

## Contiguity Theory and Pied-Piping\*

Norvin Richards, MIT

[norvin@mit.edu](mailto:norvin@mit.edu)

January, 2017

In Richards (2010, 2016), I make some proposals about how to predict the distribution of overt syntactic movement in various languages. The guiding idea is that the construction of certain kinds of phonological representations (particularly prosodic representations) begins during the narrow syntax, and syntactic operations can therefore be motivated by the need to improve prosodic structure. I argue that we can do away with syntactic parameters triggering overt movement (“strong features” and their theoretical descendants), replacing them with prosodic parameters which have already been argued to exist and can be independently motivated.

Languages vary, not only in whether they have overt syntactic movements of various kinds, but in what restrictions they place on pied-piping:

- (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.]

In this paper I will apply the principles developed in Richards (2016) to the problem of accounting for contrasts like the one in (1). The goal will be to derive the effects of Cable’s

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\* I am very grateful to Paul Marty, Sophie Moracchini, Karlos Arregi, Claire Halpert, Hrafnhildur Bragadóttir, Stefan Olafsson, Helgi Gunnarsson, and Øystein Vangsnes for much helpful discussion of the facts of French, Spanish, Zulu, Icelandic, and Norwegian. Thanks, too, to Kenyon Branan, Seth Cable, Coppe van Urk, and audiences at MIT, the University of Connecticut, Tel Aviv University, the University of Massachusetts at Amherst, the University of Maryland, McGill University, UCLA, and the GLOW Spring School in Brussels for helpful discussion, ideas, and advice. I am responsible for all the remaining mistakes.

(2007, 2010a, 2010b) conditions on pied-piping (along with the generalizations of Heck (2009); see Cable (2012, 2013) for discussion and comparison of Heck's proposals with Cable's).

In section 1 of the paper, I will begin to introduce Richards' (2016) Contiguity Theory, starting with the prosodic condition on the relation between Probes and Goals. In section 2, we will go on to see how to use this prosodic condition to yield the effects of Cable's (2007, 2010a, 2010b) LP-Intervention Condition. Section 3 will be about the effects of Contiguity on selection, and section 4 will apply our observations about those effects to derive Cable's (2007, 2010a, 2010b) QP-Intervention Condition. Section 5 will conclude.

### **1. Contiguity Theory, part 1: Probe-Goal Contiguity**

In Richards (2016), I propose conditions on the mapping of Probe-Goal relations onto prosodic structure which have the consequences informally sketched in (2):

- (2) a. In some languages, Probes and Goals must be nearly adjacent (cannot be linearly separated by any maximal projections) if the Probe *precedes* the Goal.
- b. In other languages, Probes and Goals must be nearly adjacent (cannot be linearly separated by any maximal projections) if the Probe *follows* the Goal.

Crucially, the idea is that we can determine by examining the prosodic system of a language which of the generalizations in (2) will apply to it. It is important in Richards (2016) that the conditions in (2) must be satisfied during the derivation, but need not hold of the final representation. A phrase may move, for example, to become adjacent to one Probe, and then be forced to move again by another Probe, destroying the previously established adjacency relation with the first Probe.

For most of what follows, this informal summary of Contiguity Theory will be enough. For a full discussion of how the generalizations in (2) are derived, I direct interested readers to Richards (2016). A condensed discussion follows.

Richards (2016) defends the principle in (3):

(3) ***Generalized Contiguity***

If  $\alpha$  either Agrees with or selects  $\beta$ ,  $\alpha$  and  $\beta$  must be dominated by a single prosodic node, within which  $\beta$  is Contiguity-prominent.

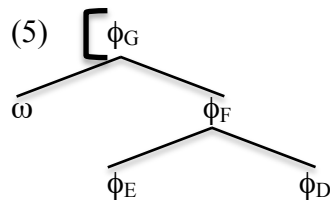
A definition of *Contiguity-prominence* which will be good enough for our purposes runs as follows:

(4) ***Contiguity-prominence***

Given a  $\phi$  (phonological phrase), F, contained in another  $\phi$ , G, F is *Contiguity-prominent in G* if F is not linearly separated from a *prosodically active* edge of G by any other  $\phi$ .

I will say that an edge of G is *prosodically active* if it is a host for prosodic phenomena. The location of prosodically active edges varies from language to language; for example, Japanese associates a Low tone with the left edge of  $\phi$  (Initial Lowering), meaning that Japanese  $\phi$  has a prosodically active left edge.

To illustrate the effects of this definition of Contiguity-prominence, consider the prosodic tree in (5), for a  $\phi$ ,  $\phi_G$ , with a prosodically active left edge (symbolized by a left bracket):



In (5),  $\phi_F$  and  $\phi_E$  are both Contiguity-prominent within  $\phi_G$ ; neither is linearly separated from  $\phi_G$ 's prosodically active left edge by any other  $\phi$  (though both are separated from it by a prosodic

word,  $\omega$ ).  $\phi_D$  is not Contiguity-prominent within  $\phi_G$ , since it is separated from the prosodically active edge of  $\phi_G$  by  $\phi_E$ .

Contiguity Theory assumes a mapping of syntactic structure onto prosodic structure along the lines developed in Match Theory (Selkirk 2009, 2011, Elfner 2012, 2015, Clemens 2014, Bennett, Elfner, and McCloskey 2016). On this approach, maximal projections are generally mapped onto  $\phi$ , and heads onto  $\omega$ . As we will see, the consequence of the definition of Contiguity-prominence given above is that when Contiguity requires a Probe and a Goal to be ‘adjacent’, they may not be separated by a  $\phi$  (that is, by a maximal projection), but may be separated by a  $\omega$  (a head).

Consider the effects of Generalized Contiguity on, for example, the relation between an interrogative C and a wh-phrase. To begin with, we can consider a case in which C is initial. In fact, there are two such cases to consider: one in a language in which prosodic activity is on the right edge of  $\phi$ , and another in which it appears on the left edge of  $\phi$ :

- (6) a. C ... wh ]  
 b. [ C ... wh

In (6a), if a  $\phi$  is built that contains both C and the wh-phrase, the wh-phrase will be at the prosodically active right edge of the new  $\phi$ . The condition of Generalized Contiguity in (3) can therefore be satisfied in a structure like that in (6a), even if wh-movement does not occur. In (6b), by contrast, if we build a  $\phi$  that contains both C and the wh-phrase, the wh-phrase will only be in a Contiguity-prominent position in the new  $\phi$  if there is no  $\phi$  intervening between C and the wh-phrase. If there are any instances of  $\phi$  intervening between C and the wh-phrase, then the structure will have to be repaired by wh-movement; once C and the wh-phrase are adjacent, the wh-phrase will be Contiguity-prominent in a  $\phi$  containing just those two elements. Alternatively,

if there are only instances of  $\omega$  (that is, heads), rather than of  $\phi$ , between C and wh, then the wh-phrase is expected to be able to remain in situ, even in (6b).

In general, then, the approach of Richards (2016) predicts that if a Probe is on the opposite side of its Goal from the position of prosodic activity, then the Probe and the Goal may be related over an arbitrary distance; this is the case described in (6a). On the other hand, if the Probe and prosodic activity are both on the same side of the Goal, then the Probe and the Goal must be made (nearly) adjacent; this is the case in (6b). There are other logical possibilities; there may well, for example, be languages with prosodic activity on both edges of  $\phi$ , or on neither. I will leave these logical possibilities aside in what follows.

