical basis for a difference between true and parasitic gaps along the lines proposed in Chomsky 1982, Cinque 1990, or Postal 1998.

3.1.4 Symbiotic Gaps

The foregoing considerations eliminate some of the most frequently cited arguments for the asymmetry between true and parasitic gaps that undergird movement-based accounts of filler/gap dependencies. As we have noted already, because movement of two or more *wh* constituents to a single filler position is essentially undefinable, parasitic gap constructions are necessarily treated as cases in which the legal movement of the overt filler justifies the existence of a second gap, not itself produced by that movement, which would otherwise not be possible. This is a stance that would obviously be strengthened if bona fide evidence for asymmetrical properties of the true and parasitic chains could be provided. The evidence offered, however, as we have just argued, turns out to be spurious.

But matters are even worse than this: there is evidence that pairs of extraction chains, neither of which is itself (presumably) legal, can license each other. This is a state of affairs that is exceedingly difficult to reconcile with the movement theory of filler/gap dependencies and its corollary requirement that when a single filler is connected to two or more gaps, one of the gaps must be independently licensed, with the possibility of other chains being dependent on the existence of the first.

The nature of this difficulty emerges clearly in the case of a rather understudied subtype of multiple-gap construction illustrated in (22):

⁸One might argue that the possibility of *thus(ly)* in examples like (i) indicates that the relevant environment is not antipronominal:

- (i) How harshly do you think we can treat THEM __ without in turn being treated *thus(ly)* OURSELVES?

However, this argument seems to us to have little force, given that *thusly* is severely register-restricted, or even archaic.

- (22) a. What kind of books_{*i*} did authors of ____{*i*} argue about royalties after writing ____{*i*} ?
 b.?*What kinds of books_{*i*} did authors of Kluwer books argue about royalties after writing ____{*i*} ?

The key point to see here is that both gaps in (22a) appear in parasitic environments, without there being any ‘true’ gap in a nonparasitic environment. Example (22b) provides the standard kind of control, showing that the gap in the *after*-phrase is ameliorated by the presence of another other gap in the sentence. Space considerations prevent us from detailing the nature of this problem, but these data are in fact inconsistent with every transformational analysis of parasitic gaps that we are familiar with.

3.2 Case Conflict in Multiple-Gap Constructions

A final problem for the approaches we have been considering arises around data such as (23):

- (23) Robin is someone who_{*i*} even good friends of ____{*i*} believe ____{*i*} likes power entirely too much.

The filler *who* is linked to two gaps, one of which, as the object of a preposition, must bear accusative Case and the other, in finite subject position, nominative Case. Such mismatches at first appear to support the position that there is an asymmetry between the two chains that parasitic gap constructions comprise: if both gaps were linked to a single filler, the latter would have to share Case specifications with both gap sites, and thus bear two mutually inconsistent Case values. On the other hand, if the filler is linked to only one of the gaps directly, then it only has to share Case with that filler, and its indirect linkage to the other gap—whether by Chain Composition (as in Chomsky 1986), \bar{A} -binding of a pronoun with only an anaphoric connection to the filler (as in Chomsky 1982 and Cinque 1990) or control of the moved pronoun (as in Postal 1998)—is in principle completely noncommittal so far as the Case specification of the second gap is concerned.

But this seemingly plausible formulation of the issues is deceptive. It turns out that none of the movement approaches to parasitic gaps has a straightforward way of accounting for the fact that such mismatches will only occur when the overt filler is morphologically neutral with respect to case marking. Nor can they predict that examples parallel to (23) (e.g. (24)), in which the filler is unambiguously marked for one or another particular case value, will be excluded (or will at best appear seriously degraded compared with the cases in which syncretic fillers appear):

- (24) a.*He_{*i*} / *Him_{*i*} , even friends of ____{*i*} think ____{*i*} likes power entirely too much.
 b. Robin is someone who(*m)_{*i*} once I realized ____{*i*} was coming to the party, I made a special point of being nice to ____{*i*}

Consider first the null RP analyses. Whether the RP remains in situ (as in Chomsky’s (1982) and Cinque’s analysis) or moves (as in Postal 1998), its relation to its filler antecedent will be such that either it will have to match that antecedent’s Case value or it will not. If it does not, then all possible combinations must be allowed: both the situation in (23) and that in (24). The point is that coindexation under \bar{A} -binding or control, if it does not take into account the Case values of the RP and its antecedent, will surely not have access to morphological *form*. In fact, overt pronouns display exactly this sort of indifference to both the Case value and the morphological form of their antecedent:

- (25) a. He_i doubts that anyone likes him_i.
 b. I told him_i he_i was going to have to shape up.
 c. I don’t know whom_i they gave the job to, but she_i’s going to have a rough time with that lot.

There seems to be no way in which the particular pattern of case mismatch possibilities illustrated in (23)-(24) can be imposed under the normal properties of pronoun/antecedent relations.

Suppose we then assume that no mismatch is possible. In that case, (23) will correctly be ruled out, but so will (24). Moreover, it is clear that both Cinque and Postal use the null RP analysis to link *tough* gaps to *tough* subjects and hence that Case mismatch must indeed be permissible (since typically such gaps are accusative, while *tough* subjects can be nominative). It therefore seems clear that the strict-match requirement is untenable in any case, and that the discrepancy between the mismatch patterns in (23) and (24) remains mysterious.

Consider now the analysis presented in Chomsky 1986. Here, Chain Composition involves a series of traces headed by an empty operator (the parasitic chain), coindexed with a second such \bar{A} -chain (the ‘true’ chain) headed by the overt filler. An interpretation is thereby supplied for the gap corresponding to the tail of the parasitic chain. We then have a structure of the general form for (23):

$$(26) \quad wh_i[\text{acc}] \dots t_i[\text{acc}] \mathbf{O}[\text{nom}]_i \dots t_i[\text{nom}]$$

Again, if the mediation of the empty operator in (26) is taken to be responsible for the goodness of the *Who... ?* version in (23) by permitting a mismatch in the case values borne by the two chains, it is then completely mysterious why the *he/him/whom* examples in (24) are bad. In the ill-formed versions, the accusative operator or topicalized pronoun is linked to an accusative gap site and the presumably nominative empty operator is linked to a nominative gap site in precisely the same way as in (23); the only difference is the structurally insignificant fact that the phonological form of *he/him/whom* is exclusively associated with

accusativity, whereas that of *who* is not. We thus have no explanation, on the Chain Composition treatment of p-gaps, for the badness of (24b) (**Robin is someone whom_i once I realized _i was coming to the party, I made a special point of being nice to _i*). And again, it is hard to see how Chain Composition could plausibly insist on a match in Case between the empty operator chain and the ‘true’ chain, in view of the fact that such a requirement would rule out (23) (*Robin is someone who_i even good friends of _i believe _i likes power entirely too much*), where the Case values also disagree. The problem is thus exactly the same for the *Barriers* analysis as for the null RP analyses.

