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Contiguity Theory and Pied-Piping

Norvin Richards

In this article, I apply the conditions of Contiguity Theory (Richards 2016) to the problem of pied-piping. I derive the conditions on pied-piping discovered by Cable (2007, 2010a,b) and account for the connection discovered by Uribe-Etxebarria (2002) between the conditions on *wh*-in-situ in a given language and the conditions on pied-piping in that language. In the end, as in Cable's approach, pied-piping dissolves as a phenomenon; the same conditions that determine when overt movement must take place also determine how much material may be pied-piped.

Keywords: pied-piping, syntax, prosody, Contiguity Theory, *wh*-in-situ, QP

In Richards 2010, 2016, I make 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 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 that 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 also in what restrictions they place on pied-piping.

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

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

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, also, to two anonymous reviewers, and to Kenyon Branan, Seth Cable, Myriam Uribe-Etxebarria, 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, the GLOW Spring School in Brussels, the LSA Institute at the University of Kentucky, and the University of the Basque Country for helpful discussion, ideas, and advice. I am responsible for all the remaining mistakes.

In section 1, I will begin to introduce Contiguity Theory (Richards 2016), starting with the prosodic condition on the relation between probes and goals. In section 2, I will show how to use this prosodic condition to yield the effects of Cable's (2007, 2010a,b) LP-Intervention Condition. In section 3, I will briefly derive Cable's (2007, 2010a,b) QP-Intervention Condition. Section 4 concludes.

1 Contiguity Theory, Part 1: Probe-Goal Contiguity

In Richards 2016, I propose conditions on the mapping of probe-goal relations onto prosodic structure that have the consequences informally sketched in (2).

- (2) a. In some languages, a probe and a goal must be nearly adjacent (cannot be linearly separated by any maximal projections) if the probe *precedes* the goal.
- b. In other languages, a probe and a goal 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 also important in Richards 2016 that the conditions in (2) must be satisfied during the derivation, but need not hold of the final representation. For example, a phrase may move 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, see Richards 2016. A condensed discussion follows.

In Richards 2016, I defend the principle in (3).

(3) *Generalized Contiguity*

If α either Agrees with [that is, enters into an Agree relation with] or selects β , α and β must be dominated by a single prosodic node, within which β is Contiguity-prominent. (Richards 2016:146)

A definition of *Contiguity-prominence* that will be good enough for present purposes runs as follows:¹

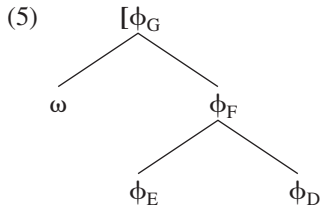
(4) *Contiguity-prominence*

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

¹ The definition actually offered in Richards 2016 requires a Contiguity-prominent ϕ to be adjacent to the prosodically active edge of the dominating ϕ , rather than merely not being separated from it by any other ϕ . The difference has to do with cases in which material that is prosodically smaller than ϕ intervenes between a Contiguity-prominent ϕ and the prosodically active edge. I posit an operation (Contiguity-adjunction) that can allow certain intervening material that is smaller than ϕ to be ignored. The definition given in (4) simply assumes that Contiguity-adjunction applies freely, which will be true in all of the cases to be considered. See Richards 2016 for discussion of limits on Contiguity-adjunction.

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 ϕ (Initial Lowering), meaning that Japanese ϕ has a prosodically active left edge.

To see the effects of this definition of Contiguity-prominence, consider the prosodic tree in (5), for a ϕ , ϕ_G , with a prosodically active left edge (symbolized by a left bracket).



In (5), ϕ_F and ϕ_E are both Contiguity-prominent within ϕ_G ; neither is linearly separated from ϕ_G 's prosodically active left edge by any other ϕ (though both are separated from it by a prosodic word, ω). ϕ_D is not Contiguity-prominent within ϕ_G , since it is separated from the prosodically active edge of ϕ_G by ϕ_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 ϕ , and heads onto ω . 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 linearly separated by a ϕ (that is, by a maximal projection), but may be separated by a ω (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 ϕ , and another in which it is on the left edge of ϕ .

