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as a Result of Complement Stranding

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The Final-over-Final Constraint as a Result of Complement Stranding*

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Abstract

It is proposed that the phenomenon ‘Complement Stranding’ provides an important insight into the linearization of complex specifiers, which in turn serves to explain Holmberg’s (2000) Final-over-Final Constraint (FOFC). Many complex phrases optionally or obligatorily strand what appear to be their complements upon movement. This phenomenon is difficult to account for given standard assumptions, even via remnant movement, as in most cases these ‘stranded’ complements are not strong islands, but rather are open to subextraction. Given Huang’s (1982) Constraints on Extraction Domains (CED), extraction of a PP complement prior to remnant movement of its containing phrase should render said PP a strong island. Given these problems, an alternative account of Complement Stranding is proposed, whereby the latter results directly from the linearization challenge posed by specifiers in an LCA-mediated PF-mapping. Essentially, Uriagereka’s (1999) Multiple Spell-Out proposal is extended to allow for the possibility of unlinearized derived specifiers. Assuming a minimal amendment to Chomsky’s (1995) Bare Phrase Structure, Complement Stranding is predicted to hold as a ‘last resort’ where a complex phrase in a complement position moves without first being spelled out, a possibility which is not fully explored by Uriagereka (1999) or Nunes & Uriagereka (2000). It is argued that the properties of Complement Stranding fall out from such an approach, as does FOFC. Finally, it is proposed that a subclass of apparent exceptions to FOFC also receive a partial explanation, given the approach outlined here.

1. Introduction

Kayne’s (1994) Linear Correspondence Axiom (LCA), which advocates a direct mapping between asymmetric c-command and linear precedence, has long been the subject of much interest and controversy. The abundance of languages with ‘head-final’ phrases proves challenging for the antisymmetry hypothesis, as deriving the former from base-generated spec-head-complement orders seems to involve unmotivated movement and, in some accounts, the presence of heads, invisible at both the PF and LF interfaces. As such, many have proposed that what was traditionally termed the ‘head parameter’ belongs in the PF component (cf. Richards 2004 *inter alia*). While this is an attractive option, especially given the lack of asymmetry between bottom pair head and

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complement in Bare Phrase Structure (Chomsky 1995), it is challenged by certain word order asymmetries, notably Holmberg's (2000) Final-over-Final Constraint (FOFC).¹

In this paper, I will defend a movement account of head-final orders based on empirical facts about discontinuous constituents and typological word order trends. It will be claimed that A-, A-bar and comp-to-spec (c-selection) movement, despite their obvious differences, actually share a certain property (Complement Stranding) which falls out from the LCA given a certain interpretation of Bare Phrase Structure, but which must be stipulated in a non-syntactic theory of head-directionality.

The structure of the paper is as follows. I begin, in section 2, by observing an interesting empirical phenomenon which I descriptively label 'Complement Stranding', a specific subclass of extraposition (cf. Rochement & Culicover 1990). Section 3 details the restrictions on CS and the cases where it is obligatory/optional, relating the pattern to islandhood. Section 4 explores potential accounts of CS, showing that it is difficult to account for given standard assumptions about phrase structure. Section 5 shows that the phenomenon is also problematic for Uriagereka's (1999) Multiple Spell-Out model. In section 6, however, it is shown that MSO can actually be extended to account for CS, once we minimally alter our assumptions regarding projection and c-command. Section 7 shows how CS also serves to derive Holmberg's (2000) Final-over-Final Constraint, and some of its exceptions. Finally, section 8 concludes and mentions some potential further implications of the proposal as well as avenues for future research.

2. Empirical evidence for Complement Stranding

In English, a number of complex phrases allow what appears to be the optional stranding of their complement upon movement. This is true of non-specific nominals when they undergo A-movement:

A-movement

- (1) a. **An exam on feudalism** has been set. [passive]
 b. **An exam** has been set **on feudalism**.
- (2) a. **A new book about String Theory** has come out. [unaccusative]
 b. **A new book** has come out **about String Theory**.
- (3) a. **Many books about dieting** seem to have been borrowed. [passive+raising]
 b. **Many books** seem to have been borrowed **about dieting**.²

A similar effect is also true of A-bar movement, with both nominal and adjectival phrases containing a wh-modifier, which I take to be a specifier:³

¹ Other such asymmetries are discussed by Kayne (1994). Many of Kayne's examples, though, relate only to the linearization of specifiers, for example the abundance of second position clitics and the existence of V2 languages as compared to the lack of penultimate clitics or V-penultimate languages.

² Ian Roberts points out to me that it is always the whole complement of N which is stranded, it is not possible to pied-pipe part of N's complement and strand the rest:

(i) A film was made about a book about Chomsky.

(ii) *A film about a book was made about Chomsky.

The reason for this pattern will become apparent in section 6.

³ The lack of subjacency effects between which-XPs is therefore due to a lack of c-command between the two wh-words, cf. Chomsky (2001):

(iii) [[Which] book] did [[which] boy] read?

A-bar movement

- (4) a. **Which book** did you borrow **about Phonology**?
 b. **Which book about Phonology** did you borrow?
- (5) a. **How many pictures** were taken **of him**?
 b. **How many pictures of him** were taken?
- (6) a. **How angry** are you **with Sally**?
 b. **How angry with Sally** are you?
- (7) a. **How certain** are you **that the Mets will win**?
 b. **How certain that the Mets will win** are you? [Baltin (1981: 262)]

In all cases, the stranded constituent is the complement of the lexical head (N/A) which constitutes the semantic core of the complex phrase.

Note that this phenomenon, henceforth ‘Complement Standing’ (CS) is distinct from the type of reanalysis which is possible with a restricted set of PP complements of N with certain verbs (cf. Davies and Dubinsky 2003, citing Bach and Horn 1976). For example, *write* differs from *set* or *borrow* in that it appears to (optionally) subcategorize for a PP complement. As such, the PP can function as an argument of the verb directly, in the absence of the NP:

- (8) I wrote (a book) about String Theory.
 (9) I borrowed *(a book) about String Theory.

