Defective Complements in Tree Adjoining Grammar

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1 Introduction

Syntactic theory has long made use of the idea that clausal complements can be different sizes. For example, while the finite complement to *believes* in (1a) projects up to CP, the nonfinite complement in (1b) projects only to IP. The most obvious reason for this approach is, of course, that the finite complement can have a complementizer, while the nonfinite one cannot. This is, in turn, related to accounts of how Case can be assigned to the complement subject when the complement is IP but not CP.[1] Another example of how smaller complements are used in syntactic theory is of course the case of subject-to-subject raising, as in (2a). Such raising is only possible when the complement is a an IP, but not a CP (2b). Restrictions on movement are therefore correlated with the size of the complement.

(1) a. John believes [$_{CP}$ that [$_{IP}$ Bill is a freak]]
b. John believes [$_{IP}$ Bill to be a freak]

(2) a. Bill$_i$ seems [$_{IP}$ t$_i$ to be a freak.]
b. * Bill$_i$ seems [$_{CP}$ that t$_i$ is a freak.]

This use of differing complement sizes has been extended to handle further types of inter-clausal movement, by increasing the options for the size of the complement. One particular case in which this approach has been taken is that of 'clitic climbing' in Romance, in which a clitic can sometimes appear in a higher clause than than the clause to which it is semantically associated. Going back at least to Strozer (1977), various linguists have suggested that clitic climbing takes place when the complement is 'defective', even more so (that is, smaller) than for the complements of raising or ECM verbs, although the exact size of the complement has changed depending on the analysis and the options available within syntactic theory.

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[1]There are different stories about how such exceptional Case marking takes place—either by governing across IP, or movement of the complement subject to [Spec, AgroP] in the higher clause, etc. These details do not matter here, since the main point is the utility of using complements of different sizes.

The purpose of this paper is two-fold. First, we discuss an analysis of clitic-climbing within the framework of Tree Adjoining Grammar (TAG). A 'defective complement' analysis was used in Bleam (1994) to account for clitic climbing in TAG. While the analysis is in several respects very successful, we point out some important cases that it is unable to handle. Indeed, following Bleam (1994)'s basic assumptions, it is difficult to give any such analysis for these cases in Tree Adjoining Grammar. Since we accept those basic assumptions, we therefore we utilize a reconceptualization of Tree Adjoining Grammar proposed by Frank and Vijay-Shanker (1998), Frank et al. (1999).

While this approach allows the problems faced by Bleam (1994)'s analysis to be handled, it in turn faces certain challenges of prohibiting locality violations by clitic movement. Investigating this problem leads to the second goal of this paper, which is to show how the same derivational machinery used for subject-to-subject raising and wh-movement is also used for clitic climbing, resulting in a unified analysis of inter-clausal movement in this revised TAG framework, while still accounting for their different properties.

In Section 2 we present the data concerning clitic-climbing in Romance, and the TAG framework is introduced in Section 3. Section 4 discusses Bleam (1994)'s analysis and problematic cases for the analysis. Section 5 discusses the recharacterization of the TAG framework, and Section 6 shows how it can be used to solve the problems discussed in Section 4. Section 7 discusses the resulting analysis in more detail, showing how locality can be retained and how the solution fits into an overall account of inter-clausal movement in TAG, and Section 8 presents a short conclusion.

2 Data : Clitic Climbing in Spanish

We are concerned in this paper with Romance object clitics, unstressed pronominal elements associated with the objects of a verb. The object as a full NP follows the verb, as in (3). In Spanish and Italian, the clitic precedes a finite verb (4), and follows a nonfinite verb (roughly) (5). We focus here on Spanish, although the same issues hold for Italian.[2]

(3) Mari no vió la película
Mari neg saw the movie
'Mari did not see the movie'

[2]In both Spanish and Italian, the object clitics (roughly) appear following a nonfinite verb, and preceding a finite verb. We abstract away from this issue here.

(4) Mari no *la* vió
Mari neg it saw
'Mari did not see it'

(5) Mari quiere ver*la*
Mari wants to see it

Object clitic placement is usually a clause bound operation, in which the clitic appears on the verb with which it is associated (or on an auxiliary verb in the same clause). As shown in (6), the clitic does not in this case appear on the higher verb, but must appear on the verb it is semantically associated with, in this case *comer*.

(6) a. Luis insistió en comer*las*
Luis insisted on eating them
b. * Luis *las* insistió en comer

This is the 'typical' case. However, with a limited number of verbs, such as *quiere*, in addition to the clitic staying with the lower verb, as in (7a), it can also optionally appear on that higher verb, as in (7b). This is commonly referred to as 'clitic climbing', since the clitic appears to climb to a higher clause. I will follow Aissen and Perlmutter (1983) in referring to the verbs that allow such movement of the lower clitic to them, such as *quiere*, as the 'trigger' verbs.[3]

(7) a. Luis quiere comer*las*
b. Luis *las* quiere comer
'Luis wants to eat them'

The puzzle of sentences such as (7b) is, of course, is that the normal locality constraint on clitic placement, as in (6), seems to be violated. Furthermore, the clitic can move past a series of verbs, as long as those verbs are all trigger verbs, as in (8):

(8) Juan *la* quiere poder comprar
Juan it wants to be able to buy
'Juan wants to be able to buy it'

[3]Clitic climbing is just one type of unexpectedly long movement allowed by trigger verbs. These different movements are commonly grouped together under the term 'restructuring'. Some of the other aspects, such as the 'long middle-*si*' raise some different issues for TAG, and also interact with clitic-climbing in interesting ways. However, space prohibits discussion here of these other aspects of restructuring.

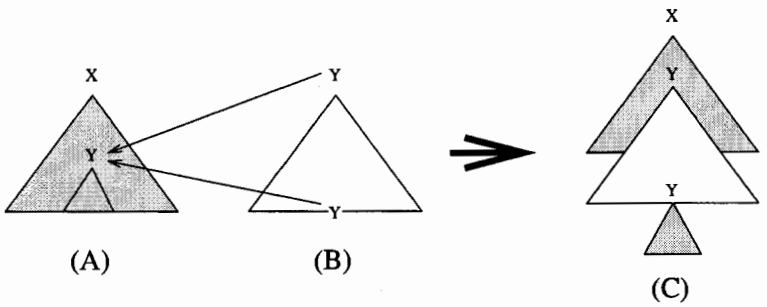


Figure 1: Adjoining in TAG

3 Tree Adjoining Grammar

The fundamental idea of TAG (Frank (1992), Kroch and Joshi (1985)) as a grammatical formalism is that the specification of grammatical constraints can be separated from the recursive processes in the grammar. This is accomplished by localizing the grammatical constraints within small pieces of phrase structure, called *elementary trees*, which are combined using the *adjoining* operation.

Adjoining inserts one elementary tree inside the body of another, as shown in Figure 1.

Trees which can be adjoined into another tree are *auxiliary trees*, and have a *foot* node along the frontier which is of the same category as the root node. Adjoining is what allows recursive structures to be separated from the specification of the grammar; recursive structures are treated as auxiliary trees, which adjoin in to produce non-local dependencies.[4]

The working hypothesis for all linguistic work in TAG is that the substantive theory of syntax must be stated over the bounded local domains of the elementary trees. It is also taken as a basic assumption that all semantic arguments associated with a verb are located in the same elementary tree as that verb. We follow here the characterization of elementary trees proposed by Frank (1992), in which an elementary tree consists of the extended projection,

[4]TAG also uses tree substitution, which by itself would only give the context-free power. The use of adjoining pushes TAG into the class of 'mildly context-sensitive' grammar formalisms (Joshi et al. 1990). Substitution is commonly used to insert arguments into a tree, a detail we have abstracted away from here. Substitution also plays a role in the definition of 'multi-component' TAG, as seen later in this section.

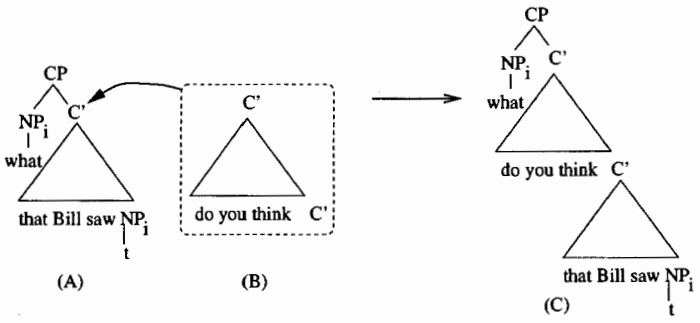


Figure 2: Wh-Movement in TAG

in the sense of Grimshaw (1990), of a lexical predicate:

(9) **Condition on Elementary Tree Minimality (CETM):** Every elementary tree consists of the extended projection of a single lexical head.

One example of the use of adjoining for recursive processes is given by the TAG analysis in Frank (1992), Kroch and Joshi (1985) of wh-movement, as in *What do you think that Bill saw?* The moved wh-movement and its trace are localized in single elementary tree for *What$_i$ that Bill saw t_i*, as shown in (A) of Figure 2.

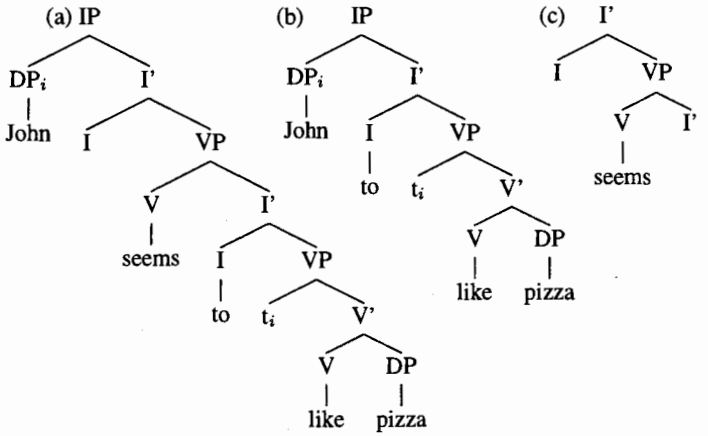
This is an example of how in TAG all movement transformations are localized to take place in a single tree. The auxiliary tree for *do you think*, (B) in Figure 2, is a C' auxiliary tree that adjoins in at the C' node of (A). This produces the desired result in (C), which shows how adjoining accomplishes the same result as inter-clausal movement, in this case cyclic A'-movement.[5]

Crucially, there is no 'movement' from one clause to another. All movement is internal to an elementary tree, and the appearance of inter-clausal movement results by segments of a tree getting stretched away from the rest of the tree, as illustrated by the *what* of (A) in Figure 2 being stretched away from the rest of (A) by the adjoining of (B).