The proposals outlined above predict that languages in which C is final should never have leftward wh-movement of the kind we find in English; such wh-movement is triggered by a need to make C and the wh-phrase adjacent, and will therefore never appear in a language with final C. We do expect to find two kinds of languages with final C. In one kind, represented by Japanese, C may be related with the wh-phrase over an arbitrary distance:

- (7) 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

In another kind of C-final language, wh-phrases should not be separable from C by any phrase:

- (8) 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

In the Georgian example in (8a), the wh-phrase is separated from final C by a  $\phi$  projected by the direct object *p'ur-i* 'bread-NOM', and Contiguity therefore fails. In (8b), by contrast, the wh-phrase and C are separated only by an  $\omega$ , projected by the verb *iq'ida* 'bought', and Contiguity is therefore satisfied.

The division between kinds of C-final languages can be related, in this theory, to independently observable differences in their prosodic systems. Japanese  $\phi$  has prosodic activity, in the form of a Low tone, on its left edge (Selkirk and Tateishi 1988, and much other work), while Georgian  $\phi$  is marked on the right edge (in this case, with a High tone: Jun, Vicens, and Löfstedt 2007, Vicens and Jun 2014).

Turning to head-initial languages, we expect, again, to find languages in which Probes must be adjacent to Goals that follow them, and languages in which Probes must be adjacent to Goals that precede them. English is a language of the first kind, assuming that  $v$  Agrees with the object and T with the subject:

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

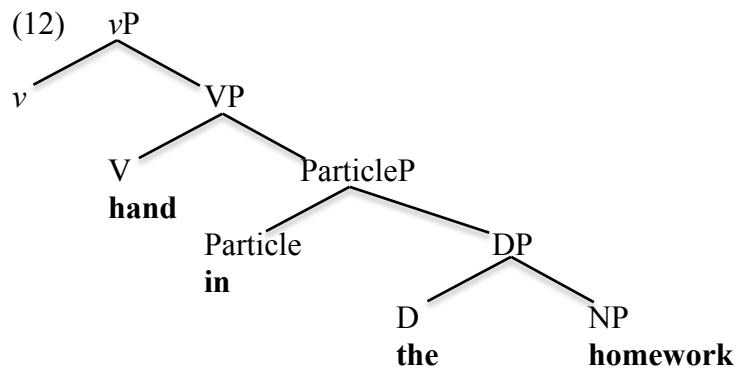
Here adverbs cannot intervene between  $v$  and the object, but can intervene between T and the subject. On the account developed here, the relevant difference between T and  $v$  is that  $v$  precedes its Goal while T follows its Goal. As the account leads us to expect, if T is moved to a position preceding the subject, it must be adjacent to its Goal, just like  $v$  in (9), and for the same reason:

- (10) a.      *Today* John T is happy.  
b.      T-is (*\*today*) John \_\_\_ happy?  
            ↑-----↓

Recall that the ‘adjacency’ requirement imposed by Contiguity is a comparatively loose one: an English Probe cannot be separated linearly from a following Goal by a complete  $\phi$  (essentially, a complete XP). We are therefore in a position to distinguish, for example, between adverbs and particles:

(11) They handed *in* the homework.

In (11), the object is linearly separated from  $v$  by the particle *in*; as long as this particle heads a projection in the clausal spine (as in den Dikken’s 1995 account, for example), then we correctly predict that the particle does not block *adjacency* in the sense that is relevant for Contiguity:



In (12), there is no complete XP (and hence no  $\phi$ ) which linearly intervenes between  $v$  and the object, though several left edges of XPs do intervene between them. Contrast examples like those in (13):

- (13) a. \*She read *quickly* the book.  
 b. \* They handed *right* in the homework.

In (13), the italicized adverbs are adjuncts (or perhaps specifiers) to heads in the clausal spine, and they are therefore XPs which linearly intervene, in their entirety, between  $v$  and the object, violating Contiguity.

English, then, is a language in which Probes and Goals must be (more or less) adjacent if the Probe precedes the Goal. French, by contrast, is a language in which Probes must be adjacent just to Goals which precede them:

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

The French verb, famously, may be separated from the object by adverbs; this is the fact that is generally described by saying that the French verb raises higher than the English verb. Less famously, French T cannot be separated from the subject by adverbs; on the account developed here, this is because T follows its Goal.

The data in (15a-b) are parallel to those summarized in (14); the negative morpheme *pas*, like the adverb in (14), can freely intervene between the verb and the object, but cannot appear between T and the subject, for reasons explored above. As (15c) shows, if the subject is null, then the need for T to be adjacent to its Goal disappears, and *pas* may now precede the verb:

- (15) 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
- c. *Pas* parler-T l'italien...  
*not* to.speak Italian  
 'To not speak Italian...'

The contrast in (15) is classically described as a difference in degree of verb raising in finite and nonfinite clauses; French verbs are said to raise to finite T but not to infinitival T. The account



developed here allows us to dispense with this stipulation; French verbs are required to be in a position that allows both  $v$  and T to satisfy their Contiguity requirements, and the differences between tensed and nontensed clauses follow.

The differences between French and English described above are to be related, on this account, to independently observable prosodic differences between them. We can also relate the facts just discussed to the differences in (16-17):

- (16) a. Who C did you see?  
b. \* C you saw who?
- (17) a. Qui C as-tu vu?  
who have-you seen  
b. C tu as vu qui ?  
you have seen who

English C, like English probes very generally, cannot be separated from Goals that follow it; the obligatory wh-movement in (16) follows from the same conditions that guarantee that adverbs cannot intervene between the English verb and its object, or between English T and the subject once T has been fronted to C. French C, by contrast, can be separated from its following Goal; the fact that (17b) is acceptable in French is connected, on this account, to the fact that French verbs may be separated from their objects by adverbs. Wh-movement is therefore not necessary in French, but it does contribute to a prosodically acceptable structure, and is therefore possible, as (17a) shows. As long as we make no stipulations about movement being either a first or a last resort, the optionality in (17) follows from the system; French is a language in which both wh-in-situ and wh-movement can create structures in which the relation between C and the wh-phrase is prosodically acceptable.

The account developed above of the facts of French and English leads us to expect correlations between the treatment of *wh*-phrases and the positioning of adverbs. We do find languages in which these correlations do not hold; the theory then requires us to seek explanations for these failures of correlation, in the form of additional factors that can impose additional requirements on word order. For example, it has often been noted (for example, by Vikner 1997 and Bentzen 2008) that Icelandic and the mainland Scandinavian languages differ, in non-V2 clauses, in the placement of the verbs, in ways that are reminiscent of the English and French facts just reviewed:

(18) *Ég veit [af hverju Hedda (\*oft) kaupir (oft) skó]* [Icelandic]

I know why Hedda often buys often shoes

(19) *Jeg vet [hvorfor Hedda (ofte) kjøper (\*ofte) sko]* [Norwegian]

I know why Hedda often buys often shoes

‘I know why Hedda often buys shoes’

Icelandic verbs in non-V2 clauses, like the French verbs just discussed, may be separated from objects by adverbs, but adverbs may not appear between T and the subject. And the facts are reversed in Norwegian, as in English. The theory then leads us to expect that Icelandic, like French, should have optional *wh*-in-situ. This is false:

(20) \**Pétur hefur talað við hvern?*

Peter has spoken with who.ACC

In fact, neither Icelandic nor Norwegian has *wh*-in-situ in non-echo questions. In Richards (2016), I argue that the lack of *wh*-in-situ in Icelandic is one instance of a larger generalization; V2 languages typically lack *wh*-in-situ. I will direct interested readers to Richards (2016) for discussion of that generalization (including an explanation of why it should hold, and an account

of the one exception to it that I know of, the Nilotic language Dinka, which is V2 and has wh-in-situ). For our purposes, the only point to make is that Contiguity Theory leads us to be surprised by the fact that Icelandic lacks wh-in-situ; this is a fact that requires explanation (in this case, an explanation of the generalization that V2 languages lack wh-in-situ fairly generally). The contrasts between Icelandic and Norwegian will become important again in the next section.

