The syntax of pied-piping

☞ Reading for Monday: Kotek (2014), chapter 2, pp. 57–70.

1 The phenomenon

The term 'pied-piping' is used by linguists to refer to structures where a movement operation applies to a constituent that is in some sense 'larger than expected.'

(1) ***Wh* movement**
  a. [To *who(m)*]$_i$ did you speak t_i?
  b. [*Which* world-famous linguist]$_i$ did the committee not consider t_i for the job?
  c. [*Whose* brother's friend's father]$_i$ did you see t_i?
  d. [*How* big a car]$_i$ did you buy t_i?

(2) **Relative clauses**
  a. [$_{DP}$ The person [$_{CP}$ [*who*]$_i$ everybody ignored t_i]
  b. [$_{DP}$ The person [$_{CP}$ [*whose* singing]$_i$ everybody hates t_i]
  c. [$_{DP}$ The person [$_{CP}$ [pictures of *whom*]$_i$ are hanging on my wall t_i]

(3) **Focus movement**
  a. I've read John's book, but [DAVE's book]$_i$, I haven't read t_i.
  b. It's [JOHN's book]$_i$ that I read t_i (not Dave's).

(4) **The pied-piping convention** (Ross, 1967, p. 206)
Any transformation which is stated in such a way as to affect the reordering of some specified node NP, where this node is preceded and followed by variables in the structural index of the rule, may apply to this NP or to any non-coordinate NP which dominates it, as long as there are no occurrences of any coordinate node, nor the node S, on the branch connecting the higher node and the specified node.

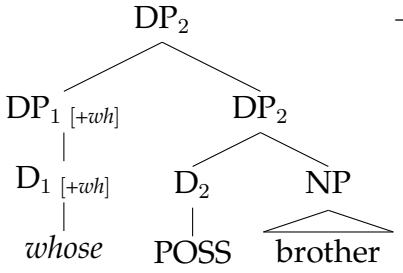
> "Just as the children of Hamlin followed the Pied Piper out of town, so the constituents of larger noun phrases follow the specified noun phrase when it is reordered...
>
> There are certain Feinschmekers who have taken issue with the formulation of this sentence, pointing out that following the original Pied Piper was obligatory for all the children of the town but one, who was lame, so that the phrase "obligatory pied-piping" is a case of terminological coals to Newcastle. These critics suggest that since convention [(4)] describes optional accompaniment, such accompaniment should best be dubbed "fellow traveling," or the like, with the term "pied piping" being reserved for cases of mandatory accompaniment such as those described below. While the point they make is valid, I have chosen to disregard it, eschewing an exact parallel to the fairy tale in question in the interest of a less elaborate set of terms."
>
> (Ross, 1967, p. 263, fn. 23-24)

2 Feature percolation

Ross's (1967) approach to pied-piping can essentially be thought of as feature percolation. If we believe that movement is driven by syntactic Agree/Attract operations, we would like to assume that the constituent targeted for movement carries the relevant feature.

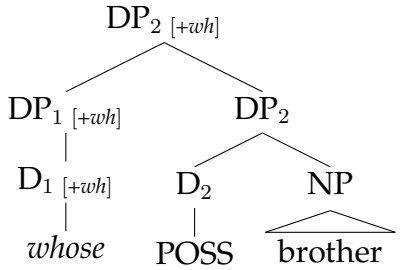
(5) **The Feature Percolation Hypothesis** (Chomsky, 1973, much subsequent work)
There is a mechanism of feature percolation that enables features to spread across phrase boundaries.

(6)



→

(7)



This feature percolation must be constrained in some way, to avoid overgenerating pied-piping structures. (Note that only (8d) is ruled out by Ross's (4).)[1]

(8) **Some impossible pied-piping**
- a. * A man [$_{DP}$ a deckchair of *whom*]$_i$ you spilled coffee on t_i
- b. * A man [$_{AP}$ fond of *whom*]$_i$ she found herself t_i
- c. * A man [$_{VP}$ to address *whom*]$_i$ she hesitated t_i
- d. * A man [$_{CP}$ that we trust *whom*]$_i$ you should not believe t_i

Constraining (5) in a principled way is not easy. Recently, Heck (2008) and Cable (2007) have argued that it is, in fact, impossible.

