Unifying Adjunct Islands and Freezing Effects in Minimalist Grammars

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Abstract

This paper presents a unified account of two well-known conditions on extraction domains: the "adjunct island" effect and "freezing" effects. Descriptively speaking, extraction is problematic out of adjoined constituents and out of constituents that have moved. I introduce a syntactic framework from which it emerges naturally that adjoined constituents are relevantly like constituents that have moved, unifying the two descriptive generalisations noted above.

1 Overview

Research into the nature of "island constraints" (conditions on domains out of which extraction can occur) is a prominent issue in mainstream syntactic theory. There has been corresponding research into the nature of these constraints in a more mathematically explicit setting within the TAG formalism, aiming to show how island constraints, particularly adjunct islands and wh-islands (eg. Kroch, 1987, 1989; Frank, 1992), might emerge from other independently-motivated properties of the grammar. However within the MG formalism, developed by Stabler (1997) as a precise formulation of the main ideas underlying the most recent incarnation of Chomskyan syntactic theory (Chomsky, 1995), there has been relatively little investigation of the nature of island constraints: to the extent that these phenomena figure in the literature (eg. Gärtner and Michaelis, 2005, 2007), familiar descriptive constraints are simply stipulated individually (eg. no extraction from specifiers, no extraction from adjuncts) for the purpose of investigating not the origin of these constraints but their effects on generative capacity.

In this paper I propose that a particular variant of the MG formalism, motivated by a number of independent considerations, permits a unified account of two well-known island constraints, namely the "adjunct island" effect and "freezing" effects: descriptively speaking, extraction is generally problematic out of adjoined constituents (Cattell, 1976; Huang, 1982) and out of constituents that have moved (Wexler and Culicover, 1981). The crucial ingredients of the formalism are two widely-held intuitions: first, that movement is usefully thought of as "re-merging" (Epstein et al., 1998; Chomsky, 2004), and second, that adjuncts are in some sense more "loosely" attached than arguments are (Chametzky, 1996; Hornstein and Nunes, 2008). A grammatical formalism in which the re-merge conception of movement is fleshed out explicitly makes possible a natural implementation of the idea of adjuncts as loosely attached, which is otherwise difficult to make precise. From this point it emerges that adjoined constituents and moving constituents are, in a certain sense, the same kind of thing; thus by adding a single constraint to our theory we capture at once both adjunct island effects and freezing effects.

The rest of this paper is organised as follows. In §2 I develop the syntactic formalism in which the eventual unification can be stated, starting with the formalism from Stabler (2006) and then introducing two additions/modifications concerning the implementations of movement and adjunction. I begin

§3 by focussing on the prohibition against extraction from adjuncts; having identified the particular constraint that must be imposed on the formalism to enforce this prohibition, I then show that this one constraint also forbids extraction from moved constituents without further stipulation.

2 Syntactic framework

2.1 Insertion and Re-merge: Stabler (2006)

I take as a starting point the variant of the MG formalism presented by Stabler (2006). This system departs from the common conception of movement as an operation which revises or rearranges some existing structure: instead of merging into position A and then moving (perhaps with the help of copying and/or deletion operations) to position B, an element satisfies certain requirements associated with position A while remaining structurally "disconnected" from the rest of the sentence, and then is structurally integrated only into position B. As a result, if we allow new elements to be simply inserted into a derivation with this "disconnected" status, we need only a single feature-checking operation (as opposed to a merging operation which builds structure, and a moving operation which builds structure in addition to dismantling existing structure).[1]

Abstracting away from some details, a derivation of the question 'who did we see' will proceed as shown in Figure 1. Features of the form `+f` indicate *requirements*, and features of the form `-f` indicate *properties*. An element bearing `-f` can discharge another element's corresponding `+f` requirement, resulting in these two features being "checked" or deleted. Note that when a requirement is discharged, the element bearing `-f` may be wholly integrated into the structure (via string concatenation), never to be further manipulated, as is case for the subject and question requirements in Figure 1; or it may remain disconnected, as is the case for the object requirement in Figure 1, since 'who' has a remaining property that will discharge the question requirement later.