Pronoun replacement shows the same thing. Given the correct context, it is possible to pronominalize just the NP argument of *write* but the same is not true of *set* or *borrow*:

- (10) Did you read my first book? I wrote it about String Theory.
 (11) Have you read his latest book? *?I borrowed it about Nixon.

This suggests that while *write* has multiple subcategorization frames, selecting for (NP) PP as well as NP, the same is not true for *set* or *borrow*. With the latter two, it must therefore be the case that the PP originates inside NP in contexts of CS. Note that this must also trivially be the case with unaccusative verbs such as *appear* and *come out* as these verbs are ungrammatical in the absence of an NP argument:

- (12) *There appeared/came out about feudalism yesterday.

2.1. Types of PPs

CS is possible with any preposition which heads a complement PP: *about*, *on*, *of*, *over*, *at* and *with*.

- (13) a. **Some disgust** was felt **at his actions**.
 b. **Some disgust at his actions** was felt.
- (14) a. **A discussion** has been started **of Chomsky’s new book**.
 b. **A discussion of Chomsky’s new book** has been started.

(iv) *What did who read?

- (15) a. **A victory** was celebrated **over the French**.
 b. **A victory over the French** was celebrated.
- (16) a. **An appointment** has come up **with a specialist**.
 b. **An appointment with a specialist** has come up.⁴

Crucially, stranded complements unlike their pied-piped equivalents are not strong islands, subextraction from them is possible:

- (17) a. ***Which topic** did **a book about** appear?
 b. **Which topic** did **a book** appear **about**?
- (18) a. ***What topic** was **an exam on** taken yesterday?
 b. **What topic** was **an exam** taken **on** yesterday?
- (19) a. ***Which topic** does **a book about** appear to have been borrowed?
 b. **Which topic** does **a book** appear to have been borrowed **about**?

Likewise, in the case of the stranded complements of wh-constituents, there is a definite contrast between extraction from pied-piped and stranded complements, though it is made more opaque by additional restrictions on extraction. Following Cinque (1990), it is known that extraction of D-linked wh-phrases from certain kinds of wh-islands is possible. As such, extraction is possible in (20a), (21a) and (22a):

- (20) a. Which team did you say **how certain** you were **that the METS would beat**?
 b. *Which team did you say **how certain that the METS would beat** you were?
- (21) a. Which aunt did you tell me **how angry** you were **with**?
 b. *Which aunt did you tell me **how angry with** you were?
- (22) a. Which vase do you wonder **how likely** John is **to break t**?
 b. *?Which vase do you wonder **how likely to break t** John is?

Extraction from the stranded complement of a whichP is blocked for independent reasons (cf. Rizzi 1990).⁵

3. Restrictions on Complement Stranding and optionality

There are a number of important restrictions on CS. For example, it is not possible with complex indefinites first-merged as specifiers:

⁴ Note that stranding is also possible with adjuncts which follow the noun:

- (v) A reply arrived on pink paper.
 (vi) A book has been published with no title.

Since these PPs cannot be extracted via wh-movement from a complex nominal they pose an additional challenge to a remnant movement account. We leave the syntax of post-nominal non-complement modifiers aside here, but note that, if the LCA holds, then these 'adjuncts' must also be asymmetrically c-commanded by the head noun, and so might also be derived by CS.

⁵ Note that the extraction facts for PPs extraposed over a low adverb are the opposite:

- (vii) Who_i did you see a picture of _i in the newspaper?
 (viii) *Who_i did you see a picture in the newspaper of _i?

I leave this superficially similar construction to one side here, assuming it can be derived via remnant movement.

- (23) a. **Pictures of celebrities** always provoke a scandal.
 b. ***Pictures** always provoke a scandal **of celebrities**.
 c. ***Pictures** always **of celebrities** provoke a scandal
- (24) a. ***Which book** will depict his childhood **about Dickens**?
 b. ***Which book** will **about Dickens** depict his childhood?

This contrast is perhaps clearest when comparing a passive construction and a predicative adjectival use of a participial form:

- (25) a. **Many books about dieting** were anticipated.
 b. **Many books** were anticipated **about dieting**.
 c. ?**Which topic** were **many books** anticipated **about**?
- (26) a. **Many books about dieting** were unanticipated.
 b. ***Many books** were unanticipated **about dieting**.
 c. ***Which topic** were **many books** unanticipated **about**?

Whereas with the passive, the complex nominal *many books about dieting* is an underlying complement, with the adjective it is not, and so stranding is not possible.⁶

CS is impossible with most specific DPs, again, once afterthought intonation is excluded:

- (27) a. **This book about String Theory** has finally come out. [definite DP]
 b. ***This book** has finally come out **about String theory**.
- (28) a. **His disgust at my reaction** was noted.
 b. ***His disgust** was noted **at my reaction**.

Apparent exceptions to this generalisation appear to involve re-analysis of the PP as a complement of the verb, as discussed above. Consider the contrast below:

- (29) **His first novel** was written **about personal matters**.
 (30) ***His first novel** was borrowed **about personal matters**.

In addition to this specificity effect, certain predicates preclude the possibility of stranding even with indefinite/non-specific nominals. More specifically, verbs which force a concrete reading on their complement such as *destroy* typically block CS:

- (31) a. **A book about String Theory** has been destroyed.
 b. ***A book** has been destroyed **about String Theory**.
- (32) a. **An exam on feudalism** has been stolen.
 b. ***An exam** has been stolen **on feudalism**.

⁶ The same contrast is true with PP adjuncts, which cannot be stranded unless they are construed as real afterthoughts, preceded by an intonation break:

(ix) *?**Photographs** always provoke a scandal **from parties**?

(x) *?**A book** has provoked an outcry **with a red cover**?

This supports the idea that this kind of 'extraposition' also results from stranding. This cannot be the case with all extraposition, however, notably extraposition over a low adverbial, as discussed in footnote 5.

Interestingly, Davies and Dubinsky have shown that these same kinds of predicates render indefinite NP complements strong islands:

- (33) *Which topic did you destroy a book about?
 (34) *Which topic did you steal an exam on? [concrete NP effect]

In both of these cases, then, the restrictions on CS and extraction appear to overlap (cf. Fiengo & Higginbotham 1981 on specificity and islandhood).⁷

4. Accounting for Complement Stranding with existing assumptions

Under standard assumptions it is impossible for a non-constituent to move. As such, the underlying representation for the examples in sections 2-3 could not be derived by movement of part of a phrase, whether we take an LCA-based approach to syntax or not.