Feature percolation appears to be limited to cases of pied-piping and is not otherwise useful. We might therefore want to derive it from the other primitives of the system—agree, merge, and move. However:

- *Merge* does not seem to help here.
- We might imagine that feature percolation is an *agree* relation, but what would the agreeing feature be and why would it be there? (9) shows that a possessive phrase needn't agree in number with its possessor.

[1] It is worth noting, though we will not give an analysis for this in class, that possible pied-piping in questions is different than possible pied-piping in relative clauses, so it's not clear that we can just give one formulation of where feature percolation should "stop."

- We might imagine that feature percolation is the result of *feature movement* (Chomsky, 1995; Pesetsky, 2000), but if so this movement would not be sensitive to known islands for extraction, such as the specifier of DP (10).

(9) [My father] is / *am at the party.

(10) a. [*Whose* father's book]$_i$ did you buy t_i?
b. * *Whose*$_i$ did you buy [t_i father's book]?

3 Pied-piping using Q-particles (Cable, 2010)

3.1 Q-particles and their distribution

In Tlingit (Na-Dene; Alaska, British Columbia, Yukon), questions may involve the fronting of a bare *wh*-word, (11a), or pied-piping of additional material of different sizes, (11b–d).

Each fronted phrase contains a *sá* particle at its right edge. Cable (2007; 2010) argues that this is a Question-particle, which projects a further phrasal layer, a QP.

In a multiple question, each *wh*-phrase occurs with its own Q-particle, (11e).

(11) ***Wh*-movement and pied-piping in Tlingit (Cable, 2010):**

a. [Daa **sá**] i éesh al'óon?
what **Q** your father he.hunts.it
'What is your father hunting?'

b. [Daakw keitl **sá**] asháa?
which dog **Q** it.barks
'Which dog is barking?'

c. [Goodéi **sá**] kkwagóot?
where.to **Q** I.will.go
'Where will I go to?'

d. [Goodéi wugootx **sá**] has oowajée i shagóonich?
where.to he.went **Q** they.think your parents.ERG
'Where do your parents think that he went?'

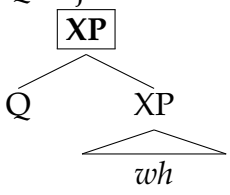
e. [Aadóo **sá**]$_1$ [daa **sá**]$_2$ [$_{TP}$ t_1 yéi oowajée [t_2 du jee yéi teeyí]]?
who **Q** what **Q** they.think their hand.at it.is.there
'Who thinks they have what?'

☞ In all languages, interrogative movement is triggered by Q-particles.

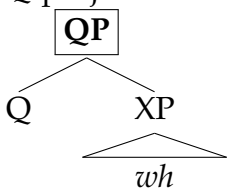
In a given language, Q-particles may project a QP layer, or they may adjoin to a structure containing a *wh*-element but not project.

(12) **Possible QP structures in Cable (2010):**

(a) Q-adjunction:



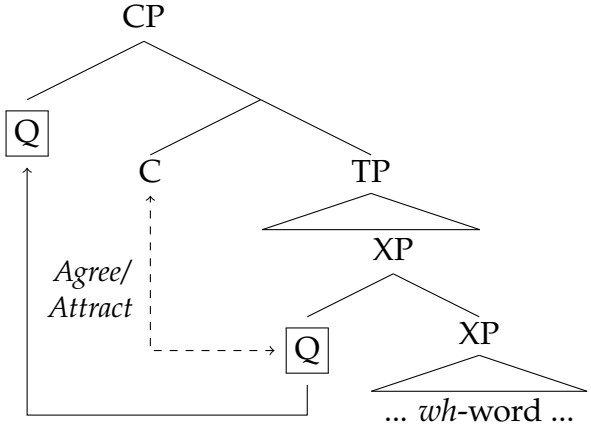
(b) Q-projection:



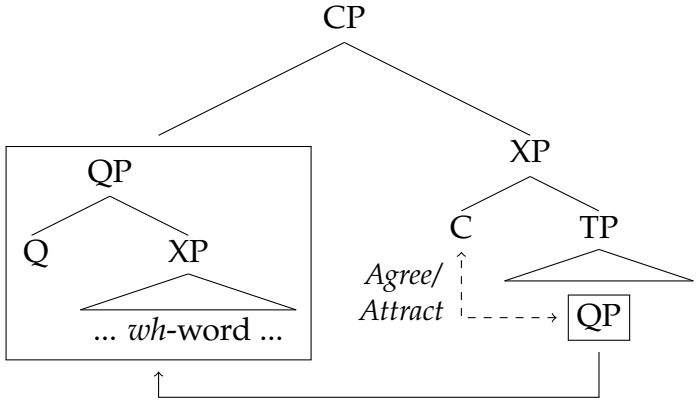
The largest constituent baring a Q-feature is attracted to the CP layer by the interrogative probe, which probes for Q-features.[2]

This gives rise to two types of languages: *wh*-in-situ languages and *wh*-movement languages.

(13) **Q-movement in *wh*-in-situ languages: Q-adjunction (Sinhala, Japanese...)**



(14) **Q-movement in *wh*-fronting languages: Q-projection (English, German...)**



[2]QP that are not moved to Spec,CP end up becoming *wh*-existentials. We will not see more of those today.

3.2 Where does Q go?

In Tlingit, Q cannot occur inside syntactic islands, inside PPs, and inside DPs.

(15) **Q can't occur inside islands, but *wh* can**

a. [[Wáa yateeyí $_{CP}$] sháax'w sáani $_{NP}$] **sá** ash koodlénxaa?
how they.are.REL girls Q they.are.tempting.him
What kind of girls are tempting him? (= Girls that are how are tempting him?)

b. * [[Wáa **sá** yateeyí $_{CP}$] sháax'w sáani $_{NP}$] ash koodlénxaa?
how Q they.are.REL girls they.are.tempting.him

c. * [[Wáa yateeyí $_{CP}$] **sá** sháax'w sáani $_{NP}$] ash koodlénxaa?
how they.are.REL Q girls they.are.tempting.him

(16) **Q can't occur inside PP, but *wh* can**

a. [Tléil [$_{QP}$ [$_{PP}$ aadóo teen] **sá**] xwagoot?
not who with Q I.went
'I didn't go with anyone.'

b. * [Tléil [$_{PP}$ [$_{QP}$ aadóo **sá**] teen] xwagoot?
not who Q with I.went

(17) **Q can't occur inside DP, but *wh* can**

a. [Tléil [$_{QP}$ [$_{DP}$ daakw keitl] **sá**] ushá.
not which dog Q barks
'None of the dogs are barking.'

b. * [Tléil [$_{DP}$ [$_{QP}$ daakw **sá**] keitl] ushá.
not which Q dog barks

(18) **Q can't occur inside DP, but *wh* can**

a. [$_{QP}$ [$_{DP}$ Aadóo yaagú] **sá**] ysiteen?
who boat Q you.saw.it
'Whose boat did you see?'

b. * [$_{DP}$ [$_{QP}$ Aadóo **sá**] yaagú] ysiteen?
who Q boat you.saw.it

Cable's idea: lexical heads (e.g. verbs, nouns), can "select through" a QP. Functional heads (like D and P) cannot see through a QP and therefore cannot have a QP complement. Picking a somewhat less than optimal name, Cable proposes:

(19) **The QP-intervention condition**
A QP cannot intervene between a functional head and a phrase selected by that functional head.

This may give us good results for Tlingit, where Q can basically go anywhere except the cases above (including for example on top of CPs and islands), this will overgenerate pied-piping for English.

3.3 English is a limited pied-piping language

English allows quite deeply embedded *wh*'s in possessive pied-piping:

(20) [$_{QP}$ [[[[*Whose*] brother's] friend's] father] Q]$_i$ did you see t_i?

However, English does not allow movement of CPs or islands, and movement of large DPs where *wh* is not near the edge of the pied-piping is at least degraded.

(21) ? [$_{DP}$ A picture of *which* president]$_i$ t_i hangs on Jim's wall?

(22) ?? [$_{DP}$ The father of *whose* brother's friend]$_i$ did you see t_i?

(23) * [$_{CP}$ that Mary likes *which* man]$_i$ does John believe t_i?