This conception of syntactic structure-building can be seen as an explicit implementation of the common intuition that movement might be thought of as merely re-merging: note the parallelism between the discharging of the subject requirement (often thought of as a "merge step") and that of the question requirement (a "move step"). This unification depends on the presence of an insertion operation that adds an element to the derivation without checking any features. In the next subsection I will propose that this insertion operation can also play a role in insightful accounts of adjuncts; more specifically, that adjuncts are elements that are inserted into the derivation but do not thereafter participate in the discharging of any requirements.

This treatment of adjunction is one of two adjustments that I make to the system of Stabler (2006): I describe this first in §2.2, and then the second adjustment, concerning the derivational status of the "disconnected" elements, in §2.3.

2.2 Adjunction as (Only) Insertion

First note that in the derivation in Figure 1, phonological/string composition occurs only upon discharging of requirements (though not conversely). Adjuncts clearly must be phonologically composed with other constituents; to make room for an account where they nonetheless do not participate in any discharging of requirements, these two ideas must be decoupled. The work done at requirement-discharging steps in Figure 1 can be broken into two operations, MRG ("merge") and SPL ("spellout"). The former discharges requirements without phonological composition, and the latter composes a new string from smaller pieces. The string produced by SPL will of course depend on which requirements have been discharged by what, so MRG must leave some record of this for SPL to interpret.

With this division of labour between MRG and SPL, the question arises of "how often" SPL applies in the course of the derivation. If SPL were applied immediately after *every* application of MRG, the result would be effectively the same as in Figure 1. Alternatively, if SPL were applied just once at the end of the derivation, the result would be a system where the abstract structural description of the entire sentence is constructed and only then its string yield computed; this is roughly the position adopted in most works in transformational grammar, including Chomsky (1995) and Stabler (1997). I adopt a position in between these two extremes, incorporat-

[1] For further discussion of how this system relates to better-known variants of MGs, see Hunter (2010, ch.1).

	⟨ see:: `+d+d-V` , {}⟩
insert 'who' ⟶	⟨ see:: `+d+d-V` , { who:: `-d-wh` }⟩
discharge object requirement ⟶	⟨ see:: `+d-V` , { who:: `-wh` }⟩
insert 'we' ⟶	⟨ see:: `+d-V` , { who:: `-wh` , we:: `-d` }⟩
discharge subject requirement ⟶	⟨ we see:: `-V` , { who:: `-wh` }⟩
	⋮
	⟨ did we see:: `+wh` , { who:: `-wh` }⟩
discharge question requirement ⟶	⟨ who did we see , {}⟩

Figure 1: Intuitive outline of a derivation in the framework of Stabler (2006).

ing the general idea of the "multiple spellout" proposal from Uriagereka (1999).

Specifically, I propose that SPL applies at the end of each maximal projection. The effect is that the record of discharged requirements left by applications of MRG to be interpreted by SPL (i.e. a partial structural description) can take the simple form of a list: the first element in the list represents the complement of the current maximal projection, the second element the first specifier, and so on.[2] A derivation of the VP constituent of 'we see the man' is shown in Figure 2. Abstracting away from some details which will change shortly: we call a string with an associated list of features a *unit*, and an *expression* consists of a unit, a (possibly empty) sequence of strings, and some additional "disconnected" units (in Figure 2, a set of them, but this will change shortly); MRG and SPL are unary functions on expressions, and INS ("insert") is a binary function on expressions. If SPL applies to an expression of the form $e = \langle u, s, t, \dots \rangle$ where u is a unit and s and t are strings, then this expression is interpreted as encoding a phrase headed by u, with a constituent with yield s in its complement position and a constituent with yield t in its specifier position. Note that SPL applies at the end of each maximal projection: once to "flatten" the DP structure encoded in e_2 to produce 'the man', and once to "flatten" the VP structure encoded in e_7 to produce 'we see the man'. These two steps are illustrated in Figure 3.

