

VP Ellipsis in Infinitival Clauses

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1 Introduction

In the literature, there are several explanations offered for certain phenomena regarding the grammaticality of VP ellipsis (VPE) in infinitival clauses, but none is entirely satisfactory. Some examples of the phenomena in question are offered below. These are borrowed from Zwicky (1982) and Johnson (2001):

- (1) You shouldn't play with rifles because it's dangerous to.
- (2) *You shouldn't play with rifles because to is dangerous.
- (3) You should keep your rifles unloaded because not to is dangerous.

In each case, the VP following infinitival *to* has been elided. The result is grammatical in (1) and (3), but not in (2), where *to* stands alone in a subject position. There are other environments where VPE is blocked in infinitival clauses as well. The problem at hand is first to characterize the environments where this occurs, and then to explain why those environments should produce this effect.

I will argue that the contrast in (1) through (3) results from a prosodic requirement on infinitival *to*, which is a prosodic *leaner*. The term *leaner* is introduced in Zwicky (1982); it refers to words that are phonologically dependent on some other constituent and must form a prosodic unit with it in order to be pronounced. There are special syntactic restrictions on what exactly infinitival *to* can lean on. In ordinary circumstances, it would lean on its complement VP, but when this is removed through VPE, *to* must look to its left for another host. Evidently, *dangerous* and *not* in (1) and (3) count as acceptable hosts, while *because* in (2) does not. My proposal is that *to* cannot cross a clause boundary to find a host, as it would have to do to lean on *because* in this case.

Thus far, my analysis closely follows that of Zwicky (1982), but there are some additional assumptions that must be made in order to update his proposal. Specifically, there is some question about what exactly is meant by the term *clause*. Does it refer to CP or TP? I argue that it must refer to CP rather than TP, and that it must be possible for a bare TP to be selected directly as a complement, rather than always being embedded in a CP complement. With these assumptions in place, it is possible to formulate a fairly coherent account of the facts with reference to the Minimalist theory of Derivation by Phase, where CP, but not TP, counts as a *phase* (Chomsky 1999). This means that the material

inside it is not available to the syntactic or phonological operations of higher clauses, and so *to* cannot cross a CP boundary to lean on something outside it. This predicts that *to* will be stranded and unpronounceable in exactly those cases where VPE following *to* is in fact ungrammatical.

In Section 2, I consider and reject several alternative explanations for the ungrammaticality of (2). The next two sections contain the core of the analysis, laying out the case for this being a prosodic requirement rather than anything else in 3, and arguing for an own-clause condition in 4. Section 5 offers a possible explanation based on derivation by phase. Section 6 concludes with a few unresolved questions for future investigation.

2 Background

There are two interlinked questions that must be answered in order to account for the facts about the distribution of VPE in infinitival clauses observed above. First, what is the relevant structural generalization that ties all the cases together? Second, given that generalization, what exactly is the mechanism that blocks VPE in cases where it cannot occur? These questions crosscut each other, and though in the first of the proposals that I will introduce in this section, the answer to the second question follows straightforwardly from the first one, it is also possible that one mechanism might account for several different generalizations, just as one generalization might be accounted for by several different mechanisms. In this section, I will discuss several different combinations of potential answers to these questions, and attempt to rule some out of further consideration.

Under the first analysis, ellipsis in infinitival clauses is ruled out specifically when the clause is an island. It is argued to follow from this that VPE is in fact derived through a movement that is subject to island constraints. This analysis is proposed, somewhat speculatively, in Johnson (2001), based on the observation that VPE can strand *to* when it heads a clause in complement position, as in (4a) and (5a), but not one in an adjunct, as in (4b); in subject position, as in (5b); or embedded in an NP, as in (6):

- (4) a. Mag Wildwood wants to read Fred's story and I also want to __.
b. *Mag Wildwood came to read Fred's story and I also came to __.
- (5) a. You shouldn't play with rifles because it's dangerous to __.
b. *You shouldn't play with rifles because to __ is dangerous.
- (6) *Lulamae Barnes recounted a story to remember because Holly had also recounted a story to __.

The environments in (4-6) in which VPE is blocked are all islands. Furthermore, it is not only ellipsis after *to* that is blocked, but ellipsis after any auxiliary in an infinitival island:

- (7) *Mag came to be introduced by the barkeep and I also came to be.
- (8) *You shouldn't have played with rifles because to have is dangerous.
- (9) *Lulamae recounted a story to be remembered because Holly had also recounted
a story to be.

Now, in general, VPE does not obey island constraints, as in the following examples with finite clauses from Sag (1976), cited in Johnson (2001). In (10), there is ellipsis in a relative clause, and in (11), in a subject:

- (10) John didn't hit a home run, but I know a woman who did.
- (11) That Betsy won the batting crown is not surprising, but that Peter didn't know she
did is indeed surprising.

Therefore, on this view, it must be the fact that the clause is non-finite that makes the difference.

Johnson's proposal is that the constraints on VPE resemble those on movement because there is in fact a movement out of the ellipsis site prior to actual ellipsis. To be specific, VPs must topicalize before they can be elided, and this movement must obey island constraints as usual. It is suggested that Topicalization resembles VPE in several other ways as well, and thus this proposal can account for several otherwise mysterious licensing conditions on VPE, such as the requirement that its trace must be governed by an Aux or *to* rather than a main V, and that the elided or topicalized VP cannot be headed by *have*. However, for current purposes, the interesting facts are those that, Johnson (2001) claims, show that Topicalization cannot strand *to* in an island any more than VPE can¹:

- (12) *You shouldn't play with rifles because *play with rifles*[to *t*] is dangerous.
- (13) *Lulamae recounted a story to remember because *remember*, Holly had also recounted
a story to *t*.
- (14) ?Mag Wildwood wants to read Fred's story, and *read Fred's story*, I also want to *t*.