Finally, Frampton’s revision of the Chain Composition account fares no better, for the deletion process by which the null operator is replaced by a trace leaves the challenge posed by (23)–(24) without even a programmatic answer. According to Frampton, a deletion rule eliminates the *wh*-operator of the parasitic chain, but leaves a trace in its place, allowing a process of chain formation to apply; and such a deletion rule must somehow not merely delete the operator, but replace it with a trace whose Case specifications presumably reflect those of the deleted operator.⁹ The result is that there are two separate chains which share a member, and either that member bears a Case which matches its gap site in each instance or else it does not. Frampton’s account will therefore either lead to a violation of Case theory (if the Case of the ‘true’ subchain must be shared with that of the parasitic chain, since then a second Case value may in principle be added to the chain at the ‘join point’ trace) or will make a false prediction that there is indeed only a single Case value assigned to both the true and parasitic subchains in parasitic gap constructions, a prediction counterexemplified by (23). There is not even a hint in Frampton’s account of how this ‘deletion’ process could be stated to yield the result in (23), while still predicting the ill-formedness of the examples in (24). It appears then that Frampton’s solution cannot avoid either violating Case theory or else mispredicting both the well-formedness of examples such as (23) and the ill-formedness of (24), just as the other movement-based accounts we have considered earlier do.

4 A Constraint-Based Approach

We start by illustrating in detail a constraint-based treatment of UDCs that has been worked out in considerable detail in a twenty-year tradition.¹⁰ We will focus here on the topicalization construction, which in some respects allows the most straightforward presentation of the SLASH connectivity mechanism, a feature whose value is a set indicating what elements are absent from a given phrase. A tripartite organization for this mechanism is frequently assumed:

⁹As noted above, it is difficult to know just what the result of the deletion operation in question consists of, since it is left almost completely inexplicit.

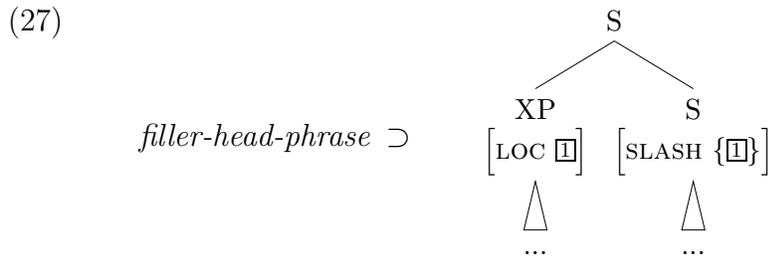
¹⁰See, for example, Gazdar 1981, Gazdar et al. 1985, Pollard and Sag 1994, Hukari and Levine 1996, and Bouma et al. 2001.

- the nonempty SLASH specification is ‘launched’ at the top of the filler/gap pathway by means of a schema that enforces identity in certain specific respects between the the filler and the specified value of SLASH;
- a general principle of grammar requires SLASH specifications to be shared between a mother category and its daughters, with the consequence that for every filler, a continuous path of SLASH specifications connects the topmost instance of SLASH with its final appearance at the gap site;
- a constituent that contains a nonempty SLASH value identified with its LOC value necessarily matches the lexical description of a phonologically null element, and, in English at any rate, no other element; alternatively, a reduction in the valence specifications of the selecting head governing the gap site ensures that no element corresponding to the ‘extracted’ category need ever combine with that head, yielding the appearance of a missing element.¹¹

We describe these separate, interlocking parts of the connectivity mechanism in turn.

The Filler-Head Phrase Type

In HPSG, signs are licensed by constructions (or schemata) that are subject to various interacting constraints. One such constraint, which applies generally to all filler-head phrases (topicalization, *wh*-relatives, *wh*-interrogatives, *wh*-exclamatives, etc.), may be stated in simplified terms as follows:

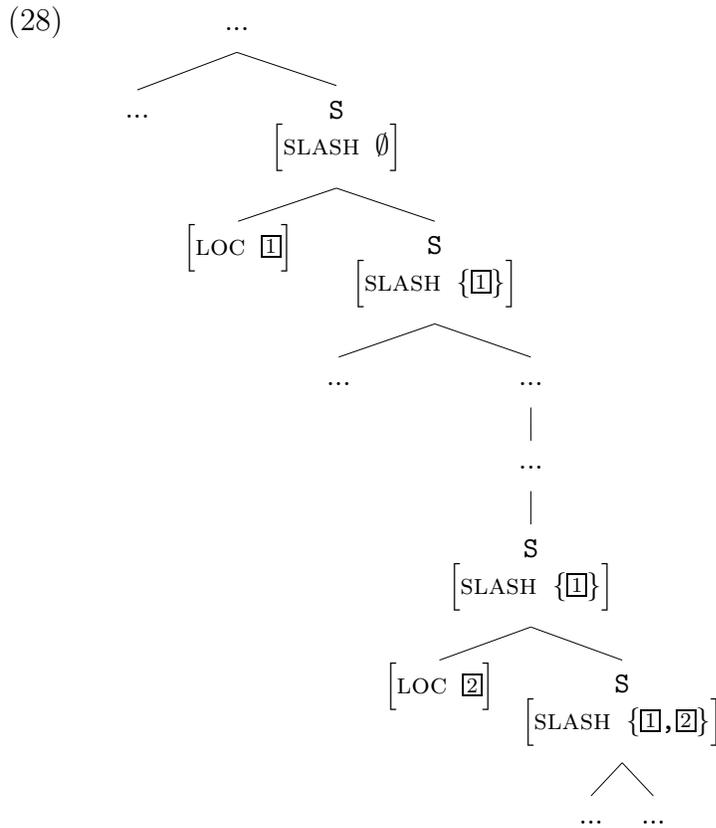


The value of LOC(AL) is a complex feature structure specifying both syntactic and semantic information, including syntactic category, semantic content, case, and so forth. Thus such information will be available at intermediate levels of structure within a UDC, particularly at the bottom, where such information must be compatible with the demands that the grammar imposes on elements in the gap position.

¹¹Resumptive pronouns have been claimed to correspond to syntactic variables, and hence something like audible traces, in various languages. It is therefore conceivable that in such languages, overt lexical entries also have such a description, though we do not consider such phenomena here.

The constraint in (27) is not so much a means of introducing SLASH into grammatical structures as a way of allowing a SLASH specification that has been introduced into a syntactic description to be safely bound off in a phrase structure. A SLASH specification can appear anywhere, but will continue to percolate through the structure (according to the principle introduced in the next section) until legally removed in accordance with constructional constraints like (27).

