

Contiguity Theory and Pied-Piping

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Roadmap:

- Review some proposals about the distribution of overt syntactic movement (Richards 2010, 2016).
- Apply these proposals to conditions on pied-piping discovered by Cable (2007).

As Cable notes, languages vary in their pied-piping possibilities:

- (1) a. *[Pictures of **whom**] do you think I should buy ___ ?
b. [Des photos de **qui**] penses-tu que je devrais acheter ___ ?
of.the photos of who think-you that I should buy
[French: Paul Marty, Sophie Moracchini, p.c.]

I'll offer an account of this kind of variation.

I. Contiguity Theory...

requires that a certain type of prosodic relation hold between Probes and Goals, and between heads in a selection relation. For reasons of time, I won't try to review the nature of that prosodic relation...instead, here's the upshot:

- Probes and Goals must...
 - be adjacent if the Probe *precedes* the Goal, in some languages (e.g., English), and
 - be adjacent if the Probe *follows* the Goal, in other languages (e.g., French).
- Heads in a selection relation must always be adjacent.

'Adjacent' will have to be understood throughout as meaning 'not separated by any phrases which completely linearly intervene between them.'

These conditions must be met at some point in the derivation, but they don't have to survive to the end of the derivation—that is, they don't have to be surface-true.

The conditions are derived from the mapping of syntax onto prosodic structure. Importantly, we don't have to state a parameter determining where adjacency is required; the parameters are prosodic, and have to do with (ideally, observable) generalizations about which edge of a prosodic phrase a language will mark with (for example) boundary tones.

1.1. Probes, Goals, and Contiguity

We expect, on the generalizations given above, that languages with final C will never have wh-movement to the left: wh-movement is triggered, on this account, by a need to make C and the wh-phrase adjacent. We expect to find two kinds of C-final languages:

- (2) a. **Dare**-ga pan-o katta (C)? [Japanese]
who-NOM bread-ACC bought
'Who bought bread?'
- b. Pan-o **dare**-ga katta (C)?
bread-ACC who-NOM bought

Japanese (as we can determine from its prosody) is a 'Probes need not be adjacent to preceding Goals' language.

- (3) a. ***vin** p'ur-i iq'ida (C)? [Georgian: Erschler 2015]
who.ERG bread-NOM bought
'Who bought bread?'
- b. p'ur-i **vin** iq'ida (C)?
bread-NOM who.ERG bought

Georgian (and, again, this follows from properties of Georgian prosody) is a 'Probes must be adjacent to preceding Goals' language. The wh-phrase therefore cannot be separated from C by the subject (though the verb is okay, since it's not a complete phrase).

Turning to some head-initial languages

(assuming **T** Agrees with the subject and **v** with the object):

- (4) John (*often*) (**T**) (**v**) sees (**often*) Mary [English]

English is a 'Probes must be adjacent to following Goals' language. So *v* must be adjacent to the object: no adverbs can be between them. T doesn't have to be adjacent to the subject, which precedes it, so adverbs are okay there.

- (5) a. Today John **T** is happy.
 b. **T**-is (**today*) John ___ happy?
 ↑-----↓

Here we see that T and the subject do have to be adjacent if the subject follows T—just as *v* and the object had to be adjacent in (5), and for the same reason.

- (6) Jean (**souvent*) (**T**) (**v**) voit (*souvent*) Marie [French]
 Jean *often* sees *often* Mary

French is the opposite of English: Probes must be adjacent to preceding Goals. So adverbs are okay between *v* and the object, but not between T and the subject.

- (7) a. Jean parle-**T** *pas* l'italien
 Jean speaks *not* Italian
 'Jean doesn't speak Italian'
 b. * Jean *pas* parle-**T** l'italien
 Jean *not* speaks Italian

Same fact as in (7): negation, like other adverbs, can't be between the subject and T.

- c. *Pas* parler-**T** l'italien...
not to.speak Italian
 'To not speak Italian...'