- (6) a. $C \dots wh] \dots$
 b. $[C \dots wh \dots$

In Richards 2016, I posit an operation of Grouping that can create new instances of ϕ , as long as the word order is not changed. In (6a), if Grouping creates a ϕ that contains C and ends at the *wh*-phrase, the *wh*-phrase will be at the prosodically active right edge of the new ϕ . Generalized Contiguity 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 ϕ that contains both C and the *wh*-phrase, the *wh*-phrase will be in a Contiguity-prominent position in the new ϕ only if there is no ϕ intervening between C and the *wh*-phrase. If there are any instances of ϕ 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 ϕ containing just those two elements.

Alternatively, if there are only instances of ω (that is, heads), rather than of ϕ , between C and *wh*, then the *wh*-phrase is expected to be able to remain in situ, even in (6b).²

In general, then, the approach I develop in 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 might, for example, be languages with prosodic activity on both edges of ϕ , 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) *Japanese*

- a. **Dare**-ga pan-o katta (C)?
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, represented by Georgian, *wh*-phrases should not be separated from C by any phrase.

(8) *Georgian*

- a. ***Vin** p’ur-i iq’ida (C)?
who.ERG bread-NOM bought
 ‘Who bought bread?’
- b. P’ur-i **vin** iq’ida (C)?
 bread-NOM **who.ERG** bought
 (Erschler 2015:40)

² As a reviewer points out, we therefore expect to find languages with obligatory *wh*-movement to a position below C, since the only requirement is that there not be any complete maximal projections that do not contain either C or the *wh*-phrase and that linearly intervene between them. I argue in Richards 2016 that such languages are indeed attested, offering as an example Tagalog embedded questions.

(i) *Tagalog*

Hindi ko alam [**kung saan** siya pumunta].
 not I know **INTERROG where** she/he went
 ‘I don’t know where she/he went.’

In (i), the *wh*-phrase *saan* ‘where’ obligatorily *wh*-moves to a position to the right of the interrogative complementizer *kung*; this is close enough for purposes of Contiguity, exactly as the reviewer points out.

In (8a), the *wh*-phrase is separated from final C by a ϕ 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 a ω , projected by the verb *iq'ida* 'bought', and Contiguity is therefore satisfied.³

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

Turning to head-initial languages, we again expect 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.

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.⁴ 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?
 ^ |
 └──────────────────────────┘

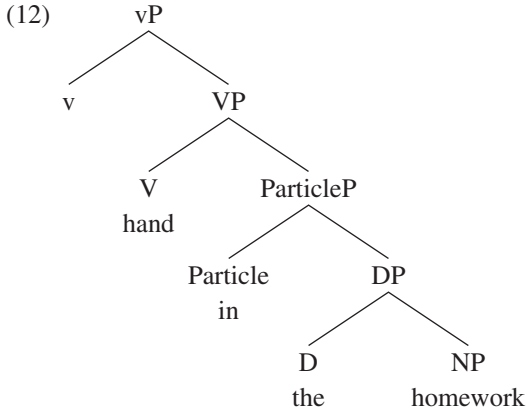
Recall that the “adjacency” requirement imposed by Contiguity is a comparatively loose one: an English probe cannot be separated linearly from a following goal by a complete ϕ (essentially, a complete XP). We are therefore in a position to distinguish, for example, between adverbs and particles.

(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), we correctly predict that the particle does not block adjacency in the sense that is relevant for Contiguity.

³ We might reasonably ask, as a reviewer does, why languages like Georgian do not move their *wh*-phrases to the right. In Richards 2010, 2016, I attribute this fact to Kayne’s (1994) Linear Correspondence Axiom: specifiers are never to the right of their sisters, at least when they are first created. In general, Contiguity Theory imposes conditions on the word order that the syntax must obey via syntactically legal means (in this case, via scrambling, an operation that Georgian can be independently shown to have).