(14), where the VP *read Fred's story* has been moved out of a complement position, is not perfect, but it is certainly better than (12) and (13), where the movement is out of subject and adjunct islands instead. If the VP were elided only after reaching its topicalized position, then we could produce the

¹ The data in (12-14) is in fact disputable because there are other known restrictions on when VP can be fronted: it only works in quite limited circumstances, such as this:

- (i) They told me to clean the windows, and clean the windows I did.

(12) and (13) lack the proper context for this to work. However, in the discussion above I choose to follow the argument as presented in Johnson (2001).

grammatical (4a) from a structure like (14), and rule out the ungrammatical (5b) and (6) because they would have to be produced from the already ungrammatical (12) and (13). This applies equally well to cases like (15), with ellipsis in infinitival clauses where the ellipsis site is not introduced by *to*, but an Aux instead:

- (15) *You shouldn't have played with rifles because *play with rifles* [to have *t*] was dangerous.

So far this analysis may seem to hold some promise, but there are significant problems with it. One which Johnson himself points out is that that merely adding a negation seems to save ungrammatical examples like (5b), as in (16), though it is not at all clear why this should so be under his analysis:

- (16) You should keep your rifles unloaded because not to _ is dangerous.

The addition of *not* should not change the status of a sentential subject as an island, and indeed it appears that it does not. (17) shows that neither wh-movement nor clefting can move anything out of an unelided version of the clause:

- (17) a. Not to keep your rifles unloaded is dangerous.
 b. *What is not to keep unloaded dangerous?
 c. *It is rifles that not to keep unloaded is dangerous.

Thus what we have in (16) is VPE within an infinitival island: this is exactly what the proposal states should be impossible. This in itself may be sufficient reason to abandon this analysis, but even if there were some explanation for (16), based perhaps on some special property of *not*, there are still other problems with it. For instance, it does not adequately explain why ellipsis out of finite islands is possible, but ellipsis out of non-finite islands is not. Topicalization should not be able to apply in either case. Indeed, it is hard to see how the original examples meant to show that ellipsis in finite clauses does not obey island constraints could possibly be derived through Topicalization:

- (18) a. John hasn't hit a home run, but I know a woman who has _.
 b. *John hasn't hit a home run, but I know a woman who *hit a home run* has _.
- (19) a. That Betsy was winning the game is not surprising, but that Peter didn't know she was _ is indeed surprising.
 b. *That Betsy was winning the game is not surprising, but that Peter didn't know

that *winning the game* she was _ is indeed surprising.

It appears that Topicalization out of these islands is impossible, just as we would expect. It is very strange to say that VPE must be fed by Topicalization if VPE can occur in places where Topicalization can't, however well such a proposal may account for other facts. Thus an analysis that derives VPE through movement cannot be correct, nor can we generalize that VPE cannot occur in infinitival islands, since there is at least one infinitival island where it can. Some other explanation is needed.

Other previous analyses, such as those in Lobeck (1995) and Zagana (1988), depend instead on the theoretical framework of Government and Binding Theory, which is no longer widely accepted. Thus it would be beside the point to review in detail the specifics of the mechanisms they propose to account for the data in question. However, their basic observations and intuitions still have some merit. Lobeck (1995) argues that the ellipsis site must be head-governed in the same way that traces of movement are. In brief, the idea is that although other Ts are head governors, *to* is not because it has no feature [\pm PAST] and is thus unable to "identify" the empty VP that follows it. Therefore, if ellipsis is to be licensed following *to*, *to* must "incorporate" into a higher V that can govern a chain of null heads (COMP, AGR, and T) ending in the empty category VP. What this means, essentially, is that *to* cannot license ellipsis unless it is in a complement of a higher V, which rules out ellipsis in the non-complement islands we have already seen. This generalization is an idea worth pursuing even if the details of Head Government are not, and I will return to it in Section 4.

3 A Prosodic Requirement

Another possibility, and the one I will argue for, is that the restriction on ellipsis in infinitival clauses is in fact caused by a prosodic requirement on *to*. That is, *to* is a *leaner*: it is phonologically dependent on some nearby constituent for its pronunciation. The idea is that *to* ordinarily leans on its complement, the VP that follows it, but when this is removed through VPE, it has to look to the left for something else to lean on. There are certain syntactic constraints on what this something else may be, and as before, the great question is what the proper generalization regarding these constraints is. The insight that there is a prosodic requirement at work was first developed in Zwicky (1982). In that paper, it was proposed that a constraint against *to* leaning on something outside its own S was what accounted for the main contrasts² seen in the grammaticality of VPE following *to*. That seems to me to be

2 Zwicky (1982) argues that another, separate constraint is required to account for another contrast: *to*'s inability to lean on any form of *be*, as in the following examples:

(i) *I didn't want to go, but what he wanted was to.

(ii) *The reason I went was to please the Smiths, and apparently the reason you went was to, as well.

It may be possible to collapse this into just one analysis, but the facts here are complex, and I have elected to set them aside for now. To get an idea of the issues involved, notice that there is at least one perfectly grammatical case where

essentially the correct generalization, and I will discuss it in more detail below in Section 4. But first, you might have noticed that we have already seen some objections to the view that the ungrammaticality of ellipsis in non-finite clauses is related to any deficiency of *to*. Thus the next task is to show that there is in fact empirical evidence that prosody plays a role here, and that the objections already seen do not stand up to closer scrutiny.

Selkirk (1996) offers some data that shows that, at least in dialects of English with intrusive *r*, VP ellipsis following *to* changes the prosodic constituency of *to*. In these dialects, *r* is inserted at the end of a prosodic word when that word ends with a low vowel and the following word begins with another vowel. She gives the following examples:

- (20) I said I was gonna-r, and I did.
- (21) We oughta-r, if we're asked.
- (22) If you hafta-r, I'll help.