SLASH is a set-valued feature. Only a single element for any given SLASH specification is introduced by any given construction (lexical or phrasal), but in principle any number of such elements can cooccur in a structure licensed by a grammar, so that we can expect to find structures of the form:



The grammar will thus license multiple gap constructions such as the following:

- (29) a. There are certain people who_j I never know what_i I should say ___i to ___j.
 b. Problems like this_i we were unsure who_j to talk to ___j about ___i.

Moreover, the existence of multiple-gap constructions is well-attested in other languages (see, for example, Maling and Zaenen 1982). The treatment of SLASH as a set-valued feature is therefore empirically well-motivated.¹²

The Nonlocal Feature Principle

Filler-head constructions introduce SLASH into a phrase structure at a particular point, above which it does not appear and below which it must appear at every hierarchical level until its termination in an empty category. It is clearly essential to maintain an unbroken linkage in SLASH values from mother to daughter(s) between these points; once a filler is introduced, the propagation of information about its presence and properties must not be allowed to disappear en route to a potential gap site, or there will be no license for a gap, with the result that constituents will appear adjoined to clauses, but with no gaps that they can be interpreted as filling. This continuous line of SLASH propagation is enforced by an explicit requirement that in all constructions other than those that license SLASH-binding, any SLASH value that appears on any daughter must be part of a mother's SLASH specification. Moreover, it is required that any term appearing as part of the mother's SLASH specification appear in the SLASH specification of at least one daughter:

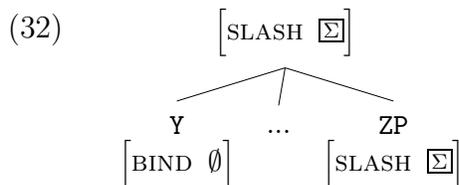
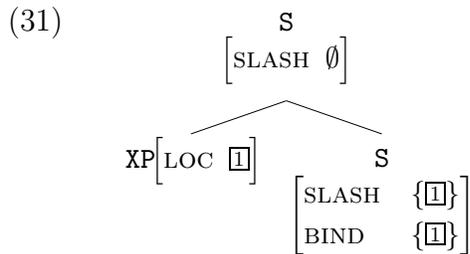
(30) **The Nonlocal Feature Principle (NLFP):**

In any construction, the mother's SLASH value is the union of the daughters' SLASH values minus the BIND value of the head daughter.

The value of BIND will be specified so that it is empty in general, but will contain an appropriate element v , just in case a given word or construction licenses the introduction of non-empty SLASH specification containing v . Above any such binding point, the set value of SLASH will not contain v . Thus BIND plays the role of a regulator, ensuring that nonlocal feature values only appear at the point where they are 'launched', and only propagate down below this point to the place in the structure where they are cashed out as a gap.¹³ Once introduced, therefore, the value in question will be blocked by (30) from appearing higher than it should, and forced by this same constraint to propagate continuously between mother and daughter until its termination in an appropriate lexical item. The 'top' and 'middle' of the UDC dependency thus contrast, in the simplest case, where only a single filler/gap linkage is involved, as in (31) and (32):

¹²We will ignore here the further issue of whether to model multiple-filler-gap dependencies with lists, rather than sets.

¹³In the case of SLASH. Other non-local features, such as WH or REL, will be cashed out as appropriate *wh*-words. Our BIND feature plays a role similar to that of Pollard and Sag's (1994) TO-BIND feature.



All that is necessary, with this apparatus in place, is to specify a satisfactory mechanism to realize the termination of the SLASH path as a gap.

SLASH Termination

The termination of SLASH dependencies is easily accommodated, simply by positing the existence of a single lexical entry with empty phonology—a *wh*-trace. Crucially, this lexical entry identifies the LOCAL value with the only member of the SLASH set, as shown in (33):¹⁴

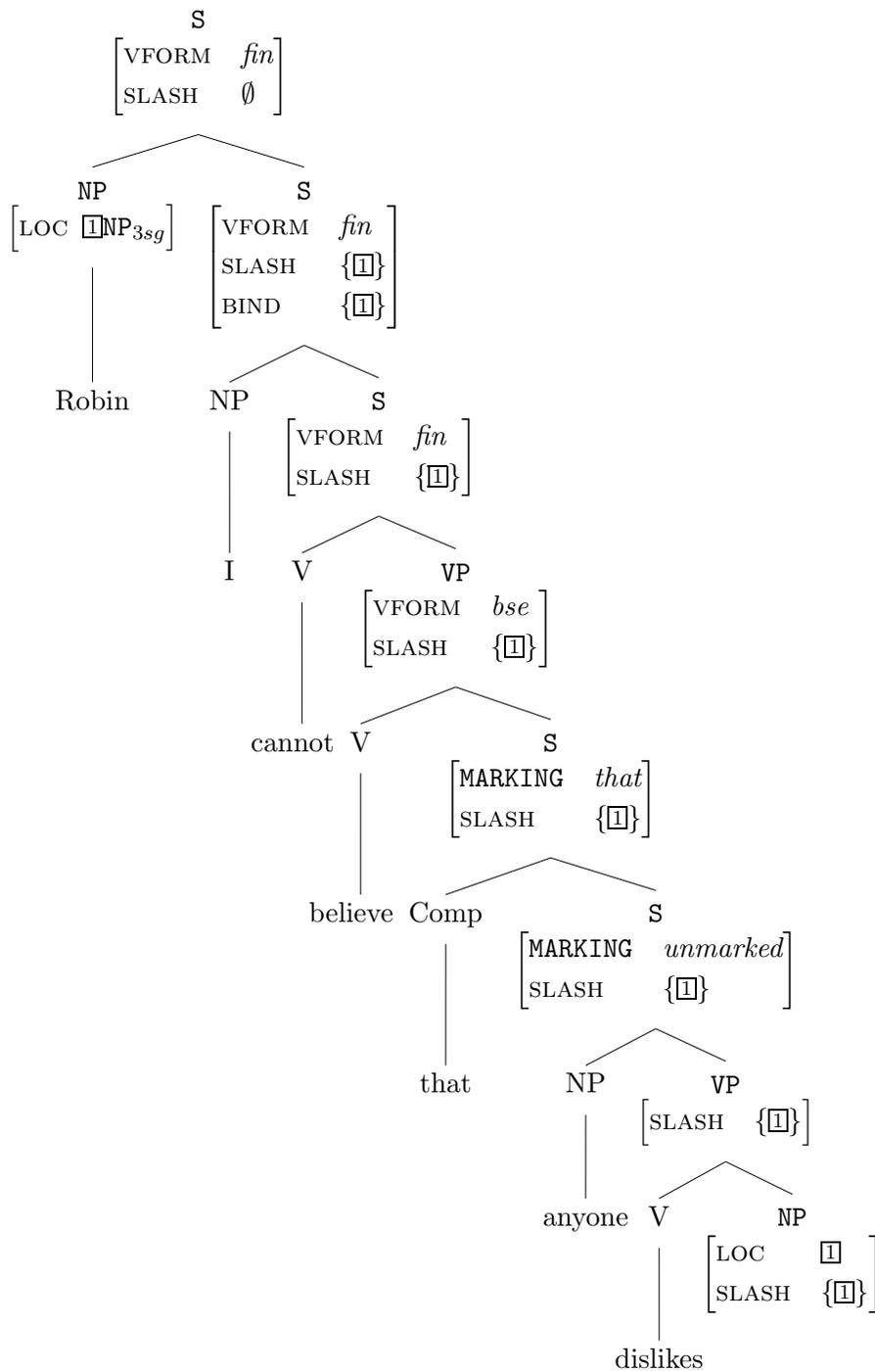


The LOC value includes information about category, content, case, and so forth and this information is constrained locally, e.g. by a lexical head that selects a *wh*-trace as its object. Hence, the identity specified in (33) ensures that a trace’s SLASH value contains only information compatible with these local constraints.