[5]Note that complement of *think* takes a C' complement, which allows the tree to be used as a C' auxiliary tree. We are adopting here Frank (1992)'s proposal that the bridge verbs (the ones that allow movement from the complement of a lower clause) are the ones that take a C' complement, as opposed to non-bridge verbs such as *regret*, which take a CP complement and so cannot be used for inter-clausal wh-movement by

(10) John seems to like pizza

(11)



The same basic approach applies for subject-to-subject raising as in (10). The auxiliary tree in (11c) is adjoined into (11b) at the I' node, thereby 'stretching' *John* away from *to like pizza*, to produce (11a).

The operations of substitution and adjoining allow two elementary trees to interact with each other. A natural way to 'loosen' the definition of TAG is to allow the TAG operations to manipulate multiple trees at a time. These extensions are referred to as 'multi-component' extensions of TAG, since the basic components of the grammar are no longer trees, but tree sets with several components. One such extension, 'tree-local multi-component TAG' (TL-MCTAG), has been the most used for various problems that arise with basic TAG. TL-MCTAG requires that all of the members of a tree set be adjoined or substituted into a single elementary tree, as broadly illustrated in Figure 3. (A) and (B) in the figure show that two members can either both adjoin into another tree, or one component can adjoin while the other substitutes.[6] What is not allowed by the definition of TL-MCTAG, though, is the scheme in (C), in which a tree adjoins into one component of the tree set, while the other component of the tree set adjoins into that tree. The consequences of this definition of TL-MCTAG for clitic climbing are discussed in the next section.

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adjoining in the same way that *thinks* can.

[6]It is also possible for both to substitute.

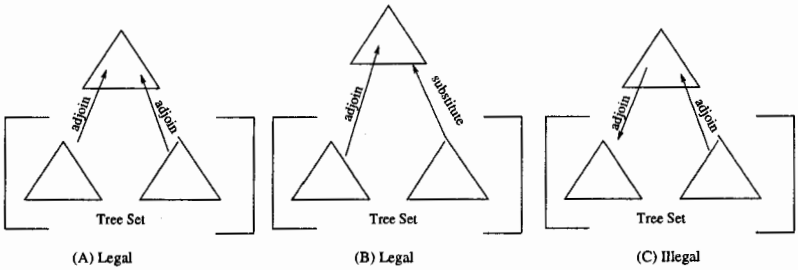


Figure 3: Tree-Local Multi-Component TAG

4 TAG and Clitic Climbing: The Problem and Previous Approaches

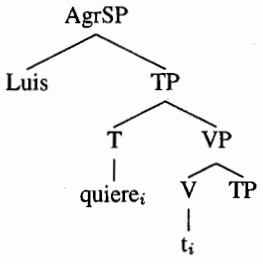
Consider again the the case of a clitic that does not 'climb', as in (7a), repeated here as (12a). Since the elementary tree for *comer* contains all the arguments of *comer*, it would naturally contain the clitic *las* as well. While there would be some issues over exactly the right way to represent the clitic in the phrase structure, that would be the case for any formalism, and there is no particular problem caused for TAG. Whatever the desired representation of the clitic is, it can be used in the elementary tree for the *comer* clause with the clitic.

(12) a. Luis quiere comer*las*
b. Luis *las* quiere comer
Luis wants to eat them

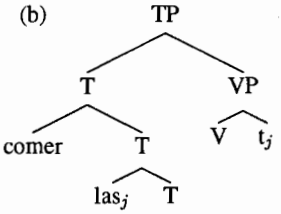
However, in a clitic climbing case such as (7b), repeated here as (12b), the clitic appears in the higher clause. Since, by the CETM, the clitic must be part of the *comer* elementary tree, it must therefore appear in the higher clause as a result of adjoining. As discussed in the previous section, the adjoining operation for TAG is able to 'stretch' away components of an elementary tree. For the case of *wh*-movement, e.g., *who does John think that Bill saw*, *does John think* adjoins in, pushing *who* away from *that Bill saw*. For subject-to-subject raising, as in *John seems to like pizza*, *seems* adjoins in to push *John* away. In both cases, the component that gets pushed away from the rest of its tree is on the periphery of the final sentence (*who* or *John*).

However, in (12b), the element being 'stretched away', the clitic *las*, is not on the periphery of the clause. The clitic appears somewhere 'in the middle' of the higher clause. This is therefore a problem for TAG.

(13) (a)



(b)



4.1 TAG and Clitic Climbing: Previous Approach

An analysis of clitic climbing in TAG was proposed by Bleam (1994).[7] Bleam (1994) crucially adopts the idea that the trigger verbs are those which can optionally take a 'defective' complement, namely VP instead of a full IP (or AgrSP, in the split-Infl structure assumed). The clitic is taken to attach to the T node, and so when the defective complement VP is selected, the clitic has no place to attach in the complement clause, and so must climb up. When the trigger verb selects a 'full' complement that includes a TP projection, the clitic attaches to the T node and so does not climb.[8]

For example, (12a), without clitic climbing, is derived by (13b) substituting into the TP node of (13a), resulting in (14).[9] Since (13b) projects up to TP, there is 'room' for the clitic, which remains attached in the lower clause.

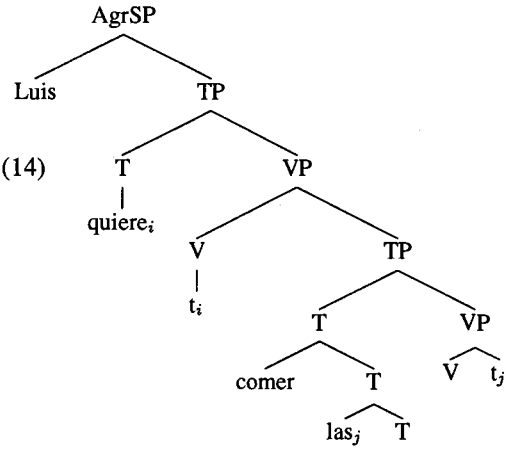
For the clitic climbing case (12b), *quiere* takes a VP complement, as shown in (15a). Since the complement is only a VP, the clitic, which must attach to a T node, has nowhere to attach, and remains 'hanging'. The complement clause is therefore represented by a multi-component tree set, as in

[7]The other aspects of restructuring are not discussed. A quite different approach to clitic climbing in TAG has recently been proposed by Candito (1999). Space prevents discussion here, but it does not alter the main points of this paper.

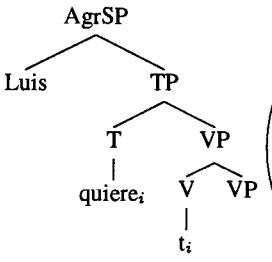
[8]Support for this approach is given by the blocking of clitic climbing by negation, on the assumption that negation is located higher than the attachment site of the clitic. If the lower clause has negation, then it must therefore also have 'room' for the clitic to attach. Likewise, if the clitic climbs, then the complement clause is defective and does not have room for negation. See Moore (1991), Rosen (1990), Wurmbrand (1998) for further arguments for this view. Napoli (1981) discusses some complications for this view in Italian.

[9]For space reasons, there are some aspects of Bleam (1994)'s analysis that we cannot discuss here, such as the need for set-local MCTAG. Although important, they are not immediately relevant to the purpose of this paper.

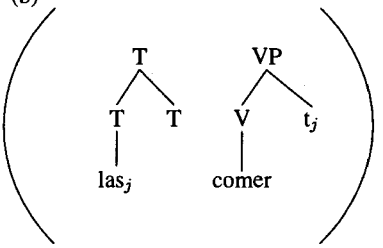
(14)


AgrSP
Luis
TP
T
VP
quiere$_i$
V
TP
t_i
T
VP
comer
T
V
t_j
las$_j$
T

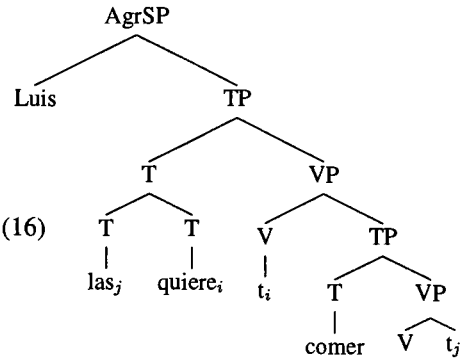
(15) (a)


AgrSP
Luis
TP
T
VP
quiere$_i$
V
VP
t_i

(b)


T
VP
T
T
V
t_j
las$_j$
comer

(16)


AgrSP
Luis
TP
T
VP
T
T
V
TP
las$_j$
quiere$_i$
t_i
T
VP
comer
V
t_j

(15b), in which one component is the clitic waiting to be attached, and the other component is the VP projection. The derivation proceeds by substituting the VP component of (15b) into the VP node of (15a), while the clitic component of (15b) adjoins into (15a) at the T node, resulting in (16), with the clitic having 'climbed'. Bleam (1994) assumes that the nonfinite verb moves (adjoins) to T when there is a TP projection, which is the case when there is no clitic climbing, as in (13b). In contrast, when the clause projects only to VP, the verb must stay at V, since there is no T head to adjoin to, as in (15b).[10]

4.2 Some Problems

An important technical aspect of Bleam (1994)'s analysis is that the clausal complementation is done by substitution, not adjoining. Substitution is used because the definition of multi-component TAG requires it. The derivation of (12b) just described uses a multi-component set (15b) in which one component (the VP component) substitutes in, while the other (the clitic) adjoins in. This is the scheme shown in (B) in Figure 3. If instead clausal complementation was done by adjoining, with the higher clause adjoining at the VP root of the lower *comer* tree, with the *las* tree adjoining into that higher clause, that would be the illegal scheme shown in (C) in Figure 3.