⁴ As a reviewer points out, it is important in this theory that we understand the “goal” of T, in the relevant sense, to be something like “the position where the DP that Agreed with T is pronounced.” In another sense, of course, the goal of T is the copy of *John* that Agreed with T, or perhaps the entire chain of which that copy is a member, but neither of these can be said to “precede” T.



In (12), there is no complete XP (and hence no ϕ) that 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 that linearly intervene, in their entirety, between *v* and the object, violating Contiguity.

English, then, is a language in which a probe and a goal must be (more or less) adjacent if the probe precedes the goal. French, by contrast, is a language in which a probe must be adjacent just to a goal that precedes it.

- (14) *French*
 Jean (**souvent*) (T) (v) voit (*souvent*) Marie.
 Jean *often* sees *often* Marie

The French verb 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. By contrast, 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. In the account developed here, 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.

On this account, the differences between French and English described above are to be related 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) *French*
 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 can be separated from their objects by adverbs. *Wh*-movement is 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 French and English facts 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 other factors that can impose additional requirements on word order. For example, it has often been noted (by, among others, Vikner (1997), Wiklund et al. (2007), and Bentzen (2008)) that in non-V2 (verb-second) clauses, Icelandic and the mainland Scandinavian languages differ in the placement of the verbs, in ways that are reminiscent of the English and French facts just reviewed.⁵

⁵ For evidence that Icelandic, like French, has prosodic activity on the right, and that Norwegian, like English, has prosodic activity on the left, see Richards 2018. To present the evidence briefly: Norwegian and English are alike in that in branching indefinite NPs with meanings like *an open doorway*, the first content word has a much higher pitch peak

(18) *Icelandic*

Ég veit [af hverju Hedda (**oft*) kaupir (*oft*) skó].
 I know why Hedda often buys often shoes
 ‘I know why Hedda often buys shoes.’
 (Wiklund et al. 2007:204)

(19) *Norwegian*

Jeg vet [hvorfor Hedda (*ofte*) kjøper (**ofte*) sko].
 I know why Hedda often buys often shoes
 ‘I know why Hedda often buys shoes.’
 (Wiklund et al. 2007:204)

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. However, this is false.

(20) *Icelandic*

*Pétur hefur talað við **hvern?**
 Peter has spoken with **who.ACC**

In fact, neither Icelandic nor Norwegian has *wh*-in-situ in nonecho 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. For discussion of that generalization (including an explanation of why it should hold, and an account of one exception to it, the Nilotic language Dinka, which is V2 and has *wh*-in-situ), see Richards 2016. For present 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:

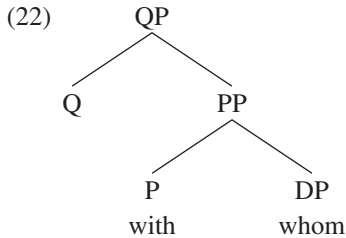
- (21) a. In some languages, a probe and a goal must be nearly adjacent (cannot be linearly separated by any maximal projections) if the probe *precedes* the goal.
 b. In other languages, a probe and a goal must be nearly adjacent (cannot be linearly separated by any maximal projections) if the probe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

on its stressed syllable than the second word does. Icelandic and French are alike in that the pitch peak on the second content word in such NPs is as high as or higher than the pitch peak on the first content word. In Richards 2018, I offer this distinction as a diagnostic for prosodic activity and demonstrate that it gives desirable results for a number of languages: prosodic activity on the left is associated with a pitch boost on the left side of the phonological phrase, and prosodic activity on the right is associated with a pitch boost on the right.

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

2 Pied-Piping, Part 1: The LP-Intervention Condition

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



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*; on this account, pied-piping 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 then reduces to the question of how distant *QP* may be from the *wh*-phrase that it dominates. I will adopt this point of view wholesale.