The fact that CS is possible with exactly those nominals which are not strong islands (when in a complement position) might be taken as evidence that CS is derived via remnant movement. In fact, if we adopt Kayne's (1994) LCA, this is certainly the most salient possible analysis. The complement/adjunct PP would be extracted from NP, to spec XP, and then NP containing the trace of the PP would move higher.⁸ The word order with verbs selecting for PP complements indicates that X must be very low, and certainly lower than the head which usually selects the nominal:

- (35) A book has been spoken of about Chomsky.

The only possibility appears to be that X selects NP and that this does not block selection between V and N.

⁷ As Rob Truswell & Geoff Poole point out, there are further restrictions on stranding not discussed here. For instance, stranding does not seem to be possible with non-nominal subjects:

- (xi) *Drinking is not advised alcohol.

It is also ruled out with some PPs which are commonly held to be nominal complements:

- (xii) *A student has arrived of Maths.

In relation to non-nominal subjects, it is possible that the requirement to satisfy the EPP requires null nominal structure to be present in such cases, and that this nominal structure triggers spell-out. The ungrammaticality of (xii) possibly stems from the fact that these nominals always have a predicative/generic reading, and can never be truly indefinite:

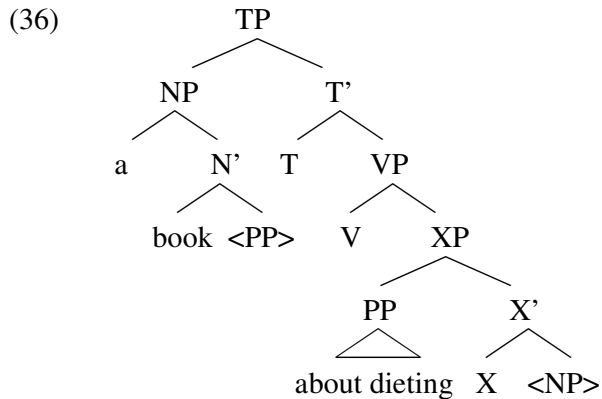
- (xiii) I am a student of Maths.

- (xiv) As a student of Maths, ...

- (xv) I'm looking for ??a student of Maths/a Maths student.

- (xvi) ??A student of Maths/a Maths student appeared at my door.

⁸ We use the label NP here for simplicity's sake. The correct label for this nominal will be discussed in section 6.4.



The fact that (some) specific DPs are islands would then serve to explain why they also fail to allow CS:

- (37) *Which topic did you borrow the book about?
 (38) *The book has come out about dieting.

There are reasons, however, to reject this kind of approach. For example, it is not clear what the status of X is, and what would motivate the extraction of PP from NP. Under minimalist assumptions, a null head which has no LF interpretation is highly suspect. The stranded PPs do not receive any special topic/focus interpretation, as they are possible in answer to wide focus questions:⁹

- (39) Q: What's new?
 A: A new book's come out about String Theory.

There are also empirical problems with the account. For example, it is not possible to extract PP and leave NP in situ, or indeed to move the XP as a constituent, without further extracting the PP to a topic position:

- (40) *He borrowed about John a book.
 (41) *Yesterday, about dieting a book appeared.
 (42) *Who is of her how fond?

Finally, the fact that it is possible to extract from a stranded complement PP suggests that the latter is not in a specifier position, given the fact that specifiers are generally strong islands (Huang 1982). All in all, there seem to be problems facing a remnant movement account of the data.¹⁰

⁹ This is not true of all extraposition. Rochement and Culicover (1989) discuss at length, the special focus associated with some kinds of extraposition in English.

¹⁰ Even if we reject antisymmetry and allow rightward movement, CS is still problematic, as it seems to be permitted in syntactic contexts where other kinds of extraction are not allowed:

(xvii) *What has [a book [about t]] been borrowed?

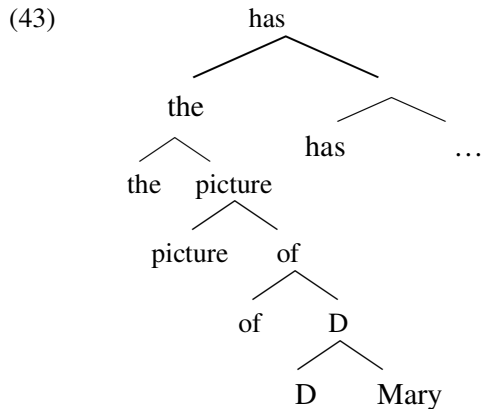
(xviii) [A book t] has been borrowed [about dieting].

If we reject the LCA and allow rightward movement then we need to account for this difference, and also for the fact that once the PP has been extraposed it stops being a strong island. While it has been known since Ross (1967) that what appears to be 'rightward movement' is subject to different restrictions to

In the remainder of the paper, an alternative account of CS is given, which relies crucially on a simplification of the LCA, and a minimal reinterpretation of Bare Phrase Structure. It is proposed that CS actually falls out from a slightly altered version of Uriagereka's (1999) Multiple Spell-Out. The proposed analysis has the advantage of explaining the properties of CS while connecting it to deeper principles of linearization and Huang's (1982) Constraints on Extraction Domains.

5. Uriagereka's (1999) Multiple Spell-Out

It is possible to restate the LCA, and the c-command relation in relation to Chomsky's (1995) Bare Phrase Structure (BPS).



Following Kayne (1994) and Chomsky (1995), I assume that intermediate (X-bar) levels count as segments (cf. Chomsky 1993, 1995: 242, 437 fn. 33, 2001: 40). If this is so, then we can essentially update Kayne's definition of c-command, as in (44), as suggested, though not explicitly stated, by Chomsky (1995):

- (44) *Definition of c-command under Bare Phrase Structure*
 X c-commands Y iff X and Y are minimal/maximal and X excludes Y and every segment of every maximal category that dominates X dominates Y.