¹⁴In fact, there is considerable work in constraint-based approaches that has explored the significant consequences of eliminating traces. See, for example, Sag and Fodor 1994, Sag 2000, and Bouma et al. 2001. The last two papers discuss examples like the following, which are immediately explained in analyses based on unrealized arguments, rather than *wh*-trace:

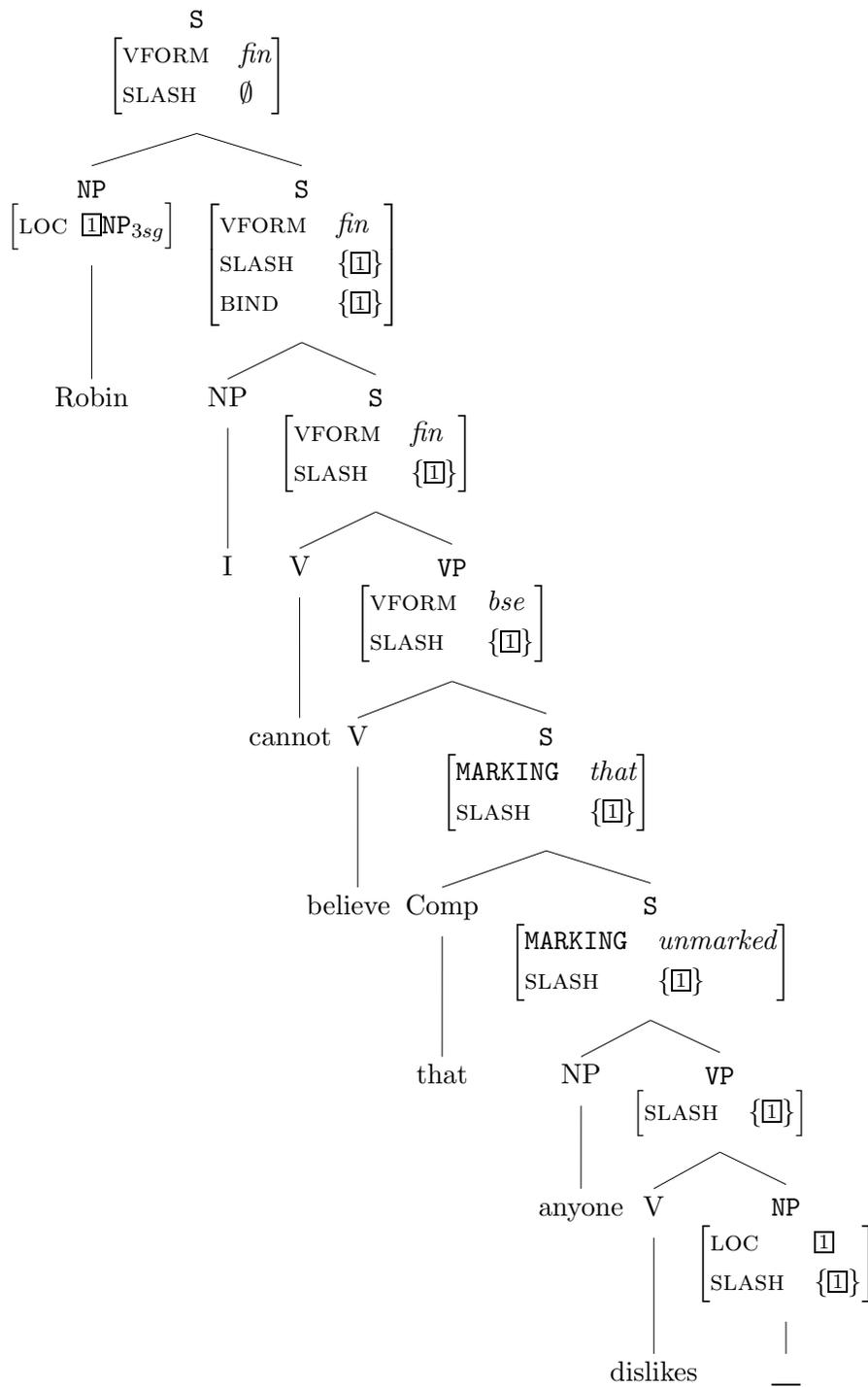
- (i) *Which of her books did you find both [[a review of] and []]?
- (ii) *Which of her books did you find [[] and [a review of]]?
- (iii) *Which rock legend would it be ridiculous to compare [[] and []]?
(cf. Which rock legend would it be ridiculous to compare with himself?)

(36)



Now the only lexical entry in the grammar of English that is compatible with the complement of *dislikes*, as constrained in (36), is (33). We may therefore terminate this tree as in (37):

(37)



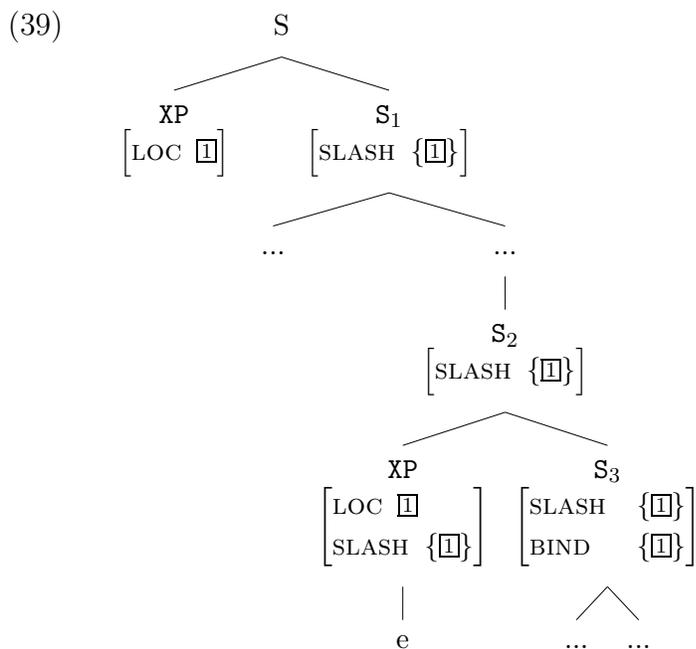
The sentence *Robin, I cannot believe that anyone dislikes* is thus licensed by our analysis, but examples like (38) are not, precisely because overt NPs bear an empty SLASH specification

and hence cannot terminate a structure like (36):