The presence of *r* in these examples, which all involve VP ellipsis, show that here, *to* -- or its cliticized counterpart, *-ta* -- is at the end of a prosodic word. However, if there is no ellipsis involved, the *r* is not inserted:

- (23) a. I'm gonna ask Adrian.
- b. *I'm gonna-r ask Adrian.

The most likely explanation for this is that in (23), the *to* can lean on the head of its complement, *ask*, and form part of a prosodic word with it, so that it is prosodic word initial rather than final and the conditions for *r* insertion are not met. But when that complement is missing, as in (20-22), *to* must lean to the left instead, and so ends up at the end of a prosodic word, where *r* insertion can take place. Thus there is independent evidence for certain special prosodic requirements on *to*. However, this by itself does not show that these requirements can account for all the facts we have seen about the distribution of VP ellipsis in infinitival clauses, and it is therefore necessary to address the objections already raised against such a view.

First, it is necessary to deal with the claim in Johnson (2001) that the observed ungrammaticality of ellipsis in certain infinitival clauses does not arise from any deficiency of the word *to* itself, but rather from the fact that the clause is non-finite. His evidence for this was that ellipsis after other auxiliaries in these same infinitival clauses was just as ungrammatical as ellipsis after *to*. The relevant examples are repeated here as (24) and (25):

stranded *to* can lean on a form of *be*. This example is also borrowed from Zwicky (1982):

(iii) I don't think you've read this book; if you were to, it would change your life.

- (24) *You shouldn't play with rifles because *to* is dangerous.
(25) *You shouldn't have played with rifles because *to* have is dangerous.

There is, however, another possible way to account for this, using prosodic requirements rather than making reference to the non-finiteness of the clause. That is, it is not generally possible to stress auxiliary verbs either. The only case in which they can be stressed is in emphatic affirmatives, like the following:

- (26) a. I *have* been keeping the rifles unloaded, so you don't have to nag me about it.
b. Even though he *did* do all the work, Harvey only got a C in the class.

But the auxiliary *have* in (25) is not in an emphatic affirmative. Like *to*, it also needs to lean on nearby phonological material to be pronounced, and, in fact, would usually appear in the reduced form 've, as in *you shouldn't've played with rifles*. Except in emphatic affirmatives, auxiliaries are not prosodically weighty enough for *to* to lean on them for its pronunciation, nor can they lean on *to*. Thus the ungrammaticality of (25) is accounted for; it stems from the same source as that of (24), the lack of nearby stressable material that *to* and *have* can attach themselves to.

Of course, not just any such material will do, and this is another possible objection to a prosodic requirement. For instance, Johnson argues against a prosodic analysis of the facts on the basis of examples like the following, where *to* is apparently unable to lean on a wh-word in an indirect question, although it ought to be stressable:

- (27) a. *We wanted to invite someone, but we couldn't decide who *to*.
b. *Mary was told to bring something to the party, so she asked Sue what *to*.
c. *I've got to plant this tree, but I don't know where *to*.

However, some of these examples may be ruled out on other grounds than the stranding of *to*. Examples similar to (27) but with a finite embedded clause instead are just as ungrammatical:

- (28) a. *We wanted to invite someone but we couldn't decide who we should.
b. *Mary was told to bring something to the party, so she asked Sue what she should.
c. *I've got to plant this tree somewhere, but I don't know where I should.

This shows that *to* is not the deciding factor; there's something else going on. Both (27) and (28) involve wh-movement out of the ellipsis site, leaving a trace behind. For example, (27a) and (28a) must be interpreted as follows:

- (29) *We wanted to invite someone, but we couldn't decide who_i to [~~invite t_i~~].
- (30) *We wanted to invite someone, but we couldn't decide who_i we should [~~invite t_i~~].

There are some known restrictions on extraction out of the site of VPE, which are independent of any special constraint on the stranding of *to*. These restrictions have been variously analyzed.

According to Sag (1976), they result from a licensing condition on VPE that operates at the level of logical form. In order for identity to be established between the elided VP and its antecedent, any trace that is within the ellipsis site and bound by an operator outside the site must correspond to a syntactically parallel trace in the antecedent. When these conditions are not met, identity between the elided VP and the antecedent cannot be established, so VPE is impossible. Because in (29) and (30), there is no similar trace in the antecedent VP, *invite someone*, there can be no identity between the two VPs, and so ellipsis is impossible in both cases. An alternative account of the same facts, offered in Schuyler (2001), involves not an identity condition at the level of logical form, but rather a condition requiring a contrastively focused expression in the C-command domain of the extracted phrase. Either analysis applies independently of any considerations on the ability of *to* to stand alone phonologically.

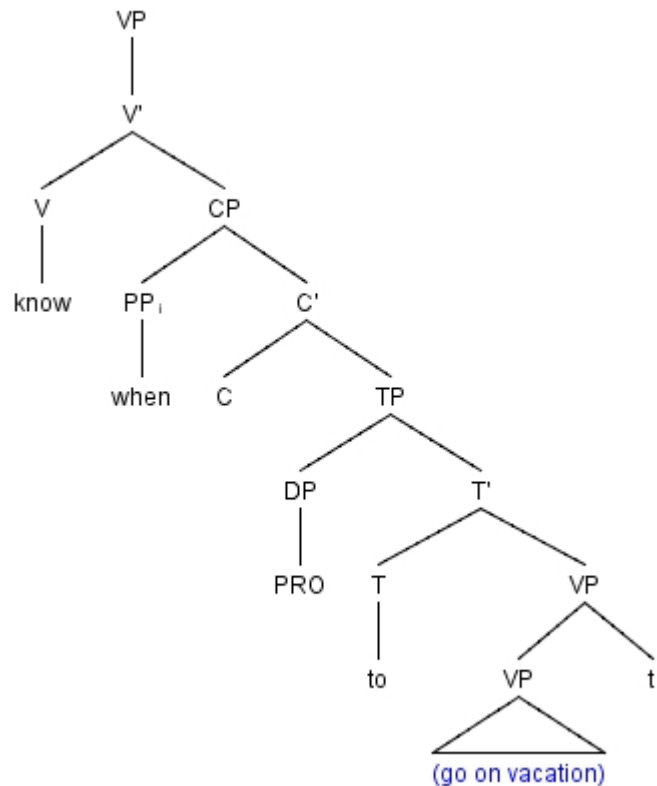
Notice that ellipsis after *to* is possible when it follows certain other wh-words:

- (31) a. John wants to go on vacation, but he doesn't know when *to*.
 b. John would like to dance the Charleston, but he doesn't know how *to*.