For Cable, *QP* may dominate the *wh*-phrase, as in (22), 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 section 1 showed, I am assuming a different account 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) that 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, in which pied-piping is comparatively constrained, though not in constructions like nonrestrictive 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, one of my claims will be that the two parameters just mentioned should be linked; on the account developed here, there is a connection between where a given language allows *wh*-in-situ and where it allows large-scale pied-piping.

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 be to account for crosslinguistic variation in pied-piping possibilities, in terms of this universal structure.

2.1 Parallelism between *Wh-in-Situ* and *Pied-Piping*

Our starting point will be a discovery made by Uribe-Etxebarria (2002) about Spanish: namely, there is an interesting parallelism between the conditions on *wh*-in-situ and on pied-piping by deeply embedded phrases.⁶ We will see that she is right, not only about Spanish, but about a wide range of languages.

At least for some speakers (Jiménez 1997, Uribe-Etxebarria 2002, Reglero 2004), Spanish 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) Spanish

- a. ¿Tú le diste la guitarra **a quién**?
 you CL gave the guitar **to who**
 ‘Who did you give the guitar to?’
- b. *¿Tú le diste **a quién** la guitarra?
 you CL gave **to who** the guitar
 (Reglero 2004:18)

As Uribe-Etxebarria remarks, the contrast in (24) is particularly striking because the ordinary ordering of these arguments is the one in (24b), yet (24b) is impossible (though for some speakers, it can apparently be rescued by putting a large prosodic break after the *wh*-phrase). I have no explanation to offer for this condition; descriptively, we can say that while Spanish is capable of creating a ϕ containing both C and the *wh*-phrase, the right edge of such a ϕ must be aligned with the right edge of a larger prosodic phrase.⁷

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) Spanish

- a. ¿[La estatua en el jardín **de qué diosa**] te ha dicho Juan que había
 the statue in the garden **of what goddess** CL has said Juan that had
 reconocido ___ ?
 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 que había
 the statue **of what goddess** in the garden CL has said Juan that had
 reconocido ___ ?
 recognized

⁶ I'm grateful to Kenyon Branán for pointing this work out to me.

⁷ To put the same idea another way, we could think of Spanish as a language in which Grouping cannot apply to create Contiguity relations for *wh*-phrases. See Branán 2018 for one proposal about why this condition holds.

‘[The statue of what goddess in the garden] did Juan tell you that he had recognized?’

(Uribe-Etxebarria 2002:227)

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 questions (Reglero 2004:20).

(26) *Spanish*

*Pedro ha preguntado que has visto a **quién**.

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

‘Pedro asked who you saw.’

(Reglero 2004:20)

Speaking descriptively, we can see the ill-formedness of (26) as reflecting a condition on the creation of a ϕ connecting C and a *wh*-phrase: such a ϕ cannot be entirely contained in an embedded clause. And, again, the same condition holds for pied-piping.

(27) *Spanish*

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.’

(Karlos Arregi, pers. comm.)

French *wh*-in-situ lacks the restriction in (24) to positions at the end of the clause.

(28) *French*

Tu fais **quoi** dans la vie?

you do **what** in the life

‘What do you do in life?’

(Shlonsky 2012:248)

And French pied-piping also appears to lack the restriction found in Spanish to the end of the *wh*-phrase.⁸

(29) *French*

?[Des peintures de **quoi** de Monet] as-tu vu au musée?

of.the paintings of **what** by Monet have-you seen at.the museum

⁸ In other words, French is unlike Spanish in being able to use Grouping to satisfy Contiguity (for the relation between C and QP in (28), and the relation between Q and the *wh*-phrase *quoi* in (29)). Thanks to a reviewer for asking me to clarify this.

‘[Paintings of what by Monet] did you see at the museum?’
 (Sophie Moracchini, Paul Marty, pers. comm.)