For reasons of space I will not be able to justify here the particular choice of a maximal projection as the relevant "phase" or "cycle" of interpretation. The motivation comes in large part from consideration of a distinctive, independently-motivated approach to the semantic composition of neo-Davidsonian logical forms (Parsons, 1990; Pietroski, 2005), according to which complement and specifier positions each take on a particular semantic significance; see Hunter (2010) for extensive discussion. But to illustrate the basic idea, an argument of roughly the same form can be made that maximal projections might constitute a significant phase of interpretation even with respect to phonological/string (rather than semantic) composition: SPL must be sensitive to the distinction between complements and specifiers since (in English) the former are linearised to the right and the latter to the left, and by composing only at the end of each maximal projection we ensure that this distinction is encoded when SPL applies in Figure 2. In a system like the one illustrated in Figure 1 where requirement-discharging and composition are strictly coupled, some other encoding of the complement/specifier distinction must be added instead.[3]

With a VP consisting of just a head, complement and specifier derived as shown in Figure 2, we now have available an interesting analysis of adjunction. I propose that in the derivation of a VP with an additional adjunct, the adjunct is only inserted and

[2] I assume for simplicity that a phrase can have multiple specifiers, although the examples in this paper will not make use of any more than one.

[3] Stabler (2006) distinguishes two different "types" of expressions, indicated by ':' and '::', for this purpose.

$$\begin{aligned}
e_1 &= \text{INS}(\langle \text{the:: +n-d}, \{\}\rangle, \langle \text{man:: -n}, \{\}\rangle) &&= \langle \text{the:: +n-d}, \{\text{man:: -n}\}\rangle \\
e_2 &= \text{MRG}(e_1) &&= \langle \text{the:: -d}, \text{man}, \{\}\rangle \\
e_3 &= \text{SPL}(e_2) &&= \langle \text{the man:: -d}, \{\}\rangle \\
e_4 &= \text{INS}(\langle \text{see:: +d+d-V}, \{\}\rangle, e_3) &&= \langle \text{see:: +d+d-V}, \{\text{the man:: -d}\}\rangle \\
e_5 &= \text{MRG}(e_4) &&= \langle \text{see:: +d-V}, \text{the man}, \{\}\rangle \\
e_6 &= \text{INS}(e_5, \langle \text{we:: -d}, \{\}\rangle) &&= \langle \text{see:: +d-V}, \text{the man}, \{\text{we:: -d}\}\rangle \\
e_7 &= \text{MRG}(e_6) &&= \langle \text{see:: -V}, \text{the man}, \text{we}, \{\}\rangle \\
e_8 &= \text{SPL}(e_7) &&= \langle \text{we see the man:: -V}, \{\}\rangle
\end{aligned}$$

Figure 2: A derivation illustrating the division of labour between MRG and SPL.

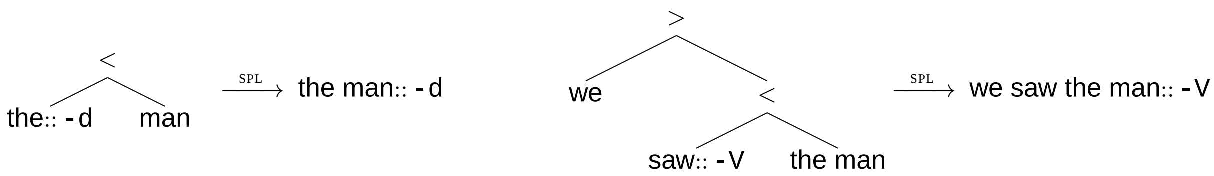


Figure 3: An intuitive illustration of the effects of SPL in Figure 2.

then immediately interpreted by SPL (as opposed to playing a more distinguished role by being affected by MRG). This is particularly plausible on the semantically-motivated understanding of argument positions (Hornstein and Nunes, 2008; Hunter, 2010). A derivation of 'we see the man today' will therefore proceed as in Figure 2 to the point where e_7 is constructed, and then continue as shown in Figure 4. The feature *V indicates a constituent that adjoins to a phrase whose head bears -V (i.e. adjoins to a VP).

2.3 Structure Among Disconnected Elements

Intuitively, an expression consists of a central "connected" component — originally a single head unit in Figure 1 and in Stabler (2006), and as of the previous subsection a head unit along with a list of argument-yield strings in Figure 2 and Figure 4 — and some associated "disconnected" units. In an expression $e = \langle C, \{u_1, u_2, \ldots\}\rangle$ let us say that the disconnected units u_i are *subordinate* to the central component C.