...but of course, when there's no subject, that isn't an issue ("infinitival verbs in French don't raise as high as tensed verbs").

Relatedly...

- (8) a. Who **C** did you see?

- b. * **C** you saw who?

- (9) a. Qui **C** as-tu vu?
 who have-you seen

- b. **C** tu as vu qui ?
 you have seen who

English C can't be separated from its following Goal: English has overt wh-movement. French C can be separated from its following Goal: French has the option of wh-in-situ (though there is no law saying you can't do wh-movement).

1.2 Sadly, there are languages other than English and French

Consider non-V2 clauses in Icelandic and Mainland Scandinavian (Wiklund et al 2007):

- (10) Ég veit [af hverju Hedda (**ofit*) kaupir (*ofit*) skó] [Icelandic]
 I know why Hedda often buys often shoes

- (11) Jeg vet [hvorfor Hedda (*ofte*) kjøper (**ofte*) sko] [Norwegian]
 I know why Hedda often buys often shoes
 'I know why Hedda often buys shoes'

Vikner 1997, Bentzen 2008: Icelandic=French (*adv between T and subject),
 Mainland Scandinavian=English (*adv between *v* and object).

But Icelandic, unlike French, lacks wh-in-situ:

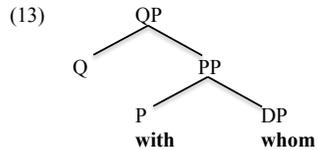
- (12) *Pétur hefur talað við **hvern**?
 Peter has spoken with who.ACC

...but Icelandic has V2...and V2 languages rarely have wh-in-situ (ask me why!)

→ Norwegian=English, Icelandic=French,
 and (for reasons I'll skip) V2 languages (almost) never have wh-in-situ.

2. ...and now for pied-piping

I'll assume, almost following Cable:



- QP dominates wh-phrases (universally)
- C Agrees with QP (universally)
- Q Agrees with the wh-phrase itself (universally, in “limited pied-piping” constructions)
 - wh-movement, restrictive relatives, but not non-restrictive relatives
 - Postal’s (1994, 1998, 2001) “A-extractions”?

- (14) John, [pictures of **whom**] I do not think you should buy ___...
 → no Q-whP Agreement: **whom** can be deeply embedded.

- (15) a. *[Pictures of **whom**] do you think I should buy ___?
 b. [Des photos de **qui**] penses-tu que je devrais acheter ___?
 of.the photos of who think-you that I should buy
 [French: Paul Marty, Sophie Moracchini, p.c.]

→ Q-whP Agreement: **whom** is limited in how far it can be embedded.
 How limited?

Uribe-Etxebarria (2002): conditions on ‘pied-piper’ reflect conditions on wh-in-situ!

Spanish (for some speakers, Jiménez 1997, Uribe-Etxebarria 2002, Reglero 2004) is an optional wh-in-situ language, with a twist:

- (16) a. ¿Tú le diste la guitarra **a quién**?
 you CL gave the guitar **to whom**
 b. *¿Tú le diste **a quién** la guitarra?
 you CL gave to whom the guitar
 ‘Who did you give the guitar to?’

Spanish wh-in-situ must be clause-final (or ‘big-intonation-break-final’, anyway: (16b) can be saved with a big enough pause after the wh-phrase).

full disclosure: I’m not going to offer an account of why this is.

But Uribe-Etxebarria (2002) points out: the same condition holds on pied-pipers within the moved phrase:

- (17) a. ¿[La estatua en el jardín **de qué diosa**] te ha dicho Juan
 the statue in the garden **of what goddess** CL.has said Juan
 que había reconocido ___?
 that had recognized
 ‘[The statue in the garden of **what goddess**] did Juan tell you
 that he had recognized?’
 b. *¿[La estatua **de qué diosa** en el jardín] te ha dicho Juan
 the statue **of what goddess** in the garden CL.has said Juan
 que había reconocido ___?
 that had recognized
 ‘[The statue of **what goddess** in the garden] did Juan tell you
 that he had recognized?’

