Wh Movement

Introduction to Syntax
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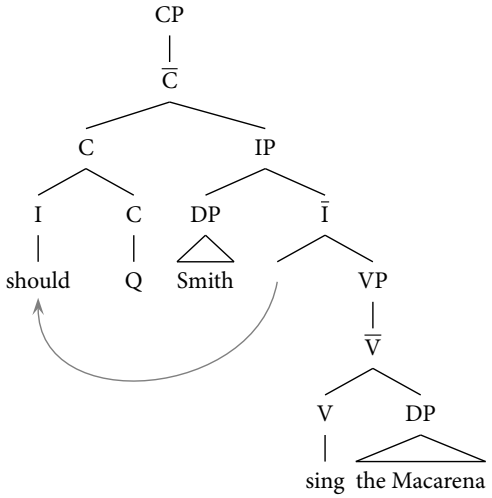
In certain questions there is a movement rule that moves the contents of I into the C position. That happens in so-called "Yes/No Questions," and it is illustrated by examples like (1).

(1) Should Smith sing the Macarena?



This rule applies obligatorily when there is a question, we have hypothesized, because there is a silent suffix in the C position of such questions that is responsible for making the sentence "mean" what a question means. That silent suffix can attach only to an I, and that is why I moves to C, so that they can join to form a word.

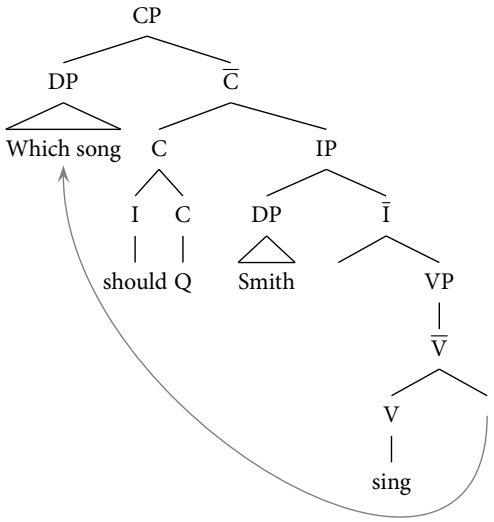
See the Head Movement essay for more details.

Another kind of question that involves this very same movement operation is found in (2).

(2) Which song should Smith sing?

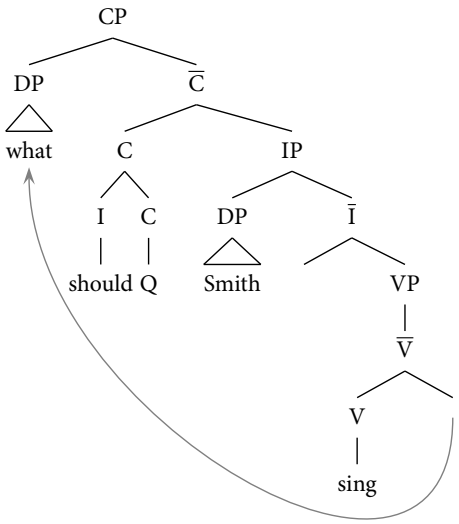
But in this question, not only has I moved into C, a DP appears before that moved I. These are called "constituent questions" or, sometimes, "wh Questions." What has happened in this kind of question is that another term has moved into a position that precedes C. One hypothesis is that the other moved term has moved into the Specifier CP. That would give (2) a representation like (3).

(3)



The rule that is responsible for moving the DP in (2) is called "Wh Movement," and it is the object of our study in this essay. To formulate this rule, we'll need to determine what class of things it can move. As (2) illustrates, certain DPs can be moved by it. These DPs must be headed by a certain kind of determiner. In (2), that determiner is *which*. There are also pronouns that can be moved by this rule. So, along side (2), are examples like (4).

(4) What should Smith sing?



There are a variety of interrogative pronouns in English. Some examples are in (5). We can think of the expressions *where*, *why* and *when* as short forms of PPs. For instance, we might think of *where* as being a pro-form for a PP with the meaning of "at which location." And we could think of *when* as being a pro-form for a PP with the meaning "at which time." We might imagine, then, parsing (5b) as (6) does.

(5) a. who should Smith visit ?

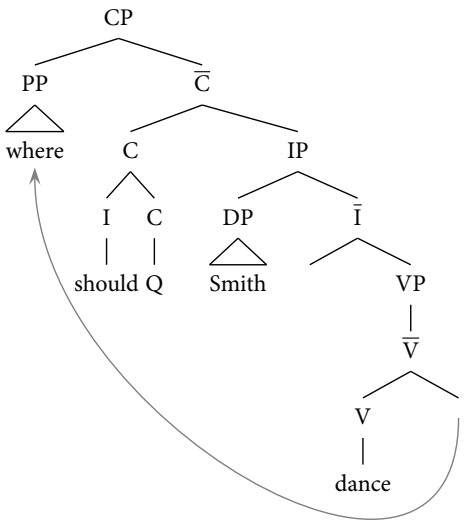
b. where should Smith dance ?

c. when should Smith sing ?

d. how should Smith dance ?

e. why should Smith visit ?

(6)



So, an initial definition of Wh Movement could be something along the lines of (7).

(7) Wh Movement

Move a wh-phrase into the Specifier of CP.

A wh-phrase is:

i. A DP with the determiner *which*, or

ii. An interrogative pro-form (i.e., *who*, *what*, *where*,…)

There are other kinds of phrases that Wh Movement can move; that is, there are other kinds of wh-phrases. We won't look at all of them in this class, but we'll examine a few more. One is illustrated by (8).

(8) To whom should Smith talk ?

To which person should Smith talk ?

Here a PP has moved. What seems to enable this PP susceptible to Wh Movement is the fact that the complement of the preposition is a wh phrase. So let's add this to our inventory of phrases that Wh Movement can move.

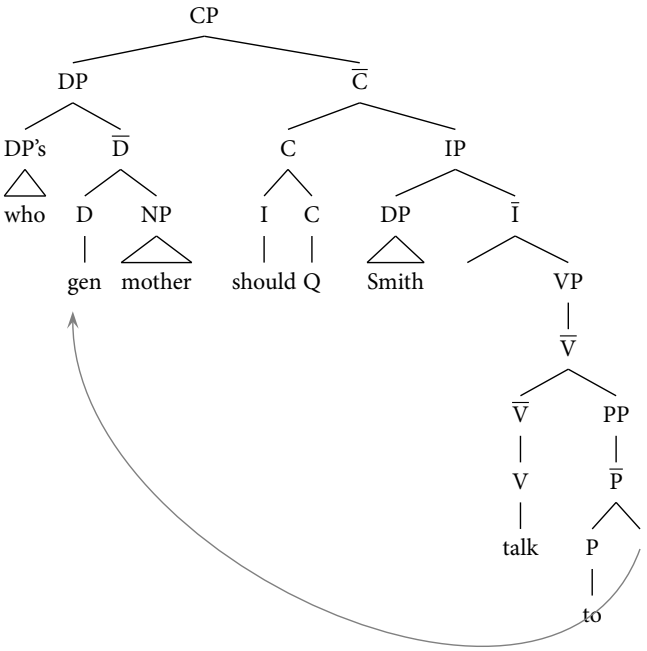
(9) A wh-phrase is:
   a. A DP with the determiner *which*, or
   b. An interrogative pro-form (i.e., *who*, *what*, *where*,…), or
   c. A PP whose daughter is a wh-phrase.

There are also examples like (10), which indicate that a wider class of DPs can be moved by wh Movement.

(10) Whose mother should Smith talk to ?

Despite the spelling, the term *whose* in this sentence is just the pronoun *who* and the determiner that assigns genitive Case. So, this sentence has a parse like that in (11).

(11)



So we can modify our definition of wh-phrase to (12).

(12) A wh-phrase is:
   a. A DP with the determiner *which*, or
   b. An interrogative pro-form (i.e., *who*, *what*, *where*,…), or
   c. A DP that immediately dominates a wh-phrase, or
   d. A PP with a daughter which is a wh-phrase.

There are still other phrases that Wh Movement can relocate. For instance, it can move Adjective Phrases if they start with the expression *how*. (13) is an example.

(13) How happy should Smith be ?

And DPs that begin with the expression *how many* can also move:

(14) How many beans should Smith eat ?

But I won't extend the description of wh-phrase to these cases because it would require too long a diversion into the structure of APs and DPs, and we can learn a lot about Wh Movement without considering them. So, I'll restrict our attention to just the wh-phrases that (12) describes.

Wh Movement can also target embedded CPs, forming so-called indirect questions, like those in (15).

(15) Jones asked [$_{CP}$ what Smith should sing].

Jones asked [$_{CP}$ which song Smith should sing].

In these examples there isn't the accompanying I-to-C movement that we see in root questions. Perhaps more surprising, though, is that in these examples we cannot have embedded complementizers. For most English speakers, the examples in (16) are worse than (15).

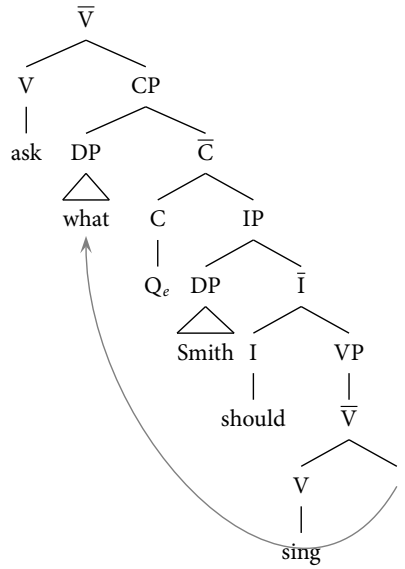
(16) * Jones asked [$_{CP}$ what that Smith should sing].