Consider now in more detail the derivation sketched in Figure 1. Upon completion of the VP constituent we derive the expression $e_{\text{VP}} = \langle \text{we see:: -V}, \{\text{who:: -wh}\}\rangle$. Here who is subordinate, in the sense just defined, to we see. Suppose the next maximal projection is a CP, the head of which is pronounced 'did' and which selects a VP complement and attracts a wh-word to its specifier position. Then the derivation will continue by inserting e_{VP} into an expression headed by did:: +V+wh-c .

In the system of Stabler (2006), the disconnected units in an expression are structured simply as a set, so the result of this insertion step will be as follows, *destroying the relationship of subordination* between who and we see.

$$\begin{aligned}
&\text{INS}\big(\langle \text{did:: +V+wh-c}, \{\}\rangle, e_{\text{VP}}\big) \\
&= \langle \text{did:: +V+wh-c}, \{\text{we see:: -V}, \text{who:: -wh}\}\rangle
\end{aligned}$$

In order to maintain this relationship between who and we see when the derivation proceeds beyond construction of the VP (which will be crucial for imposing conditions on extraction domains), we need something more structured than simply a set of units to store an expression's disconnected pieces. Roughly, we might suppose that in place of a set of units we use a set of *expressions*; since this per-

$e_7 =$ $\langle$ see:: -V , the man , we , $\{\}\rangle$
$e_8 = \text{INS}(e_7, \langle$ today:: *V , $\{\}\rangle)$ $= \langle$ see:: -V , the man , we , $\{$ today:: *V $\}\rangle$
$e_9 = \text{SPL}(e_8)$ $= \langle$ we see the man today:: -V , $\{\}\rangle$

Figure 4: The end of a derivation showing the adjunction of ‘today’ to the VP.

mits nesting of expressions, a tree notation is sensible. A tree with C at its root node and $u_1, u_2, \ldots$ as the unordered daughters of this root node will correspond to the expression $\langle C, \{u_1, u_2, \ldots\}\rangle$. The arcs of these trees correspond straightforwardly to subordination relationships. A tree with further levels of embedding encodes the more elaborate internal structure now permitted, not corresponding to any expression of the restricted form $\langle C, \{u_1, u_2, \ldots\}\rangle$

The expression e_{VP} discussed above will therefore correspond to the tree in (1); when this expression is inserted into an expression headed by the complementiser ‘did’ we keep its internal structure intact, and the result is the tree in (2).

(1) we see:: -V
|
who:: -wh

(2) did:: +V+wh-c
|
we see:: -V
|
who:: -wh

The effect of inserting one tree τ into another τ' is to add τ as one of the daughters of the root node of τ'. The effect of applying MRG to a tree whose root node has as its first feature a requirement +f, is to “look for” a unit u bearing a property -f somewhere else in the tree, and check these features; if this -f is the only remaining feature on u, then we furthermore record the yield of u at the root node, to be phonologically composed at the next application of SPL, and u is removed from the tree, its daughters inherited by the root node.

The two applications of MRG and the one of SPL that complete the derivation of ‘who did we see’, starting from the expression in (2), are shown in Figure 5. While all non-root nodes consist of just units, the root node has a unit plus a (possibly empty) list of strings, representing current argument yields as introduced in Figure 2.

Let us say that a unit x is “n-subordinate” to another unit y (in a certain tree τ) iff x can be reached from y by a downward path of length n (in τ). Note that before the first application of MRG in Figure 5, the unit who:: -wh was 2-subordinate to the root of the tree; but when the +V and -V features are checked and we see is established as an argument, its daughter who:: -wh is inherited by the root and is therefore only 1-subordinate to the root.

3 Constraining movement

We can now consider the difference, in our modified syntactic formalism, between licit extraction from a complement and illicit extraction from an adjunct. Having done so we will then see that the property that distinguishes adjuncts from complements also distinguishes in-situ constituents from moved ones. A single constraint can therefore be imposed upon the system that unifies adjunct island effects and freezing effects.

3.1 Prohibiting Extraction from Adjuncts

I take the two sentences in (3) and (4) as representative examples of licit extraction from a complement and illicit extraction from an adjunct.

(3) Who do you think [that John saw __]?

(4) * Who do you sleep [because John saw __]?