This definition of c-command means that a specifier asymmetrically c-commands the head of a phrase, and a head asymmetrically c-commands a branching complement.¹¹ Assuming that that segments/X-bar levels do not c-command, no asymmetric c-command holds directly between the terminals contained in a complex specifier (satellite) and the main spine. For this reason, Kayne adds the notion of dominance to the LCA, and this notion also seems to be required under BPS.

Uriagereka (1999) considers the use of dominance to be a departure from strict Minimalist principles and divides the LCA into what he terms the basic step and the

'leftward movement', it is not clear that the properties of CS can receive an explanatory account in these terms.

¹¹ Abels (2003) has a different take on c-command in BPS, whereby the head of a phrase mutually c-commands both the specifier and the complement with which it merges.

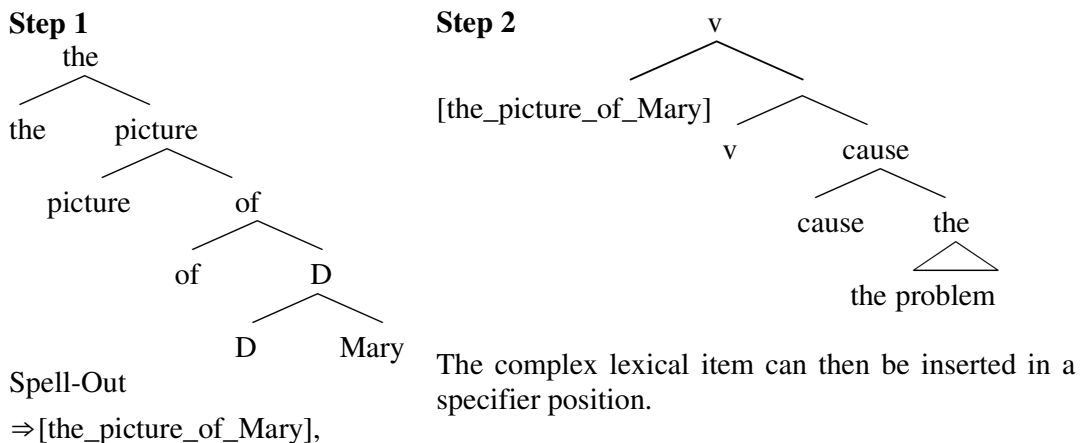
induction step, the latter of which he argues, should really be derived from something deeper:

(45) *A reworded version of Kayne's (1994) LCA*

- a) Basic step: If α asymmetrically c-commands β , then α precedes β .
- b) Induction step: If α precedes β and α dominates γ then γ precedes β .¹²

He goes on to propose an innovative account of (b) based on Multiple Spell-Out (MSO), whereby the number of applications of Spell-Out is subject to general economy principles. The basic idea is that Spell-Out is forced to apply multiple times in a single derivation in order to linearize terminals in different derivational cascades. Where a complex phrase is first-merged in a specifier position, it must therefore be spelled out in a separate workspace, prior to being 'plugged into' the main clausal spine in order to enable linearization of its terminals. Consider the following example, where null categories like D are ignored by the LCA:

Figure 1: Multiple Spell-Out



The specifier of v *the_picture_of_Mary* is spelled out prior to merge with v , and so behaves like a word in relation to the clausal spine, blocking subextraction. This captures the fact that (first-merged) specifiers, including subjects and adjuncts, are islands (Huang 1982):

- (46) ***Who** did [a picture of t] cause the problem?
- (47) ***Who** did Mary wash the car [after she saw t]?

As complex phrases which remain in a complement position can be linearized in a single derivational cascade with respect to the clausal spine, it follows that first-merged specifiers but not complements will be strong islands:

¹² The fact that the relevant relation is 'precedence' rather than 'subsequence' does not seem to follow from anything deeper. Uriagereka (1999) claims that where two possibilities are equally optimal then either one can be chosen. Given the arbitrary nature of this choice it might be expected that this would be an obvious 'parameter' of UG. The evidence presented in this paper, however, will suggest that, for some poorly understood reason, this cannot be the case. Rather the LCA appears to be a deep principle of UG.

(48) **Who** did you buy **a picture of**?

Explaining the ungrammaticality of extraction from derived specifiers as in (49) is more challenging, as Nunes and Uriagereka (2000) note:

(49) ***Who** has **a picture of** been seen?

In (49), *a picture of who* originates in a complement position. At the point of merge, then, there is no reason why the complex nominal would need to be linearized before merging with *seen*. The problem is that if *a picture of who* is linearized during the course of the derivation, then it is not clear why extraction of the copy of *who* in complement position is not possible. Nunes & Uriagereka (2000) discuss these issues and propose that last resort essentially forces Spell-Out to be a subcomponent of move so that any complex XP can only move after it has first been linearized. They claim that this is derived from basic economy and chain uniformity: essentially, if a complex phrase is spelled out in its derived position, all lower copies (with which it forms a chain) must also be of a uniform type. This captures the ungrammaticality of (49).

While this account seems to rule out (49), it is not clear how the CS data can be accommodated in MSO. Under a remnant movement approach, as soon as a PP is extracted from NP it should automatically be frozen, and subextraction blocked, as Spell-Out always precedes movement. Moreover, if Spell-Out is a subcomponent of move, there should be no possibility of scattered deletion or PF-movement to accommodate the data.

The inclusion of Spell-Out as a subcomponent of move also warrants scrutiny on theoretical grounds. As Chomsky (1993, 1995) has observed, if the operation *move* is really comprised of the independently justified operations copy+merge, then it essentially comes ‘for free’. Any complication of this process must therefore be carefully justified. Nunes & Uriagereka (2000) justify their position by claiming that Spell-Out is required because of general economy considerations. In their terms, the failure to spell out *a picture of who* prior to movement would lead to a crash in the derivation, either because of a lack of total order or because of a violation of the chain uniformity condition.

In the remainder of this paper, I question this claim. It is proposed that by altering our assumptions slightly we can accommodate the CS data and also maintain the simple version of *move*. As such, it is proposed that the interface between the narrow syntax and the PF component is not as sophisticated as Nunes & Uriagereka propose, rather arbitrary Spell-Out points interact with movement in a fully predictable way. It will further be proposed that this amendment also serves to derive the Final-over-Final Constraint, if head-finality is also movement derived (as is assumed in Holmberg 2000, Biberauer, Holmberg & Roberts 2007, 2008).