This shows that wh-words are not inherently unsuitable as hosts for *to* to lean on. The likely relevant difference between (31) and (27) is that, although these also involve wh-movement and a trace in the lower clause, in these cases the trace might not be inside the ellipsis site. *When* and *how*, unlike *who* and *what* in (27), are not complements of the elided V, but adjuncts to the VP, as in the tree below. Therefore it is not necessary to include their traces in the ellipsis site, and the previously noted conditions on extraction out of the site of VPE do not apply:

- (32) a. John wants to go on vacation, but he doesn't know when_i [_{TP} *to* [_{VP} ~~go on vacation~~] t_i].
 b. John would like to dance the Charleston, but he doesn't know how_i [_{TP} *to* [_{VP} ~~dance the Charleston~~] t_i].

(A)



Since (27-32) are either acceptable or can be ruled out on other grounds, they do not constitute an effective argument against the proposal that the grammaticality of VPE in infinitival clauses is dependent on a prosodic requirement on *to*.

4 Syntactic Requirements

From here on I will take it as established that we are in fact dealing with prosodic effects, but this is hardly a complete analysis. It still remains to determine in exactly which syntactic environments this prosodic requirement may be satisfied. As we have seen, at least three different generalizations about this environment have been proposed: that VPE may not occur in non-finite islands, that it can only occur when the *to* is in a complement position, or that the *to* cannot lean on anything outside its own clause. The reasons for rejecting the first of these options has already been discussed: first, there are in fact infinitival islands where VPE is possible, and second, the claim that there are not points towards an analysis that derives VPE through movement, but which offers no satisfactory explanation for the differences in the grammaticality of VPE in non-finite versus finite clauses. Fortunately, this is not the only generalization it is possible to make, and the other two seem more promising. In the

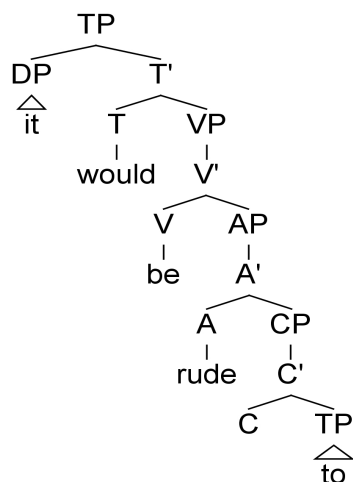
remainder of this section, I will consider the empirical predictions made by each, and conclude that the best account is the one that follows Zwicky (1982) in saying that the *to* cannot lean on something outside its own clause.

But there seems to be one significant problem with this account: it was first proposed at a time when X-bar Theory was not yet widely accepted, and was thus phrased in terms that made reference to the category S rather than to TP or CP. The *to* itself was assumed to head a VP rather than a TP. Here is the original formulation of the constraint:

- (33) a. (*To* Reattachment) When it does not form a VP constituent with an immediately following VP, the English infinitive marker *to* attaches to the constituent immediately to its left, to form a phonological phrase with it,
 b. (The Own-S Condition) except that it cannot move out of its surface-structure S (Zwicky 1982: 29).

It is not immediately obvious that this analysis can be translated into more modern terms because whether S is assumed to correspond to TP or to CP, in either case the *to* will have to attach to something outside the clause when the clause is a complement of something else, such as the A *rude* in the following tree. Thus this formulation of the generalization does not appear to account for the most common case of VPE in a non-finite clause, that is, the case where that clause is in a complement position, as is *want to*, *have to*, *going to*, etc.

(B)



This problem is not insurmountable, but it will take a bit of exposition to explain why. It may be

helpful to set this problem aside for the moment and return to it after some discussion of the other option, where *to* must lean on something it is a complement of. To show how this alternate proposal can account for most of the data, I offer an inventory of places where VPE can and cannot occur in non-finite clauses³.

4.1 The Complement Analysis

First of all, it is uncontroversial that ellipsis may occur in an infinitival complement of V:

- (34) Lulamae wants to read Fred's story and I also want to.

It may also occur in a complement of the sentential negator Σ (*not*), regardless of whether Σ P occurs in an object, as in (35a), or in a subject, as in (35b):

- (35) a. You should keep your rifles unloaded because it's dangerous not to.
b. You should keep your rifles unloaded because not to is dangerous.

VP Ellipsis may occur in infinitival clause complements of other categories as well, such as A, as in (36), and N, as in (37):

- (36) You shouldn't play with rifles because it's dangerous to.
(37) You may not want to kiss the pig, but that doesn't affect my desire to.

So far our inventory is quite straightforward: but there are some complications. A requirement that *to* should lean on something else and that the something else should select *to*'s clause as its complement seems reasonable as long as nothing intervenes between *to* and the head that selects it. However, there are certain things that can intervene, for instance, a lower clause subject that has been raised to matrix clause object, such as *Harvey* in (38a), or the object of an Object Control predicate like *persuade* in (38b):

- (38) a. I want to kiss the pig, but I don't want Harvey to.
b. I kissed the pig but I couldn't persuade Harvey to.