(24) * [$_{DP}$ A fish [$_{CP}$ that is *how* big]]$_i$ do you want t_i?

The idea here: some languages require Agreement between *wh* and Q. This has morphological reflexes, as observed e.g. in English, German and Hebrew, as opposed to Japanese and Tlingit (see also Kratzer and Shimoyama (2002) on this).

(25)

Japanese	German	Tlingit	Hebrew	English
dare	wer	aa(dóo)	mi	who
nani	was	daat	ma	what
itu	wann	gwatk/gwatgeen	matay	when
naze	warum	wáa	lama	why
doko	wo	goo	eifo	where
dore	welche	daakw	eize	which

(26) **Limited pied-piping languages (Cable, 2010, p. 147):**
If the Q-particle must Agree with the *wh*-word it c-commands, then a *wh*-word cannot be dominated in the sister of Q by islands or lexical categories. Thus limited pied-piping languages are those where Q/*wh*-Agreement must occur.

This may be independently derived from work in Distributed Morphology, which argues that every lexical category is a phase. Let's assume that Agree can't happen across a phase.

(27) **The Fine Structure of Lexical Categories** (Embick and Marantz, 2008)
Every lexical projection (VP, NP, AP) is complement to a phase head (little-*v*, little-*n*, little-*a*).

Prediction: no pied-piping of *modifiers* to lexical categories:

(28) a. * [$_{QP}$ [$_{DP}$ The [$_{NP}$ party *where*]] Q] will John enjoy?
b. * [$_{QP}$ [$_{VP}$ Go *where*] Q] will you?
c. * [$_{QP}$ [$_{DP}$ A [$_{NP}$ [$_{DegP}$ *how* big] party]] Q] will you throw?

3.4 The left edge of pied-piping constituent

The way to get around this problem is to bring the *wh* to the edge of the pied-piping, where it is not shipped off as part of the lower phase and instead is visible to Agree operations from above.

(29) **Pied-piping possible when *wh* is in left edge of pied-piping**
  a. $[_{QP}$ [[[[*Whose*] brother's] friend's] father] Q$]_i$ did you see t_i?
  b. ?? $[_{DP}$ The father of *whose* brother's friend$]_i$ did you see t_i?

(30) a. [*How* big a car$]_i$ did you buy t_i?
  b. * [A *how* big car$]_i$ did you buy t_i?

We see this in other languages as well, for example in Basque and Quechua, which allow for CP-pied-piping, but only if the *wh* is fronted inside CP (Heck, 2008).

(31) **Pied-Piping of Subordinate CPs in Basque and Ancash Quechua**
  a. **Basque:**
    i. $[_{CP}$ Nor$_1$ $[_{IP}$ joango dela $t_1]]_2$ esan du Jonek t_2?
      who go AUX said AUX John
      'Who did John say will go?'
    ii. * $[_{CP}$ $[_{IP}$ Joango dela Nor$]]_2$ esan du Jonek t_2?
      go AUX who said AUX John
  b. **Ancash Quechua:**
    i. $[_{CP}$ Imata$_1$ $[_{IP}$ wawa t_1 mikuchun$]]_2$ -taj Maria t_2 munan?
      what child eat Q Maria want
      'What does Maria want the child to eat?'
    ii. * $[_{CP}$ $[_{IP}$ Wawa imata mikuchun$]]_2$ -taj Maria t_2 munan?
      what child eat Q Maria want

Note: you might also think there is CP-pied-piping in English, at least in colloquial speech:

(32) **Possible CP Pied-Piping in English** (Kayne, 2000; Horvath, 2007)
  a. $[_{CP}$ *What's* in there$]_i$ do you think t_i?
  b. $[_{CP}$ *What* did he get$]_i$ does he think t_i?
  c. $[_{CP}$ *Where* will we go$]_i$ does she think t_i?
  d. $[_{CP}$ *Who* saw John$]_i$ do you think t_i?

And indeed, this construction requires fronting of the *wh*.

(33) **English CP Pied-Piping Requires Wh-Fronting**
  a. $[_{CP}$ *What* did he get$]_i$ does he think t_i?
  b. * $[_{CP}$ He got *what*$]_i$ does he think t_i?