Only a phrase-final pied-piper can be non-initial in the moving phrase—just as only a clause-final wh-phrase may be in situ. Or in our terms: Q-wh Contiguity, like C-QP Contiguity, is only possible in Spanish if the Goal is as far right as possible.

Another condition on Spanish wh-in-situ, which I’m also not going to explain: it’s impossible in embedded questions (Reglero 2004, 20):

- (18) *Pedro ha preguntado que has visto **a quién**
 Pedro has asked that you.have seen **DAT who**
 ‘Pedro asked who you saw’

And embedded questions have tighter restrictions on pied-piping (Karlos Arregi, p.c.):

- (19) a. ¿[El retrato **de quién**] ha dicho Juan que viste en el museo?
 the picture **of who** has said Juan that you.saw in the museum
 ‘[The picture of who] did Juan say that you saw in the museum?’
 b. *Juan me ha preguntado [el retrato **de quién**] viste en el museo.
 Juan me has asked the picture **of who** you.saw in the museum
 ‘Juan asked me [a picture of who] you saw in the museum’

French lacks the ‘end-of-the-clause’ restriction in (18):

- (20) Tu fait **quoi** dans la vie?
 you do **what** in the life
 ‘What do you do in life?’ (Shlonsky 2009)

And it also appears to lack the ‘end-of-the-wh-phrase’ restriction:

- (21) ?[Des peintures de **quoi** de Monet] as-tu vu au musée?
of.the paintings of what by Monet have-you seen at.the museum
‘[Paintings of **what** by Monet] did you see at the museum?’ (Sophie Moracchini,
Paul Marty, p.c.)

French is like Spanish in banning wh-in-situ in embedded questions:

- (22) *Peter a demandé [tu as vu **qui**]
Peter has asked you have seen **who**

And French is also like Spanish in having tighter restrictions on pied-piping in embedded questions:

- (23) a. [Des photos de **qui**] as-tu achetées?
of.the photos of **who** have-you bought
‘[Photos of **who**] did you buy?’
b. * Je ne sais pas [des photos de **qui**] elle as acheté.
I NE know not of.the photos of **who** she has bought
‘I don’t know [photos of **who**] she bought’ (Sophie Moracchini,
Paul Marty, p.c.)

Zulu has the option of wh-in-situ in main and embedded clauses:

- (24) a. U-bona-**ni**?
2SG-see-**what**
‘What do you see?’
b. Ngi-buze [ukuthi uPeter u-thenge-**ni**]
1SG-asked that 1a.Peter 1a-bought-**what**.9
‘I asked what Peter bought’ (Sabel and Zeller 2006)

And Zulu pied-piping can be by non-initial phrases, even in embedded questions:

- (25) a. [Isibonelo **sika-bani**] oku-melwe si-si-landel-e?
AUG.7.example 7.ASSOC.1-1.who 17.REL-ought 1PL.S-7.O-follow-SUBJ
‘[The example of **who**] ought we to follow?’
b. Si-no-valo ngoba a-s-azi
2PL-with.AUG-11.fear because NEG-2PL-know
ukuthi [ingane **ka-bani**] e-zo-landela
that AUG.9.child ASSOC-who 9.REL-FUT-follow
‘We’re afraid, because we don’t know [child of **who**] will be next’
(Claire Halpert, p.c.)

English doesn’t standardly allow wh-in-situ, or deeply embedded pied-pipers:

- (26) a. *You bought **what**? (non-echo)
b. *[Pictures of **what**] did you buy?

...so Uribe-Etxebarria’s observation that pied-piping and wh-in-situ are similarly restrained seems to work well cross-linguistically, so far.