6. Extending Multiple Spell-Out

Assuming that strong islandhood always results from an application of Spell-Out, in the manner proposed by Uriagereka (1999), the following typology emerges.

Whilst first-merged specifiers are always strong islands, the same is not true of first-merged complements:

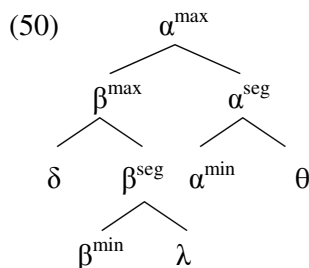
Table 1 (first version)

		First-merged specifiers	First-merged complements
+Spell-Out	-Move	CED effect	Specific DP object island
-Spell-Out	-Move	*	Non-island
+Spell-Out	+Move	CED effect	CED effect
-Spell-Out	+Move	*	?

The question mark in table 1 denotes a context in which a first-merged specifier undergoes movement to a specifier position without first being spelled out. The question is whether such a structure is linearizable according to the LCA. This issue depends very much on the status of maximal projections in Bare Phrase Structure.

6.1. Labels in Bare Phrase Structure

Let us assume that labelling is required for independent reasons.¹³ Given that the induction step is now captured via MSO, there is no longer any reason for dominance to be involved in the LCA, and terminal nodes should define their own linear position directly via the LCA. In these terms, it is not clear what status the label of a maximal projection could have, except as an extension of the projecting head. The c-command domain of a maximal projection cannot, by hypothesis, affect the linear position of the terminals it dominates. One very literal interpretation of BPS is that the label of the whole phrase is merely a graphical representation of the fact that the head of the phrase projects (cf. Hornstein 2009 for discussion). As such, the label of a phrase is simply another ‘instance’ of the projecting head. In Chomsky’s (1995: 417) words ‘a category can have two heads, one a bare head that projects, the other an X^{\max} ,



Thus for the purposes of c-command and subsequently the LCA, a logical hypothesis is that β_{\max} counts as an instance of β_{\min} . It is therefore necessary to alter our definition of c-command to include the notion of instance:

¹³ In the MSO model, if all specifiers are ‘flat’ as Nunes & Uriagereka propose, then the motivation for labelling is somewhat diminished. Labels are arguably still required for reasons of selection, though see Collins (2002) for the proposal that selection can also do without labels. Another potential reason to keep labels is explored by Hornstein (2009). He proposes that the correct account of grammatical distance in terms of ‘paths’ requires labelling. It seems then that there might be independent reasons to maintain labelling, irrespective of the structure of specifiers.

(51) *Definition of c-command under Bare Phrase Structure*

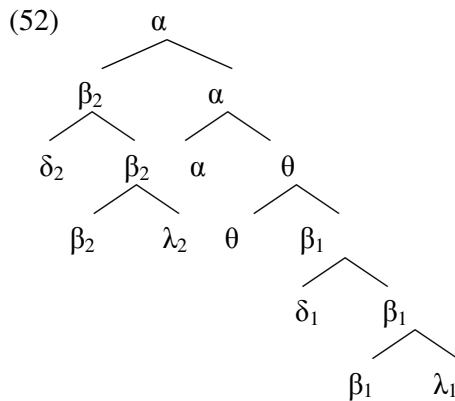
X c-commands Y iff X and Y are minimal/maximal and the relevant instance of X excludes Y and every segment of every maximal category that dominates X dominates Y.

The idea that, under BPS, heads themselves can c-command out of the phrase they project is not a standard one. Nonetheless, under BPS, it is a logical step to take if the label of a phrase is really just another instance of the projecting head. Given this hypothesis, let us consider what would happen if a non-linearized complex phrase moves from a complement position without first being spelled out.

6.2. Copy deletion and Complement Stranding

In a copy theory of movement, Spell-Out obviously needs to decide which copy is targeted for pronunciation. Let us assume, following Nunes (1995, 2004), that (i) only one copy in a chain can (usually) remain at PF and (ii) there is a preference to spell out higher copies for economy reasons.

Given our model in which terminal nodes define their own c-command domain, only *heads* will actually move ‘higher’ where a complex phrase undergoes movement. The *specifier(s)* and *complement* contained in a complex phrase do not move higher in any real sense, in fact their c-command domain remains identical in both positions. Consider the following example:



In (52), the complex phrase β has moved from a complement to a specifier position. In its derived position, β_2 , asymmetrically c-commands α and θ , whereas in its base position, shown as β_1 , it is asymmetrically c-commanded by α and θ . As such, the preference for higher copies means that β_2 is targeted rather than β_1 at the transfer to PF.

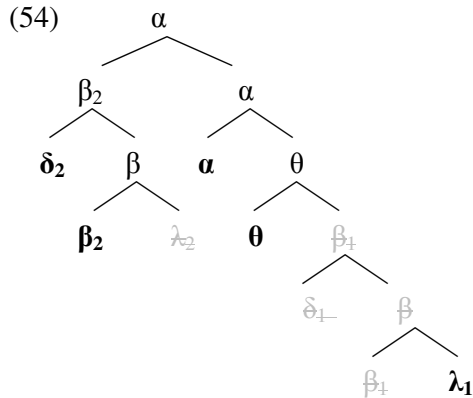
Now consider the specifier δ . Either copy of δ could potentially be targeted at PF. The derived copy of δ will necessarily precede the head β_2 . Crucially, while there are no direct linearization instructions regarding the ordering of the higher copy of δ with respect to α and θ , this ordering is possible transitively: $\delta > \beta$ & $\beta > \alpha > \theta$ therefore $\delta > \beta > \alpha > \theta$. The lower copy of δ is asymmetrically c-commanded by α & θ .

The case of the complement λ is different. Like the specifier, its c-command domain is unaltered by movement. However, unlike δ , it carries no instruction to precede anything. In both of its positions λ asymmetrically c-commands nothing. Moreover, in its derived position, shown as λ_2 , the complement cannot actually be ordered with respect to α and θ . It neither asymmetrically c-commands nor is asymmetrically c-commanded by either terminal node. Because it does not precede β , this ordering cannot be resolved transitively (even if we assume that the mutual c-command problem is resolved). It follows, therefore that only the base-generated copy of λ is a legitimate target for PF.