* Jones asked [$_{CP}$ which song whether Smith should sing].

One hypothesis about why this is involves postulating the existence of another complementizer in English. This complementizer has essentially the same meaning that Q has, but it is only found in embedded CPs. Unlike the Q found in independent, or as they are sometimes called, "root," sentences, the Q in embedded CPs is a full word. If this complementizer is present in embedded constituent questions, then, I-to-C movement will neither be required nor allowed. Heads, we have seen, can have at most one word in them, and if the embedded question complementizer is one word, then there will be no room in its C position for anything else.

We could conjecture, then, that Wh Movement forms something like (17), where Q_e represents the embedded, silent, question morpheme.

(17)



Not all embedded CPs can support Wh Movement. The examples in (18), for instance, seem ungrammatical.

(18) a. * Jones believed [$_{CP}$ which song Smith should sing].
b. * Jones thought [$_{CP}$ which song Smith should sing].

This, it is thought, has something to do with the semantic requirements of the verbs the CPs have combined with. Neither *believe* nor *think* seem semantically compatible with CP "objects" that aren't questions. Not only are constituent questions ungrammatical in this position, so also are Yes/No questions, which are what the embedded CPs headed by *whether* are called.

(19) a. * Jones believed [$_{CP}$ whether Smith should sing].
b. * Jones thought [$_{CP}$ whether Smith should sing].

On the other hand, there are some embedded CPs which must be questions, and in these cases Wh Movement is obligatory (unless a Yes/No question is formed). That is the case for the CPs that combine with the verb *wonder*, as (20) shows.

(20) a. Jones wondered [$_{CP}$ what Smith should sing].
b. * Jones wondered [$_{CP}$ that Smith should sing].
c. Jones wondered [$_{CP}$ whether Smith should sing].

But when a CP combines with a verb that can either tolerate a question CP or a non-question CP, there are two possible outputs of Wh Movement. In one, Wh Movement moves a wh-phrase to the embedded CP; and in the other it moves a wh-phrase to the root CP. These two cases are illustrated in (21).

(21) a. Jones has asked [$_{CP}$ what Smith should sing]?

b. what has Jones asked [$_{CP}$ that Smith should sing]?

Wh Movement is a rule that must apply in a constituent question. Sentences like (22) are not grammatical.

(22) * She wondered Smith should sing what.

In independent, "root," sentences Wh Movement is also obligatory, although this is a little harder to see because of the existence of a different kind of question. To see this, compare the two sentences in (23).

(23) a. Who should Smith talk to?

b. Smith should talk to who?

In the first, we have the characteristic movement of I and Wh movement that we've seen form constituent questions up to now. In the second neither of these rules have applied, and yet we still have a kind of question. But the sort of question in this second example is slightly different. We use (23b) when we are asking someone to repeat something they've said. For instance, I might use (23b) if, while uttering *Smith really should talk to* . . . , someone is interrupted by a loud noise that obscures the ending of their sentence. What I do in uttering (23b) is repeat the part of the sentence that I heard, and put a wh-phrase in the position of the part that I didn't hear. These are called "echo questions." Wh Movement, then, is obligatory to form constituent questions, and it cannot be used if one is instead making an echo question.

Interestingly, however, a wh-phrase doesn't have to be moved by Wh Movement in all constituent questions. We see that from examples like (24).

(24) What should Smith give to whom?

This is what is called a "multiple question." There are two wh-phrases in it – *what* and *whom* – and these wh-phrases together convey what kind of information this question is seeking. In (24), what is being sought is the identity of thing-people pairs such that Smith should give that thing to that person. What might serve as an answer to this question then might be a list of such pairs, as in (25).

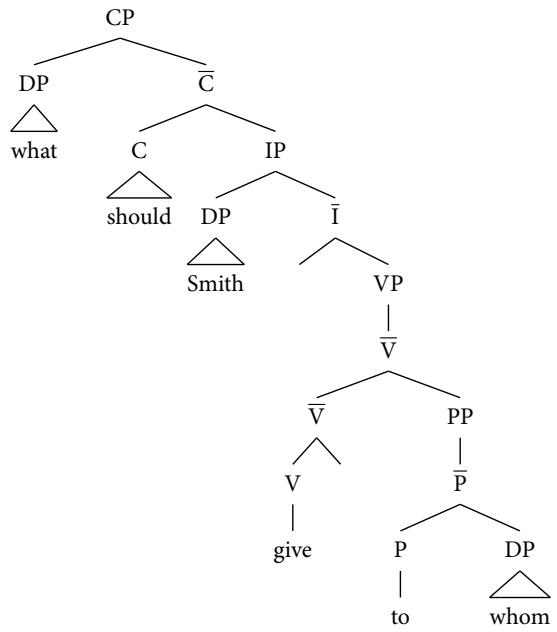
(25) the refrigerator, to the neighbors and the washing machine, to the kids

Of these two wh-phrases, only one has moved into Specifier of CP. Indeed, Wh Movement cannot be used to move both wh-phrases, as the ungrammaticality of (26) shows.

(26) * What who should Smith give to?

This follows from the fact that there is only one Specifier position in a CP, and a Specifier position has room for only one phrase in it. For example, consider what the representation that corresponds to (24) would look like.

(27)



If we understand Wh Movement to only be possible when the conditions it seeks to change are present, then Wh Movement cannot apply to (27). The conditions Wh Movement requires are a wh-phrase and an empty Specifier of CP, and the second of these is not available in (27).

What multiple questions teach us is that Wh Movement is not an obligatory rule in the sense that whenever its conditions are met, it must apply. Instead, it's obligatoriness comes from something else. It seems that (28) is the relevant requirement.

(28) If a CP is to have the meaning of a constituent question, there must be a wh-phrase in its Specifier position.

This is the requirement that Wh Movement is employed to meet, and this is why most of the time it appears that Wh Movement is obligatory.

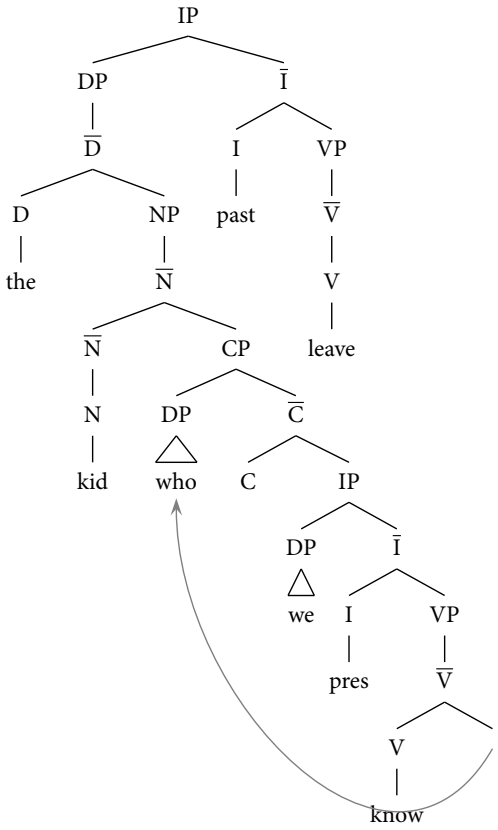
Relative Clauses

Wh Movement is found in constructions which aren't questions too. One famous place where this rule plays a role is in what are called "relative clauses," an example of which is in (29).

(29) The kid who we know left.

Relative clauses are CPs that modify N̄s; in (29) that CP is *who we know*, and it is positioned in the way that the parse in (30) indicates.

(30)



As you can see, Wh Movement is responsible for putting the wh-pronoun *who* into Specifier of CP. Like constituent questions, relative clauses require that Wh Movement occur. If *who* had not moved in (29), the sentence would be ungrammatical. So we can add to our list of requirements, (31).

(31) If a CP is to have the meaning of a relative clause, there must be a wh-phrase in its Specifier position.

Other examples of relative clauses are in (32).

(32) a. The place where we met is now gone.
b. The time when we eat is a little too late.
c. The reasons why things work that way isn't usually explained well.
d. The kids whose parents we know have arrived.
e. The kids to whom you should speak are in the room now.

We see here the same range of wh-phrases that we saw in constituent questions. There are a few ways, however, in which the kinds of phrases that can be moved in relative clauses differ from those in constituent questions. I don't believe relative clauses can involve wh-phrases with *how* in them. There are contrasts between the constituent questions and relative clauses in (33).

(33) a. i. How should we dance?
ii. * The way how we should dance is unknown.
b. i. How fast should we dance?
ii. * The speed how fast we should dance is unknown.
c. i. How many dances should we learn?
ii. * The dances how many we should learn are unknown.

It's also not possible to form a relative clause with the wh-word *what*.

At least in my dialect of English, *what* cannot be found in a relative clause. There are Englishes in which *what* can form a relative clause.

(34) a. What should we do?
b. * The thing what we should do is fun.

I don't know why there are these differences.

Another difference involves wh-phrases that use the determiner *which*. As we've seen, Wh Movement can move a DP headed by *which* to make a constituent question. This is what's happened in (35), for instance.

(35) a. Which dance should we learn?
b. Which box on the shelf should we open?