While clausal complementation can be done in TAG either by adjoining or substitution, adjoining must be used when part of the lower clause ends up in the higher clause, either through *wh*-movement or raising. This is because adjoining, but not substitution, allows the necessary 'stretching apart' of components of a tree. Bleam (1994)'s analysis, with the standard definition of TL-MCTAG, therefore makes the prediction that clitic climbing is impossible when the higher clause must adjoin, not substitute, and so clitic climbing should not occur when the higher verb is a raising verb.

(17) a. Luis suele comer*las*
b. Luis *las* suele comer
Luis them tends to eat
'Luis tends to eat them'

To see why this is the case, consider sentence (17b), which shows a clitic climbing to a higher trigger verb which is also a raising verb (Aissen and

[10]An issue raised by this analysis is the status of PRO in the complement, which is obscured by the fact that [Spec, VP] is not shown, although presumably PRO should be there. This problem is not unique to the Bleam (1994)'s TAG analysis, since every analysis taking a VP complement must say something concerning this. We return to this issue later.

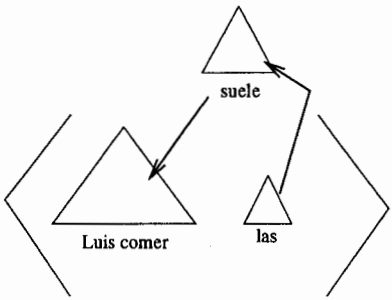
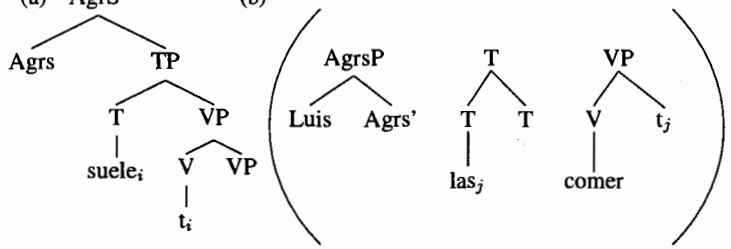


Figure 4: Clitic-Climbing with a Raising Verb

(18) (a) AgrS' (b)

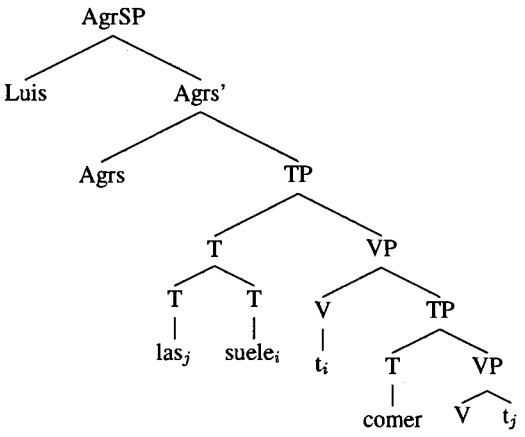


Perlmutter (1983)). Since *suele* allows clitic-climbing, it is presumably taking a VP complement in (17b). But since it is also a raising verb, the subject of the sentence, *Luis*, is part of the *comer* tree (or tree set). Without worrying here about the details of where exactly *suele* might be adjoining, the derivation would be as roughly illustrated in Figure 4. As the figure shows, *comer* and *las* are part of a multicomponent tree set, and *las* adjoins into the raising verb, *suele*, which is itself adjoining into the other component of the tree set, *Luis comer*.

However, this is exactly the derivation structure which is ruled out by tree-local multi-component TAG, as in Figure 3C. Therefore, Bleam (1994)'s analysis, using tree-local multi-component TAG, predicts that such a case will not occur, although in fact cases such as (17b) are indeed acceptable (the same is true for Italian).

One possibility which seems reasonable is that the derivation could be handled by using a tree set for the *comer* clause as in (18b). The derivation would proceed by the *comer* component of (18b) substituting into the VP node

(19)



of (18a), while the *las* component of (18b) adjoins at the T node of (18a), with the AgrS' component of (18b) fitting 'on top' of (18a), resulting in (19). This last step is however again a technical difficulty for TAG.

However, the intuition behind this approach is essentially correct, we think, and the rest of the paper can be viewed as working out of this intuition, and linking it to other problems that have been identified for basic TAG.

An examination of this example also points out an interesting issue concerning the idea of trigger verbs taking 'defective complements'. Consider again example (17b). By Bleam (1994)'s analysis, the clitic climbs when the lower clause is defective, missing a tense projection. However, while it is missing the tense projection in (17b), it must at the same time also have a [Spec, AgrSP] projection. If the VP projection substitutes into the higher tree, then it must be the root of the tree that gets substituted in, and so the AgrSP projection with *Luis* would have to be a separate tree in a tree set, perhaps an undesirable move. For example, this is the case in (18b), but the need to represent the AgrSP projection as a separate tree is clearly an artifact of the handling of clitic-climbing, and it would be more desirable to represent the AgrSP projection in the same way as in other clauses.

The same issues arise for the case of clitic climbing with wh-movement, the other case which requires clausal complementation by adjoining. To test this case, we need a case of a clitic climbing to a higher verb, while another argument is extracted. This cannot be tested with a lower verb that takes only one argument, since if that argument is cliticized, then it cannot also be extracted as a wh-phrase. However, it can be tested with a lower verb that takes

two NP arguments, as in the following examples:

(20) a. Juan quiere mostrar*telos*
Juan wants to show them to you
b. Juan *telos* quiere mostrar

(21) a. Que quiere mostrar*te* Juan
What want to-show-to-you Juan
'What did Juan want to show to you?'
b. Que *te* quiere mostrar Juan

(22) a. A quien quiere mostrar*los* Juan
To-whom want to-show-them Juan
'To whom did Juan want to show them?'
b. A quien *los* quiere mostrar Juan

(20a) has a lower verb with two argument clitics, and both can climb to the higher verb, as shown in (20b). The object argument can be wh-moved, as shown in (21a), and, crucially, even with this extraction the dative clitic can climb to the higher verb (21b). This last sentence is therefore a problem for Bleam (1994)'s analysis. Similarly, the accusative clitic can climb to the higher verb, while the indirect-object is wh-moved, as in (22ab).[11] Note that in (21) and (22), in which the complement is supposedly 'defective', it seems to project up to a [Spec, CP] position.

We are therefore left with two related problems:

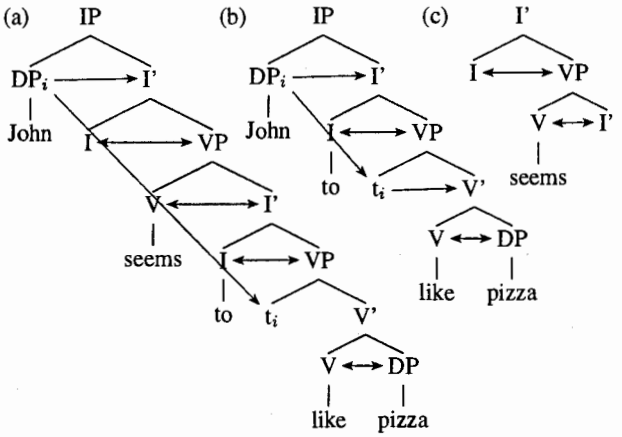
- There are cases in which the 'defective complement' has material (such as the subject or wh-item) which ends up above the root of the higher clause. This causes a problem for the definition of TL-MCTAG.
- What does it mean for the complement to be 'defective', if in fact it does project higher up, to include a subject or wh-item?

[11]An analogous point for multi-component TAG and long distance scrambling in German with extraction was made earlier by Rambow (1994).

Also, the same is true for the analogous Italian examples:

(i) a. Piero voleva spedir*melo*
Piero wanted to send it to me
b. Piero *melo* voleva spedir
c. Cosa voleva spedir*mi*
what he wanted to send to me
What did he want to send to me?
d. Cosa *mi* voleva spedire?

(24)



5 TAG Derivation as C-command

In this section we give a brief summary of the approach to TAG derivations taken in Frank and Vijay-Shanker (1998), Frank et al. (1999). This approach argues for a reconceptualization of the TAG formalism, in which the elementary structures are collections of c-command relations, and the sole combinatory operation is substitution, with adjoining eliminated. Here we give an illustration of how this approach solves one problem for TAG, and in the next section we discuss how this same approach solves some of the problems presented by the data in the previous section.

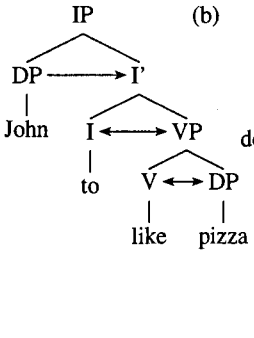
A TAG elementary tree is viewed as a collection of c-command relations determined by (at least) the following principles (cf. the definitions in Kayne (1994)):

(23) a. A moved element c-commands its trace
b. A head and its complement c-command one another
c. A modifier c-commands the phrase it modifies
d. A specifier c-commands the phrase to which it attaches

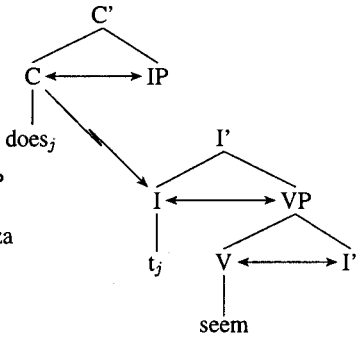
For example, the raising case (11) is reinterpreted by viewing the elementary trees (11a-c) as the collections of c-command relations (24a-c), where the arrows indicate the c-command relations.[12]

[12]The lines indicating direct domination are not intended as part of the representation, but rather as an aid to the reader in comparing the proposed structure to that

(26) (a)



(b)



The derivation is a monotonic combination of the c-command relations, and proceeds by substituting the I' node of (24b) into the bottom I' node of (24c) (the *substitution node*). Maintaining the c-command relations results in (24a). One way to view this use of substitution is that *to like pizza* substitutes into the *seems* tree, with *John* 'floating' up to its final resting place.