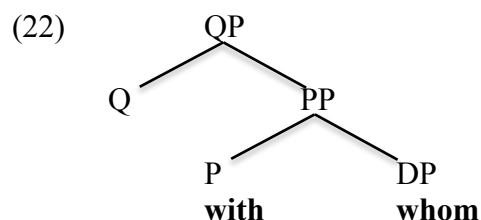
This section has given a brief sketch of the proposal made in Richards (2016) about a prosodic condition on the relation between Probes and Goals. The condition makes the general predictions that are repeated here in (21):

- (21) a. In some languages, Probes and Goals must be nearly adjacent (cannot be linearly separated by any maximal projections) if the Probe *precedes* the Goal.
- b. In other languages, Probes and Goals must be nearly adjacent (cannot be linearly separated by any maximal projections) if the Probe *follows* the Goal.

As the discussion of Icelandic and Norwegian shows, the conditions in (21) are not the only ones that can affect the distribution of movement; Contiguity Theory leads us to seek explanations for apparent counterexamples to the generalizations in (21).

## 2. Pied-piping, part 1: the LP-Intervention Condition

I will assume Cable's (2007, 2010a, 2010b) structure for pied-piping structures:



Cable's core insight is that the problem of pied-piping reduces to a problem in accounting for the distribution of a particular functional head, Q, which is associated with wh-expressions (and which is realized as an overt morpheme in some languages, like Tlingit and Sinhala, though not

in English). So-called “wh-movement”, he argues, should really be thought of as movement of QP; pied-piping, on this account, is really just the movement of a QP that dominates the wh-phrase and does not immediately dominate it. The question of how much material can pied-pipe, on this story, reduces to the question of how distant QP may be from the wh-phrase which it dominates. I will adopt this point of view wholesale.

For Cable, QP may dominate the wh-phrase, as in (22) above, but it can also be adjoined to the wh-phrase. In the latter case, QP-movement will not trigger displacement of the wh-phrase itself, which will be left in situ. I will depart from Cable in assuming that the structure in (22) is universal; as the discussion of the previous section showed, I have a different account to offer of wh-in-situ.

Cable also claims that languages may vary in whether Q Agrees with the wh-phrase. This is part of his account of why some languages allow pied-piping of larger phrases than others; he posits a locality condition (the LP-Intervention Condition) which prevents pied-piping by deeply embedded material, in those languages in which the Agree relation holds. I will do away with this parameter as well; Q universally Agrees with the wh-phrase, at least in constructions like wh-movement and restrictive relativization, in which pied-piping is comparatively constrained, though not in constructions like non-restrictive relativization, in which conditions on pied-piping are somewhat relaxed:

- (23) a. \*[Pictures of **whom**] do you think I should buy \_\_\_ ?  
b. John, [[pictures of **whom**] I do not think you should buy \_\_\_ ]...

In fact, it will be one of the claims of this paper that the two parameters just mentioned should be linked; there is a connection, on the account developed here, between where a given language

allows wh-in-situ and where it allows large-scale pied-piping (though the connection is a complex one, and apparent exceptions will need to be accounted for).

Wh-questions, then, will invariably involve a QP dominating the wh-phrase, with Agree relations between C and Q, and between Q and wh. The goal will then be to account for the cross-linguistic variation in pied-piping possibilities that we find, in terms of this universal structure.

A starting point will be a discovery made by Uribe-Etxebarria (2002) about Spanish; she notes that in that language, there is an interesting parallelism between the conditions on wh-in-situ and on pied-piping by deeply embedded phrases<sup>1</sup>. We will see that she is right, not only about Spanish, but about a wide range of languages.

Spanish, at least for some speakers (Jiménez 1997, Uribe-Etxebarria 2002, Reglero 2004) allows wh-in-situ, with an interesting condition; wh-in-situ is only possible before a large intonation break, like the one at the end of the clause:

- (24) 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?’

I have no explanation to offer for this condition; descriptively, we can say that while Spanish is capable of creating a  $\phi$  containing both C and the wh-phrase, the right edge of such a  $\phi$  must be aligned with the right edge of a larger prosodic phrase.

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<sup>1</sup> I'm grateful to Kenyon Branan for pointing this work out to me.

Uribe-Etxebarria (2002) points out that a similar condition constrains Spanish pied-piping; pied-piping by a deeply embedded phrase is possible, but the phrase in question must be at the right edge of the phrase to be moved:

- (25) 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?’

Whatever account we eventually develop of the facts in (24) may be extended to (25); the Probe-Goal relation between Q and the wh-phrase, like the Probe-Goal relation between C and the wh-phrase, may extend over some distance, but must end at the right edge of a larger prosodic phrase.

Spanish wh-in-situ is subject to another condition, which I also will not explain; it is impossible in embedded clauses (Reglero 2004, 20):

(26) \*Pedro ha preguntado que has visto a **quién**

Pedro has asked that you.have seen **DAT who**

‘Pedro asked who you saw’

Again, I will not try to actually account for this restriction, but just speaking descriptively, we can see the ill-formedness of (26) as reflecting a condition on the creation of a  $\phi$  connecting C and a wh-phrase: such a  $\phi$  cannot be in an embedded clause. And, again, the same condition holds for pied-piping (Karlos Arregi, p.c.):

(27) 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 wh-in-situ lacks the restriction in (24) to positions at the end of the clause:

(28) Tu fait **quoi** dans la vie?

you do **what** in the life

‘What do you do in life?’ (Shlonsky to appear)

And French pied-piping also appears to lack the restriction found in Spanish to the end of the wh-phrase:

(29) ?[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, however, in banning wh-in-situ in embedded questions:

(30) \*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:

(31) 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.)

Again, the distribution of wh-in-situ and of deeply embedded pied-pipers seems to be constrained by the same factors, just as in Spanish.

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

(32) 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)





(35) [*In which* drawer] did you find this?

Here the Q head is linearly separated from the wh-word by the P *in*. Recall that we saw similar facts about the relation between *v* and the object:

(36) They handed *in* the homework.

The proposal above was that failures of literal linear adjacency like the one in (36) are to be expected in Contiguity Theory. *In* in (36), like *in* in (35), is the head of a projection which dominates the Goal but not the Probe; in both cases, there is no XP linearly intervening between the Probe and the Goal (since the XP headed by *in* actually contains the Goal). In both cases, introducing an adverb between the Probe and the Goal creates ill-formedness, as expected if the adverb is an XP adjunct or specifier c-commanded by the Probe and c-commanding the Goal:

(37) a. \*They handed right *in* the homework.

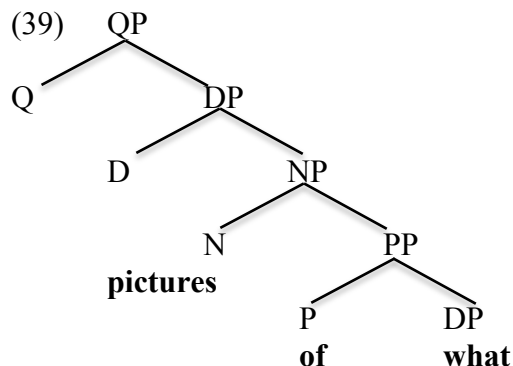
b. \*Right *in* which drawer] did you find this?

