There is No Such Thing as Pied-Piping[1]

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ABSTRACT: This paper argues that 'pied-piping', as traditionally understood, does not exist. That is, movement is argued to only ever target the maximal projection of the lexical item whose features trigger it. Classic, well-known counter-examples to this generalization are argued to have traditionally been misanalyzed. An alternative analysis of these 'pied-piping structures' is proposed, and shown to account for a wide range of their cross-linguistic properties.

1.   Introduction

The central claim of this paper is that, in a certain sense, pied-piping does not exist. That is, although we might retain the term 'pied-piping' or 'pied-piping structure' as a purely descriptive label, the class of structures it circumscribes have traditionally been misanalyzed, and differ in no interesting theoretical sense from simple non-pied-piping structures.

As we will see, this 'eliminativist' perspective on pied-piping phenomena follows from a particular theory of the structure of wh-questions. Under this theory, fronting of a wh-operator is, contrary to common perception, *not* triggered by any features of the wh-word itself. Rather, it is triggered by a distinct formal element, structurally higher than the wh-word. Thus, under this account, so-called 'pied-piping structures' are simply instances of normal phrasal movement, and their analysis needn't appeal to any special mechanisms like feature percolation (Chomsky 1973), pied-piping features (Watanabe 2006), or violable syntactic constraints (Heck 2004, 2007). Furthermore, we will see that the proposed account accurately captures the cross-linguistic properties of pied-piping structures discovered by Heck (2004, 2007).

The special syntactic theory advocated here is initially motivated by the properties of wh-questions in Tlingit, a Na-Dene language of Alaska, British Columbia and the Yukon. As we will see, the wh-questions of Tlingit do not appear on the surface to be very different from those of other, more familiar wh-fronting languages. Nevertheless, an extended argument of this paper is that, when examined carefully, the form of wh-questions in Tlingit challenges a variety of

widely-held, fundamental views regarding the nature of wh-fronting and pied-piping. To get a sense of why this is so – and to further clarify our central theoretical claim – let us briefly review some background regarding the theory of wh-fronting.

1.1   Pied-Piping as 'Epicycle' in the Theory of Movement

Since at least the mid-1960's, a fundamental question in the theory of wh-questions has been "Why do wh-words have to front in the wh-questions of some languages?" Although there are currently a great variety of answers to this question, they all seem to share the following form.

(1)   **Structure Common to Theories of Wh-Fronting**

> (i)   <u>Hypothesis 1:</u>
> Wh-words have a special property, X

> (ii)   <u>Hypothesis 2:</u>
> The position that wh-words move to has a special property, Y.

> (iii)   <u>Hypothesis 3:</u>
> General principals entail that things bearing property X must be located at positions bearing property Y.

That is, across many different frameworks and ideologies, linguists generally agree that wh-words front in some languages because *the wh-word* has a 'special property' that requires it to be located at the position that it fronts to. To illustrate the ubiquity of this explanatory structure, the following list shows how a variety of particular theories follow its contours.

(2)   **Some Theories of Wh-Fronting, Characterized in Terms of the Structure in (1)**

> <u>A GB Account (Pesetsky 1982, May 1985, Lasnik & Saito 1992)</u>
> X = the feature WH
> Y = the feature COMP and the feature [+WH]
> *An LF filter (the 'WH-Criterion') requires that "all WHs be in a* [+WH] *COMP at LF."*

> <u>A GPSG Account (Bennett 1995)</u>[2]
> X = the feature [+Q]
> Y = daughter of a root node bearing the feature [+Q]
> *A principle (the 'Foot Feature Principle') requires that a root node bearing the feature* [+Q], *such as the root node of a wh-question, have a daughter which is* [+Q].

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[2] To my knowledge, there is no widely-held account in HPSG for why wh-words must front in the wh-questions of languages like English. On the other hand, as discussed in Sag, Wasow & Bender (2003), in 'Sign-Based Construction Grammar', which employs the HPSG formalism, there is such an account.

An LFG Account (Falk 2001)
X = the feature WH
Y = Specifier of CP
An ID rule requires that a specifier of CP (as opposed to an adjunct of S) bear the feature WH.

A Semantic Account (Karttunen 1977)
X = existential force
Y = scope above the 'proto-question'
In order for a structure to be interpreted as a wh-question, the existential force contributed by the wh-word must have scope above the 'proto-question'.

A Pragmatic/Discourse-Structural Account (Horvath 1986, Kiss 1995)
X = Focused Phrase (Wh-Words are Obligatorily Focused)
Y = Focus Position
General principles entail that focused phrases appear at the designated Focus Position.

Although virtually every theory of wh-fronting possesses the 'classic structure' under (1), theories having such a structure are immediately faced with a rather fundamental challenge: how to analyze sentences like those in (3), where *more* than the maximal projection of the wh-word undergoes fronting.

(3)   **Some Pied-Piping Structures**

        a.   [Whose book] did you read?
        b.   [To whom] did you speak?
        c.   [How long a book] did he write?

Although it's often not explicitly recognized, sentences like those in (3) directly challenge the view that a property of the wh-word is what's directly responsible for the fronting seen in the wh-question. After all, if it's a property of the *wh-word* that motivates the fronting, how did this property come to appear on the larger, fronted phrase, *a phrase that doesn't otherwise inherit the properties of the wh-word*? For example, we can see from contrasts like those in (4) that a possessive DP doesn't inherit the *number* properties of a wh-possessor. How, then, does such a DP inherit the special 'wh-word properties' that trigger the fronting seen in (3a)?

(4)   **Possessive DP Doesn't Exhibit Singular Number of Possessive DP**

        a.   Who is / *are coming to your party?
        b.   [Whose sisters] are / *is coming to your party?

There is, of course, a commonly accepted answer to these questions, a theoretical construct that renders sentences like those in (3) consistent with analyses bearing the 'classic structure' under (1). This commonly accepted answer is that the structures in (3) all illustrate something called 'pied-piping'. Although details of implementation vary across frameworks, generally speaking, the term 'pied-piping' describes cases where an operation that targets the

features of a particular lexical item applies to a phrase properly containing the maximal projection of that item. This definition is highlighted below.[3]

(5)   **Definition of 'Pied-Piping'**

Pied-piping occurs when an operation that targets the features of a lexical item L applies to a phrase properly containing L^{MAX}.

We might, then, contrast the theoretical term 'pied-piping' with the more descriptive and theory-neutral label 'pied-piping structure', defined below.

(6)   **Definition of 'Pied-Piping Structure'**

A pied-piping structure is one where a phrase *properly containing* the maximal projection of a wh-word (or related operator) has undergone fronting.

Therefore, to maintain that pied-piping actually exists is to maintain that there are simply cases of the kind in (5), that it is simply sometimes possible for an operation to apply to a phrase that properly contains the maximal projection of the word whose features it targets.

Of course, what *makes* such cases possible – what mechanisms are responsible for pied-piping – is a separate, subsequent question, and one that has received much focused attention (Ross 1967; Sells 1985; Webelhuth 1992; Kayne 1994; Grimshaw 2000; Heck 2004, 2007; Watanabe 2006; Horvath 2007). Here, a commonly accepted answer is that there is an operation, called 'feature percolation', which serves to extend the special, movement-triggering features of the wh-word out from its maximal projection and onto higher phrases. Again, there has been much work exploring the nature of this hypothetical 'percolation' device, particularly the ways in which the device appears to be constrained (Sells 1985; Webelhuth 1992; Grimshaw 2000; Heck 2004). Curiously, however, the most basic question of whether pied-piping actually exists has not yet received serious attention. This is largely due to the ubiquity of the explanatory structure in (1). After all, if the only analytic option is that the fronting in wh-questions is directly triggered by a special property of wh-words, then the sentences in (3) clearly show that pied-piping *does* exist. Indeed, in some introductory discussions of pied-piping, pied-piping is presented as an *observable phenomenon*, a datum that must be explained, rather than as a technical solution to an empirical challenge faced by a particular kind of analysis.

We find, then, that when we survey the vast literature on wh-questions, despite all the variety over more specific issues, a shared, 'classic' picture clearly emerges, one where (a) the fronting of wh-words in wh-questions directly results from a property born by the wh-word, and (b) wh-questions where there is fronting of a phrase properly containing the maximal projection of the wh-word reveal the existence of pied-piping.

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[3] Note that, following the definition in (5), we do not include under the rubric of 'pied-piping' all instances of phrasal movement. That is, we accept as uncontroversial the existence of a mechanism of 'feature projection', which places the features of a lexical head onto the *projections* of that head. What is at issue here is any mechanism that serves to place the features of a lexical head onto nodes *outside* the projections of that head. As discussed in Section 3 of this paper, this is a significant distinction, given that 'feature projection' is theoretically and empirically unassailable, while the latter sort of devices are invariably stipulative and of no utility outside of deriving pied-piping structures.

The present paper seeks to challenge this classic, consensus view. More importantly, we will find that a theory rejecting assumptions (a) and (b) above is not only conceptually simpler, but is also able to capture the observed cross-linguistic behavior of 'pied-piping structures'. Our argument begins in the next section, with an introduction to the special syntactic theory of wh-fronting assumed here. Besides introducing the technology, this section also reviews the discussion of Tlingit wh-questions found in Cable (2007, to appear), highlighting the way in which Tlingit wh-questions transparently motivate the defining assumptions of the system.

Following this background material, Section 3 introduces the proposed treatment of pied-piping structures. We begin by noting that the analysis of Tlingit wh-questions from Section 2 needn't appeal to 'pied-piping' as defined in (5), despite the possibility of 'pied-piping' structures as defined in (6). Furthermore, we note that the striking similarity of Tlingit wh-questions to those of the more familiar wh-fronting languages provides *prima facie* support for extending our special theory of Tlingit wh-questions to all other wh-fronting languages. This section concludes by sketching various additional, basic advantages of applying our Tlingit-based theory of wh-fronting and 'pied-piping' to the more familiar wh-constructions of languages like English and German.

The typological argument in support of our analysis begins in Section 4, which examines constraints governing the position of wh-words in the pied-piping structures of more familiar wh-fronting languages. After introducing these constraints, we show that our proposed theory is able to account for them in a unified fashion. Moreover, the apparent inactivity of these constraints in Tlingit and related languages is argued to follow from a certain morpho-syntactic peculiarity of their wh-words.

Our core typological argument is continued into Section 5, which examines four pied-piping universals, first uncovered by Heck (2004, 2007). We will see that our 'eliminativist' theory of pied-piping is able to account for these cross-linguistic properties of pied-piping structures. Moreover, we will argue that with respect to at least one of these universals, the account proposed here offers empirical advantages over the account originally proposed by Heck (2004, 2007).

In conclusion, then, we will see that an empirically adequate theory of pied-piping structures needn't assume the actual existence of pied-piping. This result is of much potential significance. At the very least, it calls into question a long-standing and wide-spread analytic tradition surrounding structures like those in (3). More interestingly, it casts doubt upon the existence of a phenomenon that has hitherto been accepted as a very real and deeply problematic property of human language. Most importantly, we find that the overall theory of grammar can be vastly simplified. If we simply abandon the problematic assumptions in (1), we needn't deviate from the null hypothesis that operations targeting the features of a given lexical item apply only to the maximal projection of that item.

As a final introductory comment, we should note a potentially problematic feature of our discussion throughout this paper. Although pied-piping structures can be found in a variety of A-bar constructions – wh-fronting, focus-fronting, relative clauses – attention in this paper will be restricted to pied-piping in wh-questions. The reader should be aware that this is not necessarily an innocent simplification. As will be more apparent in Section 3, it is not trivial to extend the theory proposed here to structures beyond wh-questions. Neither, of course, is such extension impossible, and Cable (2007, Chapter 6) explains at length how this account is to be generalized across A-bar constructions. Thus, the material that follows can be understood as

laying the groundwork for an ongoing research project, one whose viability should be gauged by the achievements (and shortcomings) of these initial proposals.

2. Question-Particles and the Nature of Wh-Fronting: Evidence from Tlingit

This section introduces the theory of wh-fronting that will provide the foundation of our theory of pied-piping structures. Section 2.1 introduces the basics of the theory, which we call the 'Q-based Analysis', and notes its precedents in the literature. Section 2.2 then quickly reviews the arguments of Cable (2007, to appear) that the wh-questions of Tlingit require our Q-based Analysis. Finally, Section 2.3 introduces an additional piece of the analysis, which will play an important role in our later theory of pied-piping structures.

2.1 The Q-Based Analysis of Wh-Fronting

In order to introduce our special theory of wh-fronting, it will help to begin with some recent proposals concerning wh-*in-situ* languages, which will provide our own proposals with some clarifying context.

In recent work, an operation of 'Q-movement' has been argued to be central to the formation of wh-questions in several wh-*in-situ* languages (Hagstrom 1998, Kishimoto 2005). Under this analysis, the formation of wh-questions in these languages proceeds as follows.

(7) **Q-Movement in Wh-*In-Situ* Languages**
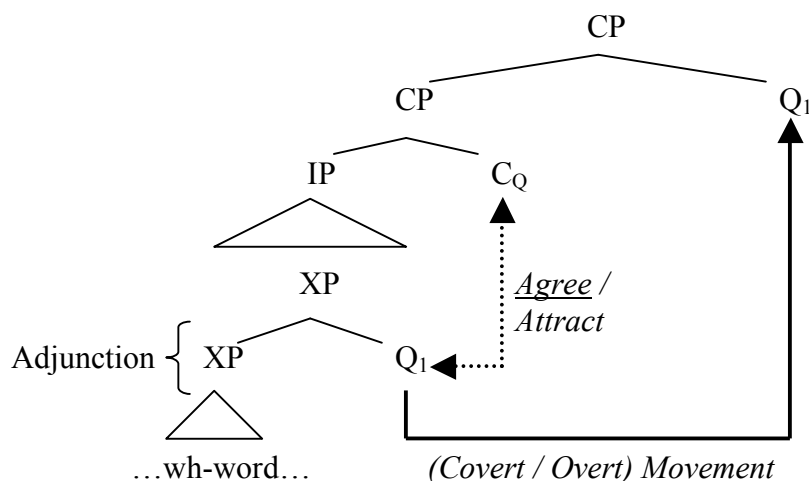
The structure in (7) represents the following claims. A wh-word is obligatorily c-commanded by a Q(uestion)-particle, which adjoins to some phrase containing the wh-word. Under this analysis, it is the Q-particle, *and not the wh-word itself*, which is probed by and Agrees with the interrogative C head of the wh-question. More concretely, the interrogative C head bears an uninterpretable instance of the interpretable Q-feature born by the Q-particle. The interrogative C must therefore probe for an interpretable instance of the Q-feature. Upon reaching the adjoined Q-particle, the interrogative C Agrees with the particle, eliminating its own uninterpretable instance of Q. This Agreement then triggers movement of the Goal, the Q-

particle, into the projection of C. In some languages (e.g., Sinhala), this movement is usually covert; in others (e.g., Japanese), this movement is always overt.[4]

Under the 'classic' theory of wh-fronting in (1), the analysis in (7) would seem to entail that wh-questions in these wh-*in-situ* languages are syntactically quite different from wh-questions in wh-fronting languages like English. After all, under the assumptions in (1), the left-peripheral position of wh-words in wh-fronting languages reflects some syntactic relationship between the interrogative C and the wh-word itself. That is, under these assumptions, the derivation of wh-questions in wh-fronting language proceeds roughly as in (8).

(8)   **Wh-Movement in Wh-Fronting Languages**
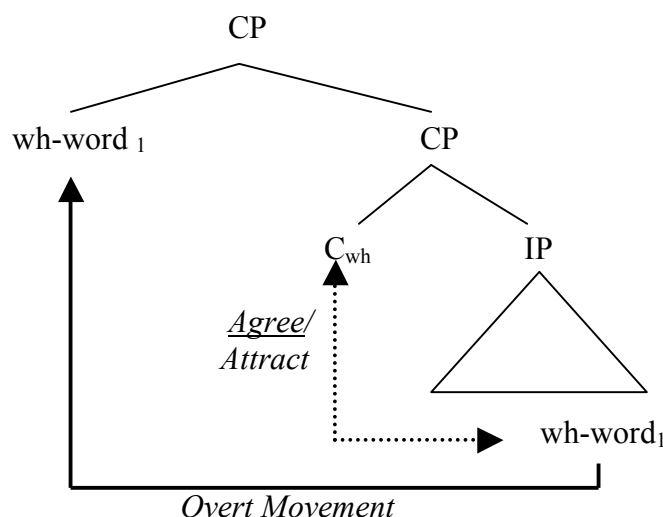
Thus, under one particular view, the interrogative C head probes and Agrees with a wh-feature of the wh-word itself. Since the wh-word is the Goal, the wh-word is then subsequently moved into the projection of the interrogative C.

As we've stated, however, one of the principle claims of this paper is that the analysis of wh-fronting in (8) is incorrect. In its place, we will take up the view that wh-questions in wh-fronting languages are formed in a manner nearly identical to that represented in (7); their only difference from wh-questions in wh-*in-situ* languages is in the relationship between the Q-particle and its sister. Specifically, we will assume throughout that in all so-called 'wh-fronting' languages, the left-peripheral position of wh-words in wh-questions has the structural character represented below under (9).

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[4] It should be noted that the Q-particle in (7) is not part of the functional projection of the wh-word itself. As we will see, the sister of Q may contain lexical heads selecting for the wh-head. Thus, the analysis in (7) must be distinguished from the competing claim that wh-*in-situ* involves pure 'feature-movement' of [+wh] up to the projection of C (cf. Chomsky 1995).

(9)   **Wh-Fronting as a Secondary Effect of Q-Movement**
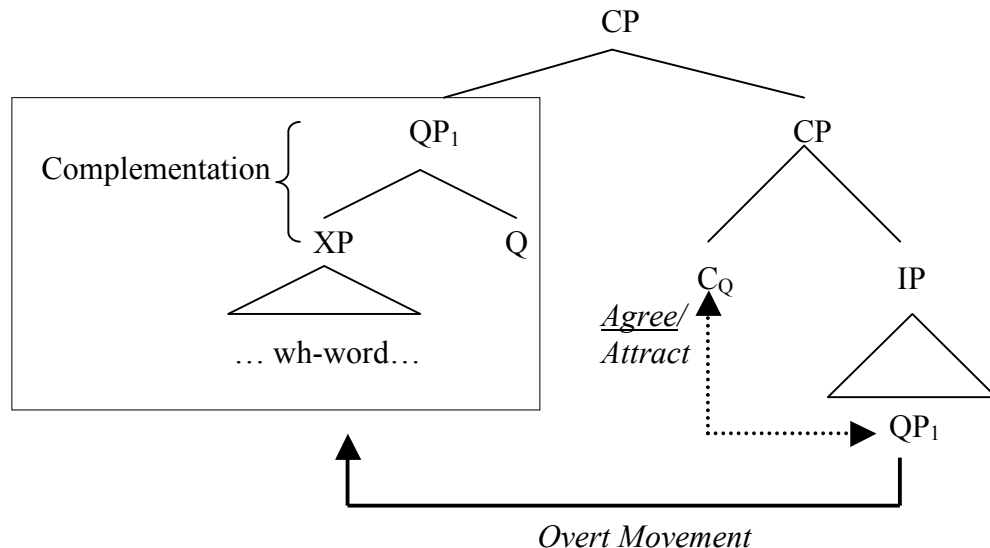
The structure in (9) represents the following claims. As with wh-*in-situ* languages, a wh-word in a wh-fronting language is associated with an obligatory Q-particle, which c-commands the wh-word. In a wh-fronting language, however, this Q-particle takes *as complement* a phrase containing the wh-word, and thus projects the category of the phrase minimally dominating Q and Q's sister. As with wh-*in-situ* languages, the interrogative C head probes for an interpretable instance of the Q-feature born by the Q-particle, *and not any feature of the wh-word itself*. In a wh-fronting language, however, the first node which the C encounters bearing this feature is the QP projected by the Q-particle, and so the C head must Agree with this QP. As with wh-*in-situ* languages, this Agreement then triggers movement of the Goal into the projection of C. In a wh-fronting language, however, since the Goal is QP, the entire QP is moved into the periphery of the clause. Because the wh-word is necessarily contained within the QP, the wh-word is fronted into the periphery along with everything else inside the QP.[5]

   We assume, then, that even in wh-fronting languages there is no direct syntactic relationship between the interrogative C and the wh-word itself. The obligatory left-peripheral position of the wh-word is a mere epiphenomenon, a by-product of the real syntactic relationship between the interrogative C and the c-commanding Q-particle.

   In this paper, the principal arguments in support of the 'Q-based Analysis' in (9) are the ways in which it advances our understanding of pied-piping structures. It is important to note, however, that some rather direct, initial support for (9) can be found in the wh-questions of Tlingit (Na-Dene; Alaska, British Columbia, Yukon). As argued at length by Cable (2007, to appear), the wh-questions of Tlingit require the analysis in (9), and cannot be accommodated

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[5] Again, it should be noted that, just as in (7), the Q-particle in (9) is not part of the functional projection of the wh-word, as its sister could contain a lexical head selecting for the wh-word. Thus, the proposal in (9) must be distinguished from the less interesting claim that the wh-feature of a wh-word heads its own projection within the functional projection of the wh-word.

   Similarly, the proposal in (9) must be distinguished from the competing proposals in Watanabe (1992), which though similar in outline, differ substantially from the account offered here in their treatment of wh-fronting languages. See Cable (2007) for an extensive discussion of the differences between Watanabe (1992) and the proposal in (9), as well as the ways in which (9) avoids certain incorrect predictions of Watanabe (1992).

within the traditional framework of (1) and (8). Reviewing why this is so will not only bolster support for our key assumptions, but will help the reader to understand their content and implications. For this reason, the following section briefly reviews the empirical arguments of Cable (2007, to appear).