Wh-phrases likes these are not found in relative clauses, as we see from (36).

(36) a. * The activity which dance we learned is fun.
b. * The thing which box on the shelf we opened is now broken.

Instead, relative clauses can have what appears to be just the bare determiner *which* in them:

(37) a. The activity which we learned is fun.
b. The thing which we opened is now broken.

One idea about what is happening in these examples involves another process in English known as NP Ellipsis.

Ellipsis refers to processes which allow a phrase or word in a sentence to go unpronounced. This typically happens when the phrases that are allowed to go unpronounced are identical to another phrase which is pronounced. An example of this is in (38).

(38) I bought Jill's hat, but I won't buy Bill's.

There is a missing NP following *Bill's* in this sentence, and that NP is understood to be *hat*. One way of capturing that is to embrace a rule that allows NPs to be unpronounced if they match another NP; this would amount to saying that (38) is just (39) with ellipsis allowing the *hat* part to be unpronounced.

(39) I bought Jill's hat, but I won't buy Bill's hat.

Other examples of NP Ellipsis are in (40).

(40) a. I'll buy some hats, but I shouldn't buy many.
b. I'll buy some hats, but I shouldn't buy any.
c. I'll shouldn't buy any hats, but I might buy some anyway.
d. I like many hats, but I'll only buy one.
e. I've bought all those hats but I have to give each away.

Notice that in these examples, the result of NP Ellipsis is that just the single determiner of the DP is left pronounced. That is also what's happened from NP Ellipsis in (41).

(41) I know I should buy some hats but I don't know which I shouldn't buy.

In these case, the determiner that remains behind from NP Ellipsis is *which*. The sentence that NP Ellipsis produces (41) from is (42).

(42) I know I should buy some hats but I don't know which hats I shouldn't buy.

The idea about the relative clauses in (37), then, is that NP Ellipsis has applied. So what Wh Movement produces is indeed something like (43).

(43) a. The activity which activity we learned is fun.
b. The thing which thing we opened is now broken.

From (43), NP Ellipsis derives (37). What's peculiar about relative clauses is that NP Ellipsis is obligatory. (43) are ungrammatical, and become grammatical only by virtue of NP Ellipsis. This is something unique to relative clauses. NP Ellipsis is otherwise optional. The question in (42), for instance, might be a little wordy, but it's not ill-formed in the way that (43) is.

In fact, there is an ellipsis process that seems to be found just in relative clauses, and it is able to remove all of the wh-phrase in a relative clauses. So from (43), it is also possible to get (44).

(44) a. The activity we learned is fun.
b. The thing we opened is now broken.

Normally, wh-phrases cannot elide. None of the constituent questions we have looked at are grammatical if the wh-phrase which has moved is not pronounced. And not all of the wh-phrases in relative clauses can either. In addition to a DP headed by *which*, any of the wh-pronouns seem able to delete, as can be seen from the pairs in (45).

(45) a. i. The place where we met is now gone.
ii. The place we met is now gone.
b. i. The time when we eat is a little too late.
ii. The time we eat is a little too late.
c. i. The reasons why things work that way isn't usually explained well.
ii. The reasons things work that way isn't usually explained well.

But neither wh-phrases with possessives in them, nor wh-phrases that are PPs can delete.

(46) a. i. The kids whose parents we know have arrived.
ii. * The kids we know have arrived.
b. i. The kids to whom you should speak are in the room now.
ii. * The kids you should speak are in the room now.

Note that while (46a-ii) makes a grammatical sentence, it isn't the same sentence that we would get from (46a-i) by deleting *whose parents*.

We can summarize this with the rule in (47).

(47) Relative Specifier Deletion
Optionally delete a wh-proform in the Specifier of a relative clause. If that wh-proform is *what*, obligatorily delete it.

By making the deletion of *what* obligatory, we explain why relative clauses never have *what* in them.

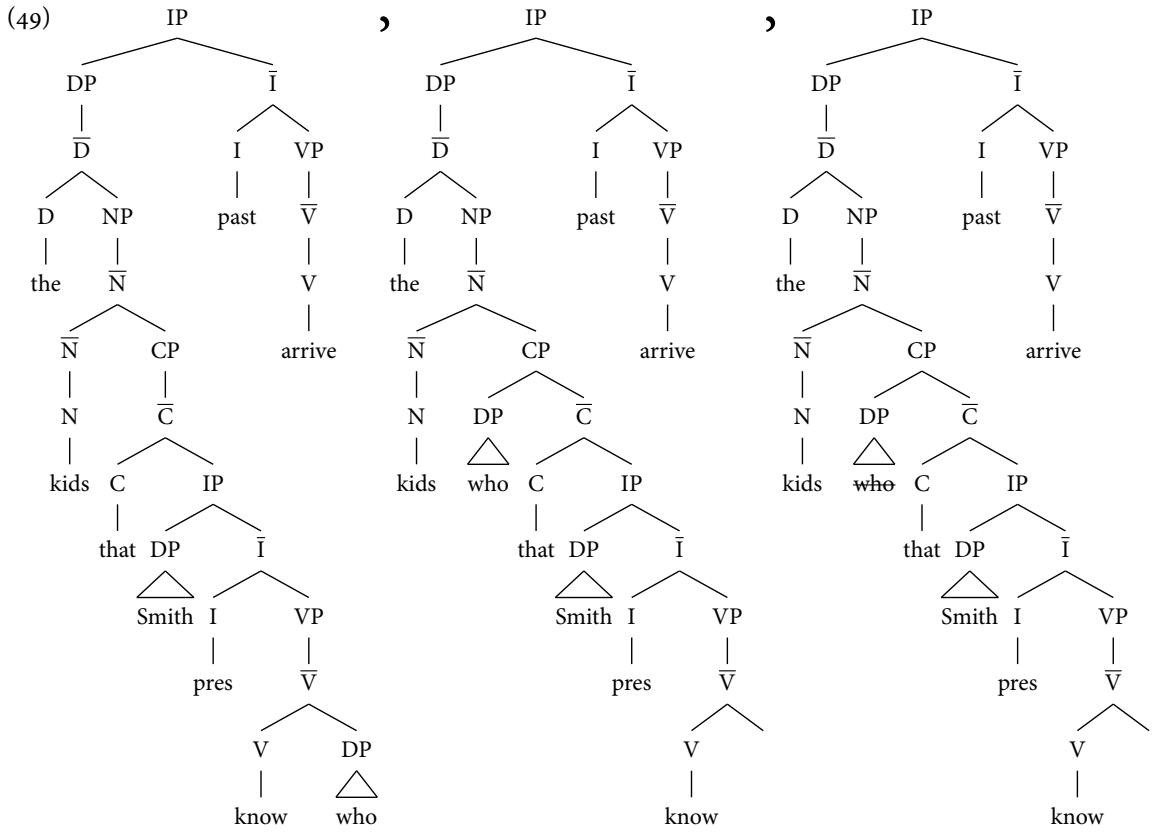
There is one last way relative clauses show up, and that is with the complementizer *that*. Some examples are in (48).

(48) a. The kids that Smith knows arrived.
b. The things that Smith brought have been lost.
c. The places that Smith goes are exciting.
d. The reasons that things work should be more obvious.
e. The times that you eat are amazing.

There is a prescriptive rule about when you should use *that*, and when you shouldn't. I never learned that rule, but in any case it doesn't seem to play a role in my syntax. Perhaps it does in yours.

If we let relative clauses come with the complementizer *that* in their head, we could produce these sentences with a combination of Wh Movement and Relative Specifier Deletion. For instance, (48a) might have the derivation in (49).

(49)



I use the ~~strikeout~~ notation to indicate that something has been deleted. In this derivation, it's *who* that is deleted by Relative Specifier Deletion in the last step.

In these scenarios, we need to make sure that Relative Specifier Deletion, which is normally an optional rule, becomes obligatory. We don't find grammatical relative clauses in English in which the complementizer *that* and a wh-phrase both appear. It seems that English has a constraint on s-structures that could be expressed with (50).

(50) Doubly Filled Comp Filter
A Relative Clause cannot have something spoken in both its head and Specifier position.

The way the Doubly Filled Comp Filter is satisfied in (49) is by using Relative Specifier Deletion to avoid saying the wh-phrase in Specifier of the relative clause.

The other way the Doubly Filled Comp Filter can be satisfied, obviously, is by not having a pronounced complementizer in its head. This might be achieved by assuming that relative clauses can have a C position with nothing in it, as I have tacitly assumed in my parses up to now, or that there is a rule that deletes the complementizer that resides in C. It's hard to decide between these two accounts, and I won't do so here.

This constraint is named the way it is because when it was formulated, the idea people had was that Wh Movement moved the wh-phrase into C (or 'Comp') position. The Doubly Filled Comp Filter was then just a name for the observation that two things cannot be in the same place. This idea was abandoned when it was discovered that I moves to C in root questions, and the wh-phrase moves to an obviously different position. This required a different formulation of the Filter (the one given here), but for some reason the original name stuck.