Some wh-words can also intervene, as we already saw in (31), repeated here as (39):

- (39) a. John wants to go on vacation, but he doesn't know when to.

3 For the moment, I'm going to withhold judgment on whether "clause" means CP or TP. This is a question that will become important later.

- b. John would like to dance the Charleston, but he doesn't know how to.

This is mildly problematic for the hypothesis, but notice that the infinitival clauses here are still complements of V, even if *to* is not adjacent to the V.

A larger complication is as follows: I have already argued that VP Ellipsis may not occur in infinitival clauses in subject or adjunct positions. However, there is a possible exception to this. It appears that VP Ellipsis is acceptable (for most speakers) when a non-complement infinitival clause has an overt subject:

- (40) a. Paul should load the rifles because for Harvey to would be a mistake.
b. Almost everyone else will pass the course, but for Harvey to, he'll have to make up ten assignments.

There are speakers who reject these examples, but it seems likely that even for them, (40a-b) are an improvement over similar examples without an overt subject in the infinitival clause:

- (41) a. *You shouldn't load the rifles because to would be a mistake.
b. *Harvey wants to pass the course, but to, he'll have to make up ten assignments.

The contrast between (40) and (41) makes sense in prosodic terms because the subject might count as overt phonological material for the *to* to lean on. The only problem is that it seems to argue against the claim about the specialness of complement position.

But in (40), the TP headed by *to* is in fact in a complement position: it is a complement of the C *for*. Thus the same analysis, based on the specialness of complement position, can work here as well, though it does require a definition of "clause" as TP rather than CP. One might object to this analysis on the basis that *to* leans on the subject rather than on the *for*, but we have already seen other cases where *to* leans on something that intervenes between it and the head that selects it as complement, rather than that head itself: it can lean on a DP raised to object, as in *want him to*, or on a *wh*-word in an indirect question, as in *doesn't know when to*. The only difference here is that the *for* itself seems to be a prosodic leaner, which also leans on the subject. This makes it a little bit suspicious to claim that *to*'s position as the head of the complement of *for* is what licenses the ellipsis after *to* in such examples. Presumably, if the subject were not present, *to* would be unable to lean on *for*. Of course, in standard English, *for* never appears when there is no subject, so this is difficult to test.

An interesting question for future research would be to find out what the facts are about ellipsis in non-finite clauses in dialects with overt *for-to*. To me, as a non-speaker of such dialects, examples where *to* has only *for* to lean on, as in (42), sound dreadful. But then so do cases where ellipsis would be entirely uncontroversial without the *for*, as in (43), whereas I can accept examples like (44), without

any ellipsis, as something that someone else might say:

- (42) *You shouldn't load the rifles because for to would be a mistake.
- (43) *Harvey hasn't read the book yet, but he wants for to.
- (44) Harvey wants for to read the book.

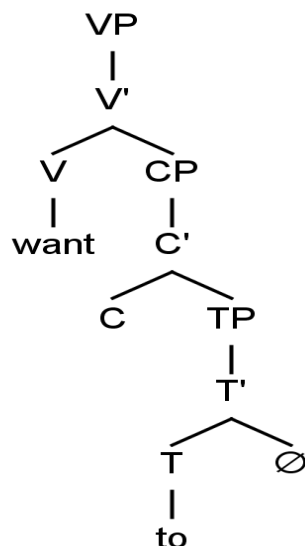
Pending such investigation with actual speakers of these dialects, it is difficult to tell conclusively what the prosodic dependency relationship, if any, between the *for* and the *to* is, but so far it seems not entirely unreasonable to attempt to account for examples like (40) in terms of the same generalization about the specialness of complement position.

However, there is a significant embarrassment that arises from this generalization. The generalization is currently stated as follows:

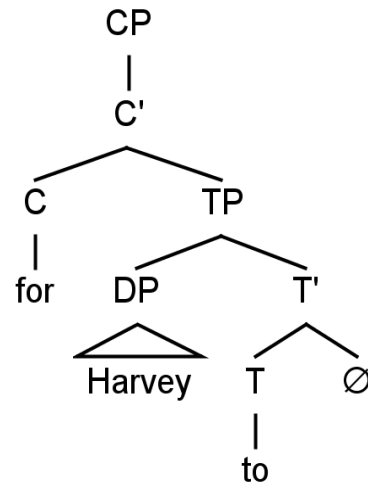
- (45) The Complement Analysis: In order for infinitival *to* to find a host to lean on, its "clause" must be in a complement position. When that condition is met, then *to* leans on either the head that selects its clause as complement, or on something that intervenes between it and that head.

I have argued that this analysis predicts the grammaticality of either of the structures below because in (C), the CP containing *to* is a complement of *want*, and *to* is therefore able to lean on *want*. In (D), the TP headed by *to* is a complement of *for*, and *to* is therefore able to lean on the subject, *Harvey*, which intervenes between it and *for*:

(C)



(D)



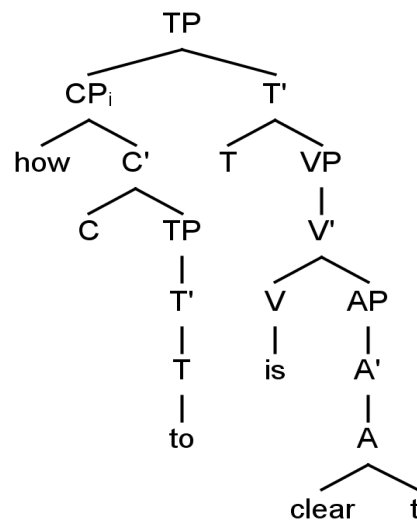
The problem is that we need two different definitions of "clause" for each structure to fall out from the analysis. It must be defined as CP for (C), and as TP for (D). These definitions are mutually exclusive. Choosing CP as the relevant constituent that must be in a complement position would incorrectly predict examples like (40) to be ungrammatical because a CP like that in (D) occurs as a subject and not in a complement position. Similarly, choosing TP would predict the ungrammaticality of structures like (C) because the thing that *to* leans on, *want*, does not actually select its TP as a complement: it selects CP, which forms an extra layer of structure between *want* and *to*.