2.2   Tlingit Wh-Questions Require The Q-Based Analysis

This section outlines the empirical motivation for assigning Tlingit wh-questions the Q-based analysis in (9). For reasons of space, certain important details regarding the argumentation and the data will be omitted here. The interested reader is referred to Cable (2007, to appear) for a fully complete and adequate discussion.

      The Tlingit sentence under (10a) illustrates the general structure of the language's wh-questions, which may be schematized as in (10b).

(10)   **The Wh-Questions in Tlingit** [6]

    a.   Waa sá   sh tudinookw i   éesh?
           how Q   feels   your   father
           How is your father feeling?
           (Dauenhauer & Dauenhauer 2000; p. 138)

    b.   <u>General Form of a Tlingit Wh-Question</u>

        [$_{CP}$ … [[… wh-word …] Q] … Main-Predicate ….]

The schema in (10b) encapsulates the following properties of wh-questions in Tlingit. First, the wh-word must precede the main predicate of the wh-question, and is typically initial in the clause. Secondly, the wh-word is followed by the Q-particle *sá*, which either directly follows the wh-word or directly follows a phrase containing the wh-word. Finally, the remaining material of the sentence typically follows the wh-word, with a strong tendency to follow the verb.

      In order to motivate the analysis in (9), we must first establish that (i) Tlingit is a wh-fronting language, and (ii) the particle *sá* which obligatorily co-occurs with the wh-word is a 'Q-particle' in the sense of Hagstrom (1998) and Kishimoto (2005). We begin with the arguments that Tlingit is a wh-fronting language.

2.2.1   Tlingit is a Wh-Fronting Language

A fundamental feature of the Tlingit language, which must be born consistently in mind, is its status as a 'free word order' language. Any linear permutation of subject, object and verb in the language is, in principle, a well-formed sentence, though there are of course discourse-structural effects associated with particular orders (see Leer 1991; Chapter 2). Because of the freedom of its word order, it isn't obvious upon casual examination whether the language requires wh-words to occupy a left-peripheral position in wh-questions. Indeed, aside from Cable (2007, to appear),

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[6] Throughout this paper, I will provide only the roughest of glosses for individual Tlingit words, which can be morphologically quite complex. This simplification is the most radical with respect to the verbal glosses, where I indicate only the "lexical" content of the verb, and none of its complex inflectional information.

this issue is not addressed in the published grammatical descriptions of Tlingit. Nevertheless, certain facts indicate that wh-words are left-peripheral in Tlingit wh-questions.

First, note that unlike other sentential material, the wh-word of a wh-question *must* precede the matrix predicate, and cannot appear in a post-predicative position. The following sentences illustrate.

(11)   **Obligatory Pre-Predicate Position of Wh-Operators**

    a.   **Aadóo**ch sá **k̲gwatóow**   yá x'úx'?
           who.erg Q   will.read   this book
           Who will read this book?

    b.   * Yá x'úx' **akwgwatóow** **aadóo**ch sá ?[7]
           this book   will.read   who.erg Q

This condition is especially apparent with long-distance questions. In Tlingit, it is preferred for clausal complements to follow the matrix predicate. When the wh-operator of the wh-question is an argument of the subordinate verb, it must appear displaced from the subordinate clause, in a position preceding the matrix verb.

(12)   **Obligatory Long-Distance Movement in Tlingit Wh-Questions**

    a.   [**Daa** sá]₁ haa k̲oo at latóowu yawsik̲aa [t_1 wutootoowú] ?
             what Q   our   teacher   said   we.read
           What did our teacher tell us to read?

    b.   * Haa k̲oo at latóowu yawsik̲aa [**daa** sá wutootoowú] ?
           our   teacher   said   what Q   we.read

It should be noted that this condition on the placement of wh-operators doesn't obviously follow from the pragmatics of word-order in the language. As we see below, wh-words can appear post-predicatively when they function as indefinites in declarative clauses.

(13)   **Post-Predicative Wh-Indefinites**

    a.   Yá x'úx' **akwgwatóow** **aadóo**ch sá.
           this book   will.read   who.erg Q
           People will read this book.

    b.   Kéet   **ax̲á**   **daa** sá.
           killer.whale   eats   what Q
           A killerwhale will eat anything.

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[7] The reader may note that the verbal form in (11b) differs from that in (11a). This is due to a morpho-phonological rule that deletes 3rd obviative object agreement when the verb is directly preceded by an NP marked by the optional ergative post-position. The effect of this rule can be seen in many of the examples throughout this paper.

One should also note that the appearance and placement of the particle *sá* in the declarative sentences under (13) establish that this particle is not an interrogative C head, as might first be supposed. Rather, like the Sinhalese Q-particle *da* and the Japanese Q-particle *ka*, it is an obligatory 'satellite' of the wh-word (cf. Hagstrom 1998, Kishimoto 2005). Finally one should note that, like Sinhalese *da* and Japanese *ka*, the Tlingit particle *sá* is not sub-morpheme bound to the wh-word. As examples like the following show, phrasal material can intervene between the wh-word and *sá*.

(14)   **Tlingit *Sá* Separated From the Wh-Word**

   a.   [**Aadóo** teen] **sá**   yigoot?
           who   with   Q   you.went
           Who did you go with?

   b.   [**Aadóo** yaagu] **sá**   ysiteen?
           who   boat   Q   you.saw
           Whose boat did you see?

   c.   [**Daakw** keitl] **sá**   ashaa?
           which   dog   Q   barks
           Which dog is barking?

   d.   [**Daat** tlein] **sáwé**   tsú   wéix   yaa nagút.
           what big   Q.foc-part   too   there.at   is.walking
           There was something large walking along over there.
           (Leer 1993; p. 17)

Indeed, as documented by Cable (2007, to appear), the placement of Tlingit *sá* is governed only by the weak condition that it *c-command* the wh-word, a property shared by Sinhala *da* and Japanese *ka*.

      The word-order facts in (11) - (13) provide clear, initial evidence that wh-operators in Tlingit wh-questions undergo fronting to a left-peripheral position. Cable (2007, to appear) also provides further evidence for the fronted status of the wh-word. For example, it is shown that any material preceding the wh-operator of the wh-question occupies a left-peripheral Topic position ((15), (16)), and that multiple wh-questions exhibit Superiority effects (17).

(15)   **Material Preceding the Wh-Operator Regularly Translated as (Dislocated) Topic**

   Ax éesh **daa**   sá   aawaxáa?
   my father what   Q   ate
   Translated as 'My father, though, what did he eat?'

(16)   **Non-Referential DPs Cannot Precede Wh-Operators**

a.   **Aa**   sá   l daa sá   uxá?
who   Q   nothing   eats
Who ate nothing?

b.   * L daa sá   **aa**   sá   uxá?
nothing   who   Q   eats

(17)   **Superiority Effects in Tlingit Multiple Wh-Questions**

a.   Aa   sá   waa   sá   kuyawsikaa?
who   Q   how   Q   said
Who said what?

b.   * Waa   sá   aa   sá   kuyawsikaa?
how   Q   who   Q   said

Given these data, we may reasonably conclude that Tlingit is a wh-fronting language. In the next section, we turn to the evidence that the Tlingit particle *sá* should be labeled as a 'Q-particle', in the sense of Hagstrom (1998) and Kishimoto (2005).

2.2.2   Tlingit *Sá* is a 'Q-Particle'

Recall that our Q-based analysis in (9) is understood to be a parametric variant of the structure in (7), proposed by Hagstrom (1998) and Kishimoto (2005) for the wh-*in-situ* languages Sinhala and Japanese. Thus, in order to defend the analysis in (9) for Tlingit, we should confirm that its particle *sá* is the same formal element as those that Hagstrom and Kishimoto identify as 'Q' in their analyses. Thus, we must show that Tlingit *sá* is the same formal entity as the Sinhala Q-particle *da* and the Japanese Q-particle *ka*.

Cable (2007, to appear) documents a variety of grammatical similarities between the particles *sá*, *da* and *ka*. They are summarized below under (17).

(17)   **Properties Shared Between *Sá*, *Da* and *Ka***

i)   Obligatory in content questions; more generally, required in every clause containing a wh-word (including declarative clauses with wh-indefinites)
ii)   Must c-command the wh-word.
iii)   In matrix wh-questions, cannot appear inside syntactic islands.
iv)   If merged outside any syntactic islands, can 'save' matrix wh-questions where the wh-word is located inside an island.
v)   Cannot c-command the matrix predicate (*does not hold of Japanese* ka)
vi)   Can c-command subordinate clauses

It is important to also note that the syntactic and semantic theory of Q-particles put forth by Hagstrom (1998) and extended in Cable (2007) captures this observed constellation of

properties, though only under the assumption that Tlingit *sá,* Sinhala *da* and Japanese *ka* are all the same formal entity, namely, a 'Q-particle'.

Given the variety of similarities under (17), as well as their following from a general theory of 'Q-particles', we may reasonably conclude that the Tlingit particle *sá* is a 'Q-particle' in the sense of Hagstrom (1998) and Kishimoto (2005).

In summary, then, we have reviewed the evidence that wh-words in Tlingit wh-questions obligatorily occupy left-peripheral positions, as well as the evidence that they are obligatorily c-commanded by Q-particles. Finally, we will review the evidence that the interrogative C of a Tlingit wh-question probes *only* for features of the c-commanding *Q-particle*, and *not* for any features of the *wh-word* itself.

2.2.3 Tlingit Wh-Fronting is a By-Product of Q-Movement

In this final sub-section, we will review the evidence that the fronted position of wh-words in Tlingit wh-questions results from a movement operation targeting the features of the Q-particle alone. In order to establish this, we must defend the twin claims that (a) the movement operation in question targets features of the Q-particle, but (b) doesn't target any features of the wh-word.

Regarding the claim that features of the Q-particle are indeed targeted, note that as mentioned under (10b), the Q-particle *sá* must appear fronted with the wh-word in Tlingit wh-questions. This fact would be straightforwardly captured if we assume that there is an operation of 'Q-movement' in Tlingit, under which the features of the Q-particle require it to be fronted in wh-questions. Alternately, we might try to develop an account in which the fronted position of the Q-particle is simply due to its being obligatorily pied-piped by movement of the wh-word. However, Cable (2007, to appear) argues at length that it is just impossible to imagine a reason why movement of the wh-word should always have to pied-pipe the Q-particle. For example, one might initially hypothesize that there is a condition in Tlingit that Q-particles cannot be stranded. Although this may indeed capture the position of *sá* in sentences like (14), it is generally not strong enough. It would fail to account for the obligatory fronting of Tlingit *sá* in sentences like (18b).[8] The contrast between (18b) and (18c) would not follow from a ban on 'Q-stranding', since the Q-particle in (18c) is not stranded. That the sub-extraction in (18c) is generally permitted can be seen from long-distance movement sentences like (18a).

(18) **No Fronting of Wh-Word Alone**

    a.   [[**Goo**déi   **sá**]$_1$ [has uwajée   [t_1 woogootx̲] i   shagóonich]]?
          where.to Q   think   he.went   your parents.erg
        Where do your parents think he went?

    b.   [[**Goo**déi   woogootx̲ **sá**]$_1$ [has uwajée t_1 i   shagóonich]]?
          where.to he.went Q   think   your parents.erg
        Where do your parents think he went?

    c.   * [**Goo**déi$_1$ [has uwajée [t_1 woogootx̲ **sá**] i   shagóonich]]?
          where.to   think   he.went   Q   your parents.erg

---

[8] Note that the possibility of sentences like (18b) demonstrates that Tlingit permits pied-piping of subordinate CPs.

Thus, the obligatory initial position of *sá* in Tlingit wh-questions must follow from there being a fronting rule that specifically targets *sá*.

Finally, let us consider the claim that the movement operation(s) seen in Tlingit wh-questions do not target any features of the wh-word. It should first be noted that, given the established existence of a rule of 'Q-movement' in Tlingit, it would be simplest to assume the picture in (9), where this is the only movement process in Tlingit wh-questions, and the left-peripheral position of the wh-word is simply one of its secondary consequences. Furthermore, there is indeed empirical reason to conclude that the interrogative C of a Tlingit wh-question *doesn't* probe for features of the wh-word. Consider the contrast between the following sentences.[9]

(19)   **Interaction Between Q-Particle and Relative Clause Islands in Tlingit**

   a.   [[**Wáa**   kligéiyi   CP] x̱áat NP] **sá**   i tuwáa sigóo?
          how   it.is.big.REL   fish   Q   you.want
          How big a fish do you want?
          (Lit. 'A fish that is how big do you want?')

   b.   * [[**Waa sá** kligéiyi   CP] x̱áat NP] i tuwáa sigóo?
            how Q   it.is.big.REL   fish   you want

In the well-formed (19a), the wh-word is contained within a relative clause island, while the Q-particle *sá* is outside the island. Importantly, in the ill-formed (19b), both the wh-word and the Q-particle are inside the relative clause island.

Note that the Q-based analysis in (9) predicts the contrast between (19a) and 19b), under the assumption that probing relations cannot cross into islands. The impossibility of (19b) is a straightforward result of the fact that the Q-particle is inside a relative-clause island, and so is inaccessible to probing by the matrix C. When the Q-particle is located outside the island, as in (19a), it is accessible to the matrix C, and the sentence is well-formed. The fact that the wh-word in (19a) remains inside the island has no bearing on the well-formedness of the sentence, given that the matrix C doesn't probe for any of its features.

Now consider whether the facts in (19) could be made compatible with a theory where the interrogative C *does* probe for features of the wh-word. Given the well-formedness of (19a), one would have to conclude that somehow the relative clause island does not upset probing of the wh-word by C. But, then, what accounts for the ill-formedness of (19b)? Since the Q-particle *sá* is directly adjacent to the wh-word, it should be as visible for probing by C as the wh-word. Therefore, the impossibility of (19b) must follow from something other than the fact that the Q-particle in this sentence is located inside a syntactic island. What this could be, however, remains quite unclear.

Therefore, from the contrast in (19), we must conclude that the interrogative C of the wh-question doesn't probe for any features of the wh-word itself. Rather, following data like those in (18), it probes only for features of the Q-particle. Thus, the fronting seen in Tlingit wh-questions is not triggered by any features of the wh-word itself, only by features of the Q-particle, a conclusion that is tantamount to accepting the Q-based analysis in (9).

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[9] Note that the data in (19) and the argument surrounding them parallel the key empirical arguments of Hagstrom (1998) and Kishimoto (2005) in support of the Q-movement analysis in (7).

2.3   The QP-Intervention Condition

The preceding sections have introduced the basics of our special Q-based analysis of wh-fronting, and have reviewed the arguments that this analysis is correct for Tlingit wh-questions. Having accepted the accuracy of this analysis for Tlingit, we can then use this language as a tool for developing the syntactic and semantic theory of Q-particles and Q-movement. Indeed, this larger project is pursued throughout Cable (2007), which uncovers a variety of additional principles governing the syntax and semantics of Q-particles. Since one of these principles will be of some importance to our later discussion of pied-piping, we will briefly introduce it here.

To begin, observe that the Q-based analysis in (9) holds that a fronted wh-word is contained with the QP projected by the Q-particle. It follows, then, that under this account, a QP projection will sometimes intervene between the wh-word and a head that selects for the wh-word. For example, in sentence (20), the object of the verb *ysiteen* is the QP *daa sá* 'what Q', which properly contains the DP which the verb is presumably selecting for.

(20)   **QPs Intervene Between Wh-Words and Selecting Heads**

[$_{QP}$ [$_{DP}$ **Daa**] **sá**]   ysiteen?
        what   Q   you.saw
What did you see?

Rather than view this as a problem for the Q-based analysis, Cable (2007, to appear) proposes to take these facts at face-value, and concludes that it is in principle possible for selectional relations to cross QP projections.[10] This immediately raises the question of *how general* this phenomenon is, whether there are any conditions governing selection across QP projections. Interestingly, it is found that such configurations are governed by the following condition.

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[10] More concretely, Cable (2007) puts forth a particular theory of selection which, combined with his semantics for Q-particles, predicts the ability for selectional relations to cross QP projections in structures like (20).
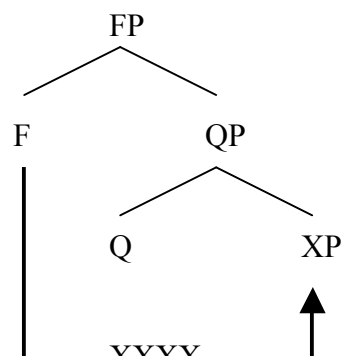
(21)   **The QP-Intervention Condition**

A QP cannot intervene between a functional head and a phrase selected by that functional head. [11] (Such an intervening QP blocks the selectional relation between the functional head and the lower phrase.)

Lexical Head   *Functional Head*

LP   FP

L   QP   F   QP

Q   XP   Q   XP
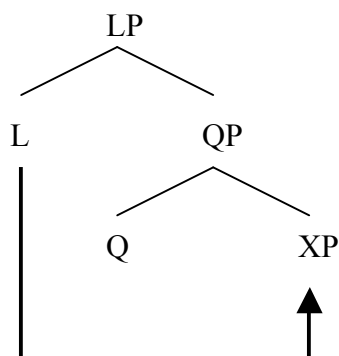
Selection: OK   *QP-Intervention Condition VIOLATED*

        Cable (2007, to appear) adduces a variety of evidence in support of the QP-Intervention Condition in (21).[12] First, one should note that it would correctly license all the well-formed Tlingit wh-questions that we have thus far seen. For example, in (20), the QP is complement to the verb *ysiteen*. Since 'verb' is a paradigmic lexical category, it follows that (21) would permit the selectional relation between *ysiteen* and the wh-word to cross the intervening QP, and so would correctly predict the possibility of (20).
        More importantly, however, Cable (2007, to appear) shows that (21) correctly rules out a number of seemingly disparate structures in Tlingit. For example, given that P is a functional category, (21) correctly predicts that the Tlingit Q-particle *sá* cannot appear between a post-position and its DP complement.

(22)   **No Q Between a Post-Position and Its Complement with Tlingit Wh-Indefinites**

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

        b.   * Tléil [PP [QP **aadóo sá**] teen] xwagoot.
                  not   who   Q   with   I.went

Similarly, given that D is a functional category *par excellence*, (21) correctly predicts Tlingit *sá* cannot appear between a wh-determiner and its NP complement.

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[11] I use the term 'intervene' in the following sense: a QP *intervenes* between F and XP if either (i) QP dominates XP but doesn't dominate F, *or* (ii) if QP dominates F but doesn't dominate XP.
[12] Furthermore, it should also be noted that the aforementioned theory of selection in Cable (2007) derives the condition in (21), and accounts for the data that motivate it.

(23)   **No Q Between a D and its NP Complement with Tlingit Wh-Indefinites**

    a.   Tléil [_{QP} [_{DP} **daa<u>k</u>w** keitl] **sá**] ushá.
        not   which dog   Q   barks
        None of the dogs are barking.

    b.   * Tléil [_{DP} [_{QP} **daa<u>k</u>w sá**] keitl] ushá.
        not   which Q   dog   barks

Finally, assuming that possessors are selected by a (null) possessive D head, (21) correctly predicts that Tlingit *sá* cannot appear between a wh-possessor and its NP possessum.

(24)   **No Q Between a Possessor and the Possessed NP with Tlingit Wh-Indefinites**

    a.   Tléil [_{QP} [_{DP} **aadóo** ∅   yaagú] **sá**] <u>x</u>wsateen.
        not   who POSS boat Q   I.saw
        I didn't see anyone's boat.

    b.   * Tléil [_{DP} [_{QP} **aadóo sá**] ∅   yaagú] <u>x</u>wsateen.
        not   who Q POSS boat   I.saw

       It is important to note that all the structures in (22) – (23) involve wh-indefinites in declarative clauses. Thus, following the empirical arguments of Cable (2007, to appear), the QPs in these sentences do not undergo any form of overt or covert movement. Therefore, the impossibility of sentences like (22b), (23b) and (24b) must be understood as resulting from a pure condition on the placement of Q-particles – like that in (21) – and cannot be understood to follow from the impossibility of P-stranding and left-branch extractions in Tlingit wh-questions, which is illustrated below.

(25)   **No P-Stranding in Tlingit Wh-Questions**

    a.   [_{QP} [_{PP} **Aadóo** teen] **sá**] yigoot?
               who   with   Q   you.went
        Who did you go with?

    b.   * [_{QP} **Aadóo sá**]₁ [_{PP} *t*₁ teen] yigoot?
           who   Q   with   you.went

(26)   **No Possessor Extraction in Tlingit Wh-Questions**

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

    b.   * [_{QP} **Aadóo sá**]₁ [_{DP} *t*₁ ∅   yaagú] ysiteen?
           who   Q   POSS   boat   you.saw

(27) **No Determiner Extraction in Tlingit Wh-Questions**

    a.   [$_{QP}$ [$_{DP}$ **Daakw** keitl] **sá**] ashaa?
               which   dog   Q   barks
        Which dog is barking?

    b.   * [$_{QP}$ **Daakw sá**]$_1$ [$_{DP}$ t_1 keitl] ashaa?
            which   Q   dog   barks

Interestingly, however, as Cable (2007, to appear) argues in detail, the impossibility of the extractions in (25) – (27) can itself be understood to follow from the QP-Intervention Condition in (21). As the reader is invited to confirm, each of the ill-formed extraction structures in (25) – (27) could only be derived from structures which, like those in (22) – (24), violate the QP-Intervention Condition.

        We therefore find that the single condition in (21) is able to rule out both the ill-formed extractions in (25) – (27) and the ill-formed wh-indefinites in (22) – (24), without incorrectly ruling out any of the licit structures of Tlingit. It is reasonable, then, to conclude that (21) forms a core principle governing the placement of Q-particles in the clause.

3. The Q-Based Theory of Pied-Piping Structures

The preceding section introduced our special, Q-based theory of wh-fronting, and reviewed arguments that Tlingit wh-questions establish its typological possibility. In this section, we begin to lay out the theory of pied-piping structures that follows from this Q-based account.