French is like Spanish, however, in banning *wh*-in-situ in embedded questions.

(30) *French*

*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) *French*

- 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 a achetées.
 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, pers. comm.)

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.⁹

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

(32) *Zulu*

- 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 2006:271, 277)

And, as expected, pied-piping by noninitial phrases is possible in both main and embedded clauses.¹⁰

⁹ Perhaps we are learning that in French and Spanish, a verb that selects an embedded interrogative CP must (at some point in the derivation) be adjacent to the *wh*-word itself (modulo prepositions and particles). In the Contiguity Theory framework, we could understand this as meaning that such verbs and the *wh*-word need to satisfy Selectional Contiguity. In languages with optional *wh*-in-situ, embedded questions with *wh*-in-situ would then be ruled out by the need to create adjacency between the higher verb and the *wh*-word, as would the option of “deep pied-piping.” As we will see later, the condition would then have to not hold in Zulu; I will not speculate on the reasons for this until I have more evidence about the prosody and syntax of Zulu embedded questions.

¹⁰ Many thanks to Claire Halpert for finding these examples online.

(33) *Zulu*

- 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 ukuthi [ingane **ka-bani**]
 2PL-with.AUG-11.fear because NEG-2PL-know that AUG.9.child ASSOC-who
 e-zo-landela.
 9.REL-FUT-follow
 ‘We’re afraid, because we don’t know [child of who] will be next.’
 (Claire Halpert, pers. comm.)

English is the opposite of Zulu, allowing neither *wh*-in-situ nor pied-piping by deeply embedded phrases.¹¹

- (34) a. *You bought **what**? (nonecho)
 b. *[Pictures of **whom**] did you buy?

The parallelism between the possibilities for *wh*-in-situ and the possibilities for pied-piping thus seems to cover a fair amount of crosslinguistic ground.

Note that the phrase responsible for pied-piping need not be literally initial in the pied-piped phrase in English.

- (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 that 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

¹¹ Examples like (34b) are sometimes merely described as “marginal” in the literature (Cable 2007, 2010b, Kotek and Erlewine 2016). The relevant literature offers comparisons between examples like these:

- (i) a. ?[A picture of **which** president] does Jim own?
 b. *[No pictures of **which** president] does Jim own?
 (Kotek and Erlewine 2016:675)

We would expect both of these examples to violate the conditions under discussion here, and in fact neither is perfect (though I have retained Kotek and Erlewine’s judgments in (i), I find both (ia) and (34b) completely intolerable without special “echo” or “quiz show” contexts; my consultants tell me that no such contexts are necessary in French or Spanish). The additional ill-formedness of (ib) would have to be handled by other principles, perhaps the ones that Cable and Kotek and Erlewine discuss.

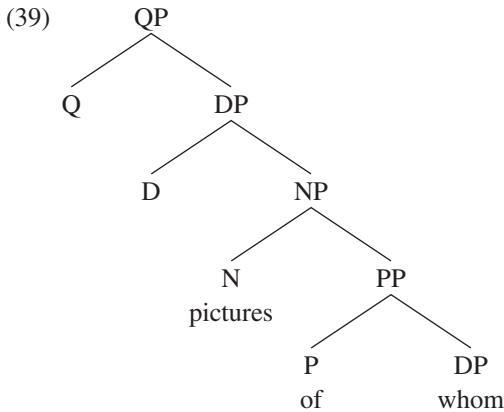
an adverb between the probe and the goal creates ill-formedness, as expected if the adverb is an XP adjunct or specifier c-commanded by the probe and c-commanding the goal.