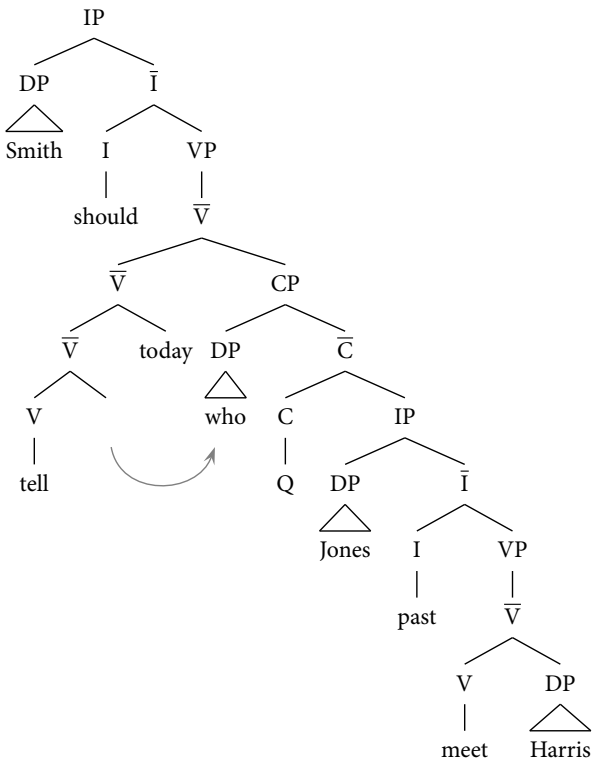
c-command

There are particular syntactic configurations that seem to block Wh Movement. One is illustrated by the ungrammaticality of (51).

(51) * Smith should tell today who Jones met Harris.

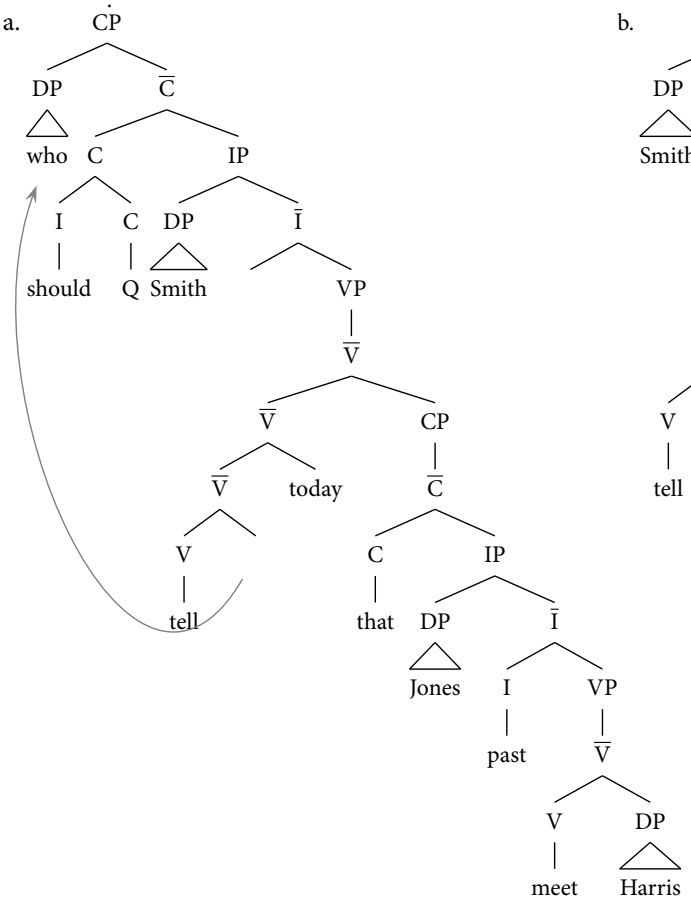
In this example, the wh-phrase *who* has moved from the position following *tell* into a Specifier of CP that follows it. This should be allowed, according to our rule of Wh Movement, but it is ungrammatical. A more detailed look at the derivation behind (51) is in (52).

(52)

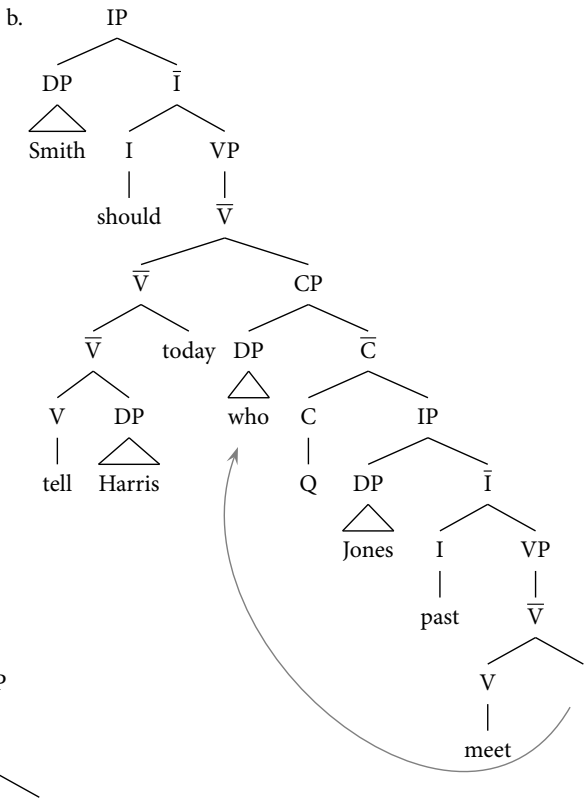


The problem with this derivation is not that Wh Movement cannot move *who* at all. We can see that by comparing (52) with (53a) (on next page), in which *who* moves to a different Specifier of CP. And we can see that Wh Movement can move a wh-phrase to the Specifier of CP that *who* is moved into in (52) by considering the derivation in (53b) (also on next page). The problem with (52) is with moving that particular *who* into that particular Specifier of CP. For Wh Movement to be successful, the wh-phrase and the Specifier of CP that are related by the rule must be in a certain kind of syntactic configuration. What we want to do is figure out what that required syntactic configuration is.

(53) a.



b.



A general observation is that when Wh Movement applies to form a grammatical sentence, the wh-phrase moves "upwards" in the phrase marker. That is, the Specifier of CP that it is moved into is higher in the tree than where the wh-phrase starts out. That, at any rate, is true of the two successful applications of Wh Movement in (53), and of all the other cases we've seen as well.

Now, the notion of higher in the phrase marker that is relevant here must have a rather precise meaning, since in the bad example of Wh Movement in (52), the wh-phrase moves to a Specifier of CP that is in some sense higher than where it starts out. So, we'll have to define the operative notion of higher in just the right way.

One way of defining higher that has some utility in other domains is with the notion "c-command," which is defined in (54).

"c-command" stands for "constituent command." This definition of it comes from Reinhart (1976).

(54) α c-commands β if and only if:

a. every phrase that contains α, contains β too, and

b. α doesn't dominate β.

Essentially, this says that α c-commands its sister and everything dominated by its sister. α is not lower than everything it c-commands, so that's the particular notion of "higher" that c-command defines.

If we look at all our grammatical examples of Wh Movement, we can observe that the Specifier of CP that the wh-word is moved into c-commands the wh-phrase that is moved. By contrast, the Specifier of CP that *who* has moved into in (51) does not c-command the position that *who* moves from. We can build this constraint into the Wh Movement rule, then, with (55).

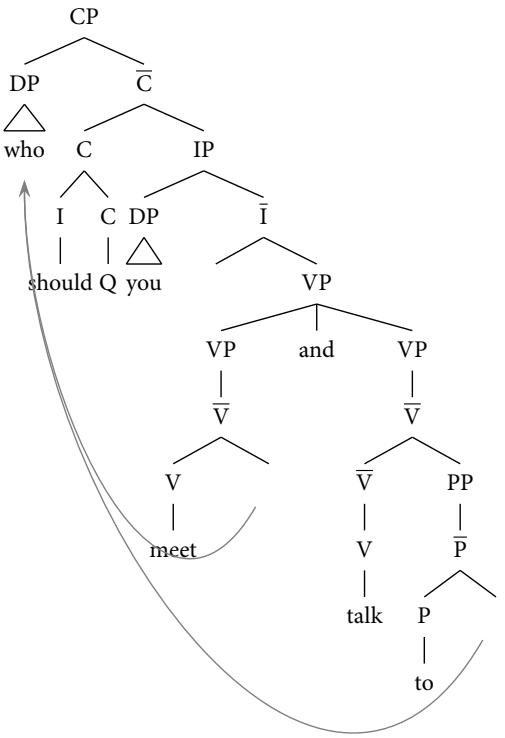
(55) Wh Movement
Move a wh-phrase from position α into a Specifier of CP position, β, just in case β c-commands α.

Across the Board Movement

There is a quirky special case of Wh Movement in which something a little more complicated than just moving a phrase is involved. These special cases only arise when there is a coordination involved. In these cases, what seems to happen is that one wh-phrase moves from two positions. An example is (56), which has a derivation something like that given in (58).

(56) who should you meet and talk to?