        Of course, since this theory is put forth as a *general* account of pied-piping structures, it necessarily assumes that the Q-based analysis in (9) holds not only for the wh-questions of Tlingit, but for *all* wh-fronting languages. Naturally, this 'universalist' hypothesis receives indirect support from the achievements of our proposed theory of pied-piping. Nevertheless, one might still rightly wonder whether there is any additional, independent motivation for extending the somewhat exotic structure in (9) to even the most familiar of wh-fronting languages.

        For this reason, Section 3.1 briefly reviews some of the other arguments that Cable (2007) uses to support the universalist hypothesis. Accepting the conclusion of these arguments, Section 3.2 then introduces the 'eliminativist' approach to pied-piping structures that the Q-based theory encapsulates. This section also notes a few general, conceptual arguments in support of the proposed theory. Our core empirical arguments arrive in Sections 4 and 5.

3.1 The Universality of the Q-Based Structure

The general theory of pied-piping laid out below assumes that the Q-based analysis in (9) is not a parochial feature of Tlingit, but rather is universal to all wh-fronting languages. In this section, we sketch some independent motivation for this assumption. For a fuller presentation of these arguments, the reader is referred to Cable (2007).

        First, it should be noted that Tlingit is not the only wh-fronting language for which the analysis in (9) is transparently motivated. As argued by Cable (2007), the QP-structure in (9) is

also overtly realized in Edo (Niger-Congo; Nigeria) and in several of the Tupí languages (Central, South America). The wh-questions of these languages are illustrated below.[13]

(28) **QP-Structure in the Wh-Questions in Edo**

[**Dè** [èbé [òmwán]]] nè   Úyì   dé ?
  Q   book   whose   that   Uyi   buy
Whose book did Uyi buy?
(Baker 1999)

(29) **QP-Structure in Tupí Wh-Questions**

[[Ma'a pe] **te**] êê   o-ì?
   where to   Q   3sf 3-go-circum
Where is she going?
(Kayabí; Brandon & Seki 1984; p. 90)

Note that the empirical claim here is not merely that there are wh-fronting languages where wh-questions overtly contain something we would pre-theoretically call a 'question-particle', a language type that is rather common (Bruening 2007). After all, our analysis in (9) still assumes the existence of an interrogative C in wh-questions, and it may be that some 'question-particles' are overt manifestations of interrogative C, rather than of Q.[14] Thus, Cable (2007) defends the stronger claim that there are wh-fronting languages whose wh-questions contain overt *Q-particles*, in our special sense of the term. Given that the Q-based structure in (9) is transparently motivated for languages other than Tlingit, the claim that it is universal to *all* wh-fronting languages is not implausible.

Furthermore, having accepted the typological possibility of (9), both conceptual and learning-theoretic considerations support a view where wh-fronting can *only* be derived via (9), and where the classic account in (1) and (8) is not an analytic option permitted by UG. First, note that nothing in our theory would prevent Q-particles from being phonologically empty in some languages. Let us then consider a hypothetical language nearly identical to *Tlingit*, but whose Q-particles are unpronounced. That is, suppose that all the *sá*'s were purged from the all the Tlingit sentences that we've seen. How would such a language appear, either to the linguist or to the child learner? For all intents and purposes, such a language would look exactly like a wh-fronting language of the kind we are familiar with.[15] Thus, having accepted the analysis in (9) for Tlingit wh-questions, as well as the possibility of phonologically empty Q-particles, it is most theoretically parsimonious to view wh-questions in the more familiar wh-movement languages as also having the structure in (9).

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[13] Although not discussed by Cable (2007), one should also note the analysis of Finnish questions developed by Holmberg (2008). Given that the behavior of Q-particles in Finnish questions is very similar to that found in Tlingit, Holmberg (2008) independently develops an analysis very similar to our Q-based account in (9).

[14] Note, for instance, the overt manifestation of interrogative C in the Edo wh-question in (28).

[15] Of course, given that relative clause islands in Tlingit may be 'pied-piped' (19), it is apparent that the class of pied-piping structures are wider in Tlingit than in languages like English, where structurally parallel sentences are not possible. However, as we will see in Section 4, this difference may be due to an independent morpho-syntactic difference between the wh-words of English and those of Tlingit.

To put the matter more acutely, given that we accept the existence both of languages possessing the structure in (9) and of languages where Q is null, the logical independence of those parameters entails that we predict languages where *both* Q is null and wh-questions receive the analysis in (9). Given that we predict such languages, we must now ask what evidence there is for languages possessing the 'classic' structure in (8). In fact, there appears to be none. There is simply *no* positive motivation for maintaining the analysis in (8) in opposition to that in (9), no special insight captured by (8) that is lost under (9).[16] Consequently, we must abandon (8) in light of the known possibility of (9). Similarly, assuming the position of the language learner, the absence of any properties requiring the 'classic' analysis in (8) would entail that a hypothesis space containing *both* (8) and (9) would create a substantially more difficult learning task than one containing (9) alone.[17]

Finally, let us briefly mention an empirical argument made by Cable (2007) for abandoning the assumptions in (1) and (8). As previously mentioned, Cable (2007) develops a semantics for Q-particles and wh-words that provides a fully compositional treatment of the wh-question structures in (9), as well as of wh-indefinites like those in (13) and (22) – (24). Importantly, it is shown that applying this Q-based semantic theory to the wh-questions of more familiar wh-fronting languages yields valuable results. One of the most interesting of these concerns the presence of Superiority effects and Intervention effects in multiple wh-questions. It is shown that the proposed semantics correctly predicts that, roughly speaking, a multiple wh-question will exhibit Superiority effects if and only if its *in-situ* wh-words *fail* to exhibit Intervention effects (cf. Pesetsky 2000). Crucially, as noted by Cable (2007), this empirical result requires one to assume that the Q-based structure in (9) is universal to all wh-fronting languages. Thus, the cross-linguistic complementarity between Superiority and Intervention effects provides additional support for the 'universalist hypothesis' assumed by the general theory of pied-piping structures below.

3.2   The Elimination of Pied-Piping

This section presents our core proposals concerning pied-piping structures. To recall, we have been making a distinction throughout between the theoretical term 'pied-piping' and the more theory-neutral, descriptive term 'pied-piping structure'. As repeated below, 'pied-piping' represents a particular theory concerning 'pied-piping structures', one where such structures are cases where an operation O targets a structure strictly *larger* than the phrase projected by the item whose features trigger O.

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[16] It might be said, of course, that the classic analysis in (1) and (8) captures the fact that it is always the *wh-word* that is fronted in a wh-question, rather than some other element of the sentence. In our Q-based analysis, however, this follows from the requirement that the Q-particle c-command the wh-word, which in turn follows from the formal semantics that is provided to them.

[17] A similar conceptual argument surrounds the impossibility of P-stranding and left-branch extractions in Tlingit. As outlined in Section 2.3, Cable (2007, to appear) demonstrates that the impossibility of these structures in Tlingit must be derived from certain conditions governing the Q-based structure in (9), and cannot be derived from any conditions on movement *per se*. Importantly, however, the impossibility of P-stranding and left-branch extractions is a property common among wh-fronting languages. Consequently, in order to have a unified account of these phenomena, one must extend the Q-based analysis in (9) to all other wh-fronting languages.

(30)   **Definition of 'Pied-Piping'**

Pied-piping occurs when an operation that targets the features of a lexical item L applies to a phrase properly containing L^{MAX}.

(31)   **Definition of 'Pied-Piping Structure'**

A pied-piping structure is one where a phrase properly containing the maximal projection of a wh-word (or related operator) has undergone fronting.

To begin laying out our eliminativist approach to pied-pipng, let us first establish that our theory of Tlingit wh-questions from Section 2 has no need of the concept of 'pied-piping' as defined in (30). This is despite the fact that the language clearly possesses 'pied-piping structures', as defined in (31). We have already seen several examples of Tlingit pied-piping structures; two are collected below for our consideration.

(32)   **Pied-Piping Structures in Tlingit**

a.   [_{PP} **Aadóo** teen] **sá**   yigoot?
            who   with   Q   you.went
      Who did you go with?

b.   [_{DP} **Aadóo** yaagú] **sá** ysiteen?
            who   boat   Q   you.saw
      Whose boat did you see?

As in the English sentences under (3), sentences like those above are such that the phrase fronted in the wh-question properly contains the maximal projection of the wh-word. Thus, these structures qualify as 'pied-piping structures' under the definition in (31), and their *prima facie* similarity to the English structures in (3) is rather apparent.
    Importantly, however, one must note that in a Tlingit wh-question, the particle *sá* always occurs directly to the right of the fronted phrase, as shown below.

(33)   **The Projection of Q is Never Properly Contained Inside the Fronted Phrase**

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

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

Thus, the fronted phrase of a Tlingit wh-question never properly contains the projection of the Q-particle. Now, according to our analysis in (9), it is the features of this Q-particle – and not the wh-word – which trigger the fronting seen in Tlingit wh-questions. Consequently, under our theory of Tlingit wh-questions, the 'pied-piping structures' of Tlingit are *not* cases where an

operation triggered by the features of a lexical item applies to a phrase properly containing the maximal projection of that item. Therefore, the Tlingit pied-piping structures in (32) are not instances of true 'pied-piping'. Finally, since the Q-particle *sá* is *never* properly contained within the fronted constituent of a Tlingit wh-question, we find that there just *aren't* any true cases of pied-piping in Tlingit. For this reason, the special concept of 'pied-piping' in (30) can be eliminated without cost from our theory of Tlingit grammar, thus simplifying the overall theory. By adopting the analysis in (9), then, we needn't deviate from the null hypothesis that if an operation (in Tlingit) targets the features of a given lexical item, then it applies only to the maximal projection of that item.

Similarly, if we extend the analysis in (9) to *all* wh-fronting languages, we needn't *ever* deviate from that null hypothesis. The pied-piping structures of all the most well-studied wh-fronting languages could receive an analysis akin to that shown for English below.

(34)   **The Pied-Piping Structures of English, Under the Q-Based Theory**

a. Whose father's cousin's uncle did you meet at the party?

b. [$_{QP}$ [[[[**whose**] father's] cousin's] uncle] **Q**] did you meet at the party?

Under this analysis, a pied-piping structure in English is derived exactly like the pied-piping structures of Tlingit. In such sentences, the (null) Q-particle takes as sister a phrase properly containing the wh-word, which entails that the fronted phrase of the wh-question properly contains the wh-word. Thus, we can derive sentences like those in (34) without viewing them as cases where one fronts 'more' than the phrase whose features trigger the fronting. Therefore, under our Q-based theory in (9), one needn't ever accept that pied-piping truly exists.[18]

The ability to eliminate pied-piping from our theory of grammar is advantageous in several respects. First, there is the simple fact that the elimination of pied-piping as a real phenomenon reduces the number of phenomena that our theory grammar must explain. More importantly, however, it allows us to eliminate from our theory all those mechanisms whose purpose is to account for pied-piping. Given the wide-spread belief in pied-piping, the issue of what mechanisms underlie this supposed phenomenon has received a good deal of focused

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[18] On the other hand, there is the indisputable fact that pied-piping structures occur in constructions other than wh-fronting in English. For example, sentences like the following seem to exhibit 'pied-piping' in 'Focus Movement'.
(i)   I've read John's book, but [DAVE's book] I haven't read.
One might rightly worry, then, whether our Q-based account isn't too parochial, failing to derive the possibility of pied-piping structures in A-bar constructions beyond wh-fronting.

This issue is taken up in earnest by Cable (2007, Chapter 6). Cable argues the Q-based theory advocated here can only account for facts such as (i) above if we assume that the extractions in question are *all* some sub-variant of the Q-movement seen in wh-questions. That is, besides the Q found in wh-questions, there also exist separate, featurally distinct instances of the category 'Q' in focus-movement constructions, relative clauses, etc.

As Cable shows, this idea is rather promising. First, it should be noted that under our use of the term, a 'Q-particle' has no essential connection to interrogativity *per se* (cf. (13), (22)-(24)). Indeed, under the semantics developed by Hagstrom (1998) and Cable (2007), Q-particles are simply interpreted as choice-function variables. Thus, their appearance in structures other than wh-questions is *prima facie* quite plausible. Furthermore, this generalization of our Q-based analysis in (9) receives some independent support from recent work on focus-movement by Horvath (2000, 2005). Horvath argues at length that so-called 'focus-movement' doesn't truly target the 'focus' feature of the focused phrase, but rather the features of a (null) formal element that sits just above the fronted phrase. I refer the reader to Cable (2007, Chapter 6) for a fuller discussion of these important issues.

attention (Ross 1967; Sells 1985; Webelhuth 1992; Kayne 1994; Grimshaw 2000; Heck 2004, 2007; Horvath 2007). Within this literature, there are two main proposals. The first is that pied-piping structures are derived via special mechanisms of 'feature percolation', which transfer the features of a head onto higher nodes outside the projection of the head (Chomsky 1973; Kayne 1983; Gazdar et al. 1985; Sells 1985; Cowper 1987; Webelhuth 1992; Grimshaw 2000; Heck 2004). The second proposal is that the theory of movement be weakened in such a way that it allows for moved phrases to merely *contain somewhere within them* the features triggering the movement (Ross 1967; Heck 2004, 2007). Both these approaches, however, encounter serious conceptual problems.

First, several arguments are put forth by Heck (2004, 2007) against any theories appealing to a mechanism of 'feature percolation'. The over-arching problem noted by Heck is that the operation of feature percolation cannot be reduced to any other, more widely encountered syntactic operations. For example, feature percolation cannot (under current assumptions) be an instance of Agreement, since Agreement cannot insert features into projections where they did not previously exist.[19] Therefore, any account holding that there is (e.g.) wh-Agreement between the wh-word and the possessive D head in (34a) would still have to account for the existence of the wh-feature on the possessive D, the very fact that a theory of feature percolation is intended to explain.

Of course, another possibility worth considering is that 'feature percolation' is simply 'feature movement'. Under this view, pied-piping occurs when the wh-feature of the wh-word itself undergoes movement placing it outside the projection of the wh-word. As Heck (2004, 2007) argues in detail, however, such an account faces immediate empirical problems.[20] The overall problem is that if 'feature percolation' were 'feature movement', then that movement would be observed to violate certain well-known movement constraints. Consider, for example, pied-piping by wh-possessors, as in (34a). If we suppose that such structures are generated by 'feature movement' of [wh] from the wh-word to the higher DP, it follows that the wh-feature must *move from the possessive specifier of DP*, as illustrated below.

(35)   **Feature Percolation as Feature Movement, With Wh-Possessors**

Movement / Percolation of Wh-feature From SpecDP

[wh]DP

[wh]DP   DP

wh-possessor   POSS   possessum

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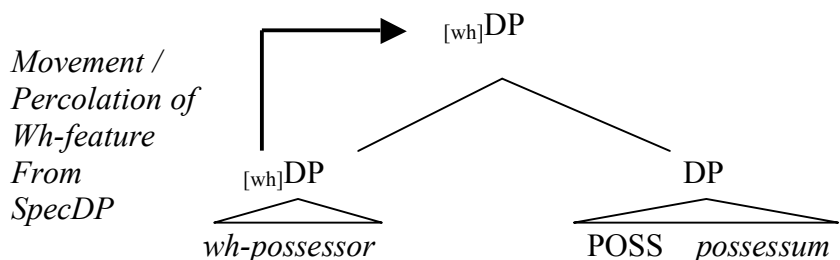
[19] Certain earlier work, however, does assume theories of Agreement where such 'feature transfer' could take place (e.g. Grimshaw (2000)). Furthermore, Pesetsky & Torrego (2001) put forth an Agreement-based theory of pied-piping that may circumvent this problem.

[20] Heck (2004) also notes that such an account faces the conceptual problem that it countenances 'feature movement', in the sense of Chomsky (1995). In most current work, the possibility of 'feature movement' has been rejected in favor of mechanisms like long-distance Agree.

However, as is well-known, English seems not to permit movement from SpecDP. [21]

(36)   **No Possessor Extraction in Wh-Fronting Languages (e.g. English)**

a.   [$_{DP}$ **Whose** book] did you read t_1 ?

b.   * [**Whose**] did you read [$_{DP}$ t_1 book] ?

Furthermore, as we will later discuss in Section 5, there is a wide-spread tendency for pied-pipers to be specifiers (of functional categories). Therefore, the notion that feature percolation is feature movement would be in conflict with the equally wide-spread tendency for wh-extraction to not be possible from specifiers (of functional categories).

Thus, the idea that 'feature percolation reduces to feature movement' receives rather direct empirical challenge from the observed constraints on movement. In the absence of any other imaginable analyses, we must conclude that any theory appealing to 'feature percolation' must admit of an additional, primitive syntactic operation. Most damning of all, however, is the fact that such a primitive 'feature percolation' mechanism serves *absolutely no* analytic purpose outside of pied-piping. Therefore, theories of pied-piping structures that appeal to 'feature percolation' are distinctly suspicious.

What, then, of the alternative approaches to pied-piping? Under these approaches, the theory of movement is weakened so as to permit structures where the moved phrase does not itself bear the feature triggering the movement (Ross 1967; Heck 2004, 2007).[22] Thus, according to such an analysis, the sentence in (34a) is permissible because it satisfies the (weak) condition that the moved phrase contain the wh-word somewhere inside it. Unfortunately, a pervasive problem for this form of analysis is the potential for over-generation. That is, it is *not* generally the case that *any* phrase containing a wh-word may be fronted in an English wh-question, as the ill-formedness of sentence (37b) illustrates.[23]

(37)   **No Pied-Piping of Finite CPs in English**

a. [$_{DP}$ Which man]$_1$ does Mary believe [$_{CP}$ that Dave likes t_1] ?

b. * [$_{CP}$ that Dave likes which man]$_1$ does Mary believe t_1 ?

Of course, if appeal is made to feature-percolation, then the observed limits on pied-piping may be encoded into the percolation mechanism itself, by placing limits on 'how far' feature-percolation may carry a feature from its lexically associated head. However, without this sort of

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[21] Of course, as mentioned in Section 2.3 and 3.1, under our Q-based account the facts in (36) do not follow from constraints on movement *per se*. However, anyone adopting the Q-based account of (36) would *ipso facto* be rejecting the 'feature movement' analysis of pied-piping in (35).

[22] To be precise, Heck (2004) proposes a hybrid theory, where the labor of deriving pied-piping structures is divided between a limited mechanism of feature percolation (identified as 'feature movement') and a limited degree of 'non-locality' between the moved phrase and the feature inside it promoting the movement. Such a theory is able to avoid many of the problems faced by theories that appeal to only one of these two general forms of analysis.

[23] Note that this also a *prima facie* issue for our Q-based theory of pied-piping structures, one that will receive extensive attention in the following two sections.

mechanism, it is difficult to identify the source of anomaly in sentences like (37b), especially since sentences like (37a) establish that such embedded wh-words are in principle accessible to the matrix interrogative C head.

In summary, then, we find that the 'classic' analysis in (1) and (8) is not only saddled with the additional concept of 'pied piping', but that the mechanisms required to generate pied-piping structures are of a rather unsatisfactory nature. By comparison, our Q-based analysis in (9) offers a far simpler account of pied-piping structures. Under this account, the special concept of 'pied-piping' may be entirely dispensed with, there being no real instances of pied-piping in human language. Consequently, one may also dispense with the mechanisms used to predict the existence of pied-piping. Under the theory advocated here, all pied-piping structures are simply instances of normal phrasal movement. Their only identifying property is that the sister to the Q-particle in such structures is not the wh-word itself, but rather a phrase containing the wh-word, a configuration whose possibility requires no special assumptions. Thus, they have no interesting syntactic (or semantic) properties, and do not stand out as a special taxonomic class. Most importantly, they do not require for their derivation any mechanisms beyond those used for simple wh-questions without pied-piping.

Finally, we will see in the following two sections that our Q-based theory can also capture a range of syntactic properties that pied-piping structures have been observed to exhibit across languages. Before we come to these syntactic arguments, though, let us briefly note an additional, semantic argument in favor of our 'eliminativist' theory. Cable (2007) demonstrates that the semantics he develops for the Q-based structures in (9) is able to correctly interpret pied-piping structures without any appeal to mechanisms beyond those required for simple wh-questions without pied-piping, an advantage over certain earlier semantic treatments of pied-piping (von Stechow 1996, Sharvit 1998). Beyond this, Cable (2007) shows that this semantics also correctly predicts that 'pied-piping' wh-words are universally subject to Intervention effects within the pied-piped constituent (cf. Sauerland & Heck 2003). As before, though, both of these empirical results crucially hinge on the assumption that pied-piping structures universally receive our eliminativist, Q-based analysis, and thus they provide additional evidence for that analysis.

4.   Q-Wh Agreement and the Constraints on Pied-Piping

In the previous section, we put forth our Q-based theory of pied-piping structures, and noted some initial, conceptual arguments in favor of this eliminativst approach to pied-piping. In this section and the following one, we will present a number of empirical arguments in support of our account, showing that it can capture in a principled fashion certain cross-linguistic generalizations regarding pied-piping structures.

To begin, let us first introduce a potentially serious problem for our proposed account. Recall that under our account, pied-piping structures are nothing more than structures where the Q-particle takes as its sister a phrase strictly containing the wh-word. Thus even complex pied-piping structures like (38a) can be analyzed as in (38b), as simple cases of normal phrasal movement of the QP projection.

(38)   **The Pied-Piping Structures of English, Under the Q-Based Theory**

a. Whose father's cousin's uncle did you meet at the party?

b. [$_{QP}$ [[[[**whose**] father's] cousin's] uncle] **Q**] did you meet at the party?

This general theory of pied-piping structures is, of course, based upon the surface form of the pied-piping structures of Tlingit. In Tlingit pied-piping structures, like the one repeated below, the Q-particle *sá* is not directly adjacent to the wh-word, but rather takes as sister a phrase containing the wh-word.