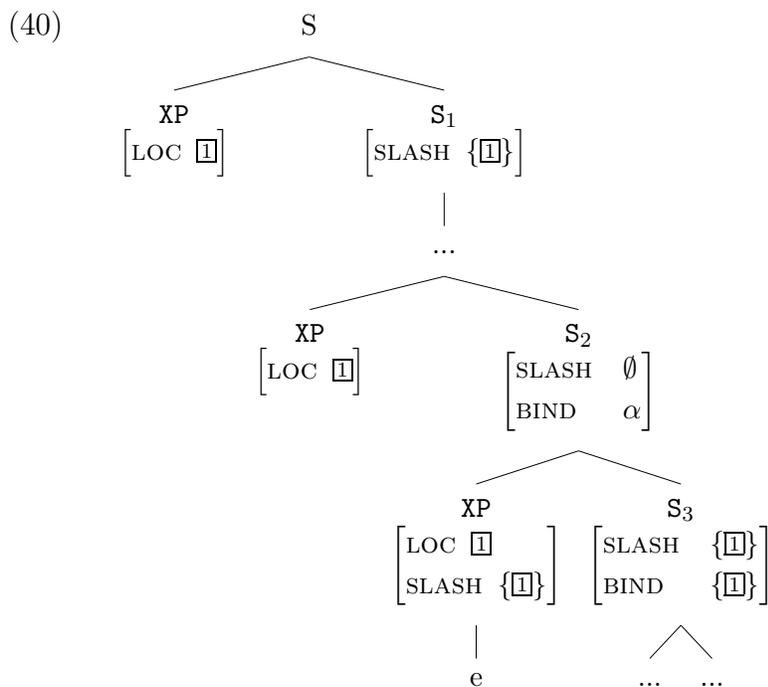
(38)*Robin, I cannot believe that anyone likes Sandy.

Crucially, there is no alternative licensing for a sentence like *Robin, I cannot believe that anyone dislikes* which chains together a number of local filler/gap constructions in the way that TG does by cyclical movement of a single filler. This device is necessary in TG because movement of a filler is the connectivity mechanism in all cases of extraction, yet movement must be local in order to participate in the TG treatments of the Complex NP Constraint in terms of Subjacency, etc. Iterated movements of the filler category are therefore required on theory-internal grounds, giving rise to \bar{A} -chains in which the head is connected to the trace at the foot by a series of c-commanding traces each of which antecedent-governs the link it immediately c-commands.

By contrast, in PSG approaches—from Gazdar 1981 on—connectivity is effected by iterated local percolation of SLASH, so that the only empty category actually present occupies the gap site itself. And it turns out that the TG iteration of filler/gap linkages cannot be emulated in the system outlined here. Such an emulation would require the following structure to be legal:



This structure is illegal under the terms of the NLFP, for the union of SLASH specifications on the daughters of S_2 minus the BIND specification on S_3 will yield the empty set. On the other hand, accommodating the NLFP at S_2 in (40) in such a structure yields:



Now the specifications on S_2 are in accord with the NLFP as far as the local tree below S_2 is concerned, but they violate the NLFP within the local tree in which S_2 is a daughter. Thus, no matter which SLASH specification appears on S_2 , the resulting structure violates the NLFP and is therefore ruled out.

Contrast this treatment of filler-gap UDCs with transformational analyses, where since the mid-1970s locally constrained movement has been obliged to leave a phonologically null replica—under some approaches a complete copy of the filler, i.e. an entire tree including its phrase structure descendent constituents—in a designated ‘escape hatch’ position (variously COMP, [Spec,CP], adjoined position to VP and other major category projections, etc.). Such intermediate positions constitute a significant embarrassment for derivational models of syntax, for reasons well summarized by McCloskey (Ms, pp. 44–45):

The presence of an appropriate element in [Spec,CP] will trigger an application of Functional Abstraction... an operation which is necessary if the content of the WH-clause is to be integrated into the larger semantic structure of which it is a part. This must in some sense be why syntactic devices exist whose effect is to fill SPEC-CP—ultimately to cause clauses to be turned into predicates.

This operation will apply appropriately at the ‘top’ of \bar{A} -dependencies. But if it applies in intermediate positions, the result will be uninterpretable (the

embedded CP will denote a predicate, rather than the proposition which the embedding verb expects to encounter in its complement position). Some extra piece of technology needs to be introduced to ensure that interpretation can proceed at these intermediate points... it might be that the offending element is deleted by some mechanism from the structures that semantic composition operates on... Or it might be that the mechanisms of semantic composition should themselves be enriched in such a way that interpretation of certain elements can be postponed until a point is reached in the larger compositional process at which they can be folded in...

But whatever move is made, real complications seem to be required. The semantic system of natural language is clearly one that is rich enough and powerful enough to allow for the construction of arbitrarily complex properties... But the locality requirements that are an integral part of the syntactic system mesh poorly with this power, and there is, as a consequence, a certain awkwardness of fit between syntactic and semantic representations. The ungainly morphosyntax of the [Irish—RDL & IAS] complementizer system... can, perhaps, be viewed as a response to this mismatch.

The problem, of course, is that the intermediate traces left by successive-cyclic movement in the transformational analysis of extraction UDCs do no work at all that would justify having them in the representation. Nothing in McCloskey's discussion of Irish, for example, establishes the need for an actual trace daughter at intermediate points along the filler/gap pathway. Not surprisingly, McCloskey does not entertain the possibility that the entire problem he sketches (one which has plagued transformational approaches to the syntax/semantics interface for decades, necessitating special deletion operations between S-structure and the final sublevel of LF) is entirely an artifact of the decision to analyze extraction in terms of (*wh*-)movement.¹⁵ The 'awkwardness' he refers to in this passage is particularly troubling for a framework, such as Minimalism, which attempts to draw specific and far-reaching conclusions from the *a priori* assumption that, as Chomsky and others have claimed in recent writing, natural language represents a 'perfect computational system'. Given the central role of movement in creating the 'ungainly morphosyntax' McCloskey refers to, it would seem that a genuinely optimal system would be one in which movement, particularly insofar as it creates the ugly state of affairs he describes, was dispensed with as the source of extraction dependencies. In this sense, the constraint-based analysis outlined above is a better candidate for an 'optimal system', given Chomsky's criteria.