Following Bošković (2001), let us assume that scattered deletion is available as a last resort, where full copy deletion is blocked. The prediction is that the only way (52) can be linearized is by stranding the complement λ :

(53) Delete lower copy of β_1 & moved copy of $\lambda_2 = (\delta) > \beta > \alpha > \theta > (\delta) > \lambda$ (total order)

Note that the specifier δ can potentially be linearized in either position. Spelling out of δ in its base-generated position will result in head-movement, spelling out of δ in its derived position will result in stranding configurations of the type described above. What is crucial for our purposes here is that the same is not true of the complement λ , only the first-merged position can be targeted for λ . For now, let us assume that where there is true optionality, PF targets leftmost copies unless instructed to do otherwise.¹⁴



Spells out $\Rightarrow \delta \beta \alpha \theta \lambda$

6.3. Accounting for the optionality

Davies & Dubinsky (2003) argue that the restrictions on extraction from DPs in complement position are largely semantically determined. In short, extraction is only ever possible from nominals with argument structure, and never from concrete nominals:

(55) *What did you buy a table of?

¹⁴ We leave aside the added complication of constraining head-movement here, though note that this approach continues the tradition of focusing on the complementarity of head vs. phrasal movement (cf. Travis 1982, Pesetsky and Torrego 2001, 2004, Matushansky 2006).

Many nominals are ambiguous between concrete and representational readings, only the latter of which involves the presence of argument structure. In such cases, the predicate selecting the nominal can force or favour one of the readings over the other, thus affecting extraction possibilities, hence famous contrasts of the following type:

- (56) Which topic did you borrow a book about?
 (57) *Which topic did you destroy a book about?

In order to account for the different extraction possibilities in (56) and (57), we are forced to posit different structural representations of *a book about which topic* in the two examples. Linking strong islandhood to an application of Spell-Out, the implication is that (57) involves an extra application of Spell-Out, absent in (56). As this application of Spell-Out has a semantic correlate (concreteness), let us assume that it is triggered by the presence of a null D phase head.

In Davies and Dubisnky's terms, extraction from DPs in subject positions, on the other hand, is wholly syntactically determined, at least in English. It would seem then that there are two different triggers for Spell-Out. A first-merged specifier, whether specific or non-specific will be forced to be spelled out prior to merge, for the basic economy reasons outlined by Uriagereka (1999). In the case of a first-merged complement, on the other hand, Spell-Out will not be forced by geometry, but will be forced by the presence of an LF-interpretable phase head, hence the sensitivity to semantics. Whether this complement XP then moves or not is independent of whether the XP has been spelled out. Crucially, where a definite (spelled-out) DP moves, it will not strand its complement. Non-specific NPs, on the other hand, are not inherently islands and hence exhibit CS.

The apparent optionality of CS is therefore due to the fact that NPs can be concealed DPs. Consider the ambiguity of the following sentence:

- (58) Two men are in the garden.

It has long proved problematic that sentences such as (58) are ambiguous between a strong and weak reading of the subject indefinite (cf. Diesing 1992 *inter alia*). One way of resolving this is to say that the strong reading of the subject involves a covert DP, whereas the weak reading involves a true NP:

- (59) [_{DP} Two men] are in the garden. = Two of the men are in the garden.
 (60) [_{NP} Two men] are in the garden. = There are two men in the garden.

The prediction would be that a weak reading of an NP would lead to obligatory CS, whereas the strong reading would prevent it.

One context which favours a true weak indefinite reading is expletive passive constructions. For some reason, in this construction in English, the object is required to move to an intermediate, preverbal position, unlike in other Germanic languages (cf. Vikner 1995 *inter alia*). In such cases, CS is much preferred:

- (61) a. There have been many films made about Elvis.
 b. *There have been many films about Elvis made.
- (62) a. There was an examination carried out of the patient.
 b. *There was an examination of the patient carried out.

There is, therefore, evidence for the existence of NP and DP subjects in English, only the former of which give rise to CS. The complete version of table 1 would therefore be as follows.

Table 1 (second version)

		First-merged specifiers	First-merged complements
+Spell-Out	-Move	CED effect	Specific DP object island
-Spell-Out	-Move	*	Non-island
+Spell-Out	+Move	CED effect	CED effect
-Spell-Out	+Move	*	Complement Stranding

6.4. The structure of complex nominals and wh-phrases

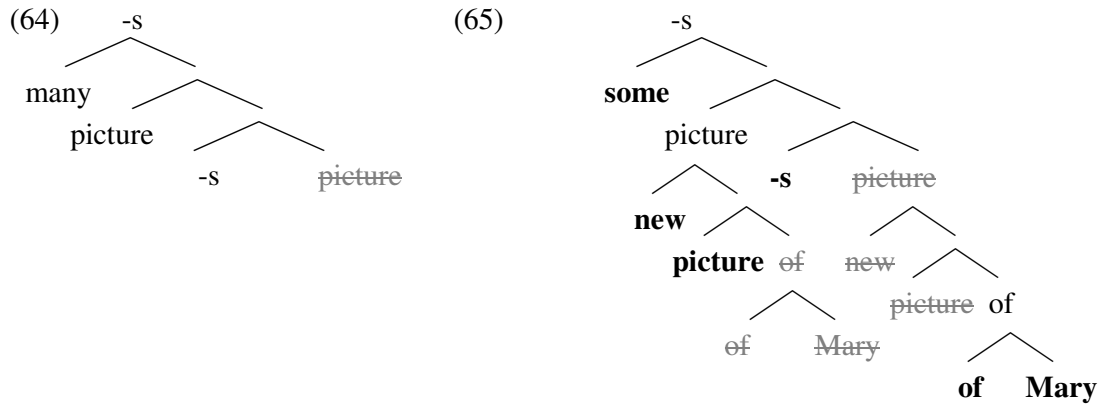
A clarification is necessary here as to the structure which is assumed for nominals in English. As mentioned in section 2, in all cases it is the complement of the lexical head N/Adj which is stranded. The DP-hypothesis (Abney 1987) and the extended DP projections posited subsequently (cf. Zamparelli 2000, Cinque 2005, Heycock & Zamparelli 2005 *inter alia*) mean that the lexical noun is not usually taken to be the projecting head of a complex nominal. Even if we assume that D is lacking in non-specific nominals (cf. Chierchia 1998), if a head such as *num* is present in, then the apparent stranding prediction is the following:

- (63) *[Many *num* [~~books about Morphology~~] have been borrowed [~~Many *num* books about Morphology~~].