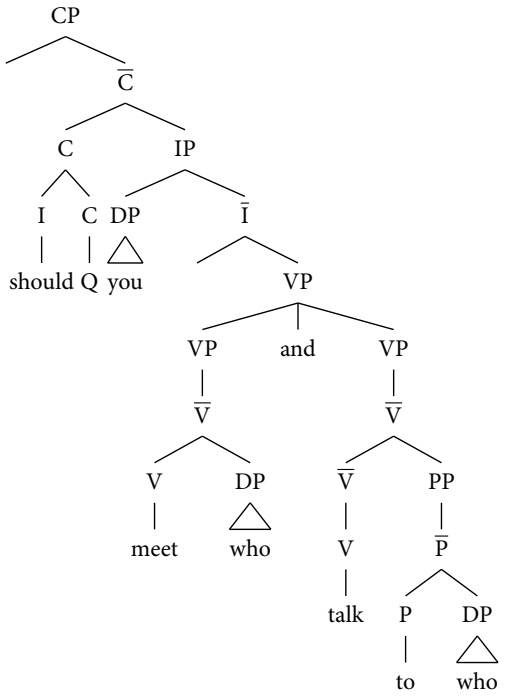
(57)



In this question, the wh-phrase *who* seems to be both an argument of *meet* and of *talk to*. Our present rule of Wh Movement doesn't produce these derivations of course, since the rule takes one wh-phrase and simply puts it in

a new position. The d-structure for the sentence in (56) should look like (58), in which there are two wh-phrases.

(58)



As it stands, Wh Movement can apply to one or the other of these wh-phrases and move it into Specifier of CP. What we need instead, is a way of collapsing these two wh-phrases into one, and then moving it.

There is presently no agreed-upon rule for doing what's needed in these examples. What we need is something that explains why this is only possible in coordinations, for instance, and no one has entirely figured out coordinations. We'll settle for a rule that just states what's needed.

(59) Glom
Two identical terms in two adjacent conjuncts can be glommed into one term if a movement rule applies to them.

The two wh-phrases in (58) are glommed before Wh Movement applies to them. When Wh Movement applies to a glommed term, the result is called "across-the-board movement." The wh-phrase in (56), then, has been "across-the-board moved."

Islands

One of the interesting features of Wh Movement is that it can move an item an indefinite distance in a sentence. This is because sentences can be indefinitely long, and Wh Movement can take a wh-phrase from any position in a sentence and relocate it to the Specifier of the highest CP. The series in (60) can be continued without any end.

(60) a. What has Sam said that you bought ?

b. What has Sam said that Mary thought that you bought ?

c. What has Sam said that Mary thought that Charles claimed that you bought ?

d. What has Sam said that Mary thought that Charles claimed that Marlies believed that you bought ?

e. What has Sam said that Mary thought that Charles claimed that Marlies believed that Sean decided that you bought ?

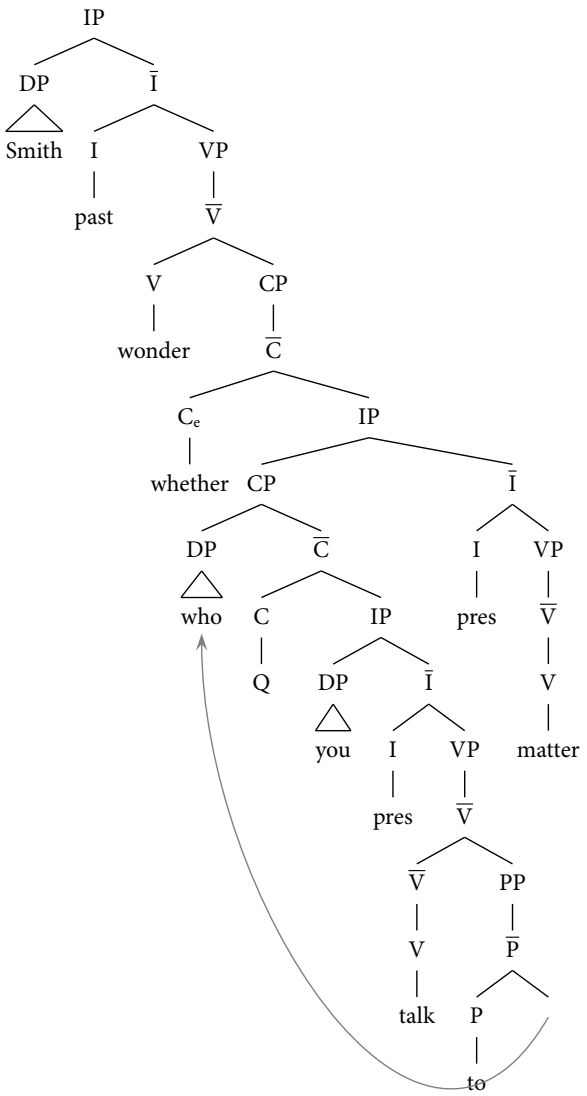
This is an interesting feature of this rule because it requires a kind of information that nothing else we've seen has needed. For everything else that we have looked at, syntactic constraints and processes need only see things that are relatively close together. The $\overline{X}$ Theory, for instance, names constraints on terms that are all in the same phrase. And the Case Filter again requires that DPs be in close proximity to certain terms — the terms that assign Case. Wh Movement, however, is a rule that can see two terms in a phrase marker that are indefinitely far apart. It is not like these other processes.

Even more interestingly, it appears that under certain conditions, Wh Movement is blocked from applying across these indefinite distances. To see this, consider first an example like (61).

(61) Smith wondered whether who you talk to matters.

This is an example in which the "subject" of the embedded clause is a CP in which Wh Movement has applied. It has a representation like that diagrammed in (62).

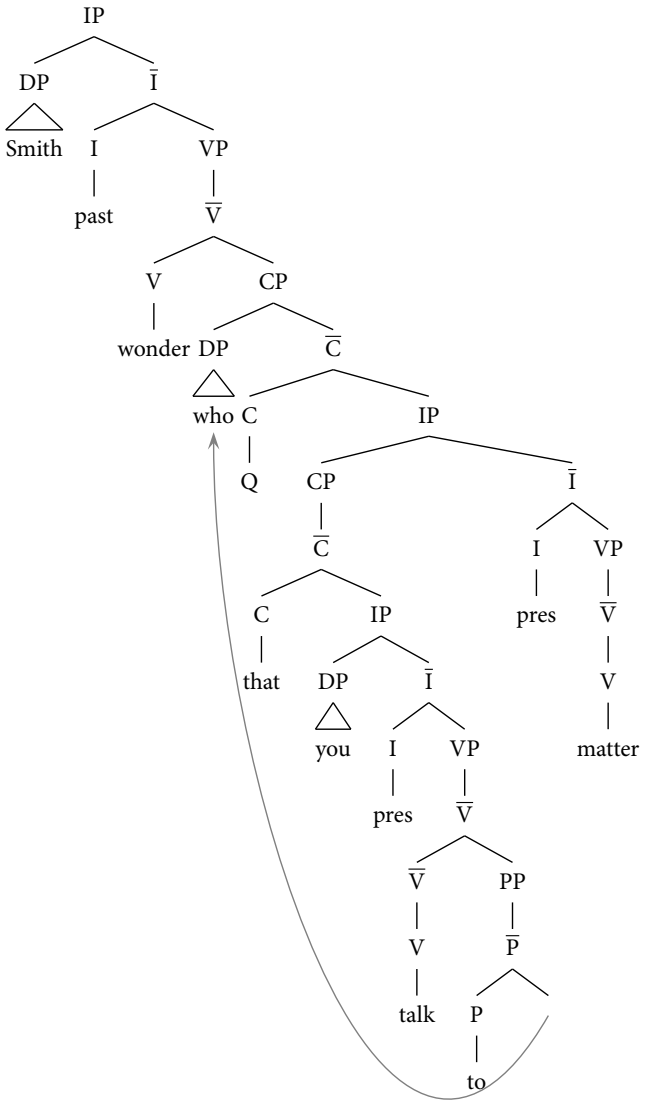
(62)



We learn from this example that a question CP can show up in the Specifier of IP.

Now imagine that Wh Movement was not to move the wh-phrase in (62) to the Specifier of the CP that stands in the "subject" position of the embedded clause, but was to instead move that wh-phrase to the Specifier of the CP that is the complement to *wonder*. Imagine, that is, that the complement to *wonder* were not a Yes/No question, indicated by the complementizer *whether*, but was instead a constituent question formed by moving the wh-phrase from within the clausal subject of the embedded IP. This would produce (63).

(63) * Smith wondered who that you talk to matters.



This is ungrammatical. While it is possible to move wh-phrases an indefinite distance, the very small difference in distance that the wh-phrase moves in (61) and (63) is the difference between a grammatical and an ungrammatical sentence.