The situation would of course be different if the kinds of local morphosyntactic registration of extraction pathways that McCloskey and others have described in detail (see Zaenen

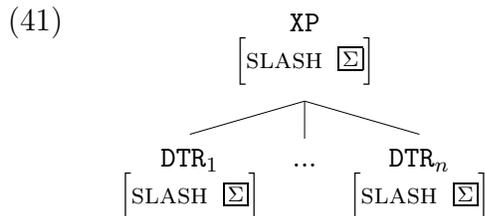
¹⁵Though as he himself notes, these operations are themselves empirically problematic in the Irish case; see his footnote 29.

1983, Hukari and Levine 1995 for summaries) could not be captured by feature percolation and instead required the presence of an actual daughter at each designated clausal ‘way-station’, as in standard transformational doctrine. But it has been shown repeatedly, in a variety of nonderivational frameworks, that local feature matching is in fact all that is required to give an empirically satisfactory account of the distribution of extraction pathway effects in *all* of the languages which display this phenomenon.¹⁶ On balance, then, the constraint-based approach to characterizing extraction dependencies appears to have a decided advantage over movement-based accounts, in this respect.

Multiple Gaps

We have already mentioned in the existence of true multiple-gap sentences like those in (29) above. These examples are accommodated by the constraint-based analysis outlined above whenever a given construction allows non-singleton SLASH values. However, space limitations prevent us from elaborating this analysis here.

In similar fashion, the analysis of parasitic gaps incorporates the fundamental insights about this phenomenon that begin with Gazdar 1981—in particular, the observation that in the absence of any constraint to the contrary, a SLASH specification on a mother category can match a separate identical SLASH specification on each of any number of daughters. In Pollard and Sag 1994, this account of the origin of parasitic gaps is built into the formulation of the NLFP given in (30). In particular, as long as two daughters of a given category share identical SLASH values, that single SLASH value will also appear on the mother as the union of its daughters’ specifications for SLASH, and the same structure can be extended to include any number of daughters:



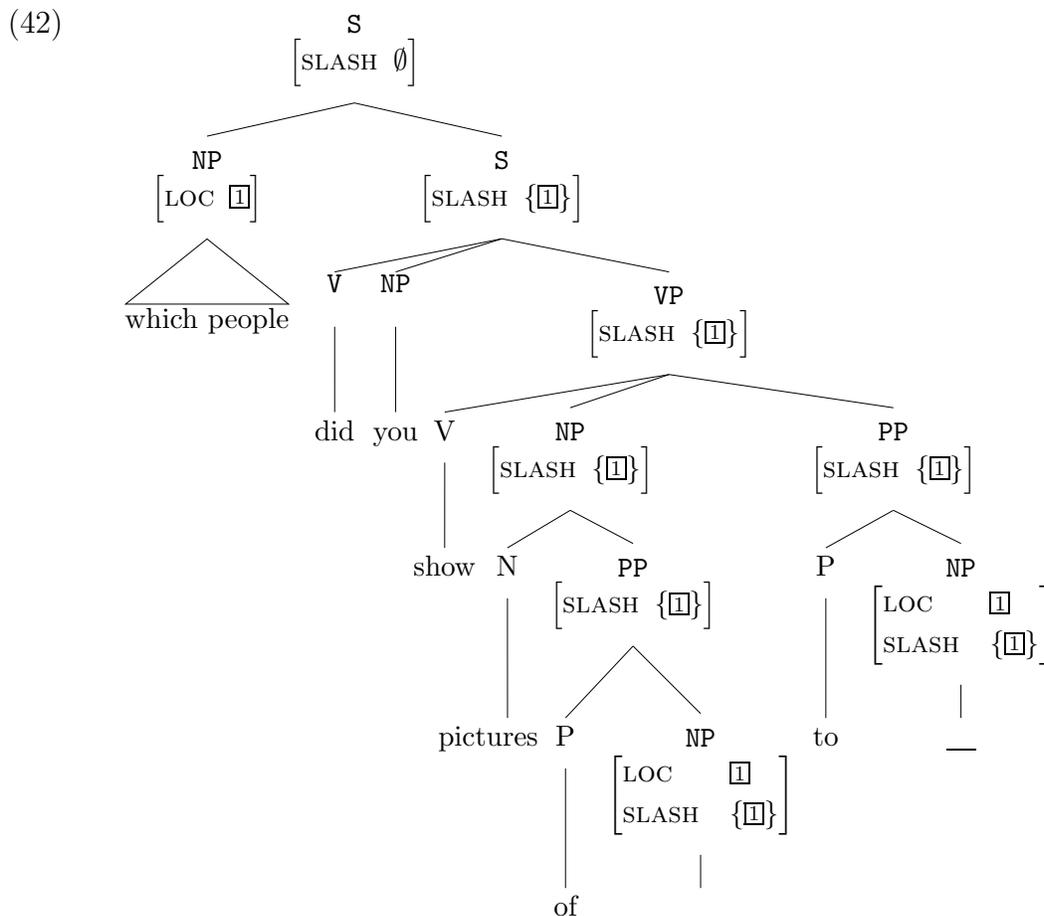
Unlike earlier versions of phrase-structure theoretic grammar, there is no pressure on SLASH to follow a path from head to head, wherever else it may appear.^{17,18} Hence the NLFP

¹⁶These effects are compatible with Categorical Grammar analyses like those of Steedman (1996, 2000). In addition, see Zaenen 1983 and Kaplan and Zaenen 1989 for LFG accounts and Bouma et al. 2001 for a demonstration of how the HPSG connectivity mechanisms allow an extremely simple and straightforward characterization of these effects.

¹⁷But see the proposal of Ginzburg and Sag (2000).

¹⁸That is, we are pursuing here the hypothesis, suggested by much recent work, that there are independent, partly extragrammatical factors that will explain why extraction out of adverbials or certain phrase-internal

provides a unified account of individual gaps (on or off head paths) and multiple-gap constructions, where both head and nonhead paths bear identical SLASH features. Note further that this same mechanism will yield both of the following structures:



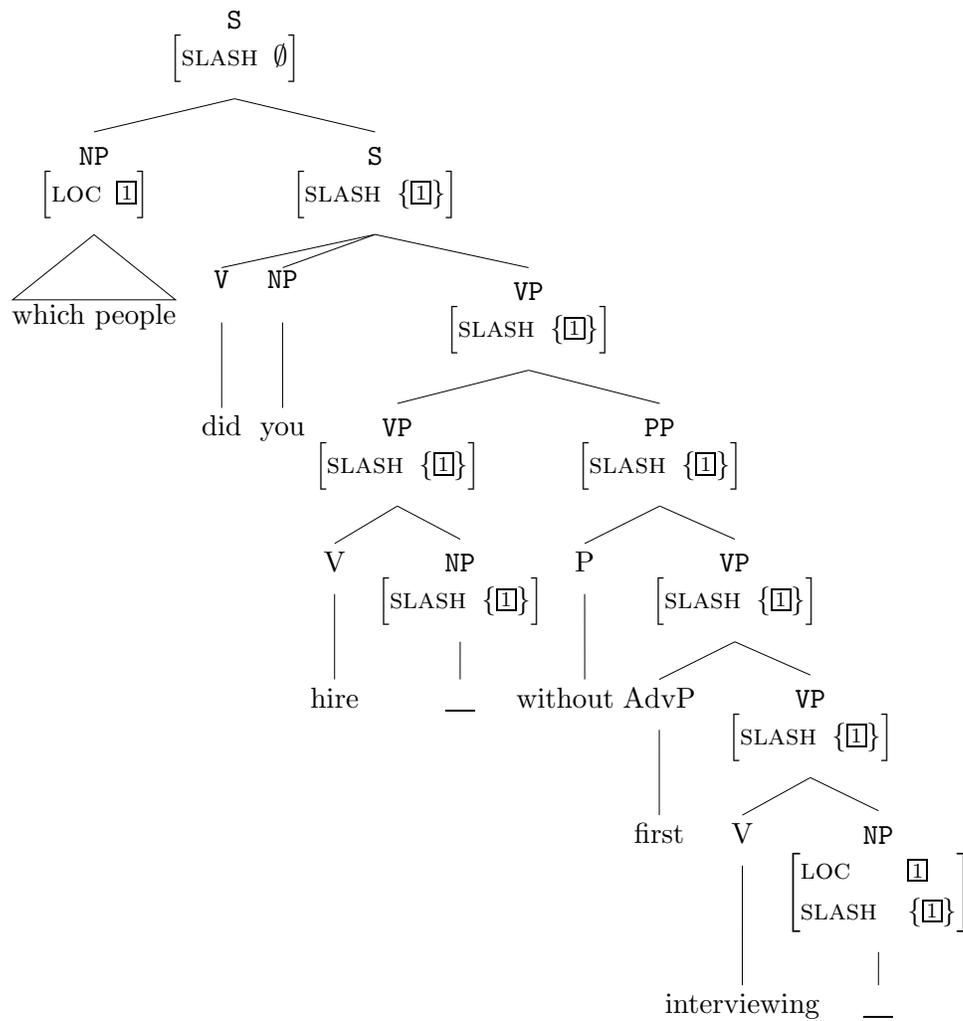
constituents is more difficult than extraction from phrase-final constituents, thus creating the illusion of grammatical ‘parasitism’. Our hypothesis therefore appeals to binding theory to account for the deviance of examples like (i) and embodies the claim that examples like (ii) are in principle grammatical:

(i) *Who did they explain $_i$ to $_i$.

(ii) (?) There are certain topics that jokes about $_$ are completely unacceptable.

This last claim is by no means necessary, however. For example, Pollard and Sag’s (1994) constraint-based analysis appeals to extragrammatical factors to explain whatever difficulty is exhibited by extraction of NPs from adverbials, but assume that extraction from subjects should be grammatically licensed only when a further extraction is present in the same argument-structure domain.

(43)



Very similar structures give rise to subject parasitic gaps, such as (44):

(44) Which of the candidates do you think my talking to $_i$ would bother $_i$?

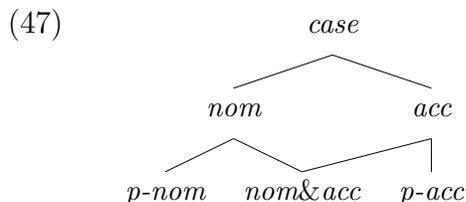
The phrase-structure theoretic approach to UDCs thus assumes, and has assumed from the outset, that the filler in parasitic gap constructions is linked by the same connectivity mechanism—the propagation of a SLASH feature—to all of the gaps that share its LOC specifications.

Moreover, there is a constraint-based resolution of the troublesome case conflict data discussed at length in the previous section (examples repeated here):

(45) Robin is someone who_i even good friends of $_i$ believe $_i$ likes power entirely too much.

- (46) a. *He_i /*Him_i , even friends of ___i think ___i likes power entirely too much.
 b. *Whom do even friends of ___i think ___i likes power entirely too much?

As Levine et al. (2000) show, the modeling assumptions of HPSG interact with lexical underspecification to predict exactly the observed contrasts. They assume that the case values form a semi-lattice structure like (47), where *p-nom* and *p-acc* stand for ‘pure’ nominative and accusative case, respectively:



This assumes that there is a case value *nom&acc* that is compatible with both the constraints imposed by prepositions on their objects (that they be some subtype of *acc*) and those that finite verbs impose on their subjects (that they be some subtype of *nom*). Because a selector (verb, preposition, etc.) only bounds the CASE value of its argument(s) (rather than resolving it), the conflict in an example like (46) is only apparent. This is because proper names are lexically unspecified for case, and hence can be resolved to the *nom&acc* value in order to satisfy both selectional demands simultaneously. By contrast, the lexical entries for inflected nominals like *he*, *him*, and *whom* all include fully resolved case specifications: *p-nom*, *p-acc*, and *p-acc*, respectively. And since *p-nom* and *p-acc* are not only incompatible with each other, but also with the value *nom&acc*, there is no way to simultaneously satisfy the grammar’s constraints in examples like (47a,b). The constraint-based approach to UDCs thus provides a satisfying solution to the vexed problem of case conflict in parasitic gaps which, as we have seen, has stymied transformational approaches to UDCs.

Finally, let us now consider coordinate structures. All analyses of coordination must posit some identity condition holding between the mother and the daughters (the conjuncts) of a coordinate structure. This is often assumed to be a requirement of category identity, though the precise resolution of examples like (48), first analyzed by Sag et al. 1985, remains as a challenge to most current accounts:

- (48) a. Kim is a Republican and proud of it.
 b. You can rely on our loyalty and that we will do everything in our power to protect you.

But any version of the identity condition is compatible with the constraint-based approach to extraction, as long as it includes the requirement that (in true conjoined structures¹⁹) the SLASH value of the conjunct daughters must be identical. This requirement, taken together with the analysis of UDCs outlined above, provides an immediate account of such contrasts as the following:

- (49) a.*[Which dignitaries]_i do you think [[Sandy photographed the castle] and [Chris visited ___]]?
 b.*[Which dignitaries]_i do you think [[Sandy photographed ___] and [Chris visited the castle]]?
 c. [Which dignitaries]_i do you think [[Sandy photographed ___] and [Chris visited ___]]?
- (50) a.*[Which of her books]_i did you find both [[a review of Gould] and [a reply to ___]]?
 b.*[Which of her books]_i did you find both [[a reply to ___] and [a review of Gould's new book]]?
 c. [Which of her books]_i did you read both [[a review of ___] and [a reply to ___]]?