I assume that the bracketed constituent in (4) is adjoined to VP, though nothing significant hinges on this choice of attachment site. The crucial difference between the two sentences will therefore reside in the construction of their respective matrix VPs: the relevant partial derivations, up to the point where no requirements remain to be discharged and we would expect SPL to apply, are shown in Figure 6.

The two expressions with which the partial derivations in Figure 6 begin represent the two sentences’ respective bracketed constituents, extraction from which we are investigating: a CP ‘that John

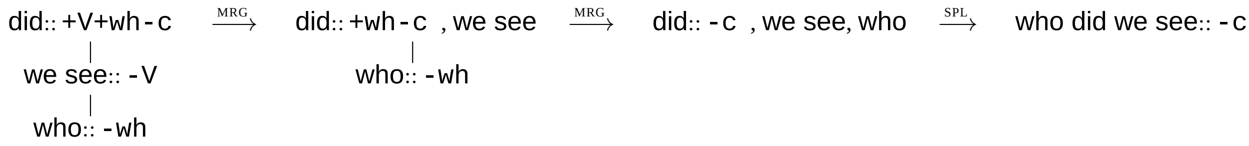


Figure 5: Final steps of the derivation of ‘who did we see’.

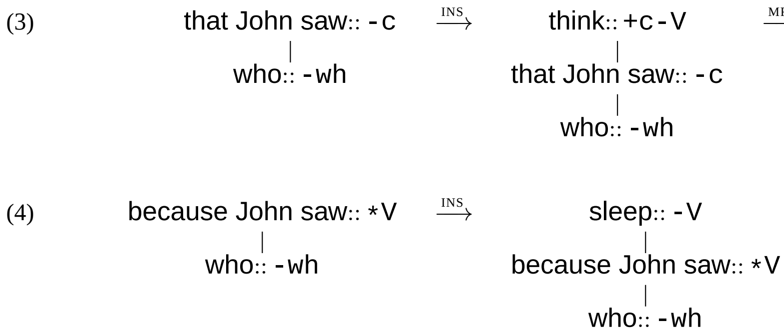
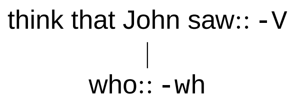


Figure 6: Comparison of the construction of the matrix VP of the two sentences in (3) and (4).

saw’ with a subordinate disconnected ‘who’ waiting to re-merge and check its `-wh` feature in the case of (3), and a VP-adjunct ‘because John saw’, likewise with a disconnected ‘who’, in the case of (4). Each is inserted into an expression headed by the matrix verb: ‘think’, which requires a CP complement, in the case of (3), and ‘sleep’, with no such requirement, in the case of (4).

After this first step the two partial derivations crucially diverge. For (3) a MRG step is required, to check the `+c` and `-c` features, before SPL can apply, and as a result who:: `-wh` is 1-subordinate to the root when the VP is completed and SPL is due to apply. For (4), however, no such MRG step is required: the adjunct is ready to be interpreted as part of the VP in its 1-subordinate position, just as ‘today’ was in Figure 4, and so SPL is due to apply immediately after the insertion step.

In order to encode the adjunct island constraint we require that the possibility of extracting who is contingent upon the merging of its mother node in these tree representations (here, that John saw), into an argument position. We can do this by stipulating that SPL does not apply to expressions where there exist units 2-subordinate to the root. The partial derivation of (3) in Figure 6 can therefore continue with an application of SPL, producing



but the would-be derivation of (4) cannot.[4]

I should emphasise that I have not said anything insightful so far about the nature of adjunct island effects. This constraint on the expressions to which SPL can apply is simply a restatement of the fact that extraction from adjuncts is prohibited. The attraction of it is that in combination with the implementation of movement that our formalism assumes, the very same constraint simultaneously prohibits extraction from moved constituents. This is what the next subsection will illustrate.

3.2 Freezing effects follow

The adjunct island constraint, we have just seen, amounts to a prohibition on applying SPL to configurations in which a moving unit u is 1-subordinate to a unit u', which is itself adjoined to, and thus 1-subordinate to, the expression’s root; in such con-

[4]Note that this constraint does not rule out multiple adjuncts independently modifying a single phrase, as long as none of these adjuncts themselves have subordinate parts waiting to re-merge.

figurations u is 2-subordinate to the root. But the general constraint — that SPL may not apply to expressions where some unit is 2-subordinate to the root — also prohibits applying SPL to configurations in which a moving unit u is 1-subordinate to a unit u', which *has not yet reached its final position*, and is thus 1-subordinate to the root. This second kind of configuration is exactly the one that characterises freezing effects.