(27)

wh-in-situ	main clause, final position	main clause, non-final	embedded questions
Spanish	√	*	*
French	√	√	*
Zulu	√	√	√
English	*	*	*

(28)

embedded pied-pipers	main clause, final position	main clause, non-final	embedded questions
Spanish	√	*	*
French	√	√	*
Zulu	√	√	√
English	*	*	*

Recall that Icelandic *should* have wh-in-situ, given where it can put its adverbs:
Icelandic=French.

Mainland Scandinavian, on the other hand, *shouldn’t* have wh-in-situ.

Neither actually does have wh-in-situ, because of V2 (I suggested).

But Icelandic pied-piping is like French pied-piping: loose in main clauses, stricter in embedded questions:

- (29) a. [Málverk eftir **hvern**] sást þú?
painting by who saw you
‘[A painting by **who**] did you see?’
b. * Ég veit ekki [málverk eftir **hvern**] þú sást
I know not painting by who you saw
‘I don’t know [a painting by **who**] you saw’
(Hrafnhildur Bragadóttir, Stefan Olafsson, Helgi Gunnarsson, p.c.)

And Norwegian pied-piping is like English pied-piping:

- (30) * [Fotografier av **hvem**] kjøpte hun? (non-echo)
 photographs of **who** bought she
 'Who did she buy photographs of?' (Øystein Vangsnes, p.c.)

So, slight twist on Uribe-Etxebarria's generalization: it's not that pied-piping by non-initial wh-phrases patterns with wh-in-situ possibilities, exactly—it's that pied-piping patterns with what wh-in-situ possibilities *should* be, if it weren't for V2.

(31)

wh-in-situ	main clause, final position	main clause, non-final	embedded questions
Spanish	√	*	*
French	√	√	*
Zulu	√	√	√
English	*	*	*
Icelandic	*	*	*
Norwegian	*	*	*

(32)

embedded pied-pipers	main clause, final position	main clause, non-final	embedded questions
Spanish	√	*	*
French	√	√	*
Zulu	√	√	√
English	*	*	*
Icelandic	√	√	*
Norwegian	*	*	*

Actually, even that is an oversimplification. One of Cable's (2007) star examples of a language in which wh-phrases can be deeply embedded in QP is Tlingit:

- (33) [Wáa kwligeyi xáat] **sá** i tuwáa sigóo?
 how it.is.big.REL fish Q you.want.it
 'How big a fish do you want?' (*lit.*, '[a fish that is how big] do you want?')

Tlingit has obligatory wh-movement (Cable 2007). For that to be true, for me, it should be a language with initial C and a requirement that probes be adjacent to *following* Goals:

- (34) C [wáa kwligeyi xáat sá] i tuwáa sigóo?
 how it.is.big.REL fish Q you.want.it
 'How big a fish do you want?'

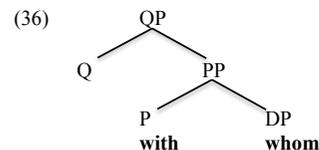
What about the Agree relation between Q and wh?

- (35) [wáa kwligeyi xáat] **sá**
 how it.is.big.REL fish Q
 'a fish that is how big'

Tlingit Q, unlike (hopefully) Tlingit C, is on the *right*. So Tlingit's need for probes to be adjacent to *following* goals won't apply here: the Goal for Q *precedes* Q. It follows that Tlingit wh-words should be deeply embeddable.

Summary

Cable (2007):



Cable posited a parameter: some languages have Q Agree with wh, and in such languages, Q and wh must be close together.

Claim I've just defended: no need for a (new) parameter. Q can Agree with wh universally (in wh-questions); whether this forces Q and wh to be close together depends on the language, in ways that are predictable from prosody (and related to wh-in-situ possibilities and position of adverbs)

If I'm right, it would be a mistake to give ourselves the power to allow the distribution of overt movements of different kinds to vary independently from each other, and from conditions on pied-piping. We should have a more constrained theory than that.

A remaining problem: none of this would stop VP from pied-piping in, for example, nonrestrictive relatives (which don't have Q-whP Agree, by hypothesis):

(37) *John, [fired **whom**] I already have...