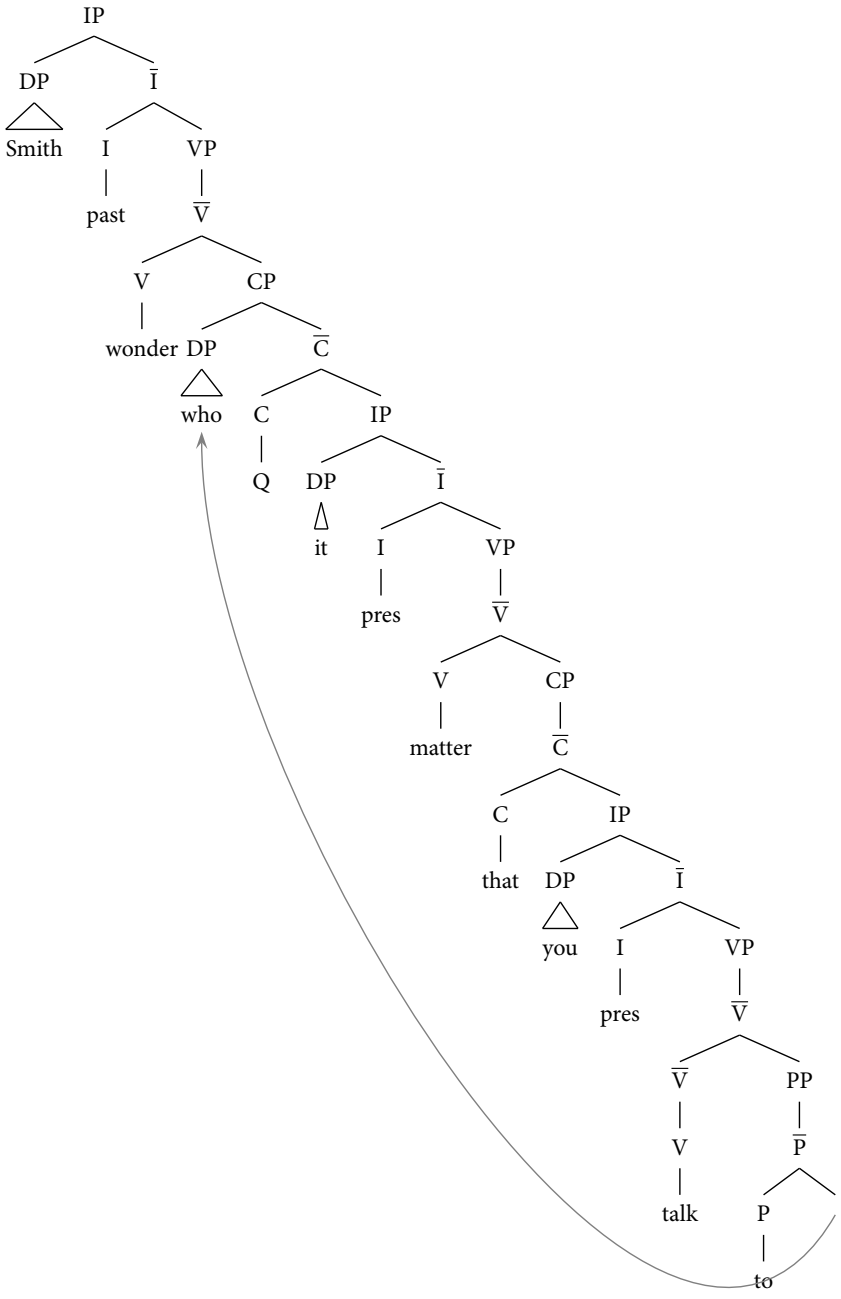
In his 1967 dissertation, John Ross carefully examined a variety of examples in which Wh Movement seems to be blocked, and teased out several generalizations about these examples. What he discovered is that there are particular syntactic configurations that appear to make Wh Movement impossible. He called these configurations "islands." The rough idea is that there are certain kinds of regions in a phrase marker from which wh-phrases cannot be moved. These configurations are Ross's islands: regions from which things cannot escape. Ross's island are sometimes said to be part of a larger set of

Ross, John. *Conditions on Variables*, MIT PhD Dissertation, 1967.

constraints on movement that determine where wh-movement – and perhaps other movement rules – is possible.

One of Ross's island constraints is responsible for the ungrammaticality of (63). To see what is responsible for blocking Wh Movement in (63), compare it to (64).

(64) Smith wondered who it matters that you talk to.



This is exactly the same sentence as (61), except that the CP argument of *matters* is in complement position in this example, and not in the Specifier of IP. Somehow, *matters* is able to take a CP argument in either complement position or "subject" position. Where the CP is determines whether a wh-phrase can be moved out of it. Ross argued that when a CP is in Specifier of

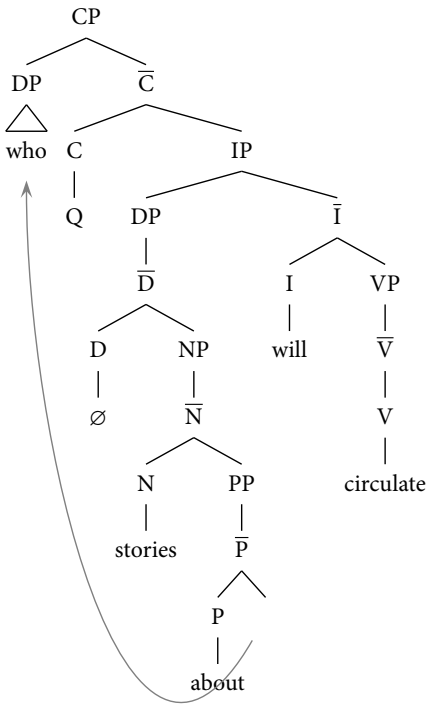
IP position, it is an island: in that position, Wh Movement may not move a wh-phrase out of it. He called this the Sentential Subject Condition.

(65) Sentential Subject Condition
When a CP is in Specifier of IP, nothing may be moved out of it.

My formulation of his condition uses the terminology we have developed in this class, and which is now common in the syntactic literature. Ross's syntax had neither CPs nor IPs, nor the notion of Specifier position, so his own formulation of the condition uses different terminology.

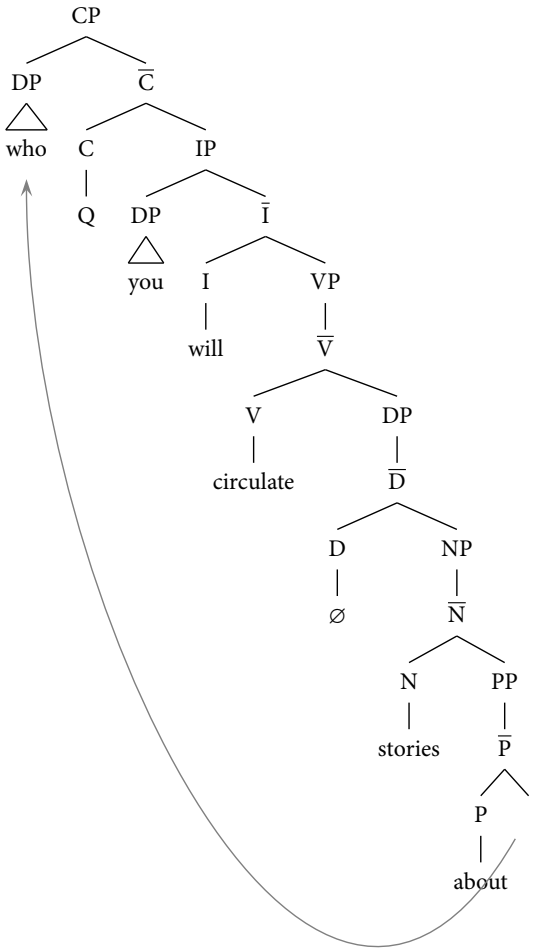
There is some reason to think that Ross's formulation of the Sentential Subject Condition is too narrow. His condition prevents movement out of just CPs that stand in Specifier of IP, but in fact movement out of any phrase that is in Specifier of IP seems to be blocked. For instance, if we try to move a wh-phrase out of a DP that stands in Specifier position, the result is ungrammatical. That's what we learn from (66).

(66) * Who will stories about circulate?



There is nothing wrong with moving out of a DP that isn't in Specifier of IP, as (67) shows.

(67) Who will you circulate stories about?

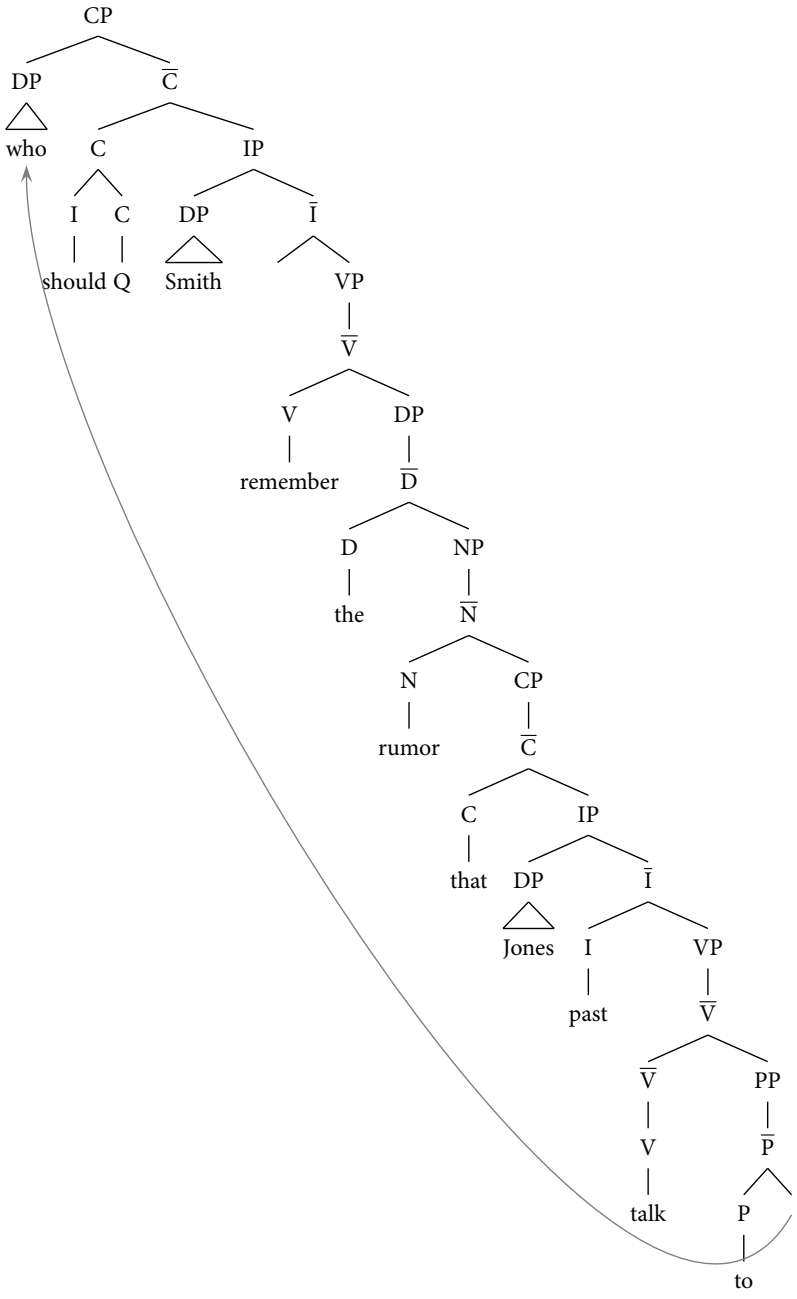


Sometimes, then, Ross's constraint is called more simply the Subject Condition, and formulated as in (68).