Beyond theoretical concerns about whether CP or TP is the relevant category that must be selected as complement, there are also empirical reasons to reject the complement analysis. These reasons apply equally well regardless of which definition of "clause" we might eventually decide to use:

- (46) a. It's better to do it sooner, but exactly when to isn't clear.
 b. I'd like to get his attention, but how to isn't clear.

As should be evident from the tree below, there is simply no way to analyze the CP containing *to* as being in a complement position in (46).

(E)



Nor can *to* lean on the head that selects its TP because that head is a phonologically null C, and *to* can only lean on things that are phonologically overt. In addition, nothing intervenes between *to*'s TP and

the head that selects it⁴, so according to the complement analysis there is no possible host for *to* to lean on in (46), no matter what definition of "clause" we use, and yet (46) is grammatical.

4.2 The CP-Boundary Analysis

Thus (46) represents the major empirical difference between an account of these phenomena that appeals to the specialness of complement position, versus one that rules out attachment across clause boundaries. There is no problem with (E) if we assume the latter theory and say that the somewhat vague "clause boundary" in question is specifically a CP boundary, and not a TP boundary. *To* then does not have to cross any CP boundaries to attach to the overt, stressable wh-word, *how*.

The earlier problem with this hypothesis was that the *to* does seem to have to cross a CP boundary to find something to lean on in cases where the CP is selected as complement to a higher category and there is nothing else overt in the lower clause that *to* could lean on instead. However, this problem is solved if we take the simple but slightly radical step of saying that in such cases there is no CP present at all: the verb takes a TP complement directly. This is somewhat suspicious, but it has always been suspicious as well to claim that an extra empty level of structure exists when there is no direct evidence⁵ for it. Notice also that we would have to make this very same claim in order to save the other hypothesis, where ellipsis following *to* is dependent on its being in complement position. We cannot in fact claim that it is a complement of the higher V if an extra level of structure intervenes. Thus the claim that TP is selected directly is doubly motivated, and it removes all the major difficulties with the analysis based on restrictions on attachment across clause boundaries. In the revised tree for *but it would be rude to*, *to* must attach to *rude*, which is outside its TP, but not outside its CP:

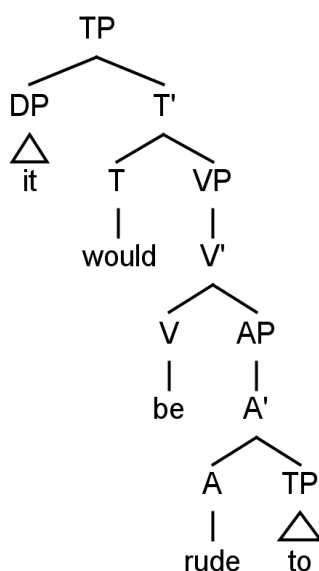
4 It has been argued that in indirect questions like (46), the wh-word in fact sits somewhere other than Spec CP, and might conceivably come between C and T, which would allow *to* to lean on *how* under the complement analysis. The evidence for the claim that it is not in Spec CP is that these indirect questions are not islands, as the following example shows, though nothing should be able to escape from them if there were something in Spec CP:

(i) This problem, I don't know how to solve.

However, the actual placement of the wh-word in these cases is unclear, and there are enough other problems with the complement analysis that it doesn't seem worthwhile to try save it on these grounds.

5 There is some indirect evidence for the presence of an empty CP in many cases. I will discuss this in some detail in section 4.3.

(F)



Choosing TP instead of CP improves things for the complement account as well, but it cannot remove the problem posed by *how to isn't clear*. Regardless of whether we take *how to* to be a CP or a TP, there is simply no way to analyze *how to* as being in a complement position. Therefore, the best account is an updated version of the one originally proposed in Zwicky (1982), which I will revise as follows:

- (47) a. (*To* Reattachment) When it does not form a TP constituent with an immediately following VP, the English infinitive marker *to* attaches to the constituent immediately to its left, to form a phonological phrase with it,
 b. (The Own-CP Condition) except that it cannot move out of its own smallest CP.

This Own-CP Condition can account for all the same examples as an analysis that relies on some special property of complement position, and it even removes a few previous complications. To show that this is so, we can revisit the cases of VPE in infinitival clauses seen in the previous inventory. First, cases where *to* occurs in a complement of V, A, N, or *not*, as in (34-37), are unproblematic if we assume that when no *for* appears, the complement selected by these categories is a TP rather than a CP. The same applies to Raising to Object cases like (38). When there is an overt *for*, as in (40), then there is clearly a CP present, but *to* can lean on the subject, which is clearly within the

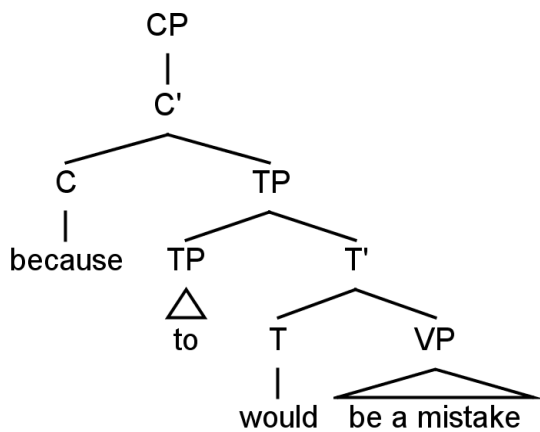
same CP⁶.