With these ideas in mind, we should reexamine the ill-formedness of (34b), repeated as

(38):

(38) \*[Pictures of **what**] did you buy?

On conventional assumptions about the internal structure of the wh-moved phrase in (38), we might expect (38) to be just as acceptable as the PP pied-piping example in (35), with a structure for the pied-piped phrase something like that in (39):



If (39) is the right structure for the moved phrase in (38), then the theory is indeed in trouble; there is no complete XP intervening between Q and the DP *what* in (39), and the reasoning that allowed pied-piping of PP ought to allow (38), contrary to fact.

As it happens, Adger (2012) has already argued that (39) is the wrong structure for expressions like (38). One of his crucial arguments is based on a typological observation, which he refers to as PP-Peripherality: in languages in which adjectives are on the same side of the noun as PP complements, the adjectives are invariably closer to the head noun than the PP complements are. This is true both in languages in which the noun precedes both adjectives and complements, as in (40), and in languages in which the noun follows both of these elements, as in (41):

- (40) a. ke *ki'i*            **nui** [o ke kumulā'au]            [*Hawaiian*]  
           the representation big    of the tree  
           'the big picture of the tree'
- b. la *foto*    **grande** [del    árbol]            [*Spanish*]  
           the picture big            of.the tree  
           'the big picture of the tree'
- c. ha-*tmuna*    ha-**gdola** [shel ha-etz]            [*Hebrew*]  
           the-picture the-big    of    the-tree  
           'the big picture of the tree'
- d. an *dealbh* **mòr brèagha** [de Mhàiri]            [*Scottish Gaelic*]  
           the picture big    beautiful of Màiri  
           'the big beautiful picture of Màiri'

- (41) a. [gach-ʈa-r] **bɔ̃ro** chobi-ʈa [Bangla]  
 tree-CL-GEN big picture-CL  
 ‘the big picture of the tree’
- b. [maratt-inte] **valiya** paʈam [Malayalam]  
 tree-GEN large picture  
 ‘the large picture of the tree’
- c. [agac-in] **büyük** resm-in [Turkish]  
 tree-GEN large picture-3.POSS  
 ‘the large picture of the tree’

Adger concludes that our standard picture of the structure of NP is on the wrong track; ‘complements’ of nouns combine, not with the head noun directly, but with a larger phrasal category that dominates both the head noun and (at least a subclass of) adjectives. This fact about NP structure could represent a difference in the way that nominal and verbal argument structures are projected, or the effects of an obligatory movement operation operating on a more conventional structure; the distinction is unimportant for our purposes, and I refer interested readers to Adger (2012) for further discussion.

If Adger is right, then the ill-formedness of (38), repeated as (42), can be explained:

- (42) \*[Pictures of **what**] did you buy?

On Adger’s account, the material preceding *of what* in the NP may look like a simple head noun *pictures*, but it is actually a phrase which would dominate not only the head noun but any adjectives that modified it. Since it is a phrase, we expect it to map onto a  $\phi$ , and hence to count as an intervener for Contiguity. Contiguity between (head-initial) Q and *what* therefore fails in (42), as desired.

Uribe-Etxebarria's observation, then, seems to succeed in a variety of domains, covering the facts not only in a corner of Spanish but also in French, English, and Zulu; in all of these languages, the conditions on *wh-in-situ* are parallel to the conditions on pied-piping. In terms of the theory under development here, in all of these languages, we can see the relation between C and QP being constrained in the same ways as the relation between Q and the *wh*-phrase; these pairs of elements must be adjacent in the same contexts, and are permitted to be non-adjacent in the same contexts.

Recall from the previous section that we find languages in which the behavior of various Probes does not line up as nicely as it does in English and French. The example given there was from Icelandic and Norwegian. Adverbs in non-V2 clauses in these languages behave like their counterparts in French and English, respectively:

(43) Ég veit [af hverju Hedda (\**oft*) kaupir (*oft*) skó] [Icelandic]

I know why Hedda often buys often shoes

(44) Jeg vet [hvorfor Hedda (*ofte*) kjøper (\**ofte*) sko] [Norwegian]

I know why Hedda often buys often shoes

'I know why Hedda often buys shoes'

In these non-V2 clauses, Icelandic adverbs, like French adverbs, may appear between the verb and the object but not between T and the subject, while Norwegian adverbs, like English adverbs, may appear between T and the subject but not between the verb and the object.

Contiguity Theory therefore leads us to expect, all things being equal, that Icelandic will also be like French in allowing *wh-in-situ*; the adverb data in (43) seem to teach us that Icelandic Probes may precede their Goals at an arbitrary distance. We saw that this was false, and I proposed that Icelandic lacks *wh-in-situ*, not because of the prosodic conditions on Agree, but because of an

independent condition banning wh-in-situ in V2 languages (which I discuss further in Richards 2016).

Given all this, it is of some interest that Icelandic pied-piping patterns with French pied-piping, while Norwegian pied-piping is like English pied-piping. Icelandic, like French, allows for pied-piping by non-initial phrases, in main clauses but not in embedded clauses:

- (45) 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, like English, bans such pied-piping:

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

The data in (45-46) exhibit a slight twist on Uribe-Etxebarria's generalization. Icelandic pied-piping does not pattern with wh-in-situ in Icelandic; Icelandic lacks wh-in-situ, after all. Rather, Icelandic pied-piping exhibits the conditions we might expect to find on Icelandic wh-in-situ, if Icelandic were not a V2 language. To put the case in Contiguity-theoretic terms, Icelandic is indeed a language in which Probes may precede Goals at an arbitrary distance, and this condition holds both for the relation between  $v$  and the object (as in (43) above) and for the relation between Q and the pied-piping wh-phrase (in (45a)). We would expect the same to hold of the

relation between C and QP—that is, we would expect the language to have wh-in-situ as an option—but this option is removed by an independent constraint on wh-in-situ in V2 languages. Icelandic is truly French under the skin, not only in the behavior of its adverbs but also in its pied-piping possibilities.

A further departure from the letter of Uribe-Etxebarria’s generalization can be found in Tlingit. Cable (2007, 2010a, 2010b) uses Tlingit as an example of a language in which a wh-phrase may be deeply embedded within the QP that it pied-pipes:

- (47) [Wáa kwligeysi 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?')

In (47), the wh-word *wáa* ‘how’ is embedded within a relative clause modifying the pied-piped nominal. And yet Cable argues, very persuasively, that Tlingit is an obligatory wh-movement language.

In order for Tlingit to be an obligatory wh-movement language, in the account developed here, it will have to share two properties with languages like English: it will need to have initial C, and it will have to be a language in which Probes cannot be separated from Goals that follow them (in the prosodic terms used above, it will have to be a language in which prosodic activity within  $\phi$  is on the left edge). Wh-movement to the left, if it is to be triggered by the need to make C and the wh-phrase sufficiently prosodically close, should only be found in languages with initial C.

On the other hand, Tlingit Q is verifiably to the *right* of its sister:

(48) [wáa kwligeyi xáat] **sá**

how it.is.big.REL fish Q

‘a fish that is how big’

By hypothesis, Q in (48) Agrees with the wh-phrase *wáa*. We have seen that in order for Tlingit to have obligatory overt wh-movement, it will have to be a language in which Probes cannot be separated from the Goals that they precede. But in (48), Q *follows* its Goal. We therefore expect, correctly, that Q and the wh-phrase will be able to be arbitrarily distant.