To avoid this problem, we can assume that the plural marker *-s* is a *num* head which attracts its complement to its specifier. If the noun is modified by a pre-nominal adjective, then this is carried along, but any complements/post-nominal modifiers are stranded low:¹⁵

¹⁵ Note that this kind of derivation would also apply to enclitic definite articles in Icelandic (Anders Holmberg, personal communication):

(xix) nýja bók-ina um Harry Potter
 new book-DEF about HP
 ‘the new book about HP’



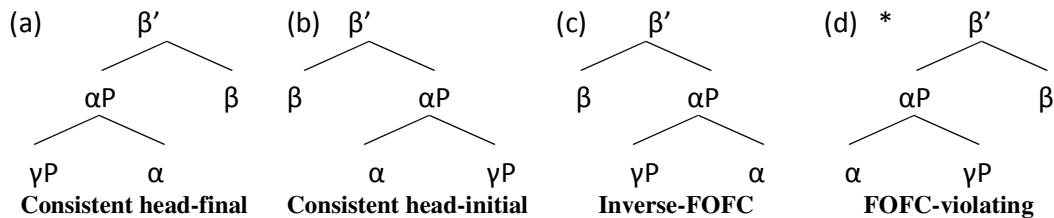
While this proposal requires further independent justification, its inclusion here is intended merely to show that CS can be accommodated in a theory which assumes a more articulated nominal structure.

7. Deriving the Final-over-Final Constraint

In this section I will argue that the approach to CS discussed above, for which we have already seen empirical support, actually serves to derive the Final-over-Final Constraint for free. Holmberg (2000), Biberauer, Holmberg & Roberts (2007, 2008) and Biberauer, Newton & Sheehan (to appear-a, -b) have shown broad empirical support for what is descriptively termed the Final-over-Final Constraint (FOFC), a constraint over disharmonic word orders, characterized as follows:

(66) *The Final over Final Constraint* (Holmberg 2000)

A head-initial XP cannot be (immediately) dominated by a head-final phrase.



FOFC is supported by typological word order trends as well as patterns of borrowing and diachronic change. Details of the supporting data can be found in the papers cited above, but a summary is included here for reference. Note crucially that in all cases of a FOFC-related gap, the inverse disharmonic order *is* attested:

Language-internal gaps in languages with variable word orders:

- a) *[N Complement] P in Finnic (Holmberg 2000)

Typological cross-linguistic lack of:

- b) *[V Object] Aux (Julien 2002, Biberauer, Holmberg & Roberts 2007)
- c) *[V Object] C (Hawkins 1988, Dryer 1992)

- d) *[C TP] V (Hawkins 1994, Dryer in press, Sheehan 2008)
- e) *[Q TP] C (Biberauer, Newton and Sheehan, to appear-a)
- f) *[Asp V] T (Julien 2007)
- g) *[P DP] V (modulo Germanic, Dryer 1992)

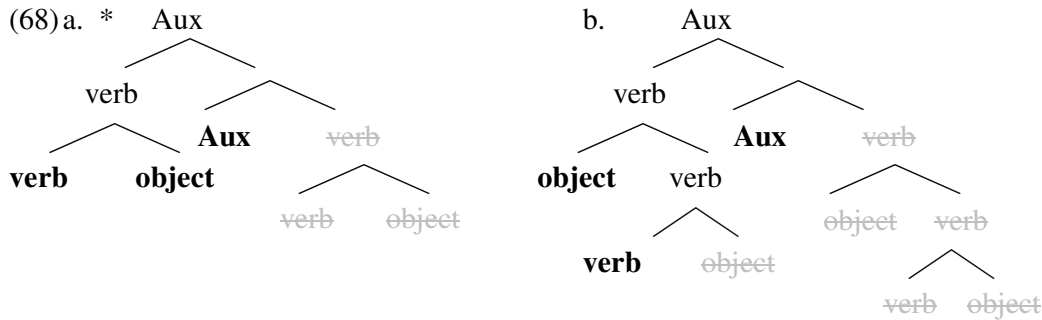
Evidence from diachronic change (Biberauer, Newton and Sheehan to appear a)

- i. Change from head-final to head-initial must proceed top-down – true of the history of English, Afrikaans and French.
- ii. Change from head-initial to head-final must proceed bottom-up – true of the history of Ethiopian Semitic.

If the LCA holds, it follows that head-final languages must be derived via movement from an underlying spec-head-comp order. If we take a roll-up approach to head-finality, in the spirit of Kayne (1994), Zwart (1994), Holmberg (2000), Julien (2002) and Biberauer, Holmberg & Roberts (2007, 2008), triggered by Holmberg’s (2000) c-selection, then in simple terms FOFC equates to the following observation:¹⁶

(67) *FOFC in roll-up terms* ⇒ roll-up movement must begin at the bottom of the tree.

Let us consider the example of *[V Object] Auxiliary:

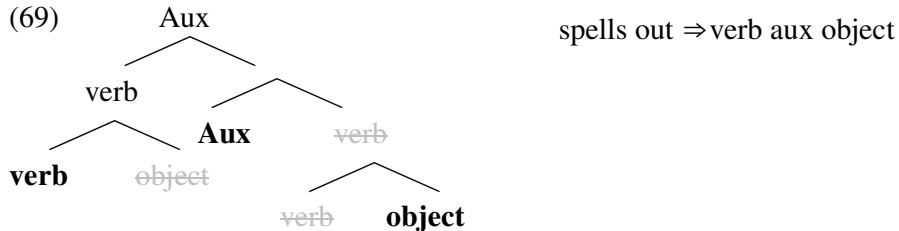


Descriptively, in these terms, (68a) is out because roll-up movement does not begin with the complement of the verb. In (68b) movement has begun at the bottom of the tree with comp-to-spec movement of the lowest complement, in this case the object of the verb. In (68a), on the other hand, the verb phrase has moved to spec Aux under c-selection, without the object having moved, resulting in a FOFC-violating order.