- (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 **whom**] 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 *whom* 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. *Hawaiian*
 ke *ki'i* **nui** [o ke kumulā'au]
 the *representation* **big** of the tree
 'the big picture of the tree'
- b. *Spanish*
 la *foto* **grande** [del árbol]
 the *picture* **big** of.the tree
 'the big picture of the tree'

c. *Hebrew*

ha-*tmuna* ha-**gdola** [shel ha-etz]
 the-*picture* the-**big** of the-tree
 ‘the big picture of the tree’

d. *Scottish Gaelic*

an *dealbh* **mòr brèagha** [de Mhàiri]
 the *picture* **big beautiful** of Mhàiri
 ‘the big beautiful picture of Mhàiri’
 (Adger 2012:97, 99, 102, 105)

(41) a. *Bangla*

[gach-ʈa-r] **boro** *chobi-ʈa*
 tree-CL-GEN **big** *picture-CL*
 ‘the big picture of the tree’

b. *Malayalam*

[maratt-inte] **valiya** *paṭam*
 tree-GEN **large** *picture*
 ‘the large picture of the tree’

c. *Turkish*

[agac-ın] **büyük** *resm-in*
 tree-GEN **large** *picture-3.POSS*
 ‘the large picture of the tree’
 (Adger 2012:162, 163)

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 present purposes; see Adger 2012 for further discussion.

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

(42) *[Pictures of **whom**] did you buy?

On Adger’s account, the material preceding *of whom* in the NP may look like a simple head noun *pictures*, but it is actually a phrase that would dominate not only the head noun but also any adjectives that modified it. Since the string *pictures* is both a head and an XP, it qualifies under Match Theory both as a ϕ and as a prosodic word (ω). Discussion in Match Theory (e.g., Elfner 2012, Bennett, Elfner, and McCloskey 2016) often introduces conditions that decide the status of such prosodically ambiguous strings, but if we adopt the claim in Richards 2016 that the derivation of prosody begins in the narrow syntax, and if we assume, with Chomsky (1995),

that syntactic representations can contain objects that are simultaneously maximal and minimal projections, then we might imagine that such objects are simultaneously ω 's and ϕ 's, at this point in the derivation. Purely phonological criteria might then force a later reanalysis of *pictures* as a simple ω , perhaps on the grounds that ϕ 's are preferentially branching (Inkelas and Zec 1990, Elfner 2012, and much other work). As long as these phonological criteria apply only after Contiguity Theory has had its effects on the narrow syntax, *pictures* will count as an intervener for Contiguity in (42), and Contiguity will fail, as desired.

Uribe-Etxebarria's (2002) 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 nonadjacent in the same contexts.

2.2 Departures from Parallelism

Recall from section 1 that we find languages in which the behavior of various probes does not line up as neatly 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) Icelandic

Ég veit [af hverju Hedda (**oft*) kaupir (*oft*) skó].
 I know why Hedda often buys often shoes
 'I know why Hedda often buys shoes.'

(44) Norwegian

Jeg vet [hvorfor Hedda (*ofte*) kjøper (**ofte*) sko].
 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 have seen that this was false, and I proposed in Richards 2016 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.

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 noninitial phrases, in main clauses but not in embedded clauses.

(45) *Icelandic*

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

And Norwegian, like English, bans such pied-piping.

(46) *Norwegian*

- *[Fotografier av **hvem**] kjøpte hun?
 photographs of **who** bought she
 ‘Who did she buy photographs of?’
 (Øystein Vangsnes, pers. comm.)

The data in (45)–(46) exhibit a slight twist on Uribe-Etxebarria’s (2002) generalization. In Icelandic, pied-piping does not pattern with *wh*-in-situ; Icelandic lacks *wh*-in-situ. Rather, Icelandic pied-piping exhibits the conditions we would expect to find on Icelandic *wh*-in-situ, if Icelandic were not a V2 language. To put the case in Contiguity Theory 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)) 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,b) 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) *Tlingit*

- [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?’)
 (Cable 2007:26)

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 ϕ 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) *Tlingit*

[wáa kwligeyi xáat] sá
 how it.is.big.REL fish Q
 ‘a fish that is how big’
 (Cable 2007:26)

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.