5.1 Solving a Long-standing Problem for TAG

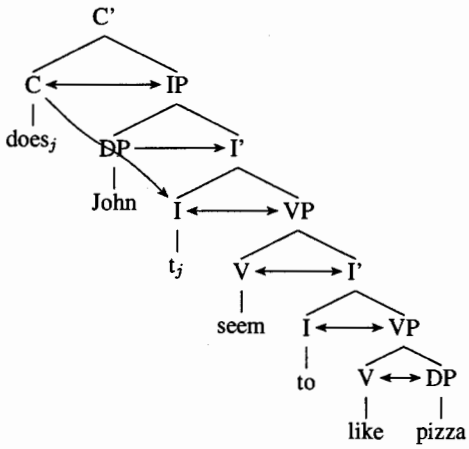
(25) Does John seem to like pizza?

One long-standing problem for TAG has been the interaction of raising and subject-auxiliary inversion, as in (25). By the CETM, *does* should originate in the same elementary tree as *seem.* However, since the raising auxiliary tree adjoins to the I' node, there is no way to include the auxiliary verb *does* within the *seems* tree so that it ends up in a position preceding the subject DP in the final sentence. That is, adjoining at I' 'stretches' *John* away from the *to like pizza*, but without allowing the 'interleaving' necessary to form (25).[13] The c-command approach allows a resolution of this problem, by using the

standardly assumed. Certain implicit c-command relations, such as that between I and subconstituents of VP, are suppressed in this figure, but are assumed to be present. See Frank and Vijay-Shanker (1998) for extensive discussion of the properties of structures defined in terms of c-command and the relationship between such structures and those defined in terms of dominance.

[13]It may be possible to handle this *do*-support example by other means, such as treating the auxiliary and raising verbs as separate trees, not members of a tree set. However, the same problem extends to examples of raising/*wh* interaction such as (ib), in which the experiencer of *seems* is extracted to the [Spec, CP] position. Here there is

(27)



collections of c-command relations in (26ab). The structure for *like* in (26a) is the same as (24b). For the *does/seem* structure in (26b), however, *does* is shown as having raised to the C node, which therefore c-commands the I node.[14]

The derivation proceeds by substituting the I' node of (26a) into the bot-

---

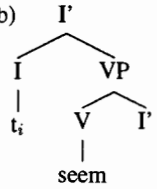
no choice but to say that *to whom* and *seem* in (ib) are members of the same elementary structure, whether a tree set or a set of c-command relations. The solution argued for here for (25) also extends to (ib).

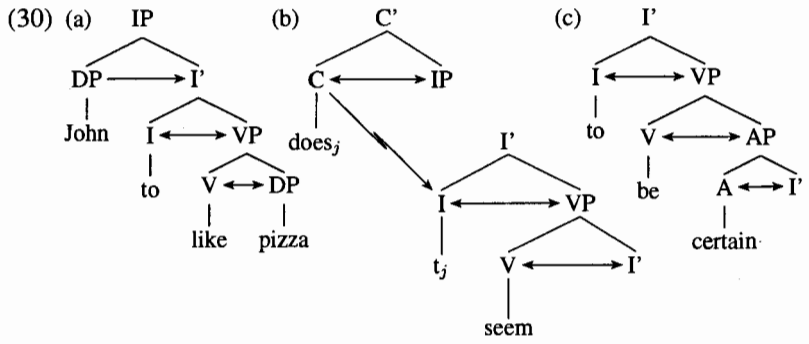
(i) a. John seems to Bill to be crazy
b. To whom$_i$ does John seem t$_i$ to be crazy

[14]Frank (1992) had previously proposed utilizing TL-MCTAG to solve this problem, using the tree set in (i). The c-command approach allows a cleaner representation of this solution.

(i) (a)

(b)





tom I' node of (26b). In the resulting structure, the *does* and *John* fragments must both c-command I', and so (27) is consistent with maintaining the c-command relations, and gives the desired derivation.

However, the substitution of *to like pizza* into the lower I' node of *seems* does not in fact fully determine the result shown in (27). The relative c-command relation of *does* and *John* is not determined—all that is known is that they both must c-command the I' node headed by the trace of *does*. However, if the IP that is the complement of the C node headed by *does* is the same as the IP parent of *John*, then the result must be as shown, with the inversion forced. The intuition is that there cannot be two IP nodes among the 'floating' components, where the *John* and *does* segments can be considered 'floating'. Condition (28) was therefore proposed in Frank et al. (1999), with a precise characterization of 'floating components' left open.

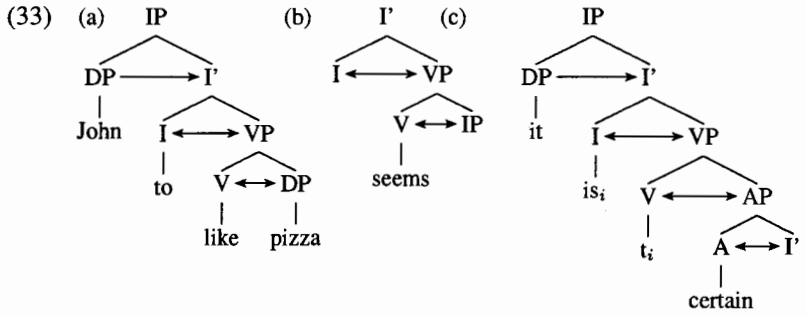
(28) Derivational CETM: The floating components of a derivation may constitute exactly one extended projection.

5.2 Unboundedness

Certain issues arise when multiple levels of embedding are considered, as in (29). The elementary structure headed by *certain* would be (30c), with the *like* and *does/seem* structures in (30ab) the same as before.

(29) Does John seem to be certain to like pizza?

There are a number of ways this derivation could proceed. For example, (30b) and (30c) could combine first, or (30a) and (30b) could combine



first. Only one of these derivations was allowed in Frank et al. (1999), by the proposed condition on derivations (31):

(31) The structure containing the substitution node must be elementary (that is, not the product of a derivation).

With this constraint, the derivation must proceed by substituting the I' node of (30a) into the bottom I' node of (30c), resulting in a structure for *John to be certain to like pizza*. The final step in the derivation substitutes the upper I' node from this structure (*to be certain to like pizza*) into the bottom I' node of (30b), resulting in the desired derivation. This derivation can be viewed as allowing *John* to 'float up' past the *certain* and *seem* clauses.

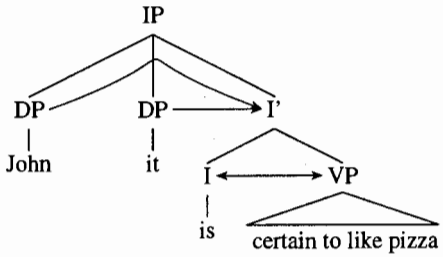
5.3 Locality Constraints

As just described, the recharacterization of TAG as c-command relations allows components of an elementary structure to be viewed as 'floating' up through the derivation. It is important, however, that such such components not be allowed to float 'too far'. For example, consider a 'superraising' case, as in (32).

(32) * John seems it is certain to like pizza

The derivation could proceed by substituting the I' node of (26a), repeated here as (33a), into the bottom foot node of (33c), allowing *John* to 'float up'. At this point in the derivation, there will be two floating items, both specifiers for IP (*John* and *it*), with no c-command relations between them. The derivational CETM therefore applies, forcing these two IP nodes be identified, since

(34)



otherwise it would constitute two distinct extended projections. The resulting structure is therefore as shown in (34).

John is prevented from floating too far by the application of the derivational CETM, which forces the IP node of *John* to be identified with the IP node of *it*, thus causing an illegal configuration.[15]

6 Fixing the Problems

6.1 The Basic Case: Optional Clitic Climbing with One Trigger Verb

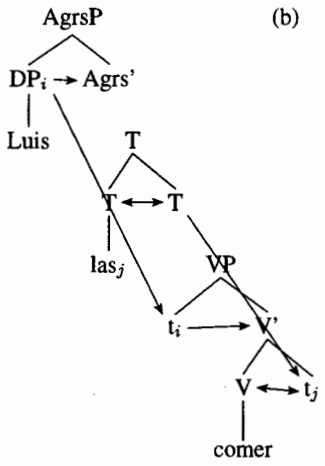
Adopting the TAG-as-c-command approach described in the previous section allows the derivation of the problematic cases, as we illustrate with the raising case (17b), repeated here as (35b).

(35) a. Luis suele comer*las*
b. Luis *las* suele comer
Luis them tends to eat
'Luis tends to eat them'

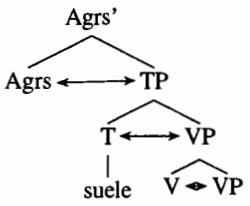
A possible derivation is shown in (36). The structure for the *comer* clause is shown in (36a). The subject, *Luis*, has moved to [Spec, AgrsP], and thus must c-command [Spec, VP], as shown, although the TP projection is not projected in (36a). The clitic *las* is shown as having moved from the object position, and thus must c-command its trace. In addition, the representation shows that it must adjoin to a T projection, although there isn't one in the *comer* clause (and so also the verb stays at the V node). The raising verb

[15]There are different ways of ruling this an illegal configuration, although the most obvious are a violation of the extended projection principle or of lack of Case for both NPs.