Now recall the kind of movement which results in CS: the movement of a non-spelled-out complex phrase from complement to specifier position. If head-finality is

¹⁶ It is important to note that while all of these authors assume some kind of roll-up movement, their assumptions differ somewhat as to the position of the object and subject. For Zwart, the object moves to spec AgrO at least in Dutch, for Roberts the position targeted by the object varies depending on the construction/language, and only for Julien is the object either moved to or first-merged in spec VP. Moreover, for Julien (2002) the presence of a specifier at any point blocks roll-up movement and so VP never moves to the specifier of v, even in a head-final language. This is incompatible with the proposal made here, as will become apparent below. In fact, under the version of c-command adopted here, the presence of more than one specifier is not a problem, so no such complementarity obtains between comp-to-spec movement and the merging of a specifier. In this much, the system proposed here is less restrictive than that proposed by Julien. Note that it would not be problematic for the approach outlined here if the object were to target a higher position than spec VP, as long as the head which attracts the object also triggers comp-to-spec.

derived by comp-to-spec movement then FOFC can be seen merely as a further example of this effect. While there is nothing banning the movement of a head-initial phrase under c-selection, at PF the derived copy of the complement will be deleted to enable linearization and the lower copy targeted, resulting in CS. In these terms the derivation in (68a) is not ungrammatical *per se* (contra Biberauer, Holmberg & Roberts 2007, 2008), but its PF order is not V-Obj-Aux, but rather V-Aux-Obj, as in (69).



According to Biberauer et al. (2008) the order V-Aux-Obj “is required for CP-complements in German, Dutch, Afrikaans and their dialects; possible with PP-complements in Dutch and Afrikaans and, to a lesser extent, German; also possible with DPs in Old English and Old Norse”. The only way to derive the FOFC-violating PF order V-Obj-Aux would be for the V+Obj to be spelled out prior to movement for independent reasons. This is arguably the case in instances of VP-fronting. I leave an exploration of how topic/focus interacts with MSO to future research.

Under these assumptions, FOFC, a gap in attested word orders in disharmonic languages results directly from the fact that movement of a complex phrase prior to spellout strands its complement. The same does not occur with a head-final phrase because, prior to movement, the underlying complement has become a specifier. For the reasons outlined in section 6, specifiers, unlike complements can be spelled out in a derived position.

The only exception to FOFC will involve phrases which are spelled out prior to movement for independent reasons (triggered by a finite set of functional phase heads such as D which trigger strong islandhood). Note that this makes the prediction that all apparent FOFC violations will involve inherent strong islands.

7.1. Deriving the exceptions to FOFC

Two classes of exceptions to FOFC have been noted by Biberauer, Holmberg & Roberts (2007, 2008). The first involves particles, which occur in many VO languages. The second involves categorial distinctness: FOFC does not hold between an embedded nominal and the clausal spine. Where such a nominal is specific, and a strong island, the fact that FOFC fails to hold is predicted by this account. This explains why specific DPs can violate FOFC in languages such as German [D NP] P. The problem is that in German, indefinite NPs can also appear in the FOFC-violating configuration.

- (70) Er hat das/ein Buch über Syntax ausgeliehen
 He has the/a book about syntax borrowed
 ‘He has borrowed a book about syntax.’ [German, De Kuthy (1998:314)]

One obvious way to get round this problem is to hypothesize that, as in English, NPs can be concealed DPs, selected by a null D and spelled out. An apparent problem with this is that PPs can be extracted from indefinite, though not definite DPs in object position in German:

- (71) Über Syntax hat Sarah sich *das/ein Buch ausgeliehen
 about syntax has Sarah herself the/a book borrowed
 ‘Sarah borrowed a book about syntax.’ [German, De Kuthy (2002:2)]

Note also that the lack of preposition stranding in German makes it impossible to tell where the PP complement has been extracted from. Given the ungrammaticality of extraction with specific nominals, it is likely that the source for (71) actually involved CS, which is possible with indefinite but not definite NPs:

- (72) Er hat ein/*das Buch ausgeliehen über Syntax.
 He has a/the book borrowed about syntax
 ‘He has borrowed a book about syntax.’

Further support of this claim comes from the fact that CS and extraction are both impossible where scrambling of the object has occurred:

- (73) *Er hat ein Buch doch ausgeliehen über Syntax.
 He has a book already borrowed about syntax
 ‘He has already borrowed a book.SPEC about syntax.’

- (74) *Über was hat Sarah ein Buch doch ausgeliehen?
 About what has Sarah a book already borrowed
 ‘What has Sarah already borrowed a book.SPEC about?’

It is widely held that scrambling is only possible with specific nominals, as such it is not compatible with CS, which is only possible with non-specific nominals. As such, it appears that a notable class of exceptions to FOFC receive an explanation once FOFC is explained in the terms outlined here.

8. Conclusions

The empirical phenomenon of CS has been argued to stem from basic facts about c-command and a strict LCA where terminal nodes define their own linear position. It has been argued that by extending Uriagereka’s system to allow for non-linearized derived specifiers we not only improve its empirical coverage, but also maintain the simplicity of the operation *move* as a composite of *copy+merge*. In the model which emerges, first-merged specifiers are linearized prior to merge, for PF interface reasons, first-merged complements, on the other hand, are only spelled out where the relevant syntactic trigger is present.

The implications of this analysis are far-reaching. Perhaps the most interesting possibility is that it might ultimately allow a unification of head and phrasal movement. It also provides a principled explanation of other cases of scattered deletion which have been proposed in the literature (cf. Bentzen to appear).

Perhaps the most direct implication of the analysis, however, is that it provides empirical evidence in favour of movement-derived head-finality. The fact that we see the same stranding effect with A & A-bar movement and c-selection is strong support for comp-to-spec movement under c-selection. If these parallels are true, it seems impossible to unify all these effects in an explanatory way without something akin to the LCA.

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