(39)   **The Pied-Piping Structures of Tlingit**

[$_{PP}$ **Aadóo** teen] **sá**   yigoot?
      who   with   Q   you.went
Who did you go with?

Thus, we find that our Q-based theory of pied-piping structures views *all* such structures as homologous to the Tlingit phenomenon in (39). However, when we compare the pied-piping structures of languages like English to their putative correlates in Tlingit, we discover that there are a significant number of differences between them. Generally speaking, the differences lie in the 'size' of the phrase dominating the wh-word in the fronted constituent. Tlingit permits the wh-word in the fronted phrase to be dominated by structures that English and other well-studied languages never allow.

We have already encountered one rather prominent example of this disparity. A centerpiece of the argument that Tlingit wh-questions possess the structure in (9) is the ability for the wh-word of a Tlingit wh-question to be contained *inside an island* within the fronted phrase (cf. Section 2.2.3). I will refer to such structures, exemplified by (40) below, by the purely descriptive label '*pied-piping past islands*'.

(40)   **Pied-Piping Past Islands in Tlingit**

[[**Wáa**   kligéiyi $_{CP}$] x̲áat $_{NP}$] **sá**   i   tuwáa   sigóo?
   how   it.is.big.REL   fish   Q   your spirit it.is.happy
How big a fish do you want?
(A fish that is how big do you want?)

Curiously, although Tlingit allows pied-piping past islands, the best-studied wh-fronting languages do not. As we see in (41) below, the putative correlates of (40) in English are ill-formed.

(41)   **No Pied-Piping Past Islands in English**

a.   * [$_{DP}$ A fish [$_{CP}$ that is **how** big]] do you want?

b.   * [$_{DP}$ A book [$_{CP}$ that **who** wrote]] did you buy?

Furthermore, as documented by Heck (2004), such structures are similarly ill-formed in all the most familiar wh-fronting languages.

But, it is not merely pied-piping of islands that separates Tlingit from the most commonly known wh-fronting languages. To facilitate our discussion here, let us adopt some special terminology. Throughout out discussion, we will use the descriptive term '*pied-piping past X*', which is defined as follows.

(42)   **Pied-Piping Past X**

A wh-question exhibits 'pied-piping past X' if the wh-word is dominated by an instance of X within the fronted phrase of the wh-question.

With this terminology in place, let us note that several authors have offered the generalization that English and other well-known languages do not permit pied-piping past lexical categories (Cowper 1987, Webelhuth 1992, Grimshaw 2000).[24] That is, in the most well-studied wh-fronting languages, no wh-operator can be dominated by a lexical category within the fronted phrase of the wh-question. The ill-formed English structures in (43) demonstrate.

(43)   **No Pied-Piping Past Lexical Categories in English**

a.   I wonder [[$_{\textbf{DP}}$ **whose** [$_{NP}$ pictures]] John bought] ?

b.   * I wonder [[$_{\textbf{NP}}$ Pictures of **whom**] John bought] ? [25]

c.   * I wonder [[$_{\textbf{AP}}$ proud of **whom**] John was] ?

d.   * I wonder [[$_{\textbf{VP}}$ eaten **what**] John has] ?

Although pied-piping past lexical categories is ill-formed in many languages, it does not appear to be problematic in Tlingit. Indeed, under the plausible assumption that Tlingit relative clauses are adjuncts to NP, such pied-piping is widely exemplified by sentences like (40), where the wh-operator is buried within a relative clause.[26]

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[24] Properly speaking, it is only Grimshaw (2000) that explicitly states this generalization. Webelhuth (1992) states, rather, that there is no pied-piping past *theta-assigners*, while Cowper (1987) states the there is no pied-piping past categories whose members can be lexically specified as being '[+Wh]'. Note, however, that in the context of their respective theories, these latter two generalizations are equivalent to the generalization that there is no pied-piping past the categories N, V, A, i.e., no pied-piping past any lexical category.

[25] Interestingly, the ill-formedness of subordinate questions like that (385b) becomes weakened if they are used instead as matrix questions. This phenomenon is carefully explored by Heck (2004) and Cable (2007). Throughout our discussion, however, we adopt the common position that the pied-piping in seen in (43b) is indeed ill-formed in English, and that there is something special about matrix environments that (marginally) improves their acceptability (cf. Heck 2004, Cable 2007).

[26] It is difficult to find more direct evidence that Tlingit permits pied-piping past lexical categories. For example, it is impossible to construct putative correlates to the English structures in (43b) – (43d). First, the syntactic class 'Adjective' is rather underrepresented in Tlingit, and the few elements of this class do not seem to take arguments. Furthermore, complements of N in Tlingit do not appear to ever remain as sisters of N, but rather always move into a higher specifier position (Cable 2007). Finally, unlike English, Tlingit has no process of 'VP fronting'.

We find, then, that our Q-based theory of pied-piping is presented with the following *prima facie* challenge. While we propose that all pied-piping structures be reduced to the Tlingit structures in (39), we find that those Tlingit structures exhibit properties that the most well-studied cases of pied-piping do not exhibit. It follows, of course, that the Tlingit structures in (39) are not *perfectly* homologous to the more widely studied cases of pied-piping. From this fact, one could certainly conclude that the two structures are not homologous at all, and that our Q-based theory of pied-piping is simply not tenable for languages like English. Throughout the following sections, however, I will argue that such a reaction would be too extreme. Indeed, we will see that it is possible within our overall Q-based theory to develop an account of the observed differences between the pied-piping structures of English and Tlingit.

To again facilitate our discussion here, let us introduce another new piece of terminology. Throughout our discussion, I will use the term 'limited pied-piping', defined as follows, to describe the pied-piping structures of languages like English.

(44)   **Limited Pied-Piping**

A 'limited pied-piping' structure is a pied-piping structure where pied-piping past islands and pied-piping past lexical categories is not permitted.

Similarly, I will use the term 'limited pied-piping language' to refer to languages where all pied-piping structures are instances of limited pied-piping. Thus, all the most widely studied wh-fronting languages appear to be limited pied-piping languages.

Let us now return to the observed differences between the pied-piping structures of Tlingit and those of the limited pied-piping languages. In order for our Q-based theory to be applied to the limited pied-piping languages, some account must be offered for *why* those languages do not permit pied-piping past islands or lexical categories. In the remainder of this section, we put forth such an account. This account will build upon the theory of Q/Wh-Agreement developed by Kratzer & Shimoyama (2002), and so Section 4.1 begins our discussion by introducing that theory. In Section 4.2, I then present our Q-based theory of limited pied-piping languages, and in Section 4.3, we see how this account captures the core properties of such languages. Finally, in Section 4.4, I try to expand the explanatory depth of our account, by deriving one of its key assumptions from a more general theory of lexical categories.

4.1   Background: Q/Wh-Agreement in Kratzer & Shimoyama (2002)

The leading idea underlying our account of limited pied-piping assumes that wh-words in some languages must undergo Agreement with the c-commanding Q-particle. Although we could certainly posit such Agreement as a bald axiom of our theory, it is important to note that there is independent precedent in the literature for appealing to such Q/Wh-Agreement. Indeed, this concept plays a critical role in the work of Kratzer & Shimoyama (2002; Section 9), where it is used to capture differences in the behavior of German and Japanese indefinites. As our own theory of limited pied-piping languages makes use of some specific proposals from Kratzer & Shimoyama (2002), we will review here the relevant aspects of their analysis.

As part of their discussion of the differing behavior of German and Japanese indefinites, Kratzer and Shimoyama (2002) observe the following difference between the wh-words of these two languages: the wh-words of German possess a "distinctive look" (Kratzer & Shimoyama

2002; p. 26), while those of Japanese do not. That is, the wh-words of German all share a common morpho-phonological 'feature', while the wh-words of Japanese don't. To see this, let us examine the paradigm of wh-words in German and Japanese, listed below.

(45)   **The Wh-Words of Japanese and The Wh-Words of German**

Wh-Words of Japanese		Wh-Words of German	
Dare	'who'	*Wer*	'who'
Nani	'what'	*Was*	'what'
Doko	'where'	*Wo*	'where'
Itu	'when'	*Wenn*	'when'
Naze	'why'	*Warum*	'why'

A mere glance at the wh-words of German reveals the following commonality: they all begin with the sound represented by "w". When we turn to the wh-words of Japanese, however, it is far more difficult to find any morpho-phonological feature that they share. Although they do share some rather abstract properties [27], it can be reasonably said that the wh-words of Japanese lack the 'unified appearance' of the German wh-words. In this sense, we will speak of the wh-words of German as possessing a 'distinctive morpho-phonological feature', while the wh-words of Japanese lack any distinctive morpho-phonological feature.

　　Importantly, Kratzer and Shimoyama (2002) propose that the 'unified appearance' of German wh-words is no mere historical accident. That is, the similar appearance of these words reflects a similar morphological structure. Specifically, Kratzer & Shimoyama (2002) propose that German crucially differs from Japanese in that German wh-words must all bear uninterpretable instances of the feature [Q]. This uninterpretable [Q] feature is in turn overtly pronounced in German as the "w" sub-morpheme, providing all the wh-words of German with their 'distinctive look'. Furthermore, since the wh-words of Japanese are assumed *not* to bear uninterpretable instances of [Q], they are correctly predicted *not* to have any distinctive morpho-phonological feature.

　　The ultimate interest of these morphological hypotheses to Kratzer and Shimoyama's broader discussion is that they can provide a potential tool for explaining certain further differences between German and Japanese. There are, after all, important syntactic consequences of the presence of uninterpretable [Q] on the wh-words of German. As Kratzer & Shimoyama (2002) note, because the [Q] feature on German wh-words is uninterpretable, they *must* undergo Agreement with a phrase bearing an interpretable instance of Q. Therefore, the wh-words of German must undergo Agreement with the Q-operator(/particle). On the other hand, the lack of any Q-feature on the wh-words of Japanese entails that Japanese wh-words need not undergo such Agreement. Kratzer & Shimoyama (2002) subsequently employ this underlying difference in the necessity of such 'Q/Wh-Agreement' to account for certain differing properties of German and Japanese indefinites.

　　In summary, then, Kratzer & Shimoyama (2002) put forth the following proposals regarding the properties of wh-words and indefinites across languages.

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[27] For example, all the Japanese wh-words above are disyllabic. Furthermore, David Pesetsky (p.c.) notes that the first consonant in each word is coronal.

(46)   **The Theory of Q/Wh-Agreement Languages (Kratzer & Shimoyama 2002)**

   (i)   In some languages (e.g. German), all wh-words bear an uninterpretable instance of the feature [Q]. In other languages (e.g. Japanese), wh-words do not bear any instance of the Q-feature.

   (ii)   In languages where all the wh-words share a distinctive morpho-phonological feature, all the wh-words bear uninterpretable [Q], the pronunciation of which provides the distinctive morpho-phonological feature.[28]

   (iii)   In languages where wh-words bear uninterpretable [Q], the wh-words must undergo Agreement with the c-commanding Q-operator(/particle). In languages where wh-words do not bear uninterpretable [Q], the wh-words needn't undergo such Agreement.

As we will soon see, these general hypotheses can be combined with our Q-based theory in (9) to provide an analysis of the limited pied-piping languages.

   However, before we can fully develop this analysis, we first must further flesh out the proposals in (46). Because Kratzer & Shimoyama's specific implementation of these hypotheses employs a syntactic theory different from that assumed here,[29] we must develop our own formal implementation of these assumptions. Therefore, the remainder of this section presents our method for implementing the proposals above in the context of our overarching Q-based theory.

   Thus far, we have remained agnostic regarding the exact nature of feature valuation under Agree. Henceforth, however, I will specifically adopt the theory of feature valuation developed by Brody (1997) and Pesetsky & Torrego (2007). The characteristic property of this system is that valuation and interpretability are independent of one another. Consequently, there are four 'states' that a given feature may be in: (i) valued and interpretable, (ii) valued and uninterpretable, (iii) unvalued and interpretable, and (iv) unvalued and uninterpretable. The following diagram illustrates this idea, as well as the notation we will use.

(47)   **The Independence of Valuation and Interpretability**

Feature = *F*	Interpretable *(iF)*	Uninterpretable *(uF)*
Valued *(F[val])*	iF[val]	uF[val]
Unvalued *(F[ ])*	iF[ ]	uF[ ]

---

[28] Note that the claim here is *not* that the wh-words of a language bear [Q] if *and only if* they all share a distinctive morpho-phonological feature. After all, it is commonly assumed that uninterpretable features needn't receive overt pronunciation in the structures where they are present (e.g. Case), and so we shouldn't expect that uninterpretable [Q] is overtly pronounced in every language where it occurs on wh-words. Thus, we assume that there are languages exhibiting Q/Wh-Agreement where the class of wh-words is as morpho-phonologically diverse as those of Japanese.

[29] The original formal implementation in Kratzer & Shimoyama (2002) is couched in terms of "greedy" feature movement, and so is not compatible with our general syntactic assumptions.

Within this system, there are two principles that drive syntactic valuation. The first is the requirement that every feature must possess a value by LF. Due to this principle, any unvalued feature *F[ ]* must probe for a valued instance of itself *F[val]*, at which point the usual mechanics of long-distance Agree apply (Chomsky 2000). The second principle relevant here is one stating that all uninterpretable features *uF* must by LF be matched to some interpretable instance *iF*. That is, if any uninterpretable instance of F (*uF*) has not undergone Agreement with an interpretable instance of F (*iF*) by LF, then the derivation crashes. For further details regarding this theory of feature valuation, I refer the reader to Pesetsky & Torrego (2007).

With these ideas in place, let us now incorporate the core hypotheses in (46) into our broader network of ideas. First, following (46i), we assume that the wh-words of some languages (e.g. German) all bear an instance of uninterpretable, valued Q, while the wh-words of other languages (e.g. Japanese) do not bear any instance of the Q-feature. This assumption is illustrated below.

(48) **The Wh-Words of German vs. The Wh-Words of Japanese**

    a.   German Wh-Word: *was* $_{uQ[+]}$
    b.   Japanese Wh-Word: *dare*

In some languages this instance of uninterpretable Q can be overtly spelled out on the wh-word, resulting in the wh-words of the language all sharing a distinctive morpho-phonological feature (46ii). Thus, we assume that the identifiable '[Wh]' sub-morpheme in the wh-words of languages like German and English is an overt pronunciation of the feature Q.

In languages where the wh-word bears an uninterpreable instance of Q, our general theory of valuation entails that the wh-word must undergo agreement with a head bearing an interpretable instance of Q. Given that the only head assumed to carry an interpretable instance of Q is the Q-particle itself, it follows that the Q-particle in languages like German must undergo Agreement with the wh-word (46iii). In order for this Q/Wh-Agreement to take place, however, we must assume that the Q-particles of such languages initially bear *unvalued* instances of Q.[30]

Therefore, in those languages where the wh-words bear an uninterpretable, valued instance of Q (e.g. German), the Q-particle must in turn bear an interpretable, unvalued instance of Q. On the other hand, in those languages where the wh-words bear no instance of the Q-feature (e.g. Japanese), we can safely assume that the Q-particle simply bears an interpretable, valued instance of Q. This idea is illustrated below.

(49) **The Q-Particles of German vs. The Q-Particles of Japanese**

    a.   German Q: $\varnothing$ $_{iQ[\ ]}$
    b.   Japanese Q: *ka* $_{iQ[+]}$

Assuming the initial valuations in (48) and (49), we derive the existence of Q/Wh-Agreement in languages like German, and the absence of such Agreement in languages like

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[30] It may at first blush seem suspicious for a Q-particle to initially bear an unvalued Q-feature. However, our proposals regarding Q are rather parallel to the proposals regarding Tense in Pesetsky & Torrego (2007), where the Tense node of the clause initially bears unvalued Tense, and receives its Tense-value only under Agreement with the uninterpretable Tense feature of the verb.

Japanese. First, in those languages where the Q-particle bears unvalued *iQ[ ]*, the lack of a value for *iQ* entails that the Q-particle must probe for a valued instance of the feature, as shown below.

(50)   **Q-Particle Probing for *iQ[ ]* in German**
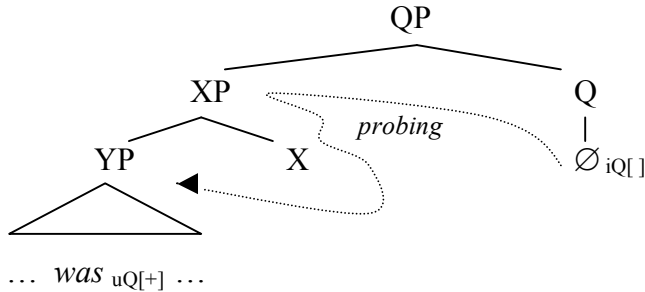
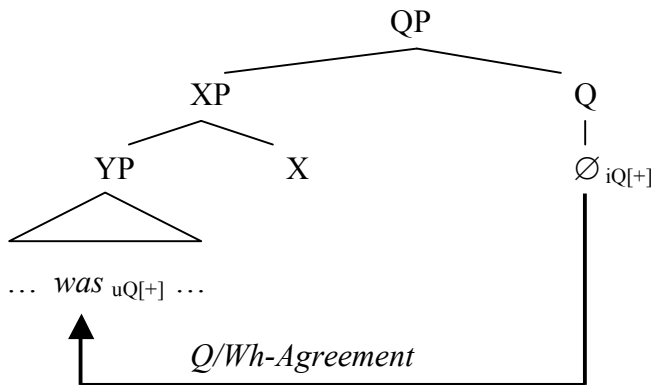Following Chomsky's (2000) algorithm for probing, the first element bearing *Q[val]* that the Q-particle probes will be the wh-word that it c-commands. Therefore, the Q-particle will undergo Agreement with that wh-word, as shown below.

(51)   **Q-Particle Agreeing with Wh-Word in German**

As we see above, this Q/Wh-Agreement has the following two results: (i) the unvalued instance of [Q] on the Q-particle receives a value, (ii) the uninterpretable instance of [Q] on the wh-word is 'matched' to an interpretable instance of [Q]. Consequently, both the 'Agreement-driving' principles of Pesetsky & Torrego (2007) are satisfied, and the structure is well-formed (i.e., interpretable at LF).

In languages where the Q-particle bears valued *iQ*, however, the presence of a value for *iQ* entails that the Q-particle will *not* act as a probe. Furthermore, since the wh-words of such languages are assumed not to bear any instance of the Q-feature, nothing will require them to undergo Agreement with the Q-particle. Consequently, in such languages, there is no syntactic Agreement relation between the wh-word and the c-commanding Q-particle, as shown below.

(52)   **No Q/Wh-Agreement in Japanese**

$$
\begin{array}{c}
\text{XP} \\
\diagdown \\
\text{XP} \qquad\qquad \text{Q} \\
\diagup\diagdown \qquad\quad | \\
\text{YP} \quad \text{X} \qquad ka_{\,iQ[+]} \\
\triangle \\
\ldots dare \ldots
\end{array}
$$
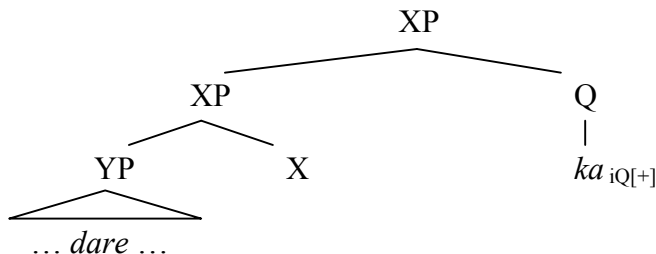
Given this implementation of the Kratzer & Shimoyama (2002) theory of Q/Wh-Agreement, we can now present our Q-based analysis of the limited pied-piping languages.

4.2   The Theory of Limited Pied-Piping Languages

To recall, we have seen that the pied-piping structures of such well-studied languages as German and English are subject to constraints that appear not to hold of pied-piping structures in Tlingit. We therefore seek to understand what is responsible for the more constrained nature of pied-piping in all the most commonly encountered wh-fronting languages.

In this context, it is worth observing that a great many of the most well-studied wh-fronting languages appear to also be languages where wh-words Agree with Q-particles, henceforth 'Q/Wh-Agreement languages'. For example, we've already seen that German is a Q/Wh-Agreement language. Of course, English also counts as such a language, given that its wh-words all share a distinctive morpho-phonological feature, the eponymous 'wh-' sub-morpheme. More generally, *all* the Indo-European languages appear to be Q/Wh-Agreement languages, by virtue of their wh-words having inherited reflexes of the ancestral */kw/ sub-morpheme, a distinctive morpho-phonological feature shared by all the wh-words of Proto-Indo-European (Sihler 1995). Given that Indo-European languages are by far and away the ones most often encountered in studies of wh-fronting and pied-piping, we find that nearly all the best-studied wh-fronting languages are also clear instances of Q/Wh-Agreement languages.[31]

Interestingly, unlike all the most commonly studied wh-fronting languages, Tlingit appears *not* to be a Q/Wh-Agreement language. When we turn to the wh-words of Tlingit, we find that they seem to lack any distinctive morpho-phonological feature. Indeed, as we see below, they constitute an even more heterogeneous class than the Japanese wh-words.

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[31] Of course, there are also some *non*-Indo-European languages well-represented in the literature on wh-fronting and pied-piping, Hungarian and Basque being two prominent examples. Although it is less clear that the wh-words of these languages share a distinctive morpho-phonological feature, it is nevertheless consistent with our proposals to assume that they are also Q/Wh-Agreement languages (cf. Footnote 28). As we will later see, such an assumption will prove to be justified.

(53)   **The Wh-Words of Tlingit**

a.	Daat	*What*
b.	Daak̲w	*Which*
c.	Aa / Aadóo	*Who*
d.	Goo	*Where*
e.	Wáa	*How, why, what*
f.	X'oon	*How much*
g.	Gwatk	*When (in the past)*
h.	Gwatgeen	*When (in the future)*

Given the phonological diversity of the Tlingit wh-words, it is consistent with our broader syntactic assumptions to assume that Tlingit is not a Q/Wh-Agreement language. Thus, we will refer to Tlingit as a 'non-Agreement language'.