(36) (a)



(b)



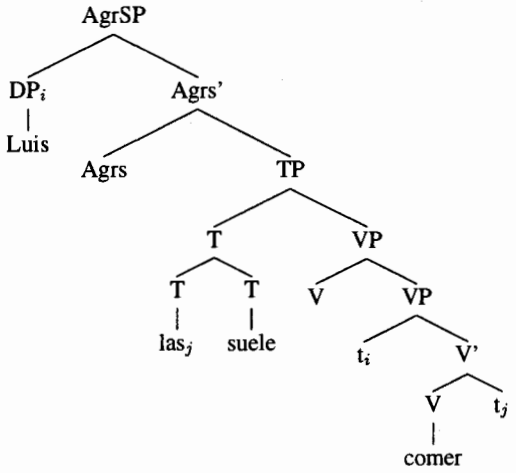
takes a VP complement, as in (36b).[16] The derivation proceeds by the VP node of (36a) substituting into the bottom VP node of (36b). Maintaining the c-command relations gives the result in (37), with *las* attached to the T node for *suele*, as desired. To avoid clutter, we have not explicitly shown the c-command relations in (37).

This derivation maintains the basic idea of Bleam (1994)'s approach, in which the trigger verb can optionally take a VP complement, getting the clitic when it does so. The use of substitution together with identification of the 'floating components' solves the problem of how the *comer* clause projects 'up to' AgrsP without including a TP projection, by using the c-command relations to allow *Luis* to raise to [Spec, AgrsP], without TP being specified at all, while still allowing substitution of the VP node into the *suele* clause.

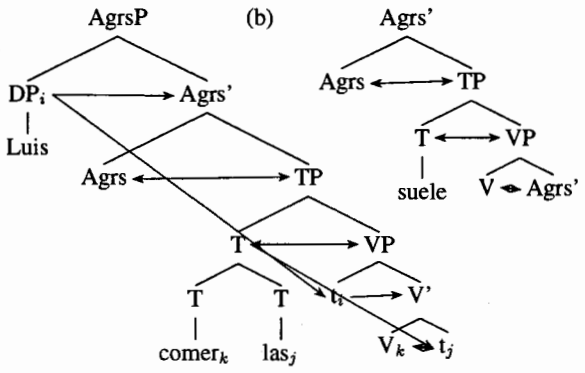
Before discussing further the issues raised by this approach, we illustrate the derivation with no clitic climbing. The tree for the lower clause in the case of no clitic climbing is shown in (38a). In this case, the lower clause projects the tense projection, the verb moves to the T node, and the clitic attaches. We assume that the trigger raising verb takes an AgrS' foot node, as in (38b), when there is no clitic climbing. The derivation proceeds by the AgrS' node of (38a) substituting into the bottom AgrS' node of (38b), resulting in (39).

[16]Since the *suele* clause does not select for a subject, neither [Spec, TP] nor [Spec, VP] are projected. Thus, there is no difference between TP and T', or VP and V', and so the intermediate projections have been eliminated.

(37)


AgrSP
DP$_i$
Agrs'
Luis
Agrs
TP
T
VP
T
T
V
VP
las$_j$
suele
t$_i$
V'
V
t$_j$
comer

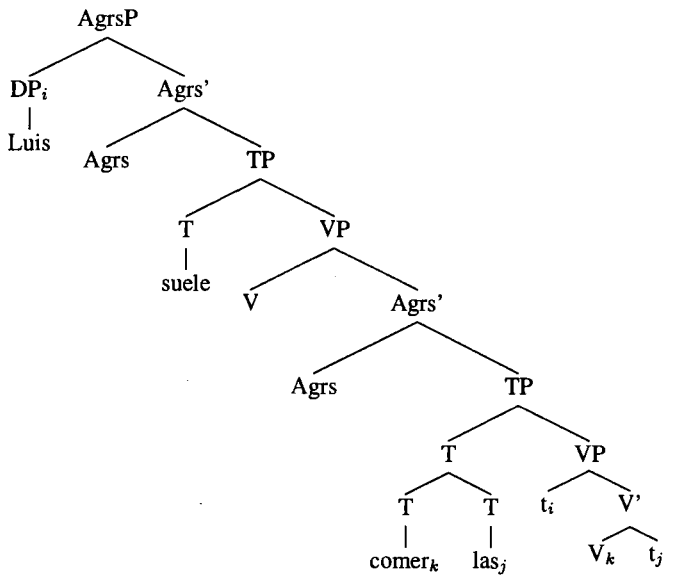
(38) (a)


AgrsP
DP$_i$
Agrs'
Luis
Agrs
TP
T
VP
T
T
t$_i$
V'
comer$_k$
las$_j$
V$_k$
t$_j$

(b)

Agrs'
Agrs
TP
T
VP
suele
V
Agrs'

(39)



6.2 Handling the Unboundedness of Clitic Climbing

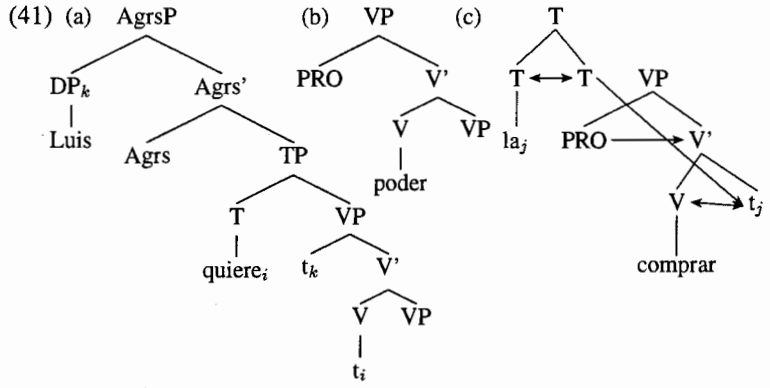
For a somewhat more complicated example, consider how the unboundedness of clitic climbing can be accounted for. Sentence (8), repeated here as (40), is a case of a clitic climbing over two trigger verbs, *quiere* and *poder*. Both of these trigger verbs are control verbs,[17] and so the structure of the derivation is somewhat different from that with the the raising trigger verb *suele*.

(40) Juan *la* quiere poder comprar
Juan it wants to be able to buy
'Juan wants to be able to buy it'

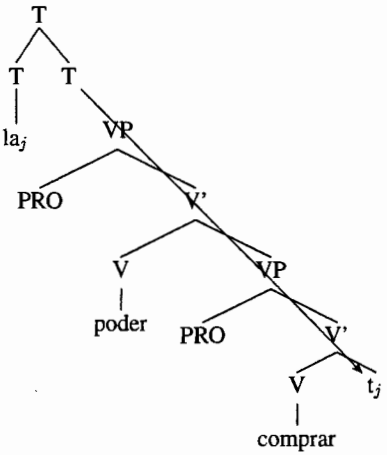
Just as in Bleam (1994)'s analysis, *quiere* (41a) heads a clause that is taking a VP complement. The clauses for *poder* (41b) and *comprar* (41c) both project to VP, thus forcing the clitic to climb.

Following the restriction (31) on derivations discussed earlier, the derivation proceeds by substituting the VP node of (41c) into the bottom VP node of

[17] Actually, it's not so clear that *poder* is a control verb, and there is also some evidence that in Spanish *quiere* should be treated as a raising verb. We leave this issue aside for now, and assume that these are control verbs.



(42)



(41b), resulting in (42).

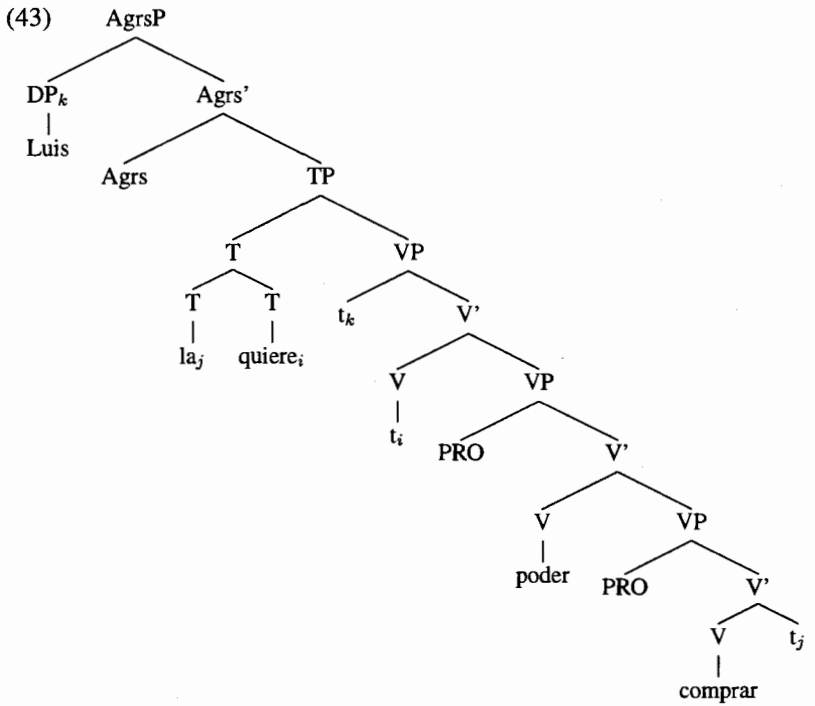
Since there is no T projection in (42), the clitic is left 'floating'. The top VP node of (42) is then substituted into the bottom VP node of (41a), resulting in (43), with the clitic then able to attach to the T node of the *quiere* clause.

6.3 Floating Components and Identified Extended Projections

Recall that in the c-command approach, a 'Derivational CETM' (DCETM) (28) was put forward as a way to control the movement of the 'floating' components, while leaving vague the definition of the floating components, although the intuitive sense was hopefully apparent. The DCETM was shown in Section 5 to have two effects in the examples discussed there:

- In the derivation (26) of *Does John seem to like pizza?*, after *to like pizza*

(43)



substitutes into *seems*, the two floating components are *John* and *does*, both of which refer to an IP projection. By the DCETM, the two IP projections must be identified, thereby fixing the order of *does* and *John*.