Something seems to just rule out pied-piping of certain phrases, regardless of the Agree relation between Q and wh. How do we do that?

Cable's answer:

(38) **The QP-Intervention Condition**

A QP cannot intervene between a functional head F and a phrase selected by F.

So QP can't dominate vP or VP, because T and v are functional heads.

Let's now derive (38).

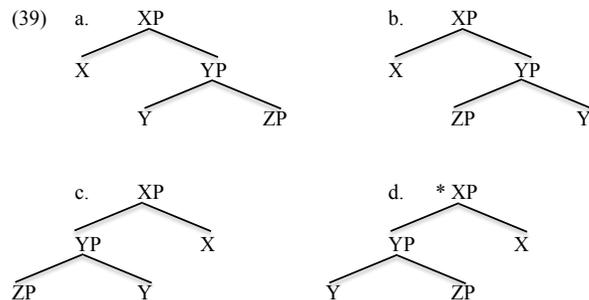
3. Selection and Contiguity

Contiguity Theory requires heads in a selection relation to be adjacent (at some point in the derivation).

One thing Richards (2016) derives with this is the Final-over-Final Constraint (Biberauer, Holmberg, and Roberts (2014):

Final-over-Final Constraint (FOFC)

If α is a head-initial phrase and β is a phrase immediately dominating α , then β must be head-initial. If α is a head-final phrase and β is a phrase immediately dominating α , then β can be either head-initial or head-final.



For example, for X=Aux, Y=V, ZP=Object → *V Object Aux.

(doesn't hold for the whole tree. We'll come back to that)

Case #1: Finnish (Holmberg 2000)

Finnish is typically Aux-V-O, but if matrix C is [+focus] or [+wh] (!), you get more freedom:

- (40) a. Milloin Jussi olisi kirjoittanut romaanin? [Aux V O]
 when Jussi would.have written INDEF.novel
 'When would Jussi have written a novel?'
- b. Milloin Jussi olisi romaanin kirjoittanut? [Aux O V]
 when Jussi would.have INDEF.novel written
- c. Milloin Jussi romaanin kirjoittanut olisi? [O V Aux]
 when Jussi INDEF.novel written would.have
- d.* Milloin Jussi kirjoittanut romaanin olisi? [*V O Aux]
 when Jussi written INDEF.novel would.have

Case #2: Basque (Haddican 2004, 116)

Negation triggers Aux-fronting:

- (41) a. Jon-ek ez dio esan-Ø Miren-i egia [Aux V O]
 Jon-ERG not AUX say-ASP Miren-DAT truth
 'Jon has **not** told Miren the truth'
- b. Jon-ek ez dio Miren-i egia esan-Ø [Aux O V]
 Jon-ERG not AUX Miren-DAT truth say-ASP
 'Jon has **not** told Miren the truth'
- c. Jon-ek Miren-i egia esan-Ø dio [O V Aux]
 Jon-ERG Miren-DAT truth say-ASP AUX
 'Jon has told Miren the truth'
- d. * Jon-ek esan-Ø Miren-i egia dio [*V O Aux]
 Jon-ERG say-ASP Miren-DAT truth AUX
 'Jon has told Miren the truth'

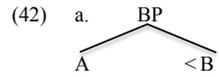
To put the generalization another way:

- a head at the bottom of the tree may be final,
- and so may any head X such that the complement of X is head-final.

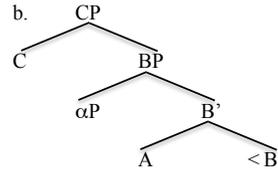
A way to get this using Contiguity:

- assume that Kayne (1994) is sufficiently right that heads enter the derivation head-initial.
- posit operations that create final heads:
 - *Untethering*, which eliminates the ordering statement between sisters, and
 - *Retethering*, which creates ordering statements that make heads final.
- these operations must be motivated: one possible motivation is Contiguity.