We have just seen that besides their limited pied-piping, all the best-known wh-fronting languages also differ from Tlingit in being Q/Wh-Agreement languages. This fact invites the following speculation: perhaps the best-known wh-fronting languages have only limited pied-piping *because* they are Q/Wh-Agreement languages. That is, perhaps it is the obligatory Q/Wh-Agreement in these languages that ultimately prevents the wh-words in pied-piping structures from being dominated by islands and lexical categories. If this were true, then we would correctly predict that Tlingit, a non-Agreement language, is also not a limited pied-piping language.

This hypothesis, which is more compactly formulated below, will constitute the overarching idea behind our proposed Q-based theory of the limited pied-piping languages.

(54)   **The Nature of Limited Pied-Piping**

> If the Q-particle must agree with the wh-word it c-commands, then that wh-word cannot be dominated in the sister of Q by islands or lexical categories. Thus, limited pied-piping occurs when Q/Wh-Agreement is obligatory. Similarly, limited pied-piping languages (e.g. English) are those where Q/Wh-Agreement is always obligatory. Non-limited pied-piping languages (e.g. Tlingit) are those where Q/Wh-Agreement is not obligatory (or does not occur). [32]

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[32] In this context, it is important to observe that although Japanese is not a wh-fronting language, the hypothesis in (54) predicts that, given its putative lack of Q/Wh-Agreement (cf. (52)), it will permit wh-words to be dominated in the sister of Q by islands. This prediction is born out by the well-known possibility in Japanese wh-questions for the wh-operator to be buried inside of an island.

(i)   Kimi-wa [$_{DP}$ [$_{CP}$ **dare**-ga   kaita] hono-o]   yomi-masi-ta   **ka** ?
       you-TOP   who-HOM wrote   book-ACC read.POL-PAST   Q
       What person is such that you read books that they wrote?
       (Books that who wrote did you read?)   (Hagstrom 1998; p. 40)

Hagstrom (1998; pp. 40 – 45) argues that such structures are derived via movement of the Q-particle *ka* from a base position outside the island, as shown below.

(ii)   Kimi-wa [$_{DP}$ [$_{CP}$ **dare**-ga   kaita] hono-o] t_1 yomi-masi-ta   **ka$_1$** ?

Thus, given the analysis in (ii), it appears that Japanese does allow wh-words to be dominated by islands within the sister of Q, as predicted by our hypothesis in (54).

This fact itself raises the following, more general point. The 'LF-Pied-Piping' analysis of sentences like (i) (Nishigauchi 1990) has often been criticized on the grounds that the putative covert pied-piping it appeals to seems

Of course, the general hypothesis in (54) still requires some concrete, underlying mechanism. That is, in order for (54) to fully constitute a theory of the limited pied-piping languages, we must have some understanding of *why* Q/Wh-Agreement entails that wh-words cannot be dominated by islands or lexical categories inside the sister of Q. In the following section, we will see in detail why this is so.

4.3   Limited Pied-Piping Results From Q/Wh-Agreement

To begin, let us recall that the first of the two characteristic properties of limited pied-piping languages is that they do not permit pied-piping past islands. Furthermore, let us recall our assumption from Section 2 that probing and Agreement cannot apply across syntactic islands. Under this general assumption, of course, it follows that Q/Wh-Agreement cannot apply across syntactic islands. Therefore, if we assume that limited pied-piping languages are Q/Wh-Agreement languages, we correctly predict that such languages will not permit pied-piping past islands. As we see below, the domination of the wh-word by a syntactic island within the sister of Q would prevent Agreement from taking place between the Q-particle and the wh-word.

(55)   **Inability to Pied-Pipe Past Islands in English**

    a.   * [DP A fish [CP that is **how** big]] do you want?

    b.

Probing/Agreement BLOCKED!!
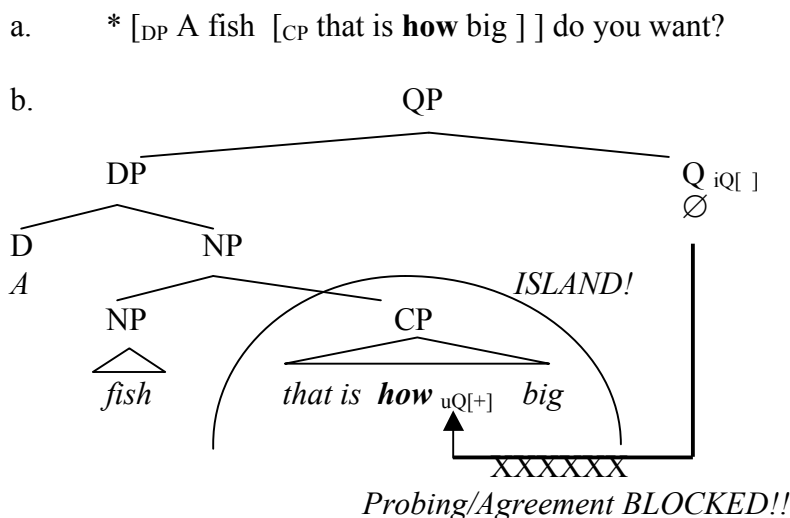
In a Q/Wh-Agreement language, then, the impossibility of Agreement in structures like (55b) would result in the Q-particle never receiving a value for its Q-feature. Consequently, the structure in (55b) would violate the principle that all features must be valued by LF, and so is predicted to be ill-formed.

Thus, our theory predicts that Q/Wh-Agreement languages will never permit pied-piping past islands. On the other hand, such configurations are predicted to be perfectly well-formed in non-Agreement languages like Tlingit. After all, the only structural problem with (55b) is that

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to violate constraints on pied-piping seen in well-studied wh-fronting languages like English (cf. Fiengo, Huang, Lasnik & Reinhart 1988, as well as Heck 2004; pp. 495 – 502). However, the behavior of pied-piping in Tlingit and the accompanying theory in (54) significantly undermine these criticisms. A proponent of the Nishigauchi (1990) analysis could justifiably hold that the differences observed between their postulated pied-piping and the pied-piping observed in English follow simply from the fact that Japanese is not a Q/Wh-Agreement language, while English is.

an Agreement relationship is required which cannot take place. Therefore, in languages where the impossible Agreement relationship in (55b) is *not* required, pied-piping past islands should be possible. This is illustrated below.

(56)   **Ability to Pied-Pipe Past Islands in Tlingit**

a.   [DP [CP **Waa** kligéiyi   ]   x̲áat] **sá** i   tuwáa   sigóo?
          how   it.is.big.REL   fish   Q   your spirit   it.is.glad
   *How big a fish do you want?*

b.
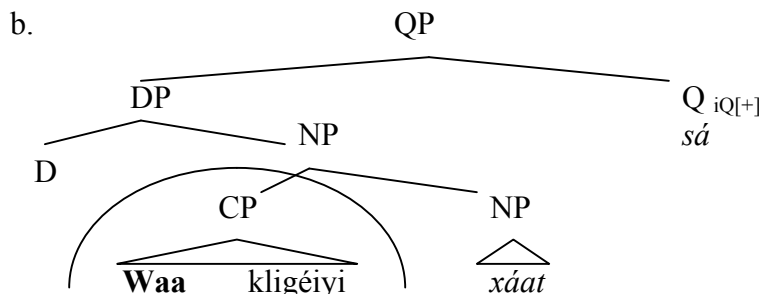
Given that Tlingit Q-particles are, like Japanese Q-particles, assumed to carry a *valued* interpretable instance of Q, no Q/Wh-Agreement is required in the pied-piping structures of Tlingit. Consequently, no syntactic principles are violated by structures like (56b), where the wh-word is dominated by an island within the sister of Q. Thus, we predict that non-Agreement languages like Tlingit should permit pied-piping past islands.

We have therefore seen that our broader syntactic theory indeed predicts that pied-piping past islands should be impossible in all and only the Q/Wh-Agreement languages, which supports our hypothesis in (54). But, what of the second core property of limited pied-piping languages, their inability to pied-pipe past lexical categories? For the moment, let us adopt the stipulation in (57), which we will assume is universal. In Section 4.4, we will see how this condition can be derived from a more general theory of lexical categories.
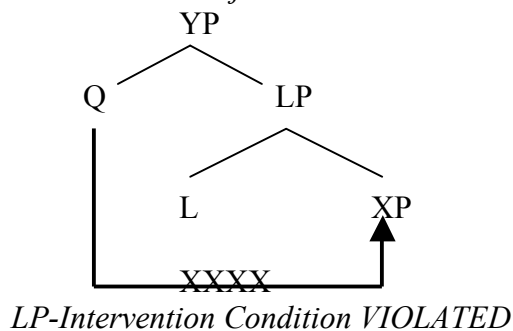
(57)   **The LP-Intervention Condition**

A Lexical Projection (LP) cannot intervene between a Q-particle and a phrase that the Q-particle Agrees with. (Such an intervening LP blocks all probing by Q.)

Functional Projection   *Lexical Projection*

Probing and Agreement: OK   *LP-Intervention Condition VIOLATED*
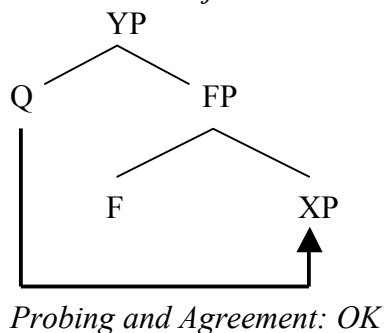
With the addition of the LP-Intervention Condition in (57), it follows that the Q/Wh-Agreement languages will not permit pied-piping past lexical categories. As illustrated below, the domination of the wh-word by a lexical category within the sister of Q would prevent Agreement from taking place between the Q-particle and the wh-word.

(58)   **Inability to Pied-Pipe Past Lexical Categories in English**

   a.   * [NP Pictures of **whom**] did John buy?

   b.

Probing/Agreement BLOCKED (by LP-Intervention Condition)!!!
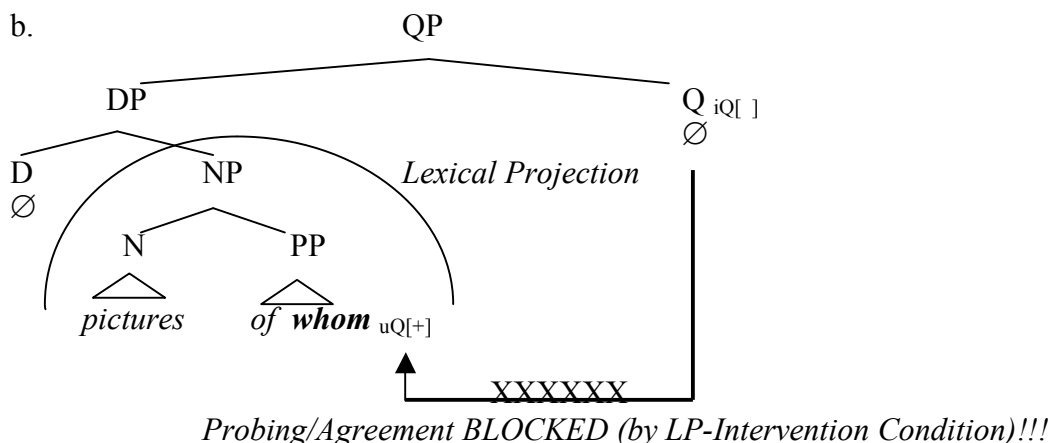
In a Q/Wh-Agreement language, then, the impossibility of Agreement in structures like (58b) would result in the Q-particle never receiving a value for its Q-feature. Therefore, just as in (55b), the structure in (58b) would violate the principle that all features must be valued by LF.

On the other hand, such configurations are predicted to be perfectly well-formed in non-Agreement languages like Tlingit. Again, the only structural problem with (58b) is that an Agreement relationship is required which cannot take place. Therefore, in languages where the impossible Agreement relationship in (58b) is *not* required, pied-piping past lexical categories should be possible. We can see this in more detail below.

(59)   **Ability to Pied-Pipe Past Lexical Categories in Tlingit**

   a.   [DP [CP **Waa**   kligéiyi   ]   x̲áat] **sá** i   tuwáa   sigóo?
                  how   it.is.big.REL   fish   Q   your spirit   it.is.glad
        How big a fish do you want?

   b.
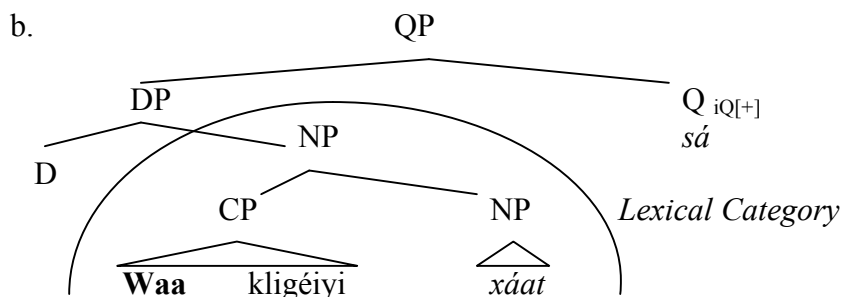
In summary, we have seen that with the addition of the LP-Intervention Condition, our

broader syntactic theory predicts that pied-piping past islands and pied-piping past lexical categories should be impossible in all and only the Q/Wh-Agreement languages. Consequently, our theory of Q/Wh-Agreement indeed predicts the generalization in (54), that the limited pied-piping languages are precisely the Q/Wh-Agreement languages. In this way, the proposals in this section provide a full Q-based theory of the limited pied-piping languages. The core properties of those languages are seen to follow from a more basic underlying property, the requirement that their Q-particles undergo Agreement with wh-words. Thus, the observed differences between the pied-piping structures of English and those of Tlingit are not due to some deep difference in their syntax, but instead to a rather superficial difference in whether Q/Wh-Agreement is obligatory.

Before we leave this section, however, let us momentarily return to a fundamental assumption of our preceding discussion, the claim that English and all the most well-studied wh-fronting languages do not permit pied-piping past lexical categories. Although we illustrated this claim with a modicum English data, it actually has a much broader empirical coverage. Indeed, it is a generalization that has been independently made several times in the literature on pied-piping (Cowper 1987, Webelhuth 1992, Grimshaw 2000), as it accounts for a wide array of seemingly disparate facts, including a number of generalizations regarding pied-piping that had previously been seen as independent properties.

Therefore, in order to provide a fuller appreciation of the work accomplished by our LP-Intervention Condition, I will review in the following subsection some of the phenomena that fall under the broader generalization that 'there is no pied-piping past lexical categories.'

4.3.1 Evidence for the LP-Intervention Condition in Q/Wh-Agreement Languages

As we first noted in Section 3, one of the most striking properties of pied-piping structures is how limited they are. No language permits a wh-word to 'pied-pipe' any and all phrases that contain it.[33] For example, we will see in Section 5 that even Tlingit disallows pied-piping past matrix predicates. Therefore, an important part of a general theory of wh-fronting is some account of the observed constraints on pied-piping structures. For this reason, linguists have for some time struggled with the logically prior task of properly characterizing *what* the constraints on pied-piping *are*, what patterns the general theory should predict. Unfortunately, given the numerous independent structural differences across the best-studied wh-fronting languages, it is far from transparent what the underlying cross-linguistic generalizations are.

Although there has yet to be discovered a completely unified account for all the various constraints governing pied-piping structures, a number of them can be seen to follow from the general impossibility of pied-piping past lexical categories (Cowper 1987, Webelhuth 1992, Grimshaw 2000). Indeed, we will see that a number of conditions which had previously been described purely in terms of the phrase-structural or linear position of the wh-word follow from this one generalization.

One immediate consequence of this generalization is, of course, that the complement of a lexical head L will be unable to pied-pipe past the projections of L. Thus, we correctly predict that limited pied-piping languages will not allow the complements of lexical heads to be 'pied-

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[33] Throughout this discussion, I will use the verb 'pied-pipe' in a purely descriptive sense. The phrase 'X pied-pipes Y' means only that X is the wh-operator in a pied-piping structure, and is dominated by Y within the fronted phrase of the structure.

pipers'.[34] The data in (43), repeated below, illustrate this fact for English.

(60)   **Complements of Lexical Heads Can't Pied-Pipe (in Limited Pied-Piping Languages)**

    a.   I wonder [[$_{DP}$ **whose** [$_{NP}$ pictures]] John bought] ?
    b.   * I wonder [[$_{NP}$ Pictures of **whom**] John bought] ?
    c.   * I wonder [[$_{AP}$ proud of **whom**] John was] ?
    d.   * I wonder [[$_{VP}$ eaten **what**] John has] ?

As we saw earlier, the data above trivially follow from the generalization that limited pied-piping languages do not permit pied-piping past lexical categories. However, the reader may rightly wonder at this point whether that generalization is the correct one to draw from the data above. Indeed, facts like those in (60) have lead many researchers to instead propose the stronger generalization that *no* complements of *any* head can serve as 'pied-pipers' (Kayne 1994, Koopman 1997, Koopman & Szabolcsi 2000). Under such accounts, pied-piping structures are only well-formed if the wh-word occupies a *specifier* position within the fronted phrase.

       This stronger generalization will receive more focused discussion in Section 5; let us here, however, foreshadow the points we will later make in greater detail. The overarching problem is that the stronger generalization is too strong, and faces a direct and immediate challenge from the ubiquity of PP-pied-piping by complements of P. That is, contrary to the stronger generalization, it is possible in most limited pied-piping languages for wh-words to 'pied-pipe' a PP from the complement of P. This is illustrated below.

(61)   **Complements of P Can Pied-Pipe (in Limited Pied-Piping Languages)**

    a.   <u>English:</u>
            [$_{PP}$ In [**what** sense]] was he a doctor?

    b.   <u>Icelandic:</u>
            Ég velti því   fyrir mér [[$_{PP}$ við **hvern**] thú talaðir].
            I roll   it before me   with who   you talked
            I wonder who you talked with.

    c.   <u>Russian:</u>
            [v **čey**   mashyne]   priyekhal ?
             in whose   car   you.arrived
            Whose car did you arrive in?

Thus, in order to allow for these rather common structures, proponents of the stronger generalization must introduce special assumptions regarding the structure of PPs, so that what appear in so many languages to be pied-pipers in CompPP are in fact covertly specifiers of PP. By contrast, our weaker generalization that complements of lexical categories cannot pied-pipe receives no *prima facie* challenge from the facts above. Because P is a functional category, the weaker generalization correctly predicts that wh-words may generally occupy the complement of

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[34] Throughout this discussion, I will use the term 'pied-pipers' in a purely descriptive sense. The noun 'pied-piper' refers to wh-operators whose projections are properly contained within the fronted phrase of a wh-question.

PP within the fronted phrase of a wh-question. As for the fact that pied-pipers do *tend* to be specifiers (Heck 2004, 2007), we will later see that this is an epiphenomenal consequence of the fact that most functional categories cannot take interrogative words as complements.

Our constraint against pied-piping past lexical categories also predicts another oft-noted feature of the limited pied-piping languages. Besides ruling out pied-piping by *complements* of lexical heads, our generalization also correctly predicts that *modifiers* of lexical heads will be unable to pied-pipe past the lexical projection containing them. This inability for modifiers to pied-pipe, illustrated below, was observed by Webelhuth (1992).

(62)   **Modifiers of Lexical Heads Cannot Pied-Pipe (in Limited Pied-Piping Languages)**

    a.   * [$_{QP}$ [$_{DP}$ The [$_{NP}$ party **where**]] **Q**] will John enjoy?

    b.   * [$_{QP}$ [$_{VP}$ Go **where**] **Q**] will you?

    c.   * [$_{QP}$ [$_{DP}$ A [$_{NP}$ [$_{DegP}$ **how** big] party]] **Q**] will you throw?

Again, since the wh-words in each of these structures is contained within a lexical projection inside the fronted phrase, our LP-Intervention Condition predicts their ill-formedness.

A third prediction of our restriction against pied-piping past lexical categories concerns the placement of possessors within pied-piping structures. A pervasive phenomenon across the limited pied-piping languages is the inability for post-nominal possessors to pied-pipe past the larger possessive DP (Heck 2004; p. 133 – 142). Sentences like (60b) demonstrate the impossibility of such structures in English, and the data below illustrate this for German.

(63)   **Post-Nominal Possessors Cannot Pied-Pipe in German (Heck 2004; pp. 134 – 135)**

    a.   [$_{DP}$ **Marias**   Tochter]
                Maria's daughter

    b.   [$_{DP}$ die [$_{NP}$ Tochter von **Maria**]]
                the   daughter of Maria

    c.   [$_{DP}$ **Wessen** Tochter] willst du malen?
                whose daughter want you to.paint
                Whose daughter do you want to paint?

    d.   * [$_{DP}$ Die [$_{NP}$ Tochter von **wem**]] willst du   malen?
                the   daughter of who   want you to.paint

As we see from (63a) and (63b), German generally permits possessor DPs to either precede or follow the N that they possess. However, if that possessor DP is a pied-piper, then the post-nominal order becomes impossible (63d), and only the pre-nominal position is allowed (63c). Thus, we find that German does not permit wh-words to function as post-nominal possessors within the fronted phrase of a pied-piping structure. As further noted by Heck (2004, 2007), similar patterns of data can also be observed in many Romance languages, as well as the Mayan

languages Chol and Tzotzil (cf. Cable 2007, Chapter 5).

  Much like the facts in (60), the inability for post-nominal possessors to pied-pipe has been seen by some as evidence that pied-pipers must generally be left-peripheral specifiers within the fronted phrase. Note, however, that post-nominal possessors are commonly held to occupy positions internal to the possessed NP, as indicated by our English structure in (60b) and our German structures in (63b,d). Under this plausible assumption, post-nominal possessors are necessarily dominated by a lexical projection within the larger possessive DP. Therefore, our LP-Intervention Condition correctly predicts their inability to pied-pipe past the possessive DPs containing them.