- In the potential derivation (33) of the unacceptable super-raising case (32), after *is certain* and *to like pizza* combine, *John* and *it* are the two floating components. Since they both refer to an IP projection (both being specifiers of IP), and both are 'floating', by the DCETM they must both be specifiers of the same IP, resulting in the invalid (for independent reasons) structure (34).

As the super-raising case in particular shows, these conditions on attachment are very reminiscent of the 'shortest move' type of restrictions from work in the Minimalist framework. The clitics in effect need to attach to a T node as soon as there is a T node to attach to, just as the floating *John* had to attach to an IP node as soon as one was available in the derivation of the superraising

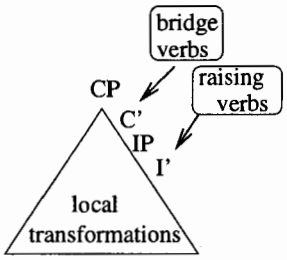


Figure 5: Capturing Different Types of Inter-Clausal Movement in TAG

case (32), thus preventing it from floating 'too far'. It would be disappointing, however, if such a 'shortest move' restriction had to be imposed in a TAG framework, since one of the claims of work in this framework (e.g., Frank and Kroch (1995)), is that by utilizing clause-sized elementary structures instead of the single-level items taken from the 'numeration', such stipulations as 'shortest move' can be eliminated. It is therefore quite nice that the DCETM, by 'identifying' the nodes of the 'floating' components, accomplishes the same effect (at least in the examples under discussion here).

While there are different ways that one might characterize the 'floating elements', in the next section I will suggest that by reintroducing the crucial place of recursive structures in the framework, we can give a relatively simple characterization of 'floating components', one that is completely natural for the TAG approach. We also discuss how this accounts for further locality issues with clitic climbing.

7 Recursive Structures and 'Floating Elements'

Consider again how wh-movement and subject-to-subject raising are handled in TAG, as discussed in Section 3. The bridge verbs adjoin in as C' recursive structures. Since the *wh*-moved items are at [Spec, CP], they are high enough to be 'stretched away' by the bridge verb adjoining in. Similarly, subjects in [Spec, IP] get 'stretched away' by the raising verb adjoining in as an I' recursive structure. Since the raising verb adjoins low, the subject doesn't have to move as high as the *wh*-item.[18] Although these standard examples of

[18]Indeed, aside from [Spec, VP] to [Spec, IP], if the VP-internal-subject-hypothesis is adopted, it doesn't have to move at all.

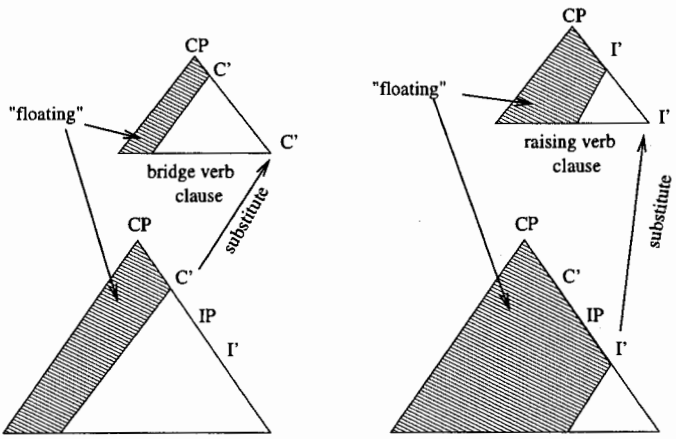


Figure 6: Inter-Clausal Movement in TAG, Revised

A' and A inter-clausal movement have quite different properties, in TAG they are handled by the same mechanism, adjoining, with the differences in their properties arising from the different loci of adjoining. The picture therefore looks roughly like that in Figure 5, which illustrates the schema of the bridge and raising verbs adjoining in.

However, the discussion of the *does/seem* case (25) shows that even for the raising case, this picture is not fully accurate. The higher clause *seems* does not consist only of a recursive I' structure, but also of some structure above the I' node, namely *does*. This suggests a way to characterize what the 'floating elements' are in the c-command recharacterization of TAG. While space prevents going into the technical details, the basic idea is to bring back into this framework the fundamental place of recursive structures.

A review of the examples discussed so far shows that in cases of 'floating elements', the higher clause (that the lower clause substitutes into) has a recursive component, and additional elements that c-command the top of that recursive component that are subject to the DCETM. The elements that c-command the substitution site in the lower clause are also subject to the DCETM.

For example, the *does...seem* clause (26b) for *Does John seem to like pizza* (25) has an I'-recursive component. The element c-commanding the recursive part of the *seems* clause (that is, *does*) is considered 'floating' and subject to the DCETM. The element c-commanding the substitution site I' in the *like* clause (26a) is also considered 'floating' and subject to the DCETM.

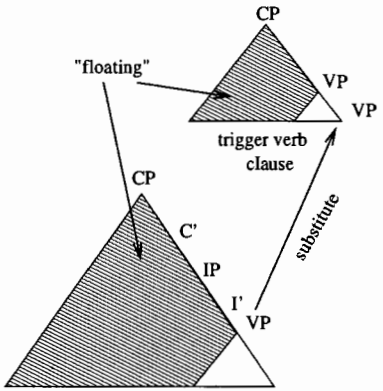


Figure 7: Trigger (Clitic-Climbing) Verbs

The DCETM causes The IP nodes for these two floating elements to be identified. The 'floating' components are therefore the part of the higher clause that c-commands the higher recursive node, and the part of the lower clause that c-commands the node that gets substituted into the higher clause. Similarly, for the superraising case (32), the *it is certain* clause (33c) has an I' recursive part, with only *it* c-commanding the recursive part, and so *it* was considered one of the 'floating' elements.

The revised picture is shown in Figure 6. Note that the importance of the 'floating' component of the higher clause is obscured by looking at the bridge verb case because there is no room for any structure above the C' node to be floating, because all that's left is the [Spec, CP] node. The importance of the *does/seem* case is that shows how there must be stuff above the recursive component that 'merges' in.

There may in fact be some advantages in redefining the notion of derivation to explicitly use the notion of adjoining plus 'identifying' the nodes in the floating components, although that cannot be discussed here. While the exact details of how those floating components are unified can be handled in a number of different ways, the important point is the overall structure of the derivation, and how the 'Derivational CETM' results in the desired constraints on movement.

7.1 Clitics and Locality

Now, consider again the place of clitic climbing with the 'trigger verbs' in this context. A look at the derivations in the previous section shows that they all have a VP recursive part, with some (but not all), having additional material above. So along with the 'defective complements' for raising and bridge verbs with the corresponding 'floating material', we have the picture in Figure 7.

For example, in the derivation for *Luis suele las comer* (36), the *suele* clause (36b) has a VP recursive component into which substitutes the VP node of the *Luis las comer* clause (36a). In order for the clitic to be 'floating', it just has to be specified that T c-commands not only the trace of the clitic, but also the VP node as well. Similarly, *Luis* in (36a) must be 'floating' as well, since it c-commands the substitution site, VP. In (36b), all the material c-commanding the VP recursive structure is 'floating'; namely, Agrs and *suele*, as desired. The identification of nodes in the floating components gives the desired result. In the case without clitic climbing (38a), since the higher clause is simply an Agrs' recursive structure, the locus of substitution, Agrs', c-commands the clitic, and so the clitic is not floating.[19]

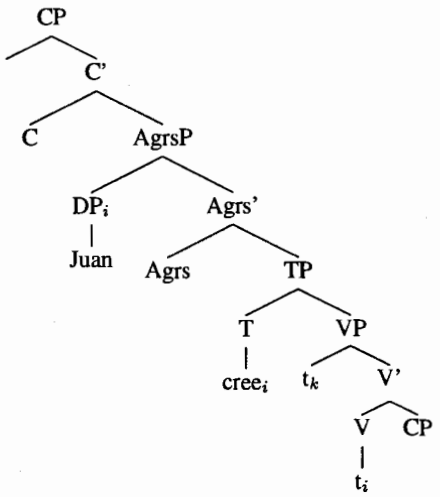
(44) a. Juan cree que Luis quiere comprar*la*
Juan believes that Luis wants to buy it
Juan believes that Luis wants to buy it
b. Juan cree que Luis *la* quiere comprar
c. * Juan *la* cree que Luis quiere comprar

We now consider some issues regarding how far the clitics can 'float', and how it is handled by the scheme just discussed. While the derivation in the previous section allows the clitic to 'float' up to derive the clitic-climbing case, we do not want to allow the clitic to float 'too far'. For example, suppose that *las* in (37) does not attach to *suele*, but rather remains 'floating'. It could then continue to float up to a higher clause, perhaps one headed by non-trigger verb, which would not be acceptable. A case of this type is (44c), in which the clitic *la* has moved past the *quiere* clause.

Consider first the derivation of the acceptable (44b). Since the clitic climbs to the *quiere* clause, this means that the *quiere* clause takes a VP complement. The *quiere* clause, (46a), is therefore the same as (41a), except that it also includes a CP node with *que* in the complementizer position. The *cree* clause (45) of course takes a CP complement.

[19] Also, if in (38a) the clitic and verb are in a mutual c-command relation, then the clitic could not move up without disrupting the c-command relations, thus violating the required monotonicity of the derivation.

(45)



The derivation proceeds by substituting the VP node of (46b) into the lower VP node of (46a). The 'floating components' are therefore the clitic in (46b) and the structure c-commanding the higher VP in (46a). The T nodes of *quiere* and *la* are therefore identified, resulting in structure (47). Then (47) substitutes into the CP node of (45). Since there is no structure c-commanding the CP node of (47), there is no material to 'float', and the clitic cannot climb any further, and so (44b) cannot be derived.