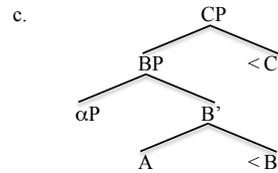
Now we can consider a derivation:



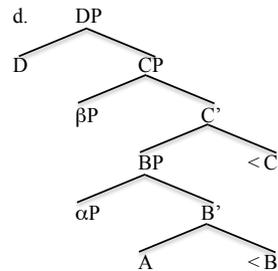
Somewhere down at the bottom of the tree, two heads are Merged. They can't be ordered by the LCA; Retethering can be motivated by the need to create an ordering. Here I've made B final.



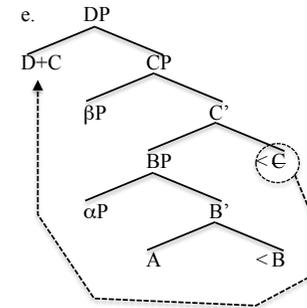
After giving BP a specifier, alphaP, I've Merged another head, C. Contiguity between C and B now needs to hold, and one way to create it would be to Untether C, and Retether it in final position:



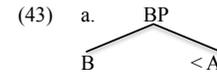
Here we see another motivation for Retethering: C can become final to become Contiguous with B.



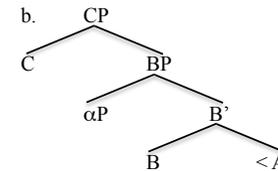
Again, we can Merge an initial head, D. This time, instead of making D final, we could head-move C to D:



C head-moves to D to become Contiguous with D (breaking its own Contiguity relation with B, in the process). The result is one type of mixed headedness: head-initial (D+C) above head-final (B). Let's now try and fail to derive the non-attested type of mixed headedness.



This time we've elected to make B initial rather than final.



Now B and C need to be made Contiguous. There are various things that would work: we could move B to C, if C is an affix, or we could move alphaP out from in between them.

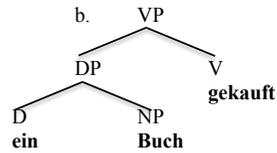
Here's something that won't work, though: making C final. There's no point in doing that.

→ if the lower heads are initial, the higher head can't be final. This is the FOFC.

Now, in what domain does FOFC hold?

Biberauer et al: not the whole utterance:

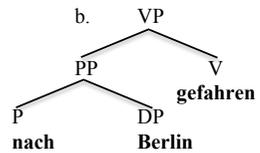
(44) a. Er hat [ein Buch] gekauft [German]
 he has a book bought



head-initial D dominated by head-final V: DP and VP are separate FOFC-evaluation domains.

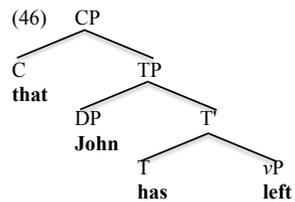
Similarly:

(45) a. Sie ist [nach Berlin] gefahren [German]
 she is to Berlin driven

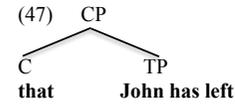


PP and VP are also separate FOFC-evaluation domains.

Biberauer et al suggest that the domains are extended projections of lexical heads (N vs. V, in this case). An alternative: the relevant domains are Spellout domains.



C and T aren't Contiguous...but C is a phase head. After TP undergoes Spellout, its internal structure becomes inaccessible to the narrow syntax:



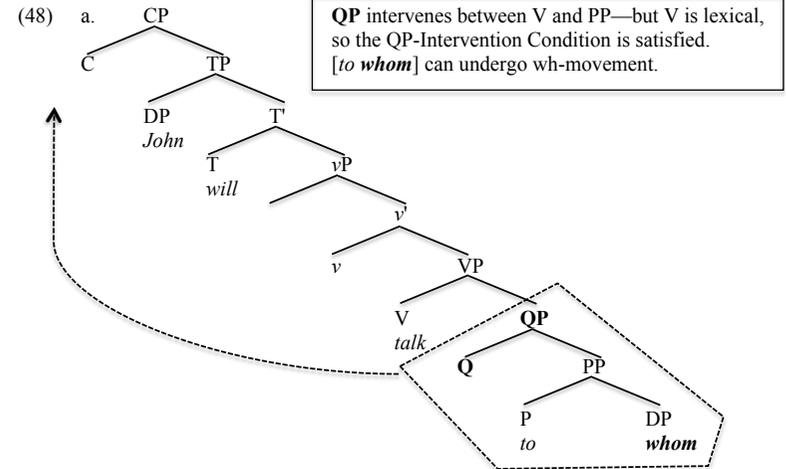
We've seen that Contiguity is evaluated during the syntactic derivation. But if the only structures that can actually be ruled out by Contiguity are spellout domains, then (47) might survive; there isn't a single Spellout domain containing both C and T.

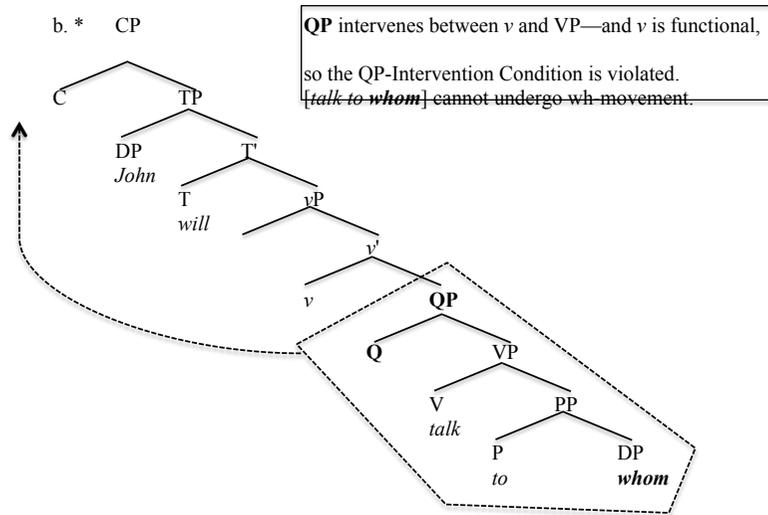
4. Selectional Contiguity and pied-piping

Let's see how to use Selectional Contiguity to derive Cable's QP-Intervention Condition:

Cable's observation:

QP disrupts selection by functional heads (QP-Intervention Condition)



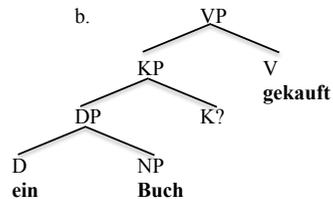


Note that this proposal is problematic for currently popular views of the structure of the extended VP: in particular, there can't actually be a *vP*, or it can't be functional (since if it were, Cable's QP-Intervention Condition would block wh-movement of subjects).

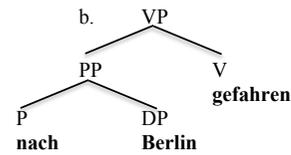
In principle, Selectional Contiguity would lead us to expect that QP couldn't dominate any selected phrase; it would always block Contiguity.

One exception; QP should be able to dominate Spellout domains. Recall from the FOFC discussion that these are the domains where FOFC 'resets':

- (49) a. Er hat [ein Buch] gekauft [German]
 he has a book bought



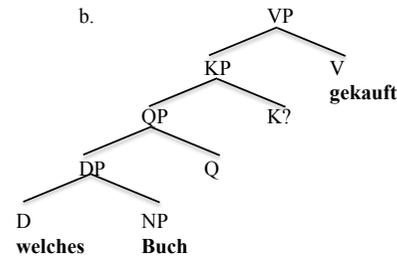
- (50) a. Sie ist [nach Berlin] gefahren [German]
 she is to Berlin driven



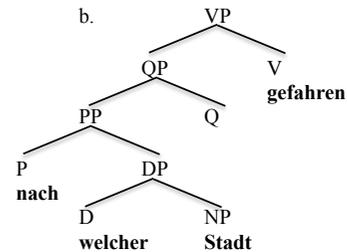
V is separated from D and P by a Spellout boundary, giving V another way of satisfying Selectional Contiguity with its complement (by converting the structure into one to which Selectional Contiguity doesn't apply).