In (48), as in (40), the *to* clause appears in a subject position, but here there is no overt *for* or subject:

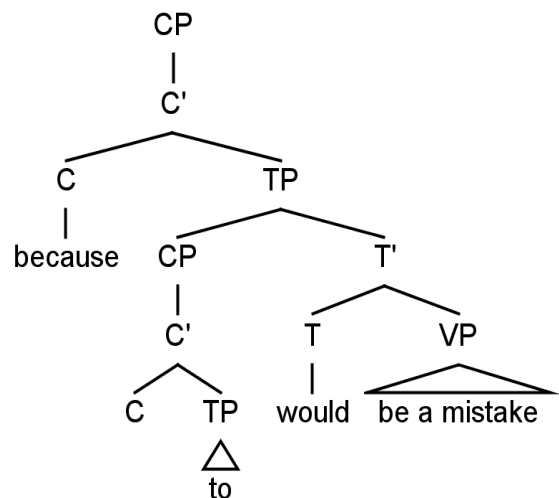
- (48) a. *You shouldn't load the rifles because *to* would be a mistake.
 b. *Harvey wants to pass the course, but *to*, he'll have to make up ten assignments.

In the interest of consistency, we might like to assume that there is no CP present here either, but that the *to* heads a TP that sits in subject position, as in (G):

(G)



(H)



However, this assumption is not automatic: to claim that the CP is lacking in some cases does not require us to generalize to all cases where the C is not overt if there are other reasons to believe the CP is in fact present, so the structure may in fact be as in (H).

It would be problematic for the CP-boundary analysis if (G) were the correct structure because *to* would not have to cross any CP boundary in order to lean on *because*, and thus (48) would be predicted to be grammatical. There might be other ways to avoid (48) without positing a structure like that in (H). For instance, it might be that *to* can only cross one TP boundary, not two, as it would have to do in this case to reach *but* or *because*:

- (49) [_{CP} because [_{TP} [_{TP} *to*]] would be a mistake]

6 Incidentally, this condition might also account for the ungrammaticality of ellipsis following *for to* in dialects where *for to* is otherwise possible because the *for* is clear evidence of the presence of a CP and the *to* would be blocked from leaning on anything above it. However, I won't make any strong claim about this because I have no supporting data from native speakers.

Or perhaps *but* and *because*, as function words, do not carry sufficient prosodic weight to allow *to* to lean on them. However, there is also an independent reason to believe that there is a CP here because whatever constituent it is that contains *to*, that constituent has been fronted in (48), and it is generally only possible to front CPs, not TPs. Therefore the structure is more likely as in (H), where it is clear that *to* would have to cross a CP boundary in order to attach to *because*:

(50) [_{CP} because [_{TP} [_{CP} to]] would be a mistake]

Thus (48) does not constitute a major complication for the Own-CP Condition: it can be accounted for using the original statement of the condition, as long as we do not assume that the absence of overt CP material necessarily means there is no CP.

It still remains to show that the Own-CP Condition can also account for indirect questions like those in (39), repeated here as (51):

- (51) a. John wants to go on vacation, but he doesn't know when to.
b. John would like to dance the Charleston, but he doesn't know how to.

These do not seem to pose a problem for my proposal, but there is again some question as to whether there is in fact a CP present here. The *wh*-words might be sitting in Spec CP, but some have suggested that this cannot be correct because indirect infinitival questions with *when*, *how* and *where* are not in fact islands, as would be predicted if the *wh*-words filled that position. (52) shows that it is in fact possible to topicalize out of these question clauses:

- (52) a. I've heard the best time of year to go to Greece is in the fall, but Ireland, I don't know when to visit.
b. This problem, I know how to do.

If these *wh*-words sit somewhere other than Spec CP -- perhaps as adjuncts to TP -- then it becomes less obviously clear that there is a CP present at all. However, it makes no real difference to my analysis whether there is a CP or not: the *to* needs to lean on the *wh*-word, but it can do that perfectly well regardless of whether it is in Spec CP or adjoined to TP. Either way, it is leaning on something within its own CP. Thus the Own-CP Condition can account for the contrasts in grammaticality in all the cases of VPE in infinitival clauses that are in question, though, in order to do so, it does require some additional assumptions about when CP is and is not present.

4.3 Theoretical Complications

It should be noted that my assumptions about this are relevant to some larger theoretical concerns, and in fact conflict with what others have proposed. I am not the first to suggest that a bare TP may be selected as a complement, but previous claims along those lines have been made specifically to account for certain otherwise mysterious contrasts between Raising and Control predicates. The data in question are as follows:

- (53) ?It was to win the race that we wanted.
- (54) *It was to be winning the race that she seemed.
- (55) *It's to win races that she tends.

The movement of the *to win the race* clause is relatively acceptable (though not perfect) with the Control verb *want*, but not grammatical at all with the Raising verbs *seem* and *tend*. One explanation is that Raising verbs take TP complements, whereas Control verbs take CP complements. If, in addition, only CPs and not TPs are capable of movement, then this accounts neatly for (53-55). However, this is a problem for my analysis of VPE in infinitival clauses because I claim that both Control and Raising verbs take TP complements. Otherwise we would predict an empirical difference in the ability of *to* to lean on Raising verbs like *seem* versus Control verbs like *want*, but there is no such difference: *want to* and *seem to* are both equally acceptable. Therefore my analysis and an analysis that posits a difference between these predicates with respect to the presence of CP are mutually exclusive. Both cannot be correct, and so some way to choose between them must be found. However, differences between Raising and Control structures are not my primary concern in this paper, and I leave it to further investigation to come to a definite conclusion on this point.

Another, related problem with my analysis is that it requires certain predicates to sometimes take TP complements and sometimes take CP complements. For instance, *rude* clearly takes a CP in (57), but in order for my analysis to work in (56), we would have to say that, there, *rude* takes a TP. If there were a covert CP, then *to* would be unable to lean on *rude* across the CP boundary.