As a concrete example, I will suppose that (5) is ruled out because 'who' has moved out of a larger constituent which has itself moved: specifically, it has moved out of the subject, which has moved for Case/EPP reasons. I will show that this can be ruled out by the same constraint on SPL that we arrived at above to enforce adjunct islands.

(5) * Who did [a picture of __] fall (on the floor)?

First consider the derivation of a sentence involving the relevant movement of the subject, but not yet with any additional wh-movement. The relevant part of the derivation of (6) is shown in Figure 7.

(6) A picture of John fell (on the floor)

The steps in Figure 7 begin at the point where the subject 'a picture of John' has been fully constructed, and it will need to merge into a theta position (-d) and Case position (-k). Note that since its theta position is not its final destination, a unit ⟨a picture of John :: -k⟩ *remains as a daughter of the root* when the +d and -d features are checked (analogous to 'who' remaining disconnected when the object requirement was discharged in Figure 1). This causes no problem in the derivation of (6) where no movement out of the subject is required: SPL applies to the last expression shown in Figure 7, since we have completed construction of the VP by this point, and the subject 'a picture of John' re-merges into its Case position when the opportunity arises.

Now consider Figure 8, showing the attempted derivation of (5), where 'who' must move out of the subject. After the two steps shown there the +d requirement of 'fall' has been discharged, so SPL is due to apply. However, as observed above, the unit ⟨a picture of :: -k⟩ remains 1-subordinate to the root ⟨fall :: -V⟩, and ⟨who :: -wh⟩ remains 1-subordinate to ⟨a picture of :: -k⟩; therefore we have a unit, ⟨who :: -wh⟩, which is 2-subordinate to the root ⟨fall :: -V⟩ and so our constraint from §3.1 prohibits application of SPL.

To see the similarity between adjunct island configurations and freezing configurations, note the similarity between the attempted derivation of (4) in Figure 6, and that of (5) in Figure 8. In each case the constituent out of which ⟨who :: -wh⟩ needs to move remains 1-subordinate to the root — in the first case, because ⟨because John saw :: *V⟩ is an adjunct, and in the second case, because ⟨a picture of :: -k⟩ has not reached its final position. Contrast these in particular with the part of the successful derivation of (3) in Figure 6, where the constituent 'that John saw' out of which ⟨who :: -wh⟩ needs to move is not subordinate to the expression's root. The proposed constraint therefore makes a natural cut between (i) adjoined constituents and moving constituents, out of which movement is disallowed, and (ii) argument constituents, out of which movement is allowed.

4 Conclusion

In this paper I have argued that two well-known generalisations concerning extraction domains can be reduced to a single constraint: first, the generalisation that extraction from adjuncts is prohibited, and second, the generalisation that extraction from moved constituents is prohibited. I have presented and integrated independently-motivated implementations of movement relations and adjunction, and shown that it emerges from the resulting system that adjoined constituents and moved constituents have a certain shared status. This allows us to add a single constraint to the theory to capture both the existing generalisations.

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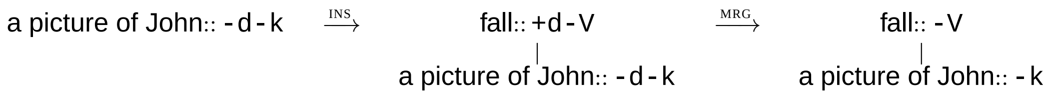

Figure 7: Partial derivation illustrating subject movement in (6).

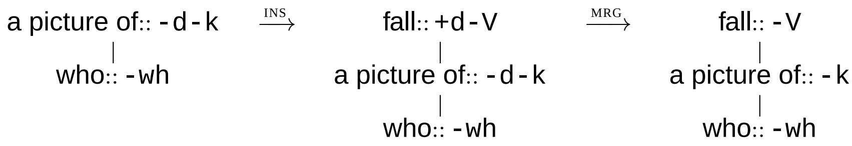

Figure 8: Ill-fated attempted derivation of the sentence in (5).

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