  In this context, let us observe that a related phenomenon in Hungarian also follows from the impossibility of pied-piping past lexical categories. Szabolcsi (1994) argues that possessors in Hungarian can occupy one of two distinct structural positions within the larger possessive DP. Much like possessors in German, Hungarian possessors can either occupy a position internal to the NP projection of the possessed noun, or they can occupy a higher position outside the NP. Importantly, however, both these two positions for possessors in Hungarian are *pre*-nominal; Hungarian does not permit post-nominal possessors. Rather, the two positions are empirically distinguished principally through their case properties. Possessors internal to the NP bear nominative case, while Possessors external to the DP bear dative case. Interestingly, it is only the *dative*-marked possessors, those presumed to be external to the NP, which can pied-pipe the entire possessive DP. The following data illustrates.

(64)   **Nominative-Marked Possessors Cannot Pied-Pipe in Hungarian (Szabolcsi 1994)**

   a.   [$_{DP}$ **Ki**-nek   a   [$_{NP}$ vendégét]] ismertétek?
       who-DAT   the   guest   you.know
       Whose guest did you know?

   b.   * [$_{DP}$ [$_{NP}$ **Ki**   vendégét]] ismertétek?
       who-NOM   guest   you.know

  Given the evidence that nominative-marked possessors in Hungarian are NP-internal, the ill-formedness of (64b) follows from our LP-Intervention Condition. Moreover, our restriction against pied-piping past lexical categories ultimately views the data in (64) and those in (63) as instances of the same basic phenomenon. That is, both these facts are derived as consequences of our single overarching generalization, despite the fact that the data in (63) superficially appear to concern the *linear position* of the wh-word, while those in (64) appear to concern its *case*. More importantly, however, let us observe that both the Hungarian possessors in (64) occupy left-peripheral specifier positions within the fronted phrase. It therefore follows that any attempt to capture the contrast between (63c,d) via the simple generalization that 'pied-pipers must be left-peripheral specifiers' would fail to capture the parallel contrast between (64a) and (64b). Thus, the behavior of possessors in Hungarian further supports our more general claim that properties like 'left peripherality' and 'specifier-hood' are not directly relevant to the constraints on pied-piping seen in the limited pied-piping languages (cf. Horvath 2007, Section 2.2).

  Furthermore, an examination of English gerunds presents us with data thematically similar to those just observed for Hungarian in (64). As reported in Horvath (2007), Culicover (1999) observes the following contrast regarding pied-piping past gerunds in English.

(65)   **Pied-Piping Past Gerunds in English (Culicover 1999)** [35]

        a.   * [**Who** solving the problem] were you thinking about?
        b.   [**Whose** solving the problem] were you thinking about?
        c.   [**Whose** solving of the problem] were you thinking about?

Like the Hungarian data in (64), the contrast between the ill-formed (465) and the well-formed (65b,c) seems connected with the case of the gerund's subject. In the ill-formed (65a), the subject of the gerund bears accusative case, as can be seen from such well-formed declarative correlates as *We were thinking of <u>him</u> solving the problem.* In the well-formed (65b,c), however, the subject of the gerund bears genitive case.

      As noted by Horvath (2007), our account of the Hungarian contrasts in (64) might also be able to capture the English data here. Let us assume that accusative-marked gerundive subjects in English occupy the NP-internal position of Hungarian nominative-marked possessors. Furthermore, let us assume that genitive-marked gerundive subjects occupy the NP-external position of Hungarian dative-marked possessors. Under these assumptions, the data in (65) follow from the generalization that English does not permit pied-piping past lexical categories. In the ill-formed (65a), the NP projection of the gerund dominates the wh-word within the fronted phrase, and so the structure is predicted by our generalization to be ill-formed. In the well-formed (65b,c), however, the wh-word is outside the NP projected by the gerund, and so nothing within our theory of limited pied-piping would rule it out. Finally, let us again note that *all* the wh-words in (65) are left-peripheral specifiers, which supports our claim that the constraints governing limited pied-piping are not directly sensitive either to left-peripherality or to specifier-hood.

      Thus far, we have seen that a constraint against pied-piping past lexical categories would alone predict a variety of facts that would otherwise only be captured via distinct generalizations. I therefore conclude that any theory of limited pied-piping languages should derive this constraint as a theorem. As we have seen, this constraint would follow from our foundational hypothesis in (57), the LP-Intervention Condition. Thus, the data presented in this sub-section provide important evidence in favor of our overall Q-based account.

      Unfortunately, however, it is quite apparent that our hypothesis in (57) is little more than a stipulation, vacuously restating the observed impossibility of pied-piping across lexical categories. Therefore, in the following section, we will develop some more basic assumptions regarding lexical categories, under which (57) can be derived as a theorem.

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[35] Note that a more well-known observation regarding pied-piping in English gerunds comes from Webelhuth (1992), who reports a contrast between sentences like (65b) and (65c).

      (408b)   * [Whose solving the problem] were you thinking about?
      (408c)   [Whose solving of the problem] were you thinking about?   (judgment of Webelhuth 1992)

Thus, Webelhuth (1992) would seem to group (65b) with (65a) as ill-formed, in distinction to the well-formed (65c). Furthermore, this particular grouping of judgments crucially supports Webelhuth's proposed theory of pied-piping.

      As Horvath notes, however, Cullicover (1999) reports the judgments in (65) in a context entirely unrelated to the nature of pied-piping, and without any plausible interest in challenging the theory of Webelhuth (1992). Moreover, consultation with other English speakers reveals a consensus that, although there may be a (slight) contrast between (65b) and (65c), it is not nearly as strong as the contrast between (65a) and the other two.

      In summary, it appears that with respect to pied-piping past gerunds, there is a much stronger effect from the case-marking of the pied-piping subject than from the case-marking of the object. As we note below, this stronger effect is captured by our Q-based theory, while the weaker one remains a mystery under our account.

4.4   Lexical Categories and Phases: Deriving the LP-Intervention Condition

In the previous sections, we have observed that limited pied-piping languages disallow (i) pied-piping past syntactic islands, and (ii) pied-piping past lexical categories. At present, our account treats these properties as if they were separate conditions, derived from distinct components of the grammar.   However, it would certainly be more attractive to derive them both as consequences of some more fundamental condition.

   To this end, let us first adopt the following, key hypothesis concerning lexical categories.

(66)   **The Fine Structure of Lexical Categories (cf. Embick & Marantz 2007)**

   Every lexical projection (VP, NP, AP) is complement to a functional projection (v, n, a).
   Furthermore, each of these 'categorial heads' (v, n, a) is a phase head.

That is, let us assume that every lexical projection is dominated by its own equivalent of the 'little-v' projection commonly held to dominate VPs. According to this hypothesis, then, every NP, AP and VP is embedded in a structure like that represented under (67), below.

(67)   **Diagram of the Lexical Projections**
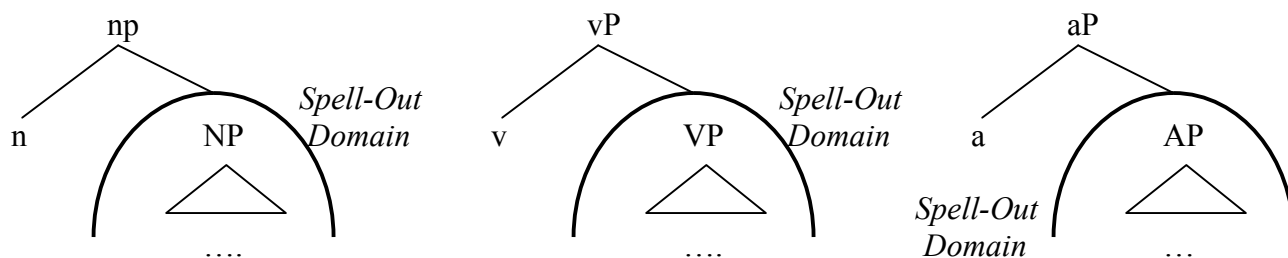
   Importantly, if we assume that each of the little categorial heads (v, n, a) shares with little-v the property of being a phase head (cf. Chomsky 2000), then we may derive the inability for Q/Wh-Agreement to cross lexical projections. After all, under this assumption, it follows that all the material inside a lexical projection is in a separate Spell-Out domain from any material outside the lexical projection (cf. Chomsky 2000). Furthermore, under the standard formulation of the 'Phase Impenetrability Condition' (PIC), syntactic operations like Agree cannot apply to heads within separate Spell-Out domains (cf. Chomsky 2000).[36] Thus, under these assumptions, no material inside a lexical projection can undergo Agreement with any head outside that lexical projection. Consequently, we predict that Agreement between a Q-particle and a wh-word buried inside a lexical projection should be impossible. The following illustrates.

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[36] Note, however, that there is much controversy over the exact nature, and therefore statement, of the PIC. For instance, Bošković (2005) argues that Agreement *can* apply across different Spell-Out domains.

(68)   **Inability for Q/Wh-Agreement to Cross a Lexical Projection**

Agreement Impossible, By Virtue of The PIC
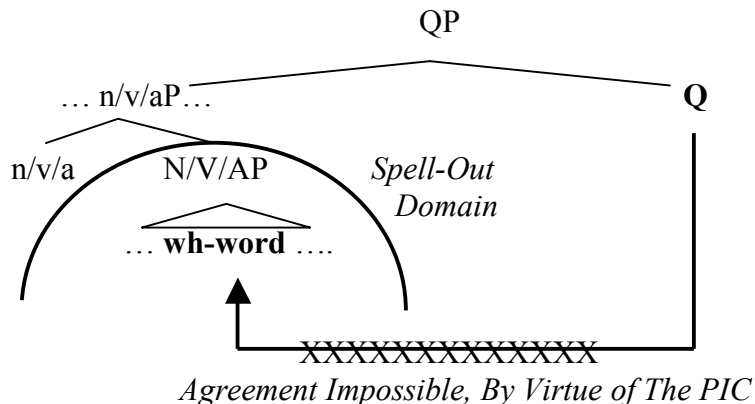
        We therefore see that from the core hypothesis in (66), we predict that Q/Wh-Agreement languages will not allow a lexical projection to intervene between a Q-particle and the wh-word that it binds. Thus, (66) would be sufficient to predict that Q/Wh-Agreement languages will not permit pied-piping past lexical categories. Most importantly, an account based upon (66) is able to derive this prediction without any appeal to the LP-Intervention Condition. Rather, the prediction is seen to follow purely from the sensitivity of Agreement to the PIC. In this way, the phase-based account in (66) provides a theory of limited pied-piping where both its core properties follow from independently known properties of Agreement. Furthermore, we should observe that both these conditions most likely follow from the *same* fundamental property of Agreement: its inability to apply across separate Spell-Out domains. After all, a plausible view regarding the inability for movement/probing/Agreement to cross syntactic islands is that such operations would violate the PIC. Ultimately, then, it is the PIC that accounts for the properties of both pied-piping past islands and pied-piping past lexical categories.

        Besides permitting us to dispose of the stipulative 'LP-Intervention Condition', our account in (66) receives some indirect support from observed variation in the pied-piping of subordinate clauses. First, let us note that pied-piping of subordinate clauses is possible in both Basque and Ancash Quechua, two languages that we can assume are Q/Wh-Agreement languages. In both these languages, however, pied-piped subordinate clauses must possess a particular form. In both Basque and Ancash Quechua, a subordinate clause can only be pied-piped if the pied-piper is fronted into the left-periphery of the subordinate clause (cf. Heck 2004, *inter alia*). Thus, as we see below, neither Basque nor Ancash Quechua permits subordinate clauses to be pied-piped by wh-words internal to the subordinate IPs.

(69)   **Pied-Piping of Subordinate CPs in Basque and Ancash Quechua**

Basque   a.   [$_{CP}$ **Nor**$_1$ [$_{IP}$ joango dela t_1]]$_2$ esan du   Jonek t_2 ?
                           who   go   AUX   said AUX   John
                    Who did John say will go?

              b.   * [$_{CP}$ [$_{IP}$ Joango dela **nor**]]$_2$ esan du   Jonek t_2 ?
                                     go   AUX   who   said AUX   John

Quechua c. [$_{CP}$ **Imata**$_1$ [$_{IP}$ wawa t_1 mikuchun]]$_2$-taj Maria t_2 munan ?
                      what   child   eat   Q   Maria   want
             What does Maria want the child to eat?

          d. * [$_{CP}$ [$_{IP}$ wawa **imata** mikuchun]]$_2$-taj Maria t_2 munan?
                       child   what   eat   Q   Maria   want

As an aside, let us note that this condition also seems to govern putative cases in English of subordinate clause pied-piping (Kayne 2000, Horvath 2007). Consider the following data.

(70) **(Putative) Pied-Piping of Subordinate CPs in English**

      a.   [$_{CP}$ **Who** [$_{IP}$ saw James]]$_1$ do you think t_1 ?

      b.   * [$_{CP}$ [$_{IP}$ James saw **who**]]$_1$ do you think t_1 ?

      c.   * [$_{CP}$ That [$_{IP}$ **who** saw James]]$_1$ do you think t_1 ?

Although it is highly controversial, let us provisionally assume that English sentences like (70a) exhibit clausal pied-piping (Kayne 2000, Horvath 2007). If this analysis is correct, the ill-formedness of (70b) and (70c) reveals that such pied-piping can only occur if the wh-word is fronted to the left-periphery of the subordinate clause, exactly the condition seen in (69) for Basque and Quechua.[37]

If we assume that Basque, Ancash Quechua and English are all Q/Wh-Agreement languages, then the data in (69) and (70) would follow from the inability for Agreement to apply across separate Spell-Out domains. Since C heads are the paradigmatic example of phase heads, each of the ill-formed structures in (69b,d) and (70b,c) would require Q/Wh-Agreement to apply to heads in separate Spell-Out domains, contrary to the PIC. The following structure illustrates.

(71) **No Q/Wh-Agreement Across Complementizer Heads**

Agreement Impossible, By Virtue of The PIC

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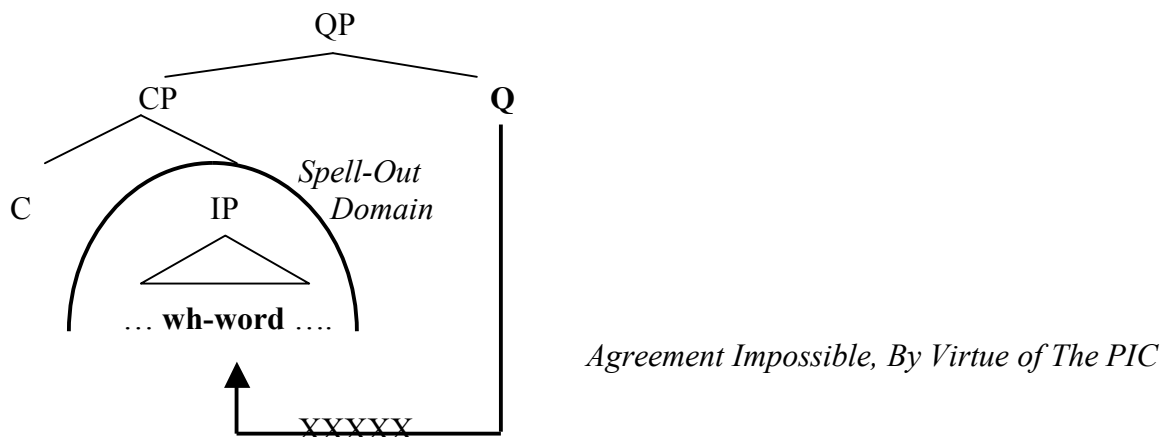
[37] Of course, if the 'clausal pied-piping analysis' of (70a) is ultimately incorrect, then we require some account of the impossibility of clausal pied-piping in English (and other familiar wh-fronting languages). For an approach to this problem, see Chapter 5 of Cable (2007).

Therefore, under these assumptions, the only way in which a Q-particle can Agree with a wh-word buried inside a subordinate CP is if that wh-word moves into the specifier position of the CP, as shown in (72) below.

(72)   **Subordinate CP Pied-Piping is Possible if the Wh-Word is in Spec-CP**

Q/Wh-Agreement Possible!!!
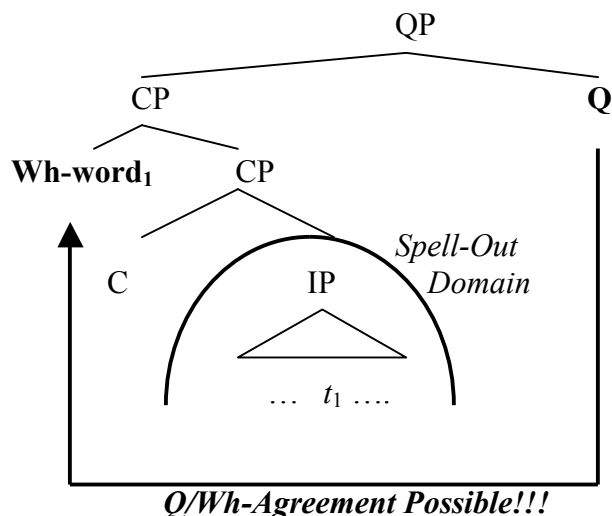
We thus find that (our version of) the PIC correctly predicts that Q/Wh-Agreement languages will only permit pied-piping of subordinate CPs if the pied-pipers occupy SpecCP,

To complete this picture, let us consider those languages where Q-particles and wh-words do *not* obligatorily Agree. Now, because 'clausal pied-piping' is most popularly known from the Q/Wh-Agreement languages Basque and Quechua, it has often been claimed that such pied-piping is *always* subject to the constraint seen in (69) (cf. Heck 2004). Under the proposal advocated here, however, the pattern in (69) is crucially tied to the need for Q-particles and wh-words to Agree in those languages. It follows, of course, that languages where Q-particles and wh-words *don't* Agree are predicted by our system to permit structures like (69b,d). That is, since the so-called 'non-Agreement' languages don't require Q-particles to Agree with wh-words, structures like the following are predicted to be well-formed.

(73)   **Non-Agreement Languages Allow Pied-Piping of CPs by IP-Internal Wh-Words**
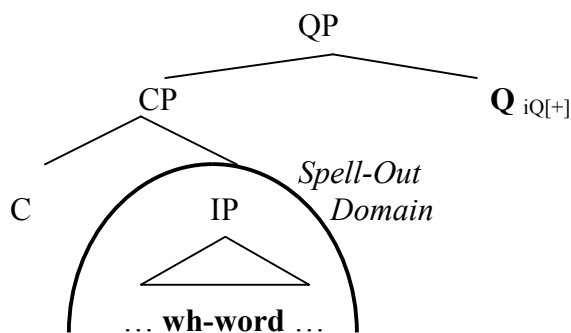
The behavior of clausal pied-piping in Haida supports the accuracy of this prediction.

Following the grammatical description by Enrico (2003), Haida is a non-Agreement language with overt wh-fronting.[38] That Haida is a non-Agreement language can be seen most clearly from the fact that pied-piping past islands is possible. As the following sentences demonstrate, Haida permits pied-pipers to be dominated by (internally headed) relative clauses.

(74)   **Pied-Piping Past Islands in Haida**

   a.   [$_{DP}$ [$_{CP}$ Dang **giisda** tla.adsiisk'yùu]]-.uu   dang   riidang?
                   you   who   will.help   FOC   you   wait.for
           Who are you waiting for that is going to help you?

   b.   [$_{DP}$ [$_{CP}$ **Giisda** raayaa]]-.uu   7aanàa   7iijang?
                   who   be.fat   FOC   in.next.room   is
           Who that is fat is in the next room?   (Enrico 2003; p. 205)

Importantly, subordinate CPs may be pied-piped in Haida by wh-words internal to the subordinate IP. This is evident from sentences like (74a) and (75) below.

(75)   **Non-Left-Peripheral Wh-Word Pied-Piping a CP in Haida**

   [$_{CP}$ k'yuwee **guus**rahl   'la srasgadaan]-.uu   7wii qeeng.ulaang?
       the.door what.with 3Sub strike   FOC   it.is.easy.to.see
   What is it easy to see that he hit the door with?   (Enrico 2003; p. 205)

Thus, the behavior of subordinate clause pied-piping in Haida reveals that the restriction observed in (69) is *not* universal. As predicted by our account, non-Agreement languages allow pied-piping of subordinate CPs even when the pied-piping wh-words are *not* left-peripheral.

        In summary, we have seen that variation in the behavior of 'clausal pied-piping' independently supports the notion that Q/Wh-Agreement is subject to the PIC, a cornerstone assumption of our phase-based account in (66).[39] We may reasonably conclude, then, that the stipulation in (57) can be dispensed with, and its effects derived from a more general theory of the structure of lexical categories. In order to simplify our discussion, however, I will in the remainder of this paper continue to appeal to the stipulation in (57), with the understanding that this is simply 'short-hand' for the network of assumptions laid out in this section.

5.   Further Results Regarding Pied-Piping

Up until now, our discussion has centered on the two core properties of limited pied-piping

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[38] Although Haida does optionally permit wh-words to remain *in-situ* in wh-questions, such sentences necessarily contain the interrogative clitic *gu*, as in the sentence below (Enrico 2003; p. 206).
   (i)   Huu-gu Joe guus taa-gaa?
           there-Q Joe what eat-EVID
           What did Joe eat?   (Enrico 2003; p. 206)
Thus, we can be certain that the sentences in (74) and (75) indeed contain overt pied-piping, given that they lack any instance of the interrogative clitic (cf. Enrico 2003; pp. 203 – 207).
[39] However, see Cable (2007, Chapter 5) for a discussion of a potential empirical problem facing the account in (66).

languages, the inability to pied-pipe past islands and the inability to pied-pipe past lexical categories. In this section, I will enumerate some further predictions of our Q-based theory of pied-piping structures. In some cases, these predictions are fully general, and are expected to hold of all wh-fronting languages. In other cases, we will see that our system (correctly) makes different predictions for Q/Wh-Agreement and non-Agreement languages.