This section has been about the conditions on the relation between Q and the wh-phrase, and I have tried to show that these conditions generally mirror the conditions on the relation between C and QP. In particular, we find languages, like English, in which Q and the wh-phrase, like C and QP, must always be adjacent; languages, like Zulu, in which they can always be related at an arbitrary distance; and languages, like French and Spanish, in which they may be separated from each other under certain conditions (and the conditions are the same for both relations, as Uribe-Etxebarria pointed out). The conditions on the relation between C and QP, of course, are often met via movement; this is the classic wh-movement. None of the examples we have looked at so far, however, have the relation between Q and the wh-phrase being created by movement.

There are certainly cases in which movement does seem to be triggered by the need to make Q and the wh-phrase adjacent. One of the clearest such cases comes from a phenomenon described by Aissen (1996) in Tzotzil, by Broadwell (2001) in San Dionicio Zapotec, and by Coon (2009) for Chol. In all of these languages, possessors are generally postnominal, but become prenominal if they pied-pipe their possessees:



- (49) a. Tyi yajl-i [i-plato **aj-Maria**] [*Chol*: Coon 2009, 166]  
 PRFV fall-ITV 3POSS-plate CL-Maria  
 ‘Maria’s plate fell’
- b. \*Tyi yajl-i [**aj-Maria** i-plato]  
 PRFV fall-ITV CL-Maria 3POSS-plate
- c. [**Maxki** i-plato] tyi yajl-i?  
 who 3POSS-plate PRFV fall-ITV  
 ‘Whose plate fell?’
- d. \*[I-plato **maxki**] tyi yajl-i?  
 3POSS-plate who PRFV fall-ITV

We can account for the data in (49) the same way Coon does. In (49c), both C and Q are head-initial, and are triggering movement to themselves: of the DP *maxki i-plato* ‘whose plate’, in the case of C, and of the DP *maxki* ‘who’, in the case of Q.

I will have to leave for further research the serious question of how to constrain this kind of Q-driven movement. Some constraints on it will have to be found. We have already seen, for example, how to rule out (50a) in English, but we do not want to be able to rescue (50b) by doing Chol-style Q-driven movement of the pied-piping wh-phrase:

- (50) a. \*[ Pictures of **what**] did you buy?  
 b. \*[ **what** pictures of    ] did you buy    ?  
 c. **what** did you buy [pictures of    ]?

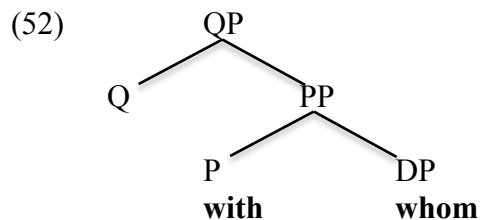
In (50b), *what* has moved to the left periphery of the pied-piped phrase, and the locality conditions on Q’s relation with its Goal should be satisfied. There is a temptation to appeal to the well-formedness of (50c), perhaps invoking some kind of condition requiring QP to dominate

as little material as possible. But the simplest version of such a condition cannot hold cross-linguistically, since possessors in Chol need not pied-pipe:

- (51) a. **Maxki** tyi yajl-i [i-plato \_\_ ]  
 who PRFV fall-ITV 3POSS-plate
- b. [ **Maxki** i-plato ] tyi yajl-i?  
 who 3POSS-plate PRFV fall-ITV  
 ‘Whose plate fell?’

As Coon points out, one straightforward way to account for the Chol facts is to say that QP dominates wh-phrases, and can dominate any DP that will allow it to dominate a wh-phrase; in (51a), QP dominates the wh-phrase *maxki* ‘who’ itself, while in (51b) it dominates *maxki i-plato* ‘whose plate’, and nothing more need be said. A condition requiring QP to be maximally small is incompatible with this kind of account; if one insists on positing such a condition, the optionality found in Chol would have to reflect other kinds of optional structural differences between the different versions of the question, perhaps involving optional remnant movement (see Abels 2003 and Heck 2009 for proposals along these lines). The question of how to rule out examples like (50b) in English is therefore quite a serious one, and I will have to leave it for future research.

I began this section with Cable’s (2007, 2010a, 2010b) proposal about the structure of a pied-piped phrase:



Cable posits a parameter governing the behavior of structures like (52); he claims that languages may vary in whether Q must Agree with the wh-phrase, and that this Agree relation, if it exists, imposes locality conditions that prevent pied-piping by deeply embedded material (his LP-Intervention Condition). I have argued that we should do away with this parameter. Q universally Agrees with the wh-phrase in wh-questions (though perhaps not in some other A-bar constructions, such as non-restrictive relatives); cross-linguistic differences in pied-piping can be related to differences more generally in the permissible interactions of Probes and Goals. Uribe-Etxebarria's observation, and the exceptions to it that we find in Icelandic and Tlingit, suggest that we should not give ourselves the power to specify independently of one another, for a given language, the distribution of various types of overt movement and the conditions on pied-piping. A more constrained theory, in which these properties of languages should covary (and in which failures of these properties to covary are taken to be problems in need of explanation), seems to be possible, and therefore desirable.

### 3. Contiguity theory, part 2: Selectional Contiguity

The theory of the preceding chapter imposes conditions on pied-piping in certain types of A-bar extraction, including wh-movement and restrictive relativization. I explicitly excluded other kinds of A-bar extraction, such as non-restrictive relativization, from the conditions developed there, suggesting that these might be constructions in which Q never Agrees with the wh-phrase. The goal was to account for contrasts like the one in (53):

- (53) a. \*[Pictures of **whom**] do you think I should buy \_\_\_ ?  
 b. John, [[pictures of **whom**] I do not think you should buy \_\_\_ ]...

However, pied-piping in nonrestrictive relatives is not completely free:

- (54) \*John, [[fired **whom**] I already have \_\_\_ ]...

There must be some other condition constraining pied-piping, then, apart from the locality conditions on the Agree relation between Q and the wh-phrase.

Cable (2007, 2010a, 2010b) proposes a condition which would rule out examples like (54). His *QP-Intervention Condition* bans structures in which QP intervenes structurally between a functional head F and a phrase which F selects; in other words, QP may not dominate a phrase which is selected by a functional head F, if it does not also dominate F. In (54), fronting of the verb phrase would demand that QP dominate VP, or perhaps *v*P. But both of these phrases are selected by functional heads (*v* and T, respectively, in standardly assumed trees). The QP-Intervention Condition therefore prevents QP from immediately dominating such projections. A direct object, by contrast, could be immediately dominated by a QP, since it is selected by the lexical head V; Cable's condition therefore correctly predicts that a direct object may be wh-moved<sup>4</sup>.

I will try to derive the effects of Cable's condition from Contiguity Theory. The core of the account will be the condition in (55):

(55) **Selectional Contiguity**

If the head  $\alpha$  selects the head  $\beta$ , then  $\alpha$  and  $\beta$  must be linearly adjacent.

In Richards (2016) I propose that Selectional Contiguity is a special case of the Generalized Contiguity condition discussed above; I will direct interested readers to Richards (2016) for discussion of how to do this. I assume, here and throughout, that selection relations are relations between heads; we may talk informally of a verb selecting a PP, but the relevant selection relation is actually between V and P.