(68) Subject Condition
Nothing may move out of a phrase that is in Specifier of IP.

A second island that Ross discovered is illustrated by (69).

(69) * Who should Smith remember the rumor that Jones talked to?



Compare this sentence to (70).

(70) Who should Smith remember that Jones talked to?

The difference between these examples is the presence of the DP. In (70), the wh-phrase has been moved out of a CP that is the complement to a verb; but in (69), the CP from which the wh-phrase has been moved is within a DP. Ross decided that this was the relevant difference in the examples. He formulated what he called the "Complex NP Constraint," which I have reframed in (71).

Ross called NPs with CPs inside them, "complex noun phrases."

(71) The Complex NP Constraint
Nothing may move out of a CP that is the daughter of an NP.

The Complex NP Constraint does seem to be a valid generalization. There are very few examples in which Wh Movement seems capable of moving something out of a CP that is embedded within a noun phrase.

Another of Ross's constraints is illustrated by (72).

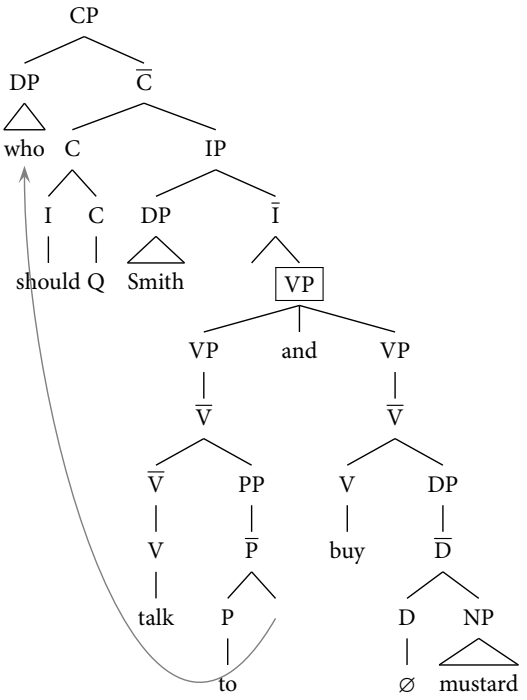
(72) * Who should Smith talk to and buy mustard?

What seems to have gone wrong here has to do with the coördination. Ross suggested that there is a condition against moving stuff out of a coördination. He called this the "Coördinate Structure Constraint."

(73) The Coördinate Structure Constraint
Nothing may move out of phrase that is built with a coördination.

This will block (72) because *who* has moved out of a VP that is constructed from the coördination of two others; (74) illustrates.

(74)



The boxed VP is the one that is built with a coördination, and so it is the phrase from which movement is blocked by the Coördinate Structure constraint.

Note that the instances of "across-the-board" movement that we saw in the previous section are counter-examples to the Coördinate Structure Constraint. Somehow, whatever permits across-the-board movement also manages to satisfy the Coördinate Structure Constraint.

These are the three islands from Ross's dissertation that we will deal with. There are others, however, that have been discovered by other people. One is illustrated by (75).

(75) a. * Who should Smith eat rice [after Jones talks to]?

b. * Who should Smith eat rice [while Jones massages]?

c. * Who should Smith eat rice [before Jones talks to]?

d. * Who should Smith go to L.A. [because Jones likes]?

e. * Who should Smith go to L.A. [even though Jones visited]?

In each of these examples, the wh-phrase has moved out of a kind of adverbial clause. These are sometimes called "adjuncts," and one idea is that what makes them islands is that they are modifiers, and not arguments. If that is the right description of what makes the examples in (75) ungrammatical, then it can be traced to a condition like that in (76).

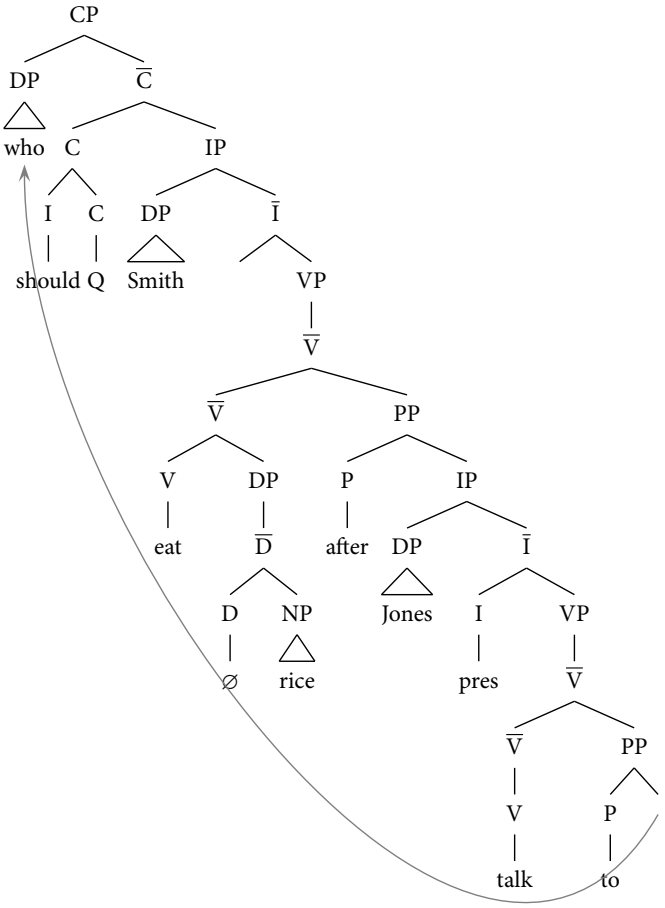
(76) Adjunct Condition

Nothing may move out of a non-argument phrase.

(75a) violates this condition because the phrase headed by *after* is a modifier; (75a) has the representation sketched in (77).

I've left the $\overline{\text{P}}$s out of this phrase marker so that it will fit on the page.

(77)



Both Ross's Coördinate Structure Constraint and the Adjunct Condition are known to have counterexamples. When adverbial clauses like those in (75) are made so that the IP they contain is not finite, there is an improvement in the ability of Wh Movement to move a wh-phrase out of them. For instance, many speakers find the examples in (78) to be better than those in (75).

(78) a. Who should Smith eat rice in order to please ?

b. ? Who shouldn't Smith go to L.A. without first consulting ?

c. ? Who should Smith eat rice when talking to ?

At present, there is no consensus about what makes certain of these examples better than others.

The Coördinate Structure Constraint has violations that Ross himself noted. One of these is (79).

(79) What should Smith run to the store and buy ?

Here there has been some progress, and a good classification of the different types of coördinations that allow Wh Movement from them exists. I won't go farther into this area in this essay however.

Another constraint on Wh Movement is illustrated by (80).

These sorts of examples were first discussed by Chomsky (1964).

(80) a. * What should Smith ask who bought ?

b. * Who should Smith ask what bought?

c. * Who will Smith ask when left?

d. * What can Smith wonder why Jones bought ?

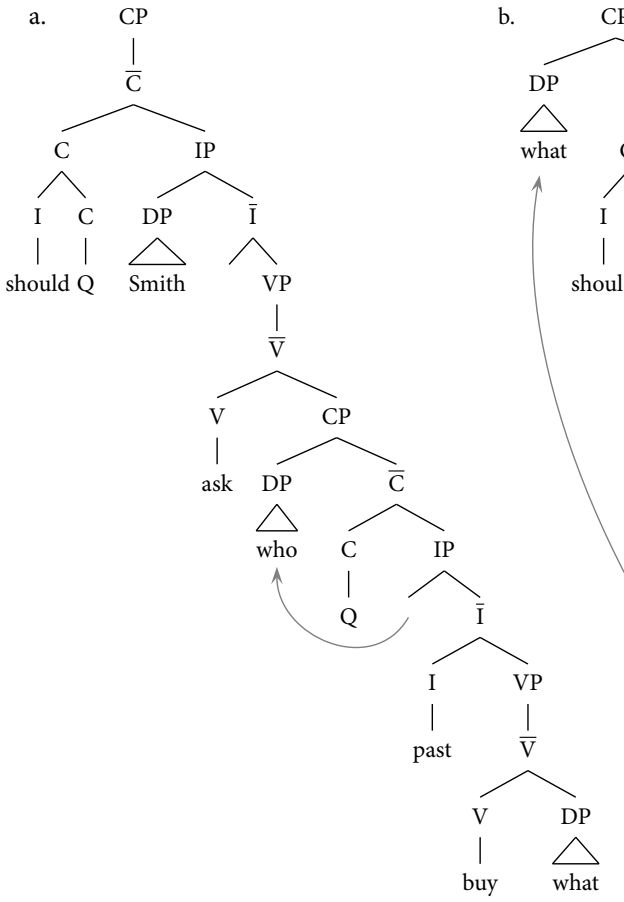
In each of these examples, a wh-phrase has moved out of an indirect question. Chomsky had the idea that this is what is responsible for their relative badness. This constraint is sometimes known as the "Wh Island Constraint," and it has been formulated along the lines in (81).