I begin in Section 5.1 by demonstrating that our theory of pied-piping is able to derive the 'Transitivity Generalization' of Heck (2004, 2007). Then, in Section 5.2, I show that that our account predicts the inability for matrix predicates to be pied-piped. Section 5.3 presents our discussion of the relationship between pied-piping and left-peripherality. Next, in Section 5.4, I show that our Q-based account correctly predicts that pied-piping should generally be in free variation with sub-extraction of the wh-word. Finally, Section 5.5 demonstrates how our Q-based account can capture the fact that limited pied-piping is subject to the Coordinate Structure Constraint.

5.1   The Transitivity Generalization

In his cross-linguistic study of pied-piping, Heck (2004, 2007) argues that pied-piping obeys the following generalization across all natural languages.

(76)   **Transitivity (Heck 2004, 2007)**

If A can pied-pipe B, and B is in a canonical position to pied-pipe C, then A can pied-pipe C.

This property of pied-piping is nicely exemplified by possessor pied-piping in English. As is well-known, possessors can pied-pipe possessive DPs in English.

(77)   **Transitivity of Pied-Piping: English Possessors**

[$_{DP}$ **Whose** father] did you meet at the party?

Furthermore, if a possessive DP containing a wh-possessor is *itself* a possessor, then the larger possessive DP can also be pied-piped by the wh-possessor.

(78)   **Transitivity of Pied-Piping: English Possessors**

[$_{DP}$ [$_{DP}$ **Whose** father's] friend] did you meet at the party?

This process of embedding may, of course, be further iterated, and there seems to be no principled limit on the depth of embedding.

(79)   **Transitivity of Pied-Piping: English Possessors**

[$_{DP}$ [$_{DP}$ [$_{DP}$ [$_{DP}$ [$_{DP}$ **whose**] father's] friend's] uncle]] did you meet at the party?

As shown by Heck (2004), this property of Transitivity can also be seen in PP-pied-

piping. It is most easily observed in languages where pied-piping of PPs is obligatory, such as German. In German, the complement of P can pied-pipe the PP in which it is contained, as illustrated below.

(80)   **Transitivity of Pied-Piping: German PPs**

Ich frage   mich [CP [PP mit **wem**] sie gesprochen hat].
I   ask   myself   with whom   she spoken   has
I wonder who she has spoken with.   (Heck 2004; p. 126)

Moreover, if a PP containing a wh-complement is itself the complement of a larger PP, then the larger PP may also be pied-piped by the wh-word. Such embedding can be further iterated, and there again seems to be no principled limit on the depth.

(81)   **Transitivity of Pied-Piping: German PPs**

Fritz   will   wissen [CP [PP bis [PP zu [DP **welchem** Punkt]]] er gehen kann].
Fritz   wants to.know   until to   which   point   he to.go can
Fritz wants to know until which point he can go to.   (Heck 2004; p. 126)

Thus far, we've seen that possessor DPs can pied-pipe larger possessor phrases, and that complements of P can pied-pipe lager PP complements. Finally, just as we would expect from the general statement in (76), this property of Transitity is not sensitive to the *exact* position of the pied-piping phrase. That is, possessor DPs can also pied-pipe larger PP complements, as we see below.

(82)   **Transitivity of Pied-Piping: German PPs and Possessors**

Ich frage   mich [CP [PP bis [PP zu [DP **wessen** Geburtstag]]] ich warten muss].
I   ask   myself   until to   whose   birthday   I   to.wait must
I wonder whose birthday I have to wait until.   (Heck 2004; p. 127)

Let us now confirm that our Q-based theory of pied-piping can predict the Transitivity Generalization in (76). First, recall that within our theory of pied-piping structures, the informal notion that 'A can pied-pipe B' amounts more precisely to the claim that 'A can be dominated by B in the fronted phrase of a pied-piping structure'. With this in mind, we restate the Transitivity generalization in (76) so that it reads as in (83), below.

(83)   **Transitivity, Within the Q-Based Theory**

If A can be dominated by B in the fronted phrase of a pied-piping structure, and B can be dominated by C in the fronted phrase of a pied-piping structure, then A can be dominated by C in the fronted phrase of a pied-piping structure.

Within our Q-based account, it trivially follows that the non-Agreement languages will satisfy (83). Informally speaking, since there are no limits on the 'distance' between the Q-

particle and the wh-word in such languages, the mere fact that 'B can pied-pipe C' entails that 'A can pied-pipe C'. The following structure illustrates.

(84)   **Transitivity in Non-Agreement Languages**
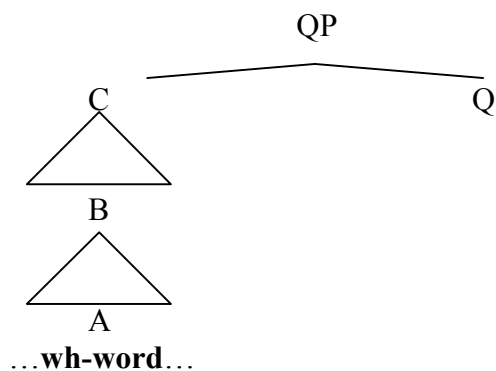
More precisely, as we will see in greater detail throughout the remainder of this section, the only time a non-Agreement language disallows a node X from being dominated by a node Y in the fronted phrase of a pied-piping structure is when the node Y is not a permissible sister to the Q-particle. Thus, suppose that B can be dominated by C in the fronted phrase of a pied-piping structure. It follows that C is a legitimate sister of the Q-particle. Consequently, it also follows that *A* can be dominated by C in the fronted phrase of the pied-piping structure. In this way, our Q-based theory predicts that non-Agreement languages will satisfy the generalization in (83).

Finally, let us confirm that our Q-based theory predicts that the Q/Wh-Agreement languages will also satisfy the generalization in (83). As we will presently see, our account derives the Transitivity Generalization for Q/Wh-Agreement languages from the basic transitivity of accessibility for Agreement (cf. Heck 2004, 2007).

First, note that if a wh-word at position A can be dominated by B in the fronted phrase of a pied-piping structure, then it follows that there is no 'barrier' to Q/Wh-Agreement within the constituent B (i.e., B contains no islands and no lexical projections). This is illustrated below.

(85)   **Transitivity in The Q/Wh-Agreement Languages, Part 1**

*Wh-word at position A can pied-pipe the larger phrase B.*
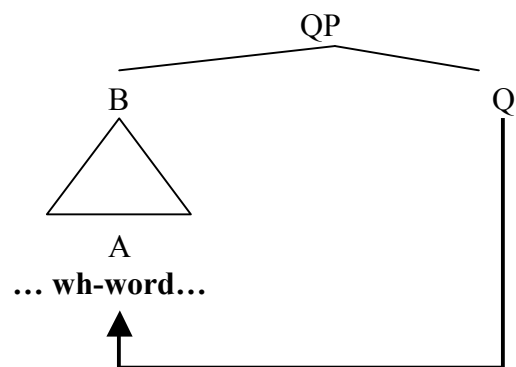
Agreement Possible; Thus, No 'Barriers' to Q/Wh-Agreement Within B

Similarly, if a wh-word at position B can be dominated by C in the fronted phrase, then it follows that there are no 'barriers' to Q/Wh-Agreement within the constituent C (i.e., no islands, and no lexical projections).

(86) **Transitivity in The Q/Wh-Agreement Languages, Part 2**

Wh-word at position B can pied-pipe the larger phrase C.

Agreement Possible; Thus, No 'Barriers' to Q/Wh-Agreement Within C
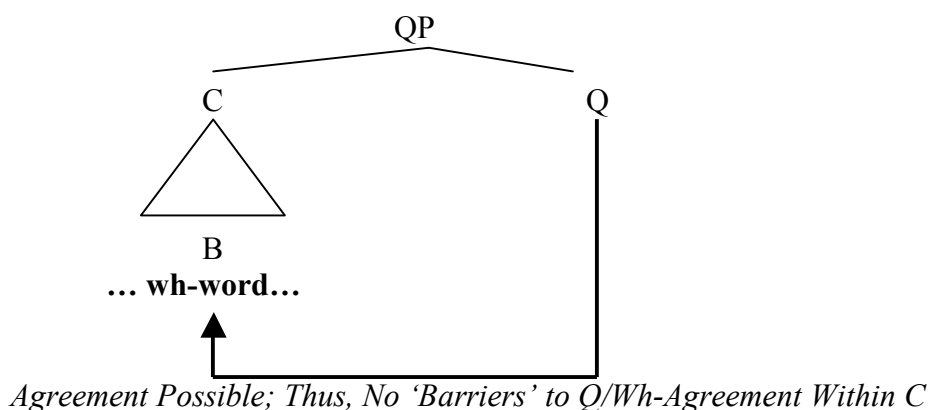
Finally, given that there are no barriers to Q/Wh-Agreement within either B or C, it follows that no such barriers would separate a wh-word at position A from a Q-particle that is sister to the phrase C. Therefore, in even a Q/Wh-Agreement language, it should be possible for A to be dominated by C within the fronted phrase of a pied-piping structure.

(87) **Transitivity in The Q/Wh-Agreement Languages, Part 3**
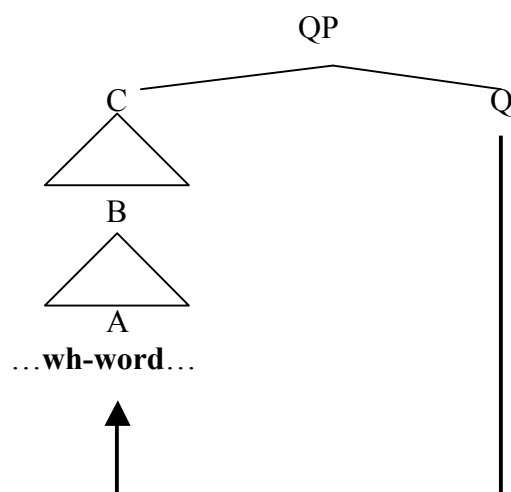
No 'Barriers' Inside either C or B; Therefore, Agreement between Q and wh-word is Possible!!!

In summary, then, we find that our Q-based theory of pied-piping correctly predicts that all languages should exhibit the Transitivity Generalization in (76)/(83), even those languages where pied-piping is otherwise subject to rather stringent locality conditions.

5.2   The Inability to Pied-Pipe Matrix VPs and Other Predicates

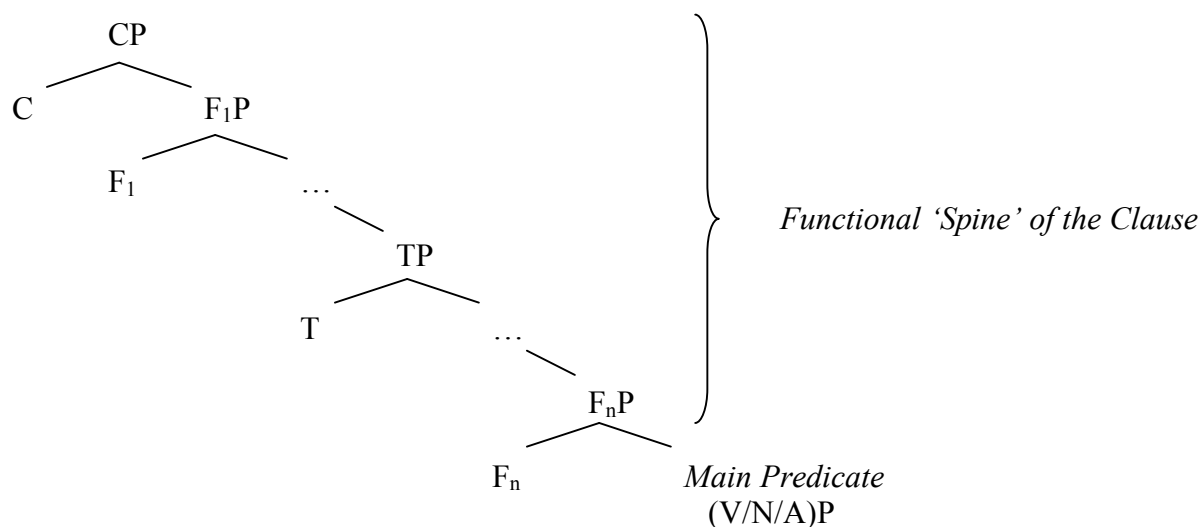A second general prediction of our Q-based theory of pied-piping is that *no* language should permit pied-piping of matrix predicates. That is, in all languages – even the non-Agreement languages – it will not be possible within a CP for a wh-word within the fronted phrase of the CP to be dominated by the main predicate of the CP.

This result ultimately follows from our QP-Intervention Condition. To see this, let us first consider the following, commonly-held picture concerning the architecture of any given clause.

(88)   **Universal Clausal Architecture**

```
        CP
       /  \
      C    F₁P
          /  \
        F₁    …
                \
                 TP
                /  \
               T    …
                      \
                      FₙP
                     /  \
                   Fₙ    Main Predicate
                          (V/N/A)P
```

Functional 'Spine' of the Clause

Under this familiar picture, the main predicate of the clause is dominated by a variety of functional projections (F_1P … F_nP), at the very least CP and TP. Naturally, it assumed that any given functional head F_i along the 'functional spine' of the clause selects for its complement. Thus, at the very least the T head of the TP projection selects for the main predicate, while the C head of the CP projection selects for the TP.

With this picture as background, let us now suppose that within some clause C, a wh-word is dominated by the main predicate of C within the fronted phrase of C. The following structure illustrates.

(89) **No Pied-Piping of Main Predicates**
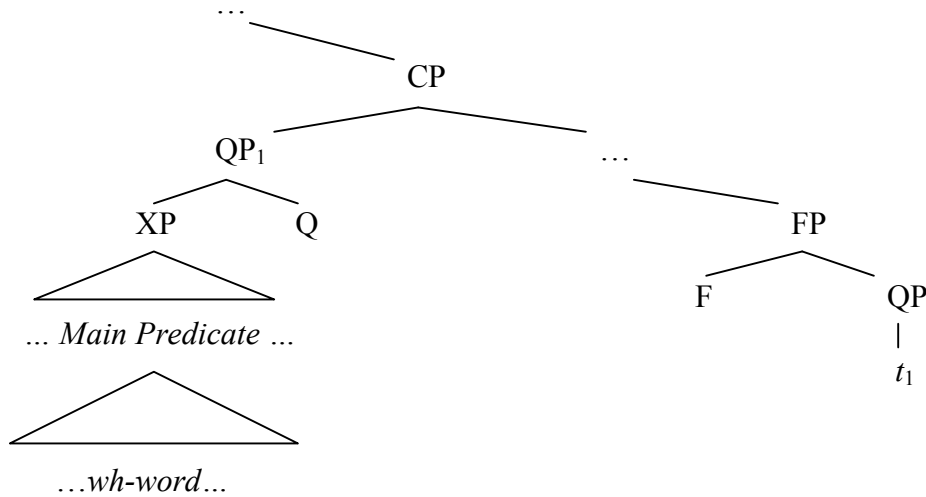
Now, since the wh-word is dominated by the main predicate of C within (89), it follows from the assumptions in (88) that the XP sister of Q is either the main predicate itself, or some projection F_iP from along the 'functional spine' of the clause. Furthermore, the picture in (88) also entails that prior to movement, the fronted phrase occupies a base position as sister to some functional head F_j along the 'functional spine' of the clause. Finally, our classic assumptions hold that this head F_j selects for the XP sister of the Q-particle in (89).

From these consequences, it further follows that the structure in (89) is ill-formed. Because the language in question is by *ex hypothesi* a wh-fronting language, it follows under our Q-based theory in (9) that the fronted phrase in (89) is a QP. Therefore, a QP-projection must intervene between the XP sister of Q and the F_j head that is sister to the base-position of the fronted phrase. Finally, because F_j is a functional head, and selects for XP, it follows that the hypothetical configuration violates the QP-Intervention Condition in (21). Thus, our account predicts that the pied-piping seen in (89) will be impossible. Note that, since no assumptions have been made concerning Q/Wh-Agreement, it follows that we predict such pied-piping structures to be impossible in *all* wh-fronting languages.

The argument above demonstrates that our system predicts that no language will permit the wh-fronted phrase of a clause C to contain the main predicate of C. That this is indeed a correct prediction has been widely accepted in the prior literature on pied-piping (cf. Heck 2004, 2007). For example, the following data illustrate the truth of this prediction for English, and similar data can be observed in all the best-studied wh-fronting languages.

(90) **No Pied-Piping of Main Predicates in English**

a. * [$_{QP}$ [$_{VP}$ Eaten **what**] **Q**] have you?

b. * [$_{QP}$ [$_{AP}$ Proud of **whom**] **Q**] are you?

c. * [$_{QP}$ [$_{DP}$ A doctor of **what**] **Q**] is he?

53

Of course, the reader might note that each of the structures in (90) independently violates the condition in English against pied-piping past lexical categories. Importantly, however, pied-piping of matrix predicates is *also* impossible in non-Agreement languages, like Tlingit, which in principle allow for pied-piping past lexical categories. This can be seen from contrasts like the following.[40]

(91)   **No Pied-Piping of Main Predicates in Tlingit**

    a.   [$_{CP}$ [$_{QP}$ **Daa**   **sá**]$_1$ [$_{TP}$ a<u>x</u> éesh [$_{VP}$ t_1 aawa<u>x</u>áa]]] ?
                what   Q   my father   ate
        What did my father eat?

    b.   * [$_{CP}$ [$_{QP}$ [$_{VP}$ **Daa** aawa<u>x</u>áa] **sá**]$_1$ [$_{TP}$ a<u>x</u> éesh t_1]] ?
                  what   ate   Q   my father

We find, then, that the generalization we predict above is indeed true; *no* wh-fronting language allows pied-piping of main predicates.

    It is instructive to compare our Q-based theory of this generalization to the account put forth by Heck (2004, 2007). Under that account, the impossibility of the structures above follows from an assumption that pied-piping is a 'last resort' operation, which can only occur when sub-extraction of the wh-word is impossible. According to the logic of that account, because the complements of main predicates can always be extracted, pied-piping of those predicates is universally ruled out. In other words, pied-piping of main predicates is ill-formed because the 'simpler' option of extracting the complement of the predicate is always possible.

    Unfortunately, this straightforward account rests upon a highly controversial assumption: the notion that pied-piping is a 'last resort'. We will later argue in Section 5.4 that, contrary to the theory of Heck (2004, 2007), pied-piping often freely co-varies with sub-extraction of the wh-word. Although we will see more examples of this later, one rather acutely problematic case is the pied-piping of subordinate clauses. In the languages where pied-piping of subordinate clauses is possible – e.g., Basque, Quechua and Tlingit – such structures can freely alternate with long-distance extraction of the wh-word. This is illustrated for each of these languages below.

(92)   **Free Variation of Long-Distance Movement and CP-Pied-Piping in Tlingit**

    a.   [$_{QP}$ [$_{PP}$ **Goo**déi   **sá**]]$_1$ has uwajée   [$_{CP}$ t_1 woogoot<u>x</u>]   i   shagóonich ?
              where.to Q   they.think   he.went   your parents.erg
        Where do your parents think he went?

    b.   [$_{QP}$ [$_{CP}$ **Goo**déi   woogoot<u>x</u> **sá**]]$_1$ has uwajée t_1 i   shagóonich ?
              where.to   he.went   Q   they.think   your parents.erg
        Where do your parents think he went?

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[40] See Cable (2007, to appear) for a richer discussion of the impossibility in Tlingit of pied-piping main predicates. Note that this condition was actually already mentioned earlier in (17), under the description that 'the Q-particle *sá* cannot c-command a matrix predicate'.

(93)   **Free Variation of Long-Distance Movement and CP-Pied-Piping in Basque**

    a.   **Se$_1$**   pentzate su   [$_{CP}$ t_1 idatzi rabela Jonek] ?
          what   you.think   written   has   Jon.erg
          What do you think Jon wrote?   (Arregi 2003b; p. 117)

    b.   [$_{CP}$ **Se**   idatzi rabela Jonek]$_1$ pentzate su t_1 ?
              what written has   Jon.erg   you.think
          What do you think Jon wrote?   (Arregi 2003; p. 118)

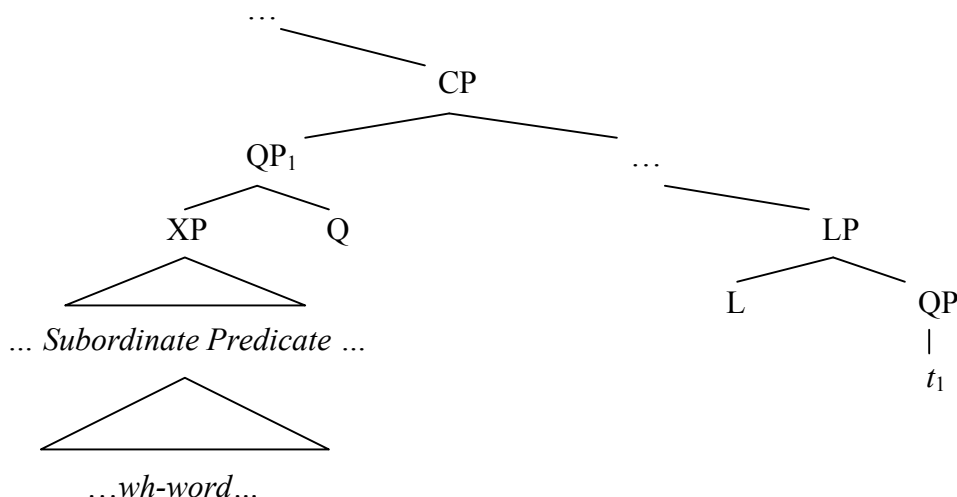(94)   **Free Variation of Long-Distance Movement and CP-Pied-Piping in Quechua**

    a.   [**Ima**-ta]$_1$-taj Maria-ka   [$_{CP}$ Juzi t_1 mikushka]-ta   krin ?
            what-ACC Q   Maria-TOP   José   ate-ACC   believes
          What does Maria believe that José ate?   (Cole & Hermon 1981)

    b.   [$_{CP}$ **Ima**-ta   wawa mikuchun]-taj Maria kri?
              what-ACC   child   ate   Q   Maria believes
          What does Maria believe that the child ate?   (Cole & Hermon 1981)

Consider, then, what the theory of Heck (2004, 2007) predicts regarding pied-piping of subordinate CPs in each of these languages. As is clear from (92a), (93a) and (94a), each of these languages permits sub-extraction of wh-words from within subordinate CPs. Given that such sub-extraction is possible, the assumption that pied-piping is generally a last resort operation would predict that pied-piping of the subordinate CPs should be impossible.[41] That is, Heck (2004, 2007) predicts that pied-piping of subordinate predicates in Tlingit should be as ill-formed as the pied-piping of matrix predicates in (91). As we can see from (92b), (93b) and (94b), however, this prediction is incorrect. Contrary to the predictions of Heck (2004, 2007), pied-piping of subordinate predicates is *not* blocked by long-distance extraction. Thus, we see that unlike matrix predicates, the pied-piping of subordinate predicates is sometimes possible.