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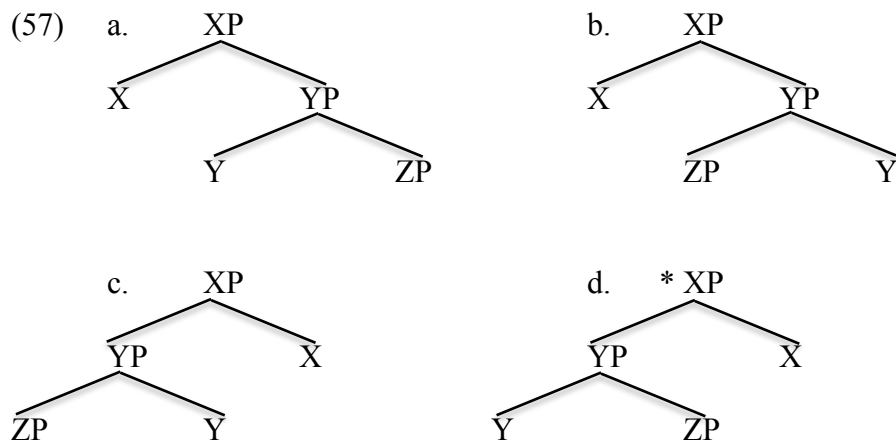
<sup>4</sup> As Cable notes, his proposal interacts badly with the idea that agents are selected by the functional head *v* (he opts to Merge agents within VP instead).

There are two important caveats about (55). The first is that, like Generalized Contiguity, the condition must hold at some point in the derivation, but need not survive to the final representation; there are many instances of derivational opacity in which (55) is obeyed during the derivation but not at the end. Moreover, (55) must be taken to hold only within certain domains, as we will see shortly; it turns out to be useful to claim that the grammar must seek to obey (55) for all pairs of heads in a selection relation, but that pairs of heads which are separated by a Spellout boundary may end up never obeying (55) at any point.

In Richards (2016), I use Selectional Contiguity to derive the effects of the Final-Over-Final Constraint (FOFC) of Biberauer, Holmberg, and Roberts (2014). The FOFC is a constraint on the distribution of head direction in certain parts of the tree, summarized in (56):

(56) **If  $\alpha$  is a head-initial phrase and  $\beta$  is a phrase immediately dominating  $\alpha$ , then  $\beta$  must be head-initial.** If  $\alpha$  is a head-final phrase and  $\beta$  is a phrase immediately dominating  $\alpha$ , then  $\beta$  can be either head-initial or head-final.

As Biberauer, Holmberg, and Roberts note, the condition in (56) does not constrain the entire tree; we will return to this fact shortly. But for certain pairs of heads, the trees in (57a-c) are all in principle acceptable, while the tree in (57d) is ruled out by the FOFC:



One instance of the effects of the FOFC comes from a condition on Finnish word order discussed by Holmberg (2000). Holmberg notes that Finnish sentences in which the matrix clause contains either a focus or a *wh*-moved phrase have a certain amount of freedom of word order—but that the word order is, crucially, not completely free:

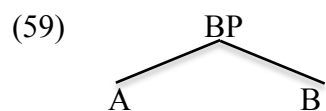
- (58) a. Milloin Jussi olisi kirjoittanut romaanin? [Aux V O]  
 when Jussi would.have written INDEF.novel  
 'When would Jussi have written a novel?'
- b. Milloin Jussi olisi romaanin kirjoittanut? [Aux O V]  
 when Jussi would.have INDEF.novel written
- c. Milloin Jussi romaanin kirjoittanut olisi?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

We can understand the condition in (58) as reflecting the trees in (57), if we take the auxiliary to be the head *X*, and the verb to be *Y*, and the object to be *ZP*. The one order which is ruled out by the FOFC is the one in (57d), and (58d): the one in which the lower phrase (the verb phrase, in this case) is head-initial while the higher phrase (headed by the auxiliary) is head-final.

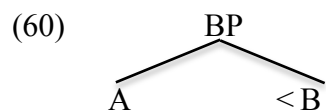
Descriptively, the generalization captured by the FOFC is that, for those portions of the tree for which the FOFC holds, a phrase may be head-final only if it has no head-initial complement; that is, a head-final phrase must either be at the bottom of the tree, or must have a head-final complement. Head-initial phrases, by contrast, may have either head-initial or head-final complements, or no complement at all.

In Richards (2016), I understand the FOFC, as Biberauer, Holmberg, and Roberts themselves do, as a condition on a special operation that creates head-final phrases. In particular, I assume that the LCA of Kayne (1994) is correct in claiming that heads invariably begin the derivation head-initial. I then posit a pair of operations which are responsible for creating final heads: the first of these, Untethering, deletes the ordering statements responsible for ordering a pair of sisters, and the second, Retethering, creates new ordering statements that can order unordered sisters (and need not respect the LCA in doing so, so that the resulting ordering can be head-final). For our purposes in this paper, a single operation reversing the order of sisters would have been sufficient; in the full statement of the theory in Richards (2016), it turns out to be useful to be able to order other operations between Untethering and Retethering. Finally, I also crucially assume that the operations that create final heads must be motivated, and that one possible motivation for them is the need to create Selectional Contiguity.

Let us consider a derivation. We can begin by Merging two heads, projecting the label of one:

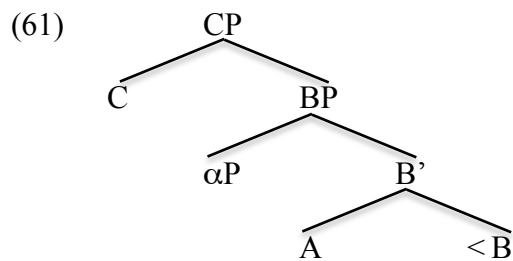


On standard views of c-command, we expect the tree in (59) to be unlinearizable by the LCA: A and B are in a mutual c-command relation. The operation of Tethering, which imposes an order on two sisters, is therefore motivated, by the need to create a linear order. In this case, let us create a head-final order, which I will symbolize by marking the final head with <:

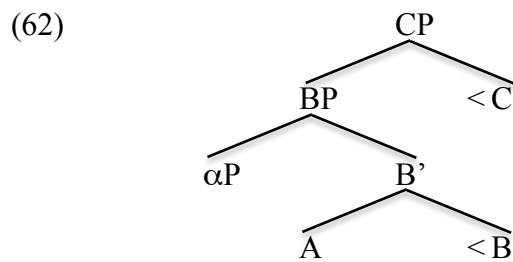


The two heads are now ordered, via the operation of Tethering, and we arrive at one of the consequences of the FOFC: a head may be head-final if it is at the bottom of the clause. A natural question arises of how languages choose, at this stage of the derivation, whether to be head-initial or head-final; I will direct interested readers to Richards (2016) for some further discussion of that question.