3.5 Parameters of variation

From (Cable, 2007, p. 358–360), this is a summary of the variation in the Q-based system, and some major consequences.[3]

(34) a. **The projection parameter: Q-projection vs. Q-adjunction**
In some languages (the Q-adjunction languages), Q adjoins to its sister and their mother is of the same category as the sister. In other languages (the Q-projection languages), Q takes its sister as complement, and so the node minimally dominating the Q and its sister is a QP.

b. **The Q-movement parameter: Overt vs. Covert**
In some languages (the Overt Q-movement languages), the highest syntactic copy of a Q-particle is pronounced. In other languages (the Covert Q-movement languages), the lowest syntactic copy of a Q-particle is pronounced.

c. **The Q-pronunciation parameter: Pronounced vs. Null**
In some languages, the Q-particle has phonological content. In other languages, the Q-particle is phonologically null.

d. **The Agreement parameter: Q/*Wh*-Agreement vs. Non-Agreement**
In some languages (the Q/*Wh*-Agreement languages), a Q-particle must Agree with a *wh*-word. In other languages (the Non-Agreement languages), Q-particles needn't undergo Agreement with any *wh*-word.

e. **The Multiple *Wh*-Question parameter: Multiple Qs vs. Single Q**
In some languages (the Multiple QP languages), a multiple *wh*-question can contain multiple Q-particles. In other languages (the Single QP languages), multiple *wh*-questions must contain only a single instance of Q.

(35) **Some consequences**

a. The cases where Q is attached, not directly to the *wh*-word, but higher up, are the ones that people call "pied-piping" constructions.

b. Because Q has to move to C, no movement-preventing obstacles (like islands or phase boundaries) can be in the way between Q and C.

c. In languages where Q agrees with *wh*, no agreement-preventing obstacles (like islands or phase boundaries) can be in the way between Q and *wh*.
The game will be to make sure that Q attaches at the right height, which we will see is not always the same in different languages.

d. There are basically three kinds of *wh*-in-situ language: (a) Q-projection languages that move QP covertly, (b) Q-adjunction languages that move Q covertly, and (c) Q-adjunction languages that move Q overtly. There is only one kind of *wh*-movement language: Q-projection languages that move QP overtly.[4]

[3] Another consequence we'll return to soon has to do with predictions regarding *focus intervention effects* (Beck, 2006).

[4] Abstracting away from how multiple questions behave. If we wanted to worry about that, we'd end up with several additional types: languages that disallow multiple questions; languages that allow multiple

References

Beck, Sigrid. 2006. Intervention effects follow from focus interpretation. *Natural Language Semantics* 14:1–56.

Cable, Seth. 2007. The grammar of Q. Doctoral Dissertation, Massachusetts Institute of Technology.

Cable, Seth. 2010. *The grammar of Q: Q-particles, wh-movement, and pied-piping*. Oxford University Press.

Chomsky, Noam. 1973. Conditions on transformations. In *A festschrift for Morris Halle*. New York: Holt, Reinhart, and Winston.

Chomsky, Noam. 1995. *The minimalist program*. MIT Press.

Embick, David, and Alec Marantz. 2008. Architecture and blocking. *Linguistic Inquiry* 39.

Heck, Fabian. 2008. *On pied-piping: wh-movement and beyond*. Berlin: Mouton de Gruyter.

Horvath, Julia. 2007. Separating "focus movement" from focus. In *Phrasal and clausal architecture*. John Benjamins.

Kayne, Richard. 2000. *Movement and silence*. Oxford Studies in Comparative Syntax. Oxford University Press.

Kotek, Hadas. 2014. Composing questions. Doctoral Dissertation, Massachusetts Institute of Technology.

Kratzer, Angelika, and Junko Shimoyama. 2002. Indeterminate pronouns: the view from Japanese. In *The Proceedings of the Third Tokyo Conference on Psycholinguistics (TCP 2002)*.

Pesetsky, David. 2000. *Phrasal movement and its kin*. Cambridge, Mass.: MIT Press.

Ross, John Robert. 1967. Constraints on variables in syntax. Doctoral Dissertation, Massachusetts Institute of Technology.

QPs; and languages that allow just one QP but multiple *wh*-words. Once we've done our movements, we need to worry about where to pronounce each QP/*wh*.