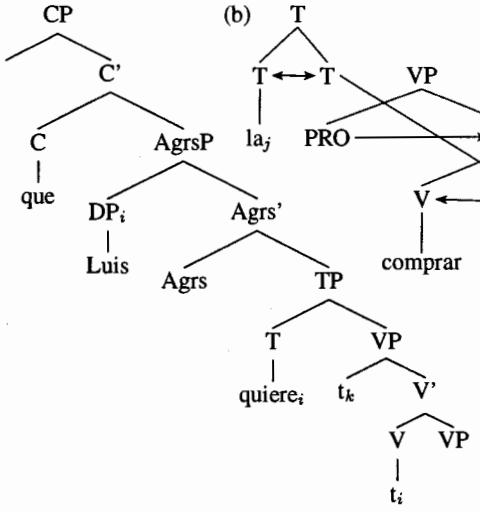
7.2 Intersecting Clitic Climbing

One interesting case of restrictions on clitic movement is what Aissen and Perlmutter (1983) referred to as 'intersecting clitic climbing'. In all of the examples discussed so far, the trigger verbs are either raising or subject-control verbs. In Spanish, however, there are also some object-control verbs which allow clitic climbing, such as *permitir*, as in (48ab).[20]

(48) a. Juan le permitió arreglar*la* (a Pedro)
Juan allowed Pedro to repair it
b. Juan se *la* permitió arreglar (a Pedro)

[20]The *le* clitic in (48a) is changed to *se* when it appears with *la*, the 'spurious-*se*' rule. This does not matter for our purposes here.

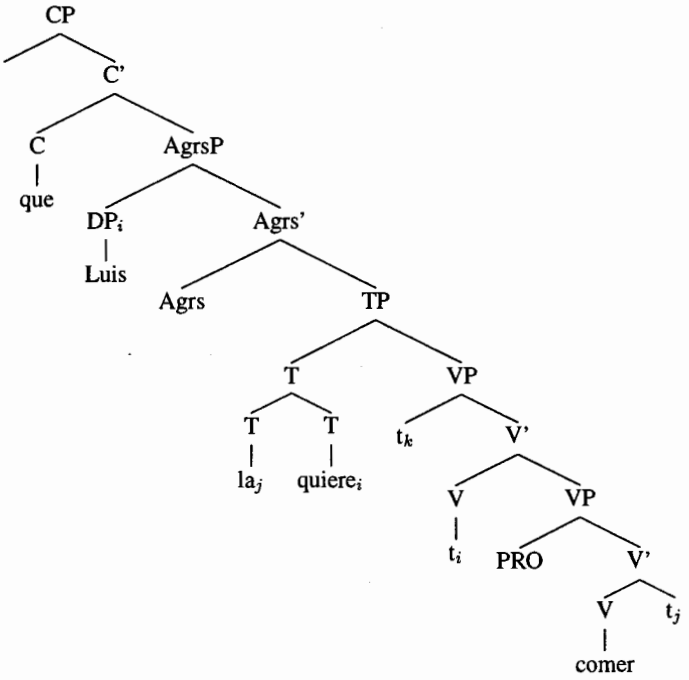
(46) (a)


CP
C'
C
que
AgrsP
DP$_i$
Luis
Agrs'
Agrs
TP
T
quiere$_i$
VP
t$_k$
V'
V
VP
t$_i$

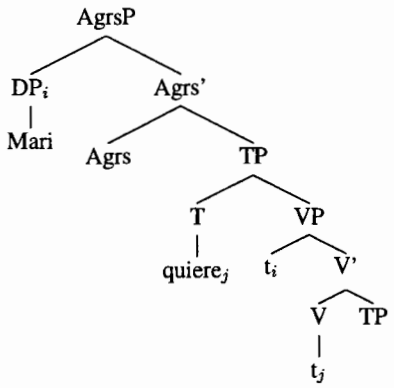
(b)

T
T
T
la$_j$
VP
PRO
V'
V
t$_j$
comprar

(47)


CP
C'
C
que
AgrsP
DP$_i$
Luis
Agrs'
Agrs
TP
T
VP
T
T
la$_j$
quiere$_i$
t$_k$
V'
V
VP
t$_i$
PRO
V'
V
t$_j$
comer

(50)



(49) a. Mari quiere [permitir *te* [ver *lo*]]
Mari wants [to permit you [to see it]]
'Mari wants to permit you to see it'
NOM1 V1 [V2 DAT2 [V3 ACC3]]

b. Mari quiere [permitir *te* *lo*$_j$ [ver t$_j$]]
NOM1 V1 [V2 DAT2 ACC3$_j$ [V3 t$_j$]]

c. Mari *te*$_i$ *lo*$_j$ quiere [permitir t$_i$ [ver t$_j$]]
NOM1 DAT2$_i$ ACC3$_j$ V1 [V2 t$_i$ [V3 t$_j$]]

d. * Mari *te*$_i$ quiere [permitir t$_i$ *lo*$_j$ [ver t$_j$]]
NOM1 DAT2$_i$ V1 [V2 t$_i$ ACC3$_j$ [V3 t$_j$]]

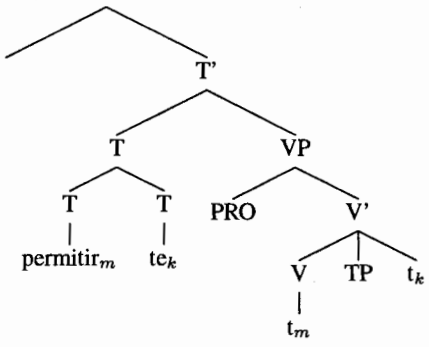
e. * Mari *lo*$_j$ quiere [permitir *te* [ver t$_j$]]
NOM1 ACC3$_j$ V1 [V2 DAT2 [V3 t$_j$]]

Things get interesting when there are two trigger verbs, one a control verb, such as *quiere*, and one a verb such as *permitir*, as in (49).[21] It is possible for a clitic from the *permitir* clause and one from the lowest clause to both climb all the way to the highest clause, as in (49c). It is also possible for the clitic from the lowest clause to climb to the middle clause, as in (49b). However, when this is done the clitics appear to be 'stuck together'.[22] It is not possible for the lowest clitic to climb over the middle one, as in (49e), nor for the clitic from the middle clause to climb to the higher clause while the one from the lowest clause climbs to the middle clause, as in (49d).

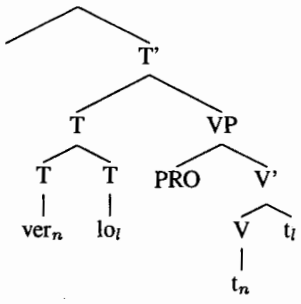
[21]The bottom lines are meant to help illustrate the pattern—NOM1 refers to the nominative argument of the first (highest) verb, etc. Also, the clitics have been written separately from the infinitival verb to better show what has moved where.

[22]Bleam (1994) referred to this as a 'bandwagon' effect.

(51) (a)



(b)



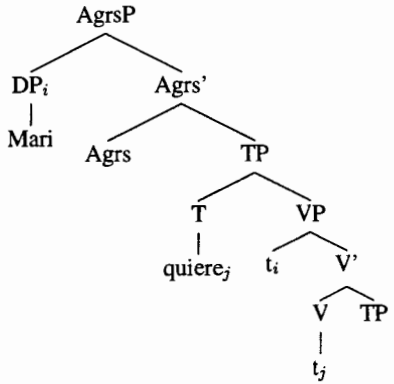
We now show how this falls out of the structure of a derivation as discussed so far. The case with no clitic climbing, (49a), is straightforward. Both *quiere* and *permitir* take complements that are 'bigger' than just VP projections. Most likely these are CP projections, but to avoid clutter we will just show them as TP projections, although it doesn't matter for present purposes. The point is that the complement is 'non-defective'-enough so that the clitics do not climb. To derive (49a), therefore, the structures in (50) and (51) are used, with (51b) substituting into (51a), with the result substituting into (50).

To derive (49b), the *ver* clause must be a VP, so that the clitic is forced to climb. At the same time, the clitic *te* from the *permitir* clause does not climb, and so the *permitir* clause is a TP clause. Therefore the structures in (52) and (53) are used. The VP node of (53b) substitutes into the bottom VP node of (53a). At that point the *lo* clitic and the structure above the higher VP node in (53a) are 'unified'—that is, the T nodes are identified, and so the clitic structure *lo* must attach to the *te permitir* structure. The clitics are both now 'stuck' on *permitir*.

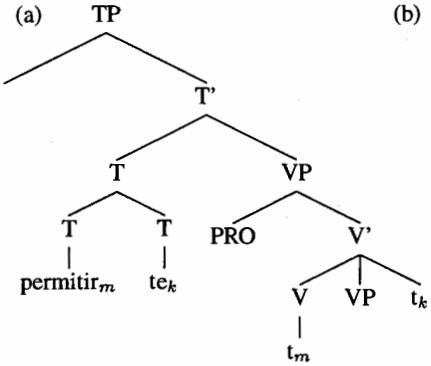
Similarly, to derive (49c), the structures in (54) and (55) are used, in which both *permitir* and *ver* project only to VP. As is hopefully clear, this forces both clitics to climb to the *quiere* clause.

Now consider the unacceptable cases (49de). For (49d), since *te* climbs from the *permitir* to the *quiere* clause, then the *permitir* clause must project only to VP, with *quiere* taking a VP complement. Since *lo* climbs from the *ver* clause to the *permitir* clause, it must project only to VP, and the *permitir* clause takes a VP complement. But then this are the same structures as used to derive (49c), and so (49d) cannot be derived.