- (56) She wanted to ask his age, but she realized it would be [rude to].
- (57) Sam might be able to ask his age, but it would be [rude for Harvey to].

It certainly not impossible for one lexical item to have more than one subcategorization, so there would be no problem here if there were some empirical evidence to support the idea that *rude* sometimes takes TP and sometimes CP. However, I have no such evidence. The motivation for the claim is entirely theoretical, not empirical: it is what must be said in order for the CP-boundary analysis to work. At present, I know of no evidence that directly contradicts this claim, so the problem does not yet

appear to warrant abandoning the CP-boundary analysis, but it does raise some questions. Hopefully, future investigation will yield some solid evidence to either support or disprove the claim.

For now, I retain the analysis where infinitival *to* must lean on something in its own clause, where *clause* is defined as a CP, because at present I see no alternative statement of the syntactic environment in which VPE can occur in infinitival clauses that makes the right predictions. A claim that VPE cannot occur in infinitival islands predicts incorrectly that examples like (16), repeated here, should be ungrammatical:

- (58) You should keep your rifles unloaded because not to is dangerous.

Similarly, the claim that *to* must lean on something that takes its maximal projection as a complement fails to account for the grammaticality of certain indirect infinitival questions, like the following:

- (59) I'd like to get his attention, but how to isn't clear.

As of yet, there seems to be no empirical data that similarly falsifies an analysis based on the Own-CP Condition. Any objection to this analysis arises from the theoretical assumptions that must be made in order for it to work, that is, that predicates take a bare TP complement rather than a CP complement in cases where there is no overt CP material present. Although these assumptions do raise problems, they also have the benefit of pointing toward an attractive explanation of why this particular condition applies, in terms of Derivation by Phase, as I will discuss below.

5 Derivation by Phase

The question remains: what is special about the CP boundary that prevents infinitival *to* from leaning on a constituent outside it? A possible answer comes from the theory of Derivation by Phase, a part of the Minimalist Program introduced in Chomsky (1999), which makes an important distinction between CP and TP: CP is a phase, and TP is not. A phase is a self-contained syntactic domain which is impenetrable to outside operations, except for the material at its leftmost edge. That is, CP is built piece by piece from the bottom up, and various operations can take place within it, including some that move material to the leftmost edge, i.e. to Spec CP. Once the construction of CP is complete, everything left within its embedded TP is sent off to the phonology and becomes invisible to further syntactic operations. Only material that was already moved to Spec CP can be moved again by operations within a higher clause.

Derivation by phase was conceived as a way to guarantee successive cyclicity within a Minimalist framework, but it also has an important effect for our present purposes in that it divides TP

from CP syntactically and phonologically. When *to* heads a TP complement of C, its TP will be sent off to the phonology by itself, and thus any phonological dependencies within it must be satisfied internally. Therefore, if VPE removes the VP complement of *to*, it will be unable to find anything else to lean on when nothing stressable precedes it within the same clause. If something stressable does precede it, such as a subject or a negation, then there is no problem. Nor is there any problem if nothing precedes it within the TP, but we assume that that TP is not embedded within a CP. Because TP does not count as a phase, if a bare TP is taken as complement in some higher constituent, it will then be included in the same phase as that constituent.

The only case of stranded *to* that might prove problematic for this theory is the case of indirect questions, where *to* might be analyzed as leaning on a wh-phrase that sits outside its TP, in Spec CP. However, as already noted, there is some question about whether the wh-phrases in fact fill the Spec CP position in these cases, since if they did we would expect the indirect question clauses to be islands, and apparently they are not. So the wh-phrase may in fact be included somewhere within the TP. But even if they are not located within TP, there is still ongoing debate about whether there may be phonological relationships between material in CP and TP, and so this may not pose an insurmountable difficulty for a derivation by phase explanation. It appears fairly certain at least that if *to* has to lean on something outside not just TP, but CP as well, then this analysis will predict an ungrammatical result, which is just what we want.

6 Conclusions

In the end, there are a few points that have yet to be resolved and require further exploration. The one that is most pertinent to larger theoretical concerns is my claim that bare TP rather than CP may be taken as a complement in some cases. A much fuller investigation of what exactly these cases are is needed, since it seems fairly clear that the mere absence of overt CP material is not sufficient evidence for the total lack of a CP. Other properties of the clauses in question must be considered, and depending on the choice of properties, differing conclusions about its CP-hood may be reached. If we use the ability of *to* to lean on something outside the clause as a diagnostic, then both Raising and Control predicates must take TP, not CP complements, but other diagnostics suggest a difference between these predicate types: Raising verbs take TP complements, whereas Control verbs take CP complements. These claims are mutually exclusive, so some way to choose between them must be found. Another, perhaps smaller, lingering issue is the need for an account of *to*'s inability to lean on *be*.

However, leaving those points aside, the core of the analysis seems solid. I have shown that there is good reason to believe *to* is a prosodic leaner which must form a phonological unit with some host in order to be pronounced, and that it is the syntactic restrictions on what this host may be that

produce the contrasts in grammaticality that I first set out to explain. Several possibilities with respect to the exact statement of these syntactic restrictions have been proposed, including a claim that VPE cannot occur in infinitival islands, a claim that infinitival *to* must lean on something that takes it as a complement, and my final conclusion that *to* may not lean on anything outside its own clause, where *clause* refers to CP and not TP. This last option is superior to the others because it can account for several empirical facts that they cannot, as we have seen in examples like (58) and (59). It also lends itself to a neat explanation involving derivation by phase. Because a derivation by phase analysis posits a natural phonological boundary at CP, it is clear why infinitival *to*, a phonological leaner, cannot reach outside CP to find a host to lean on. Thus when it loses its VP complement through VPE, *to* becomes stranded and unpronounceable if there is nothing to its left within the same CP, and it is this that causes the ungrammaticality of VPE in certain infinitival clauses.

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