(81) The Wh Island Constraint
Nothing may move out of a CP with a wh-phrase in its Specifier position.

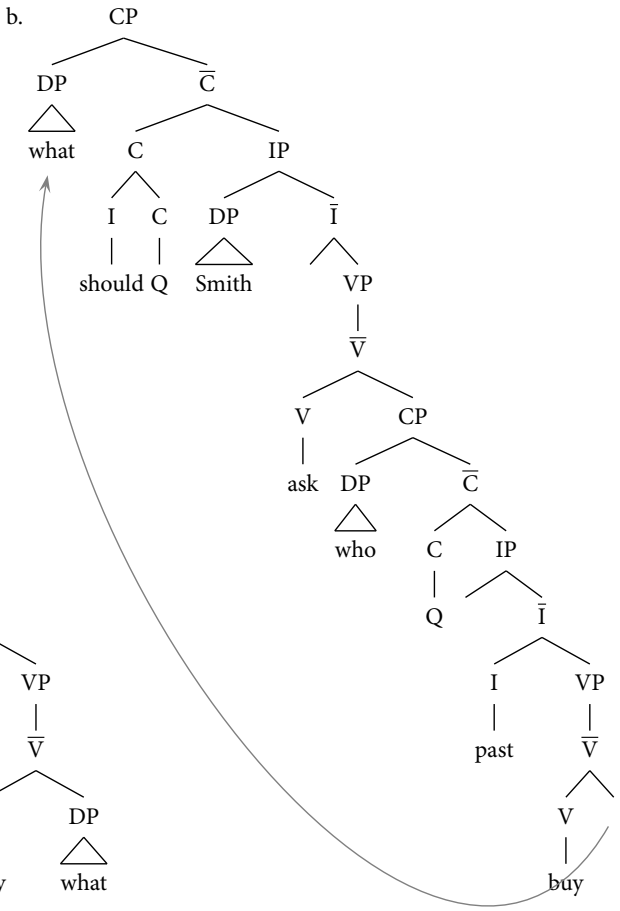
To the extent that the Wh Island Constraint is correct, though, it raises an interesting problem. The CP that is an island becomes an island by Wh Movement itself. So if we were to look at the derivation that leads to the outcome in (80a), for instance, there will be two applications of Wh Movement. Suppose the first application of Wh Movement creates the representation in (82a) on the next page. The second application of Wh Movement would

produce (82b), if the Wh Island Constraint allowed it. The Wh Island Constraint prevents this second application of Wh Movement because the embedded clause has a wh-phrase in its Specifier position, and the Wh Island Constraint says that things can't be moved out of clauses that have a wh-phrase in its Specifier position. If the derivation involves this ordering of applications of Wh Movement, then the Wh Island Constraint does the right job and blocks the resulting s-structure.

(82) a.

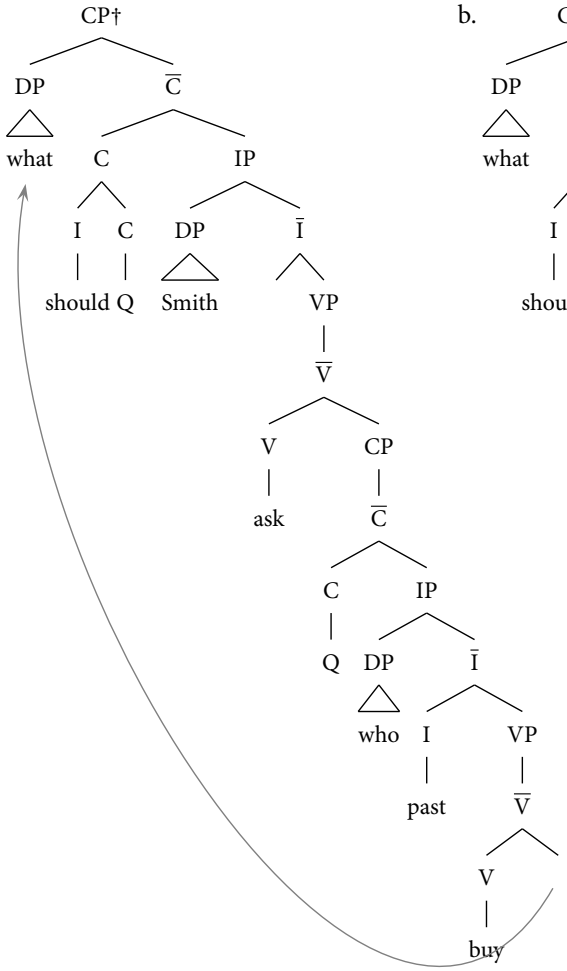


b.

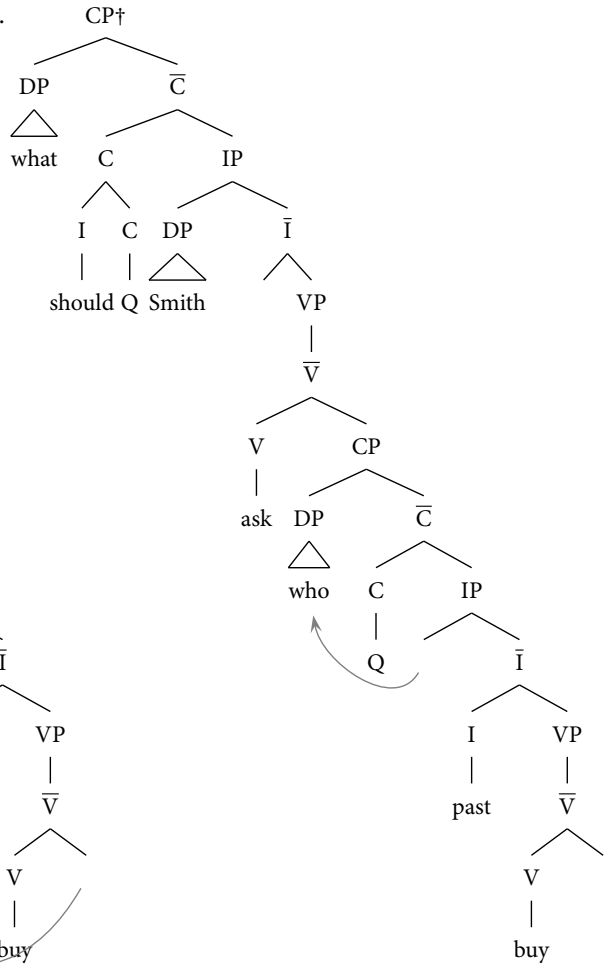


But because there is nothing that orders the applications of Wh Movement, it is possible to give this sentence another derivation. It should be possible to achieve the ungrammatical outcome in (80a) by simply reversing the two steps we've seen in (82). If we apply Wh Movement to *what* first, as in (83a) on the next page, there is no violation of the Wh Island Constraint. Then Wh Movement could apply a second time to form an s-structure matching the sentence in (80a), as indicated in (83b). No application of Wh Movement in this derivation violates the Wh Island Constraint. If we are to prevent (80a), we will need something more than just the Wh Island Constraint, then. We will need something that prevents the derivation in (83).

(83) a.



b.



One proposal is to impose an ordering on movement operations of the sort that Wh Movement is. A common solution is to adopt what is called the Principle of the Cycle. The idea behind the Principle of the Cycle is that movement operations apply to the phrase marker from the bottom up. It can be formulated as in (84).

(84) Principle of the Cycle
Call the smallest XP that contains the terms that a rule, α, involves, the "cyclic domain of α." No cyclic domain of a rule may be (properly) contained by the cyclic domain of another rule.

α properly contains β if α contains β and $\alpha \neq \beta$.

The derivation of (80a) that we wish to block would be prevented by the Principle of the Cycle. Let's step through how.

Suppose the first application of Wh Movement in the derivation moves *what* into the Specifier of the root CP, as indicated in (83a). The cyclic domain of that application of Wh Movement is the root CP, that is "CP†." (The two terms that this application of Wh Movement involves are the Specifier of CP† and *what*. The smallest XP that contains both those terms is CP†, so this is the

cyclic domain.) The second application of Wh Movement will move *who* into the Specifier of the embedded CP. The cyclic domain of that application of Wh Movement is the embedded CP. The embedded CP is embedded in CP†, and therefore a violation of the Principle of the Cycle arises if *who* is moved after *what* is moved.

The Principle of the Cycle requires that (80a) be derived in the following way: first, *who* is moved into the Specifier of the embedded CP, then Head Movement moves *should* into the head of the root CP, and finally, Wh Movement brings *what* into the Specifier of the root CP. This last step will violate the Wh Island Constraint, and that is why (80a) is ungrammatical.

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Reinhart, Tanya. 1976. The syntactic domain of anaphora. Doctoral Dissertation, Massachusetts Institute of Technology.