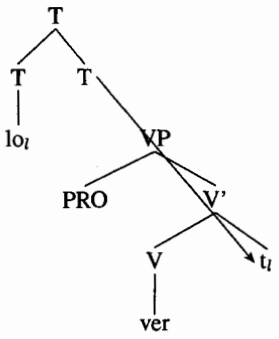
(52)


AgrsP
DP$_i$
Agrs'
Mari
Agrs
TP
T
VP
quiere$_j$
t$_i$
V'
V
TP
t$_j$

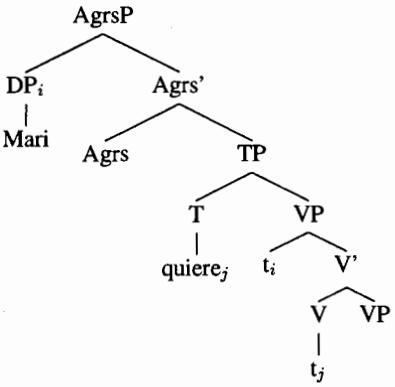
(53) (a)


TP
T'
T
VP
T
T
PRO
V'
permitir$_m$
te$_k$
V
VP
t$_k$
t$_m$

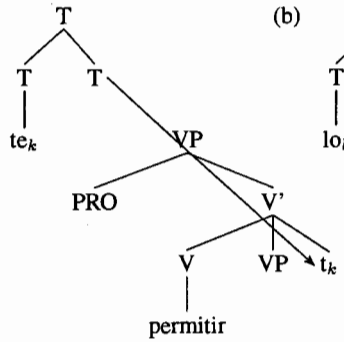
(b)


T
T
T
lo$_l$
VP
PRO
V'
V
t$_l$
ver

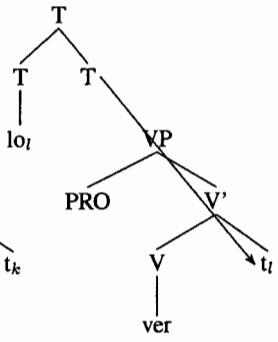
(54)


AgrsP
DP$_i$
Agrs'
Mari
Agrs
TP
T
VP
quiere$_j$
t$_i$
V'
V
VP
t$_j$

(55) (a)



(b)



For (49e), since *te* does not climb out of the *permitir* clause, the *permitir* clause must project higher than VP, TP in this example. Since *lo* climbs out of the *ver* clause, the latter must only project to VP. Therefore the *permitir* clause is (53a), and the *ver* clause is (53b)). These are the same structures used to derive (49b), and so (49e) cannot be derived. Once the VP node of (53b) substitutes into the bottom VP node of (53a), the T nodes are 'identified', and *lo* is attached to *permitir te*.[23]

In short, the use of the Derivational CETM, forcing the 'floating components' to be identified, allows the desired locality constraints to be preserved. Again, it is accomplishing the same effect as a 'shortest move' type constraint.[24]

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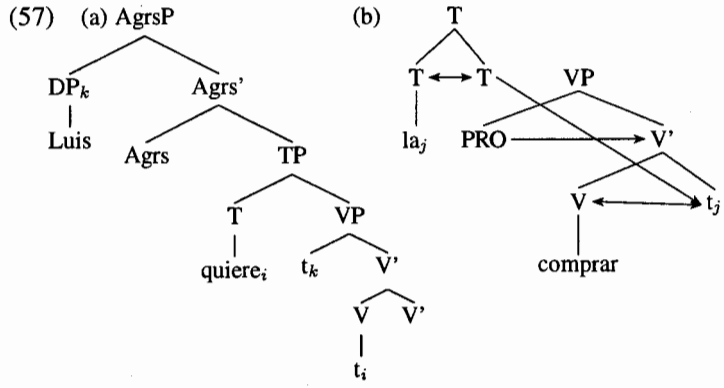
[23]For space reasons, we have left out one additional case, (i), in which the middle clitic climbs to the highest clause, while the lowest clitic remains with the lowest clause.

(i) Mari *te*$_i$ quiere [permitir t$_i$ [ver *lo*]]
NOM1 DAT2$_i$ V1 [V2 t$_i$ [V3 ACC3]]

This is acceptable, and can be derived without a problem. The *quiere* clause takes a VP complement, forcing *te* to climb up, and so the structures (54) is used for the *quiere* clause. The permitir clause takes a structure like (55a), but with the difference that its complement is TP, not VP. Therefore the clause for *ver* is (51b), and *lo* stays in the *ver* clause.

[24]Space prevents further discussion here, but Bleam (1994) used the locality properties of the TAG variant called 'set-local TAG' to derive the unacceptability of the violations of (d) and (e). The fact that the the system described here accomplishes the same result suggests that the crucial issue has not the particular features of set-local TAG, but rather the typology of the trees, as long as the derivational machinery can take advantage of their properties.



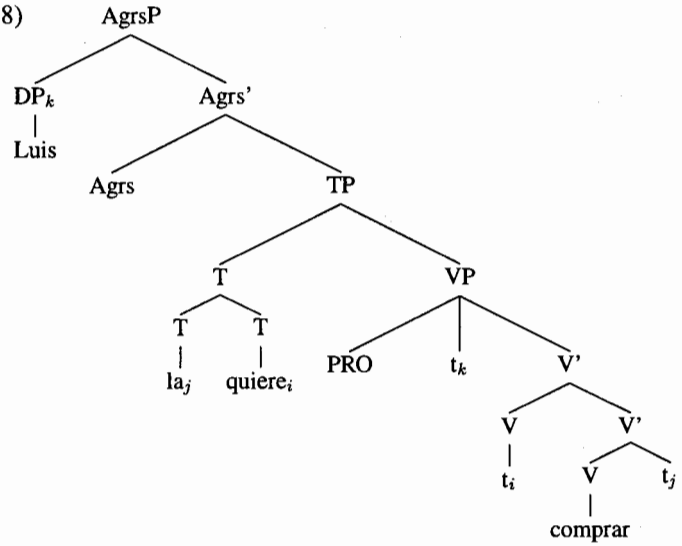
(56) Luis *la* quiere comprar
Luis it wants to buy
'Luis wants to buy it'

We end with a brief comment on the problem of licensing PRO in the VP complement. The use of 'identifying' the floating elements allows for what may be an interesting approach to this problem. Suppose that in a sentence such as (56), *quiere* takes a V', not a VP, complement, shown in (57a), although the complement clause (57b) is still a VP clause. The difference now is that the V', not the VP, node of (57b) substitutes into (57a) at its bottom V' node. Now all the material that c-commands V' in (57b), namely the PRO specifier of VP and the clitic, and the material that c-commands the higher V' node in (57a) are subject to the DCETM. This has the effect of making both PRO from the *comprar* clause and the t_k trace of the subject from the *quiere* clause both be specifiers of the same VP, resulting in (58).

This is the same situation as in the superraising case (34), except that there it was multiple IP specifiers, rather than multiple VP specifiers here, where one specifier is a PRO. It is easy to imagine a story whereby PRO can be licensed in this configuration, by getting coindexed with the other specifier of VP. We leave for future work the exact working out of this account. It is encouraging to note, though, that this possibility follows from the derivational machinery used so far.[25]

[25]There is some similarity between this 'multiple [Spec, VP]' approach to defective complements and the 'movement-to-[Spec, VP]' approach of Boskovic (1994). We leave for future work a comparison of these approaches.

(58)



8 Conclusion

In this paper we have discussed an analysis of clitic climbing with the framework of Tree Adjoining Grammar. We showed that the analysis proposed by Bleam (1994) is inadequate for certain cases, in particular those in which the trigger verb is a raising or bridge verb. We discussed how by adopting the reconceptualization of TAG as monotonic c-command as proposed elsewhere, these problems can be overcome. This leads naturally to a conception of inter-clausal movement in TAG in which an internal node of the lower clause substitutes into a node of the higher clause with the higher parts of each clause 'merging' together, in the sense discussed. The derivational structure is the same for all types of inter-clausal movement—as discussed in this paper, for wh-movement, raising, and clitic-climbing. The differences in their properties arise from the differing loci of substitution, and the consequences of that location for movement in the structure for the lower clause (how far an NP has to move to be above the locus of substitution).

There are a number of issues related to this work that require further investigation. The most immediate is a precise characterization of the 'floating' elements and how they are 'identified' by the DCETM. The view suggested here based on the recursive structure of the higher clause may be useful, or

it may be possible to characterize the floating components solely in terms of how 'loose' they are in the c-command relations.

There are several details regarding the analysis of clitic-climbing that need to be cleaned up. One is the issue of the clitic-verb order. A second issue, perhaps more serious and certainly more interesting, concerns how the clausal structures differ in the clitic and non-clitic-climbing cases. Ideally, we would like for there to be just a 'one bit' difference between the two cases—one parameter is changed, and clitic climbing either occurs or not. In particular, we would like to say that if the higher clause takes a different size complement (VP or TP), then clitic-climbing either does or does not occur. However, in the analysis described here, the complement size taken by the higher clause must correlate with the structure of the lower clause. That is because, given the assumption that the verb moves to T, the infinitival lower verb moves to T when there is no clitic climbing, and does not move to T when there is. If the higher clause selects a VP complement, then the lower clause must not have a TP projection, and the clitic must be 'floating' by itself. If the lower clause did have a TP projection, then the verb would move to that T projection, and then both the clitic and the lower verb would end up above the higher verb, obviously undesirable. The most obvious way to fix this problem is to modify the placement of the clitic to be above the place where the infinitival verb moves. Then the desired result could obtain in which the lower infinitival clause is always the same, with the appearance of the clitic in the lower or higher clause dependent only on the size of the complement selected by the higher verb.

One further area of work is the investigation of how other problematic cases of long-distance movement, such as long distance scrambling in German (Rambow (1994)), should be integrated into this approach. Of particular interest is whether such scrambling follows the pattern of 'intersecting clitic climbing' as in (49) and if not, how the different patterns of movement can be integrated into this approach without altering the basic derivational mechanism.

Also, the other aspects of 'restructuring' in Romance, such as the 'long middle-*si*', should be integrated into this approach. For reasons that can't be discussed here, these other aspects raise different challenges for TAG (see Kulick (1998) for discussion). There is also an interaction between these other aspects and clitic climbing that is important to capture.

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