Let us next give BP a specifier, and Merge the resulting BP as the complement of a new head, C:



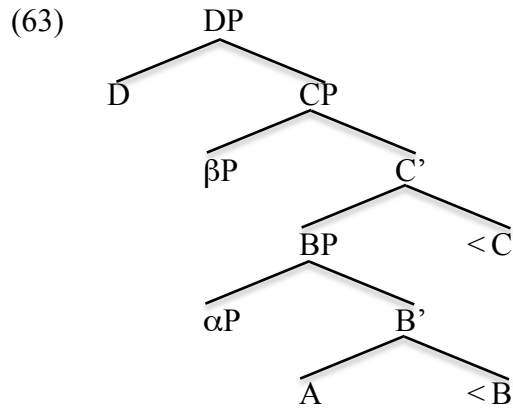
Since C Selects B, the two heads are subject to Selectional Contiguity, and must be made adjacent. There are various ways to achieve this result, but one of them would be to apply Untethering and Retethering to make C final:



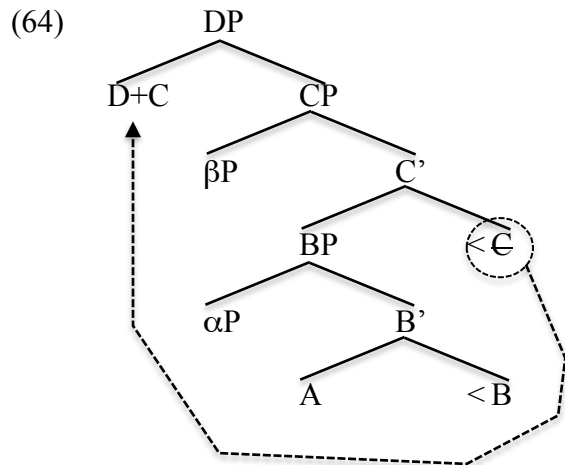
Selectional Contiguity is satisfied; now that B and C are both final, they are adjacent. And we arrive at the second kind of case in which head-finality is licensed by the FOFC: heads may be final if they have head-final complements.



We do not predict, however, that if a complement is head-final its selector must be head-final as well. Consider a further step in the derivation, in which we give CP a specifier and Merge CP as the complement of a new head, D:



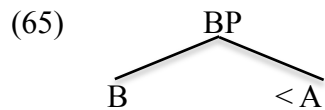
Again, C and D must be made adjacent, and again, one way to achieve Selectional Contiguity would be to make D final. But another way would be to head-move C to D, if D is the kind of head that can host head-movement:



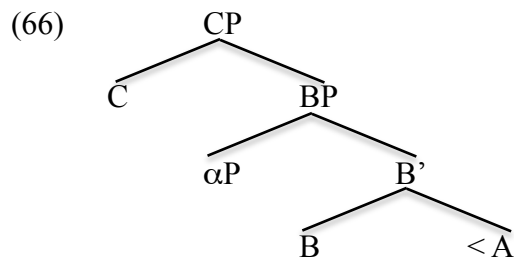
Head-movement in (64) creates Selectional Contiguity between C and D. We thus predict, correctly, that a head-final phrase may be selected by a head-initial head. Note that the head-movement in (64) creates Contiguity for C and D at the cost of breaking the Contiguity relation that held between C and B; this is a kind of derivational opacity that is frequent in the theory of

Richards (2016), in which previously existing Contiguity relations are routinely sacrificed for the sake of new ones.

The derivation in (59-64), then, creates a structure with mixed headedness of the kind that is countenanced by the FOFC. Let us now try, and fail, to create a FOFC-violating structure with mixed headedness. We can begin, again, at the bottom of the tree, this time electing to make BP head-initial rather than head-final:



Again, we can give BP a specifier, and Merge BP as the complement of a new head C:



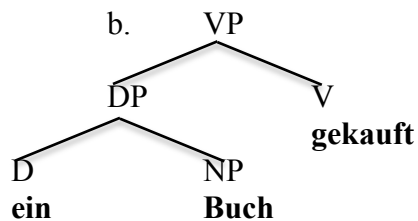
B and C must be made Selectionally Contiguous, as before. As before, there are various ways Contiguity could be created: B could head-move to C, for example, or the specifier  $\alpha P$  could move out from between B and C. One operation that crucially will *not* create Contiguity, however, is making C final; if C were final, it would still not be adjacent to B. The operations that would make C final are therefore impossible in this case, since they are unmotivated. We therefore arrive at a desirable result: a head with a head-initial complement cannot itself be head-final. This is the FOFC.

Biberauer et al (2010) point out many instances of the operation of the FOFC; I direct readers to their work for further instances of its effects. One of their observations is that the FOFC holds of certain pairs of heads, but not of others. We saw in the Finnish data above, for

example, that the auxiliary and the verb are constrained by FOFC. The verb and the direct object, however, are not, as we can see in German:

(67) a. Er hat [ein Buch] gekauft [German]

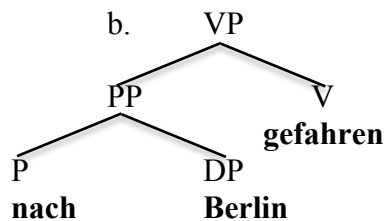
he has a book bought



In (67), the head-final German verb selects for a head-initial DP, in apparent violation of the FOFC. Similarly, a German head-final VP may dominate a head-initial PP:

(68) a. Sie ist [ nach Berlin ] gefahren [German]

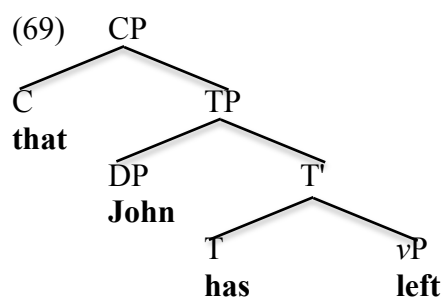
she is to Berlin driven



The FOFC must therefore be constrained to hold just of certain subparts of the tree.

Biberauer, Holmberg, and Roberts (2010) suggest that the FOFC could be restricted to apply to extended projections of lexical heads. PP and DP, they suggest, are in separate extended projections from the verb, while the verb and the auxiliary are both in the extended projection of the VP. In Richards (2016), I suggest an alternative: the FOFC (or the condition of Selectional Contiguity from which I try to derive it) constrains Spellout domains, but does not ultimately hold of heads that are separated by a Spellout boundary. Applying Selectional

Contiguity in this way allows me to account for failures of Selectional Contiguity between C and T in languages like English:



Since Spellout of the CP phase separates C from its complement TP, the reasoning goes, C and T need not obey Selectional Contiguity. Similar reasoning, I suggest, could allow V and D, and V and P, to fail to obey the FOFC, as long as we invoke Spellout operations which separate V from DP and from PP. The fact that the FOFC does hold of the relation between the verb and an auxiliary, on this account, will be related to the fact that the verb generally raises to *v*, and therefore escapes Spellout of the VP. This approach raises the possibility that we could find violations of the FOFC in the VP domain as well, but that they would need to be languages in which the verb does not raise to *v*; see Erlewine (to appear) for some exploration of this possibility.

Descriptively, then, we have arrived at something like the following generalization: certain heads in a selection relation must typically be made adjacent at some point in the derivation, and this condition holds, for example, of the relation between the verb and an auxiliary, but not of the relation between the verb and the direct object, or of the relation between the verb and a selected prepositional phrase.

#### 4. Pied-piping, part 2: the QP-Intervention Condition

Cable's (2007, 2010a, 2010b) QP-Intervention Condition can handle the contrast in (70):

- (70) a. Pied-piping, [about which] Mary will speak...
- b. \* Pied-piping, [speak about which] Mary will...

The QP-Intervention condition bans structures in which QP immediately dominates a phrase selected by a functional head. The PP in (70a), on this account, can be dominated by a QP, because it is selected by the lexical head V; the VP in (70b), by contrast, is selected by *v*, and therefore cannot be dominated by QP.

Suppose we adopt Cable's idea that Q neither selects nor is selected for (though, as we have seen, it does participate in Agree relations, both as a Goal and as a Probe). The theory of Selectional Contiguity just described, on the face of it, seems to lead us to expect that QP could never dominate a phrase selected by any head at all; Q would always intervene between the heads in the selection relation, making selection impossible<sup>5</sup>.