These are of course the familiar data commonly referred to as Ross's (1967) Coordinate Structure Constraint and its 'Across-the-Board' exceptions, all of which are derived from the interaction of the identity constraint on coordinate structures and the NLFP.²⁰

5 Conclusion

It is worth considering, in light of the evident differences between the constraint-based and P&P analyses of parasitic gaps, how the former addresses the three questions Chomsky (1982, p. 39) identifies as pivotal for understanding the parasitic gap phenomenon:

¹⁹We ignore here the issue of asymmetric conjunction and apparent counterexamples to the Coordinate Structure Constraint. For discussion and debate on the status of this constraint, see Postal 1998 (Chapter 3), Levine 2001, and Kehler 2002 (Chapter 5).

²⁰There is a further issue raised by the observation that gaps cannot be conjuncts:

- (i)*[Which of her books]_i did you find both [[a review of ___] and [___]]?
 (ii)*[Which of her books]_i did you find [[___] and [a review of ___]]?
 (iii)*[Which rock legend]_i would it be ridiculous to compare [[___] and [___]]? (cf. [Which rock legend]_i would it be ridiculous to compare ___ with himself_i ?)

For further discussion, see Bouma et al. 2001 and Sag 2000, who account for such examples by eliminating *wh*-traces from their constraint-based analysis of UDCs

- A. Why does the phenomenon exist at all?
- B. What are the basic properties of parasitic gaps?
- C. What principles and mechanisms determine these properties?

The particular form of the constraint-based answer to these questions can be summarized somewhat schematically as follows:

- Parasitic gaps emerge almost trivially as a subcase of filler/gap linkages licensed by the Nonlocal Feature Principle, under exactly the same constraints that license single filler/single gap possibilities;
- gaps in such multiple gap phenomena may occur freely (where not prohibited by the mechanisms that give rise to familiar island effects, by principles of the binding theory, or by some other independently motivated effects reflecting the various syntactic, semantic, pragmatic, phonological and processing constraints which interact to determine well-formedness judgments);
- the specifically syntactic mechanisms which determine these properties are those responsible for gap-licensing in general, and the principles of the binding theory which impose, e.g. an anti-o-command requirement on gaps in multiple gap constructions.

In addition, as we have demonstrated at length, the constraint-based approach to UDCs avoids the difficulties facing transformational alternatives in a number of domains, including the across-the-board pattern of coordinate structures and the resolution of conflicting case constraints in parasitic gap constructions.

To summarize the principal results of our comparison, we have argued that an analysis of gap identity in multiple gap constructions, including p-gaps and ATB gaps, with very wide empirical coverage (including the case-divergence phenomena noted in section 3) follows immediately from combining the standard HPSG filler/gap linkage mechanisms with the simple elaboration of case types discussed in Section 4 above.²¹ Nothing further is required to derive this outcome for multiple gap phenomena.

By contrast, the movement-based account of UDCs finds itself in the worst of both worlds when confronted with multiple gap phenomena: On the one hand, a formally much more powerful set of mechanisms is required. Nonetheless, these mechanisms are descriptively inadequate in the face of any examples involving a single filler, but multiple gaps. Movement-based analyses are apparently unable to express the generalizations that these constructions embody.

²¹The case-syncretization type approach we sketched earlier has been extended well beyond multiple-gap issues to an account of neutralization phenomena in coordinate structure; alternative treatments are given in Levy and Pollard 2001, Daniels 2001, and Sag 2002.

Frampton’s attempt to replicate the strikingly simple idea that a given filler can be linked to any number of gaps by the same mechanism—an idea instantiated virtually without cost in the constraint-based approach we sketch—relies on complex and only vaguely specified devices to yield, essentially by pure stipulation, only a subset of the legal multiple gap possibilities that are licensed on the nonmovement approach. The lack of any positive evidence supporting an asymmetry between ‘true’ gaps on the one hand and parasitic gaps on the other, as we stressed in connection with the Kearney paradigm, underscores the costly nature of the movement approach, which inherently entails such asymmetry.

The naturalness of the constraint-based approach derives from two sources:

- the possibility that any number of gap sites can be linked to a given filler by a single connectivity mechanism (SLASH propagation), and—very importantly—
- the strategy in HPSG of deriving from precisely formulated processing and pragmatic sources (see the citations in sec. 2) what the movement approach takes to be theory-internal, stipulated, configurational conditions on extraction.

This latter aspect of movement-based approaches to extraction—the assumption that an otherwise illegal extraction can only be salvaged by a structural connection (of some kind) to a legally extracted filler (or legal chain)—is contradicted by the behavior of symbiotic gaps (as suggested in section 3). Since there is no legal extraction on which the ‘illegal’ movement can piggyback, BOTH extractions are illegal under that approach. By contrast, the constraint-based analysis we have sketched treats these examples as almost trivial, since there is nothing GRAMMATICALLY illicit about extraction either from the subject or an adjunct, *per se*.

Space limitations have prevented us from exploring a number of other questions of direct relevance to the investigation of extraction, such as the apparent systematic divergence between filler and gap properties (e.g. the long-recognized contrast between *That Robin might be a spy, she had never thought of __* vs. **She had never thought of that Robin might be a spy*, or the similar but lexically specific apparent connectivity breakdown exemplified by the following contrast (which is considered in detail in Postal 1993b):

- (51) a. It’s Robin who I can assure you to be the best person for the job
 b.*I can assure you Robin to be the best person for the job

Such phenomena might be taken to support the existence of filler/gap linkages involving only partial identity between the morphosyntactic properties of fillers and corresponding gap sites (see, for example, Bresnan 2000). But there are a variety of alternative approaches. For example, we might adopt the solution offered in Bouma et al. 2001 for cases like *assure*, which allows certain heads to select complements that are obligatorily realized as gaps, and extend it to the case of prepositions in general. A related analysis would involve a

restriction on linear order: certain elements (*assure*, *allege*, prepositions generally) cannot precede particular complements within the phrases that those elements head. Given the range of data, the number of alternative solutions available, and the scale of the problem, we can do no more here than acknowledge the existence of such open questions.

We believe, however, that the foregoing review of multiple gap constructions brings out the radically different impact that such constructions have on the movement-based approaches, on the one hand, and constraint-based analyses, on the other. The awkwardness of the special technical resources that must be introduced in order to overcome the empirical and conceptual difficulties that parasitic and other multiple gap constructions pose for movement-based accounts contrasts sharply with the simplicity and elegance with which the constraint-based treatment subsumes both single and multiple gaps. The contrast between these approaches, we submit, arises from the obstacles that the movement mechanism itself presents for a unitary account of the extraction data, and underscores the superiority of approaches which do not burden themselves with the obsolete relic of transformational technology.

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