2.3 Movement within the Pied-Piped Phrase

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 (2002) points out). The conditions on the relation between C and QP, of course, are often met via movement; this is the classic *wh*-movement. In none of the examples we have looked at so far, however, is the relation between Q and the *wh*-phrase 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 Ch’ol. In all of these languages, possessors are generally postnominal, but become prenominal if they pied-pipe their possessives.

(49) *Ch’ol*

- a. Tyi yajl-i [i-plato **aj-Maria**].
 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
 (Coon 2009:166)

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. For example, we have already seen how to rule out (50a) in English, but we do not want to be able to rescue (50b) by doing Ch’ol-style Q-driven movement of the pied-piping *wh*-phrase.

- (50) a. *[Pictures of **who**] did you buy?
 ↓
 b. ***[Who** pictures of ___] did you buy ___?
 c. **Who** did you buy [pictures of ___]?

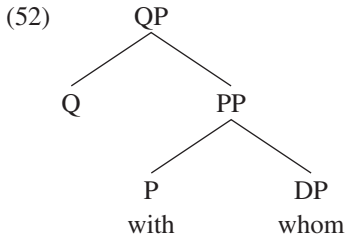
In (50b), *who* has moved to the left periphery of the pied-piped phrase, and the locality conditions on Q’s relation with its goal should be satisfied. There is a temptation to appeal to the well-formedness of (50c), perhaps invoking some kind of condition requiring QP to dominate as little material as possible. But the simplest version of such a condition cannot hold crosslinguistically, since possessors in Ch’ol need not pied-pipe.

- (51) *Ch’ol*
 a. **Maxki** tyi yajl-i [i-plato ___]?
 who PRFV fall-ITV 3POSS-plate
 ‘Whose plate fell?’
 (Coon 2009:166)
 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 Ch’ol 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 were to insist on positing such a condition, the optionality found in Ch’ol 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.

2.4 Summary: Probes, Goals, and Pied-Piping

I began this section with Cable’s (2007, 2010a,b) 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 \bar{A} -constructions, such as nonrestrictive relatives), and crosslinguistic differences in pied-piping can be related to differences more generally in the permissible interactions of probes and goals. Uribe-Etxebarria's (2002) 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 Pied-Piping, Part 2: The QP-Intervention Condition

The theory of the preceding section imposes conditions on pied-piping in certain types of \bar{A} -extraction, including *wh*-movement. I explicitly excluded other kinds of \bar{A} -extraction, such as nonrestrictive 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,b) proposes a condition that 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 that F selects; in other words, QP may not dominate a phrase that is selected by a functional head F, if it does not also dominate F. In (54), fronting of the VP would demand that QP dominate VP, or perhaps vP. But both of these phrases are selected by functional heads

(*v* and *T*, respectively). The QP-Intervention Condition therefore prevents QP from immediately dominating such projections. By contrast, a direct object 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.¹²

Cable's QP-Intervention Condition can also be derived from Contiguity Theory, though for reasons for space I will not sketch the derivation fully here. For the sake of readers already familiar with Contiguity Theory: the QP-Intervention Condition is a consequence of Selectional Contiguity (Richards 2016). Since *Q* neither selects nor is selected, QP potentially blocks selection relations across it, and is therefore restricted in where it can appear.

In Richards 2016, I used Selectional Contiguity to derive Biberauer, Holmberg, and Roberts's (2014) Final-over-Final Condition. As Biberauer, Holmberg, and Roberts point out, there are certain general apparent counterexamples to the FOFC; for example, it reliably constrains the relation between auxiliaries and verbs, but not that between verbs and their selected DPs and PPs. I proposed that DPs and PPs are standardly separated from the heads selecting them by Spell-Out boundaries, and that violations of Selectional Contiguity that cross Spell-Out boundaries are forgivable (see Branen 2018 for further discussion of this point). I was not explicit about what the relevant phase heads are to be, but we could posit a *K(ase)P* dominating DP, and a *pP* dominating PP, both projections of phase heads.