Thanks to our discussion of the FOFC, however, we can also see that there are certain kinds of licit exceptions to Selectional Contiguity; I suggested above that violations of Selectional Contiguity which cross spellout boundaries might be forgivable, while for Biberauer et al (2010) the relevant boundaries are those separating extended projections. Whatever the correct account, the result is that Selectional Contiguity constrains, for example, the relation between an auxiliary and the verb, but not the relation between the verb and a selected PP or DP.

Consequently, we expect, correctly, that QP will be able to separate a selected PP or DP from its selecting verb, but be unable to separate a verb phrase from the functional head selecting it:

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<sup>5</sup> In principle, we might expect to find certain kinds of counterexamples to this generalization, in the form of QPs with a different head direction from the heads on either side of them (for example, a QP with an initial head, intervening structurally but not linearly between final heads). I will leave for future work the question of whether this kind of potential counterexample is problematic.

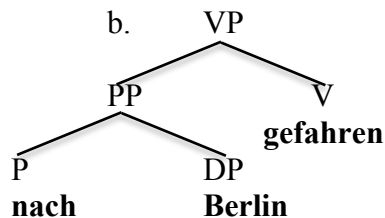
- (71) a. This topic, [about which] I could speak for many hours...  
 b. This topic, [which] I could discuss for many hours...  
 c. \*This topic, [speak about which for many hours] I could...

The same considerations that allowed us to derive the FOFC (and the various other effects discussed in Richards 2016) from Selectional Contiguity will allow us to derive the effects of Cable's QP-Intervention Condition.

Coppe van Urk (p.c.) points out an interesting consequence of this account for the distribution of preposition-stranding. Suppose we borrow from Abels (2003) the idea that when PP is a Spellout domain, an anti-locality condition bans extraction of the DP complement of P; such movement would have to take place via the edge of PP, and the relevant move is too short in whatever sense is relevant for anti-locality. We then expect P-stranding to be possible just in languages in which PP is *not* a Spellout domain. And on the account just developed, this would have to be in languages in which the relation of PP with its selector obeys the FOFC.

We saw above that for some languages, like German, the relationship between PP and its selector must not be subject to the FOFC, since German has head-final VP but head-initial PP:

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



On the other hand, in a language like English, the relationship between P and V would obey the FOFC (understood as a consequence of Selectional Contiguity) even if PP were not a Spellout domain:

(73) She has driven [to Berlin].

And, of course, in English, prepositions can be stranded:

(74) Which city did she drive to \_\_\_ ?

Within the Germanic family, the predicted correlation seems to hold: we find preposition stranding in languages with head-initial VP (English and the Scandinavian languages), but generally not in languages with head-final VP (e.g., German, Dutch).

As van Urk further points out, there is an additional twist; in OV languages like Dutch and (colloquial) German, P-stranding actually does become possible just for so-called ‘R-pronouns’, which appear *before* adpositions (van Riemsdijk 1978 and much other work):

(75) a. **waar** op [Dutch: van Riemsdijk 1978: 135-137]

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?'

Thus, P-stranding is possible in languages in which the relation between PP and its selecting V obeys Selectional Contiguity (in the form of the FOFC) without the need to make PP a Spellout

domain; this includes languages with head-initial VP and PP (such as English) and languages in which VP is head-final, just when the stranded P is also head-final (e.g., the Dutch facts above). If, as Abels suggested, a PP which forms a Spellout domain invariably bans stranding, then the facts follow.

## **5. Conclusion**

This paper has taken as its starting point Cable's (2007, 2010a, 2010b) framework for understanding the phenomenon of pied-piping. Cable's crucial insight was that previous work on pied-piping had missed the existence of a functional head he calls Q, null in many languages but overt in Tlingit, which reliably associated with wh-phrases. The problem of pied-piping, on this view, can be reduced to the problem of accounting for the distribution of Q; the phrase which undergoes A-bar movement is simply a QP, and once we understand which phrases can be dominated by QP, we will understand how much material can pied-pipe.

I have followed Cable in assuming that QP dominates the operators which undergo A-bar movement. I have also followed him in claiming that Q Agrees with the head of the operator that QP dominates, and that the Probes that trigger movement of the operator (for example, interrogative C) are in fact Agreeing with Q. Finally, I have joined Cable in claiming that Q neither selects nor is selected for by any other head.

I have accounted for cross-linguistic variability in a different way than Cable does. For Cable, QP may either dominate or be adjoined to an operator; this is his account of the distribution of wh-in-situ. Also, for Cable, languages may vary in whether Q Agrees with the head of the operator; this is his account of the cross-linguistic variation in how deeply the operator may be buried in the pied-piped phrase.



In the account developed here, these parameters are done away with, and replaced with the parameters offered in Richards (2010, 2016). Languages invariably have QP dominating the operator, on this account, and Q invariably Agrees with the head of the operator. Cross-linguistic variation in pied-piping is to be attributed, I have claimed, to variation in the direction of heads and in the details of the prosodic system. The system I constructed in Richards (2010, 2016) to account for the distribution of overt and covert movement, I have argued, can also account for the conditions on pied-piping, once Cable's insights about the driving forces behind pied-piping are taken into account.

The resulting system has the benefit of being strongly constrained. We expect a correlation, for example, between the conditions on pied-piping in a given language and the possibilities for *wh*-in-situ in that language; as Uribe-Etxebarria (2002) discovered, this correlation holds to a remarkable degree. Similarly, the approach to head-movement in Richards (2016) ultimately predicts that head-movement and pied-piping possibilities should be correlated. When we find counterexamples to the expected correlations, this theory requires us to develop accounts of them. The counterexamples discussed in this paper were Icelandic (where I claimed that the V2 word order prevents *wh*-in-situ in Icelandic, despite the prosodic conditions for *wh*-in-situ being present) and Tlingit (where I claimed that Tlingit C and Tlingit Q differ in head direction, and hence in the conditions under which they require adjacency to the Goals with which they Agree).

Because Q does not participate in selection, QP potentially blocks Selectional Contiguity, a condition which requires heads in a selection relation to be linearly adjacent. We have seen that QP may appear just where Selectional Contiguity can be shown not to hold (in those positions in which the FOFC, which we can also derive from Selectional Contiguity, breaks

down): QP may dominate DP or PP, for example, but not VP. This is the consequence of Cable's QP-Intervention Condition.

Because Q Agrees with the wh-word itself, the relation between Q and the wh-word must satisfy Probe-Goal Contiguity, a condition which requires adjacency between Probes and Goals under certain prosodic conditions. We thus expect the relationship between Q and the wh-word to be constrained by the same conditions that hold between C and QP; in general, we expect that if C and QP must be adjacent (that is, if wh-phrases must move overtly), then Q and the wh-word will also have to be adjacent (that is, the word triggering pied-piping will need to be more or less on the left periphery of the larger phrase which it pied-pipes). This is Uribe-Etxebarria's (2002) generalization, and the conditions which enforce it here are the equivalent in this theory of Cable's LP-Intervention Condition.

Cable's generalizations about pied-piping, then, appear to follow from principles argued for on independent grounds, once Cable's basic technology for pied-piping is adopted. Much work still remains to do, of course<sup>6</sup>, but this unification of the conditions on pied-piping with the conditions on movement seems like a desirable one, if it can be sustained.

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<sup>6</sup> For example, nothing in this account predicts pied-piping for covert movement, of the kind which Kotek and Erlewine (2016) have very convincingly documented. The principles motivating that kind of pied-piping will have to be different ones.

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