→ we should be able to insert QP above these spellout domains:

- (51) a. Er hat [welches Buch] gekauft [German]
 he has which book bought



- (52) a. Sie ist [nach welcher Stadt] gefahren [German]
 she is to which city driven



(technical note: what's the phase head? we may have to invent one: we need DP and PP to be spellout domains, so unless V is always a phase head, there may have to be a *pP* above PP, for example).

conclusion: spellout domains (DP, PP...) and adjuncts can be dominated by QP.

Cable's QP-Intervention Condition: vP can't be a wh -phrase.

5. Conclusion

(53) Selectional Contiguity

In a structure containing two heads X and Y which are in a Selection relation, X and Y must be linearly adjacent at some point in the derivation.

predicts that:

A-bar moved phrases must be unselected (adjuncts) or phase spellout domains.
→ DP, PP, not vP . (Cable's **QP-Intervention Condition**)

(54) Probe-Goal Contiguity

Probes and Goals must...

- be adjacent if the Probe *precedes* the Goal, in some languages (e.g., English), and
- be adjacent if the Probe *follows* the Goal, in other languages (e.g., French).

predict that:

a language will be able to have pied-piping by a phrase which is not initial in QP,
just if and where the language can have wh -in-situ
(or rather, where it *should* be able to have wh -in-situ: Icelandic)
(Cable's **LP-Intervention Condition**)

Many things left to work out...but this seems to get Cable's basic outline.

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Appendix: PP pied-piping

What are we predicting about pied-piping of PP? Notes on an answer:

If we put aside, for a moment, the need for the wh-word to be Contiguous with a higher selector, then we expect that QP should be able to dominate either PP or DP, since these are both separated by Spellout from their phase heads (they are both FOFC-reset domains).

Let's borrow from Abels the idea that a wh-phrase escaping a phase-complement PP will have to move first to the edge of the phase head that takes PP as a complement, and that this move is overly local (though defining anti-locality to rule out this move, while allowing extraction of direct objects, won't be straightforward).

Extraction of DP from PP, on that account, will only be possible if PP isn't a spellout domain. One prediction: preposition-stranding will be limited to languages in which PP doesn't violate FOFC (e.g., VO, prepositional languages, like English and Scandinavian).

In languages in which PP is a spellout domain, PP will then have to pied-pipe. Pied-piping PP will in fact be the only way to ask questions with objects of PPs. Contiguity with a higher selector will have to be created some other way; maybe, as a last resort, you get to prosodically flatten P in ways that are useful for the actual version of Selectional Contiguity.

Coppe van Urk (p.c.) points out that this account offers a plausible story about P-stranding in OV languages like Dutch and (colloquial) German, which is possible (van Reimsdijk 1978 and much other work) with so-called 'R-pronouns', which appear *before* adpositions:

- (55) a. **waar** op [Dutch: van Reimsdijk 1978]
where on
'on what'
- b. op **wie**
on who
'on who'
- c. Waar heb je __ op gerekend?
where have you on counted
'What did you count on?'
- d. *Wie heb je op __ gerekend?
who have you on counted
'Who did you count on?'

What distinguishes (55c), on this account, is that its P is FOFC-compliant, capable of satisfying Selectional Contiguity even if it is not separated from V by a spellout boundary. This particular PP, then, would be able to not be a spellout domain, and extraction would be able to take place.