The proposal, then, was that just those heads that are constrained by the FOFC (for example, verbs and their auxiliaries) are subject to a constraint of Selectional Contiguity that requires them to be sufficiently close to each other, while heads that seem to be immune to the FOFC (for example, direct objects and their selecting verbs) are not subject to such a constraint. If QP interferes with Selectional Contiguity, then we expect QP to be able to appear just between those heads that are not constrained by the FOFC; in other words, we expect, correctly, that QP will be able to separate a selected DP or PP from its selector, but will be unable to separate a VP from the functional head selecting it.

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

The same considerations that allow 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. We arrive at the conclusion that pied-piping should be able to apply to categories across which the FOFC does not hold.

Coppe van Urk (pers. comm.) points out an interesting consequence of this account for the distribution of P-stranding. Suppose we assume, in the spirit of Abels (2003), that when PP is a Spell-Out domain (triggered by the phase head *p*, introduced above), an antilocality condition

¹² As Cable (2007:123n72) 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).

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 antilocality.¹³ We then expect P-stranding to be possible just in languages in which PP is *not* a Spell-Out domain.

I said above, following Biberauer, Holmberg, and Roberts (2014), that the relationship between PP and its selector cannot always be subject to the FOFC. In German, for example, we find head-final VP but head-initial PP.

(56) *German*

Sie ist [nach Berlin] gefahren.
 she is to Berlin driven
 ‘She has driven to Berlin.’

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 Spell-Out domain, since both projections are head-initial.

(57) She has driven [to Berlin].

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

(58) Which city did she drive to ___ ?

Within the Germanic family, the predicted correlation seems to hold: we find P-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).

(59) *Dutch*

- a. **waar** op
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?’

¹³ As a reviewer points out, the relevant notion of antilocality will have to be different from Abels’s (2003). Abels proposes that P is itself a phase head in some languages, and the relevant notion of antilocality bans movement of the complement of P to its specifier. Making P a phase head would not rescue it from interacting with a selecting V for purposes of the FOFC, and I have therefore instead introduced a phase pP dominating PP. On this account, we will need a version of antilocality that prevents movement of the complement of P to the specifier of the projection immediately dominating PP. One such version of antilocality would be that of Brillman and Hirsch (2016), in which movements subject to antilocality must always cross intervening specifiers.

- d. ***Wie** heb je op ___ gerekend?
who have you on counted
 ‘Who did you count on?’
 (Van Riemsdijk 1978:37, 135, 137)

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 Spell-Out 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 suggests, a PP that forms a Spell-Out domain invariably bans stranding, then the facts follow.

4 Conclusion

This article has taken as its starting point Cable’s (2007, 2010a,b) 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 associates with *wh*-phrases. On this view, the problem of pied-piping can be reduced to the problem of accounting for the distribution of Q; the phrase that undergoes \bar{A} -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 claiming that QP dominates the operators that undergo \bar{A} -movement. I have also followed him in arguing 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 crosslinguistic 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 crosslinguistic variation in how deeply the operator may be buried in the pied-piped phrase.

In the account developed here, these parameters are replaced with the parameters offered in Richards 2010, 2016. On this account, languages invariably have QP dominating the operator, and Q invariably Agrees with the head of the operator, at least in *wh*-questions. Crosslinguistic 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 developed 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. For example, we expect a correlation 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

certain 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 article were Icelandic (where I claimed that the V2 word order prevents *wh*-in-situ, despite the prosodic conditions for *wh*-in-situ being present) and Tlingit (where I claimed that C and 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 that requires locality between heads in a selection relation. 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 that 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 that it pied-pipes). This is Uribe-Etxebarria's (2002) generalization, and the conditions that 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 be done, of course,¹⁴ 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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¹⁴ For example, nothing in this account predicts pied-piping for covert movement, of the kind that 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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