    Importantly, this observed contrast between pied-piping of matrix and subordinate predicates *is* correctly predicted by our Q-based theory. To see this, let us suppose that within some clause C, a wh-word is dominated by a subordinate predicate of C within the fronted phrase of C. The following structure illustrates.

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[41] As we will later discuss, Heck (2004) is well-aware of the problem that such cases of apparently optional pied-piping raise for his general theory. In principle, a proponent of Heck's account could attempt to analyze the clausal pied-piping structures in (92)-(94) as cases of so-called 'massive pied-piping', an exceptional class of pied-piping structures that Heck (2004) predicts to exhibit optionality. Unfortunately, the exact treatment of 'massive pied-piping' developed by Heck (2004; Chapter 4, Section 4.3.5) would preclude such an analysis of (92)-(94), but this would be one general avenue for a proponent of Heck (2004) to explore.

(95)   **Pied-Piping of Subordinate Predicates is Sometimes Possible**

```
...
   \
    CP
   /  \
 QP₁    ...
 / \       \
XP   Q      LP
            / \
           L   QP
               |
               t₁
```

... *Subordinate Predicate* ...

…*wh-word*…

As we see above, the hypothesized structure *could* be such that the base position of the QP is sister to a *lexical* head L. Indeed, in each of the well-formed (92b), (93b) and (94b), the fronted phrase moves from a position where it is sister to a V. Because the sister to the QP is a lexical head, it follows that the interposition of the QP between L and the XP that it selects for does *not* violate the QP-Intervention Condition in (21). Finally, because there are no other principles that structures like (95) potentially violate, we predict them to be well-formed. Thus, our Q-based theory correctly predicts that pied-piping of subordinate predicates can in some cases be possible, particularly when the base position of the fronted phrase is sister to a lexical head, such as the main verb of the clause.

In summary, then, we find that our Q-based theory of pied-piping correctly predicts the observed contrast between the pied-piping of matrix and subordinate predicates. Although pied-piping of subordinate predicates is possible in some languages, *no* language permits pied-piping of matrix predicates.

5.3   The Relationship Between Pied-Piping and the Left Edge

In Section 4.3.1, we briefly noted that a potential advantage of our Q-based theory of pied-piping is that it does not predict that pied-piping is only possible from left-peripheral specifiers. Consequently, the ability for wh-words in CompPP to pied-pipe the larger PP presents no *prima facie* challenge to our theory. In this section, we will elaborate upon this point in detail.

Let us begin by noting that our Q-based account employs exactly the same mechanisms to derive pied-piping by specifiers and pied-piping by complements of P. That is, the analysis of pied-piping structures where the wh-word occupies a specifier position appeals to no notions beyond those appealed to in the analysis of pied-piping structures where the wh-word occupies CompPP, and *vice versa.*

This 'analytic uniformity' does not, however, hold for most other theories of pied-piping (e.g. Sells 1985, Cowper 1987, Kayne 1994, Koopman 1997, Grimshaw 2000, Koopman & Szabolcsi 2000). Under most other accounts, pied-piping by wh-words in CompPP employs mechanisms not required for pied-piping by specifiers. For example, under analyses like Kayne

(1994) and Koopman (1997), it is only specifiers that can truly pied-pipe. Consequently, special assumptions must be introduced regarding the covert syntax of adpositional phrases, so that what appear overtly to be pied-pipers in CompPP are covertly in SpecPP. Similarly, Grimshaw (2000) proposes that complements of P can pied-pipe PP because adpositions are 'extended projections' of D, and so can inherit the wh-feature of their complements via normal feature projection. However, since Grimshaw's system assumes that a given phrase can never be an extended projection of its specifier, it follows that some other mechanism (i.e., Spec-Head Agreement) must be responsible for pied-piping of a phrase by its specifier. However, despite this tendency for theories of pied-piping to treat pied-piping by CompPP via mechanisms different from those used in pied-piping by specifiers, there is simply no evidence that these two cases of pied-piping do involve distinct mechanisms.

On the other hand, the tendency to treat pied-pipers in CompPP as exceptional does have some potential merit. Indeed, it is largely *by design* that earlier accounts categorize pied-piping by CompPP as a distinct phenomenon from pied-piping by specifiers. Such accounts generally seek to predict that, aside from CompPP, all pied-pipers must occupy left peripheral specifier positions. Importantly, this prediction is *in fact true*, at least for the Q/Wh-Agreement languages. As is clear from the cross-linguistic studies of Heck (2004, 2007) and Horvath (2007), in the Q/Wh-Agreement languages, it *is* the case that P is the only category that permits pied-piping from its complement. In all cases but pied-piping of PP, a pied-piping wh-word must occupy a left-peripheral specifier position. Given this tendency, which Heck (2004, 2007) dubs the 'Edge Generalization', we must therefore question whether our uniform treatment of pied-piping is in fact accurate. Does our Q-based theory of pied-piping actually fail to capture an important property of pied-piping by failing to explicitly limit pied-piping to left-peripheral specifiers?

In fact, it does not. Rather, there is under our Q-based account a quite straightforward explanation for the observed tendency in Q/Wh-Agreement languages for pied-pipers to be specifiers. Under our account, this tendency follows from the fact that *P happens to be the only functional category that directly takes interrogative words as complements*.

To see this more clearly, let us first consider the class of functional categories, which we might reasonably assume to be the following: C, I, D, Deg, P. [42] Now, consider the class of wh-words, which we might reasonably assume to be represented by the following English items: *who, what, which, where, why, how*. Placing these two sets side-by-side, we easily observe that the only member from the first set that can take as complement a member of the second set is the category P. It follows, then, that if a wh-word ever occupies a complement position, and is *not* complement to P, then it must be complement to some lexical head. Recall, though, that in the Q/Wh-Agreement languages, pied-piping past lexical projections is impossible. Consequently, in those languages, any wh-word that is complement to a category other than P will not be able to pied-pipe. We see, then, that our theory correctly predicts that, for the Q/Wh-Agreement languages, it is only PPs that may be pied-piped from their complement position.

In short, the reason why so many pied-pipers are specifiers (in the Q/Wh-Agreement languages) is not that there is some special importance of the specifier position *per se*. Rather, this tendency simply follows from the twin facts that (i) these languages only permit pied-piping past *functional* categories, and (ii) there is only one functional category, P, where a wh-word can occupy the complement position. Consequently, for the Q/Wh-Agreement languages, if the wh-

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[42] To my knowledge, all other purported functional heads (e.g., Foc, Agr, Num, Loc) are a result of 'exploding' the four basic functional categories listed above.

word of a pied-piping structure is ever contained within a phrase other than PP, it must be within the specifier of that phrase. For this reason, in the grand majority of pied-piping structures (in the Q/Wh-Agreement languages), the wh-word will be a left-peripheral specifier.

In summary, while our Q-based theory *does* correctly predict that pied-pipers in the Q/Wh-Agreement languages will almost always occupy specifier positions (Heck 2004, 2007), it does *not* derive this tendency by banning pied-piping from complement position. Rather, this generalization emerges as an epiphenomenal consequence of the independent fact that P is just the only functional head to take wh-words as complements. Thus, our Q-based theory correctly predicts the tendency for pied-pipers in Q/Wh-Agreement languages to be specifiers without receiving any *prima facie* challenge from the widespread possibility of PP-pied-piping.

5.4   The Optionality of Pied-Piping

One important result of our Q-based theory of pied-piping is that it correctly predicts that pied-piping of a phrase XP by a wh-word W will generally be in free variation with sub-extraction of W from inside XP.

To help unpack this claim, let us first note that nothing within our Q-based theory requires that a Q-particle be 'as close as possible' to the wh-word that it binds. Suppose that a wh-word is contained within a structure XP, which is in turn contained within a larger structure YP, as illustrated below.

(96)   **Optionality of Pied-Piping in Proposed Analysis**
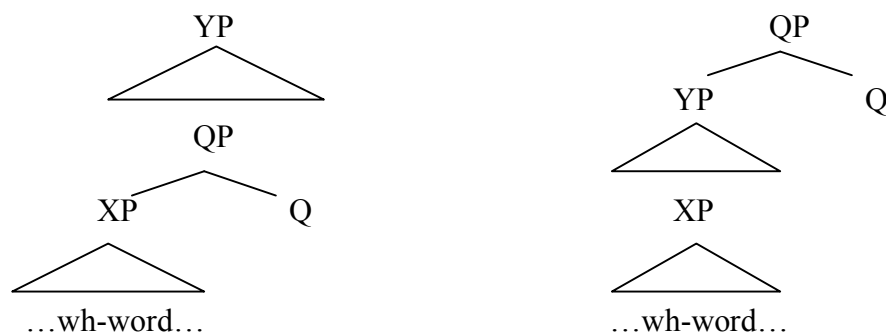
Moreover, let us suppose that neither XP nor YP contain any barriers to Q/Wh-Agreement. Finally, let us suppose that placement of Q as sister to either XP or YP would not violate the QP-Intervention Condition. Under these conditions, our Q-based theory licenses *both* the structures in (96). That is, placement of Q as sister to XP is predicted to be as well-formed as placement of Q as sister to the larger structure YP. In this sense, our theory permits Q-particles to be either closer or farther from the wh-word; there is no predicted requirement that Q-particles be maximally close to the wh-words they c-command.

Given our Q-based theory of wh-fronting in (9), the general well-formedness of both structures in (96) entails that pied-piping of a larger phrase YP and sub-extraction from within YP should be freely alternating options. That is, under our Q-based account, the mere ability to extract an XP from within some constituent YP does not alone entail that pied-piping of a larger constituent YP containing XP should not be possible. Pied-piping and sub-extraction are predicted to generally occur in free variation with one another.

This prediction indeed appears to be correct. Heck (2004) surveys a number of pied-piping constructions, the majority of which appear to optionally co-vary with sub-extraction of the wh-word. The following is a representative list of some of the constructions where the choice between pied-piping and sub-extraction appears to be entirely free.

(97)   **P-Stranding vs. PP-Pied-Piping in Icelandic (Heck 2004; p. 153) [43]**

    a.   Ég velti því fyrir mér [**hvern**$_1$ thú talaðir [$_{PP}$ við t_1]].
        I roll it before me who you talked with
        I wonder who you talked with.

    b.   Ég velti því fyrir mér [[$_{PP}$ við **hvern**] thú talaðir].
        I roll it before me with who you talked
        I wonder who you talked with.

(98)   **P-Stranding vs. PP-Pied-Piping in German and Dutch (Heck 2004; p. 184)**

    a.   Fritz möchte wissen [**wo**$_1$ du [$_{PP}$ t_1 mit] gerechnet hast].
        Fritz wants to.know what you with counted have
        Fritz wants to know what you expected (to happen).

    b.   Fritz möchte wissen [[$_{PP}$ **wo**-mit] du gerechnet hast].
        Fritz wants to.know what-with you counted have
        Fritz wants to know what you expected (to happen).

(99)   **P-Stranding vs. PP-Pied-Piping in Irish (Heck 2004; p. 301 - 303) [44]**

    a.   **Cé**$_1$ a raibh tú ag caint [$_{PP}$ t_1 leis]?
        who C were you at talking with
        Who were you talking with?

    b.   [$_{PP}$ **Cé** leis] a raibh tú ag caint?
        who with C were you at talking
        Who were you talking with?

---

[43] Of course, the reader might at this stage wonder how the possibility of P-stranding in (97)-(99) - not to mention English - is possible under our Q-based account in (9). After all, following the 'QP-Intervention Condition' in (21), all the P-stranding structures in (97)-(99) should be ill-formed. Note that the same problem applies for the possessor-extraction and D-extraction examples that follow in (100) - (105).

    This important issue is tackled at length by Cable (2007), who proposes analyses of P-stranding and left-branch extractions whereby they actually satisfy the QP-Intervnetion Condition in the languages where they are acceptable. I refer the reader to Cable (2007; Chapter 4) for the full account.

[44] The reader may observe that in both German (446) and Irish (447), there is some kind of inversion between the wh-word and the preposition when the PP is pied-piped. Our Q-based account has no special explanation of this inversion. Note, however, that the example of Icelandic in (97) demonstrates that the optionality of PP-pied-piping is not necessarily tied to such inversion.

(100) **DP Splits in German [and Other Germanic Languages] (Heck 2004; p.185)**

    a.   Fritz möchte wissen [**was**$_1$ du [$_{DP}$ t_1 für Leute] eingeladen hast].
           Fritz wants to.know what you   for people invited have
           Fritz wants to know what kind of people you have invited.

    b.   Fritz möchte wissen [[$_{DP}$ **was** für Leute] du eingeladen hast].
           Fritz wants to.know   what for people you invited have
           Fritz wants to know what kind of people you have invited.

(101) **DP-Splits in French [and Other Romance Languages] (Heck 2004; p. 186)**

    a.   **Combien**$_1$ Marie a décidé d'engager [$_{DP}$ t_1 de personnes] ?
           how.many Mary has decided to.employ   of persons
           How many people has Mary decided to employ?

    b.   [$_{DP}$ **Combien** de personnes] Marie a décidé d'engager ?
             how.many of persons   Mary has decided to.employ
           How many people has Mary decided to employ?

(102) **DP-Splits in Russian [and Other Slavic Languages] (Heck 2004; p.187)**

    a.   Ja sprosil [**čju**$_1$ ty cital [$_{DP}$ t_1 knigu]]
           I asked   whose you read   book
           I asked whose book you read.

    b.   Ja sprosil [[$_{DP}$ **čju** knigu] ty cital]
           I asked   whose book you read
           I asked whose book you read.

(103) **DP-Splits in Greek (Heck 2004; p.187)**

    a.   Anarotieme [**tinos**$_1$ echis diavasi [$_{DP}$ t_1 vivlio]].
           I.wonder   whose you.have read   book
           I wonder whose book you have read.

    b.   Anarotieme [[$_{DP}$ **tinos** vivlio] echis diavasi].
           I.wonder   whose book you.have read
           I wonder whose book you have read.

(104) **DP-Splits in Mohawk (Heck 2004; p.187)**

    a.   **Ka nikáyΛ**$_1$ íhsere'   ahshnínu' ne [$_{DP}$ t_1 ká'sere] ?
        which   you.think you.buy NE   car
        Which car do you want to buy?

    b.   [$_{DP}$ **Ka nikáyΛ** ká'sere] íhsere'   ahshnínu' ?
             which   car   you.think you.buy
        Which car do you want to buy?

(105) **DegP-Splits in German [and Other Germanic Languages] (Heck 2004; p.188)**

    a.   Ich frage mich   [[**wieviel**   Grade]$_1$ der Ofen [$_{DegP}$ t_1 zu heiss] war].
        I   ask   myself   how.many degrees the oven   too hot   was
        I wonder how many degrees too hot the oven was.

    b.   Ich frage mich   [[$_{DegP}$ **wieviel**   Grade zu heiss] der Ofen war].
        I   ask   myself   how.many degrees too hot the oven was
        I wonder how many degrees to hot the over was.

In addition to these cases, we might also note optionality of clausal pied-piping in Tlingit, Quechua and Basque, illustrated earlier under (92) – (94).

    In each of the sentence pairs in (97) – (105), we find that sub-extraction of the wh-word in the (a)-sentence exists side-by-side with pied-piping of a larger structure in the (b)-sentence. Therefore, we may conclude that there is no general prohibition against pied-piping a larger structure XP when a smaller phrase within XP can be sub-extracted. Thus, our Q-based analysis correctly predicts that pied-piping is *not* a 'last resort' operation, but rather a freely available option (where consistent with independent constraints).

    On the other hand, some researchers have proposed that, contrary to the prediction of our Q-based account, pied-piping *is* indeed a kind of 'last resort' repair operation (Heck 2004, 2007). Under this perspective, pied-piping of a larger constituent XP can *only* occur when sub-extraction of the wh-word from inside XP is impossible. Such accounts therefore predict that pied-piping should *not* be in free variation with sub-extraction; rather the two should appear to be in complementary distribution.

    The principal evidence supporting this opposing view is the relative marginality of PP pied-piping in English and Danish, two languages where P-stranding is possible.[45] The

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[45] Heck (2004) also puts forth a number of other arguments in favor of pied-piping being a 'last resort' operation (Heck 2004; pp. 149 – 174). However, each of these allows an alternative explanation.

    First, Heck (2004; pp. 157 – 165) notes that the universal inability to pied-pipe matrix predicates follows from pied-piping being a last-resort, since sub-extraction from within a predicate is always possible. However, we've already seen that this generalization also follows from the QP-Intervention Condition (cf. Section 5.2). Heck notes that the quantifier *alle* 'all' cannot be pied-piped by German wh-words, and that this might follow from the fact that *alle* can be stranded (Heck 2004; pp. 165 – 167). However, this also might well be because such elements are adverbs rather than adnominal quantifiers (Fitzpatrick 2006); such an adverbial analysis would account for the ordering restrictions that Heck observes when the wh-phrases are in-situ (Heck 2004; p. 167). Heck similarly notes that adjectival/adverbial modifiers of German wh-words cannot be pied-piped, and instead must be stranded (Heck 2004; pp. 168 – 171). However, the data seem to show that such elements *never* form constituents with the wh-

following data illustrate.

(106) **P-Stranding vs. PP-Pied-Piping in English**

    a.   I wonder [**who** she left [PP with t_1]] ?

    b.   *(?) I wonder [[PP with **who**] she left] ?

(107) **P-Stranding vs. PP-Pied-Piping in Danish (Heck 2004; p. 151)**

    a.   Jag gad vide [**hvem**$_1$ du har snakket [PP med t_1]] ?
            I would know who you have spoken with
            I wonder who you spoke with.

    b.   * Jag gad vide [[PP med **hvem**$_1$] du har snakket] ?
            I would know with who you have spoken

Under the competing assumption that pied-piping of an XP can only occur when sub-extraction from within XP is impossible, these facts follow straightforwardly. Thus, it seems that the behavior of PP-pied-piping in two of the best-known P-stranding languages suggests that pied-piping is *not* a freely available option, and can only occur when sub-extraction is ruled out.

On the other hand, we should note that, when viewed together with the data from (97) – (105), the data in (106) and (107) appear to be exceptional, and not indicative of the general pattern. Rather, the general pattern does appear to be that sub-extraction and pied-piping are in free variation with one another. Of course, an account still must be offered for the exceptional behavior of P-stranding in English and Danish, an analysis that would render it consistent with our Q-based approach to pied-piping structures. Although such an account is developed by Cable (2007), for reasons of space, I will not pursue that task in this paper. For our purposes here, it is sufficient to note that the apparent tendency for pied-piping to be optional conforms to the predictions of our account.[46]

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words (Heck 2004; p. 170). Finally, Heck claims that the French relative pronoun *dont* 'of whom' can pied-pipe a DP only if the DP is itself an island for extraction (Heck 2004; pp. 173 – 174). However, Heck himself notes that the data in question do not come from a single speaker, and that it's rather controversial whether *dont* ever actually pied-pipes anything (Heck 2004; p. 138 – 140).

In addition to these arguments, Heck notes that possessors in Chamorro cannot pied-pipe complex possessive DPs, and instead must be extracted (Heck 2004; pp. 171 – 173). Note, however, that in the context of the examples above, Chamorro seems to be the unusual case, and not indicative of the general pattern. Moreover, Cable (2007, Chapter 5) sketches an account of the Chamorro facts that is consistent with the general Q-based account.

Finally, Heck notes that in Basque, one cannot extract the complement of a participle, and so participles may (indeed, must) be pied-piped (Heck 2004; pp. 160 – 161). Note, however, that it's somewhat controversial whether Basque even has wh-movement (Arregi 2003a); moreover, in the context of the cases listed above, this sort of pattern appears to be the exceptional one.

[46] In a similar vein, Heck (2004) notes his own theory must provide some alternative account of the apparent optionality of pied-piping in (97) – (105). Unfortunately, although Heck (2004) outlines several general ways in which the appearance of optionality might emerge, the patterns in (97) – (105) are not specifically analyzed.

Thus, the question of whether pied-piping is truly a 'last resort' may ultimately reduce to the question of whether it is easier to 'explain way' the alleged optionality in (97) – (105) or the alleged non-optionality in (106) and (107). Cable (2007) argues in greater detail that the latter is in fact easier than the former.

5.5 Pied-Piping is Subject to the Coordinate Structure Constraint

Finally, our Q-based theory makes an important prediction regarding the interaction between pied-piping and coordination. As first noted by Postal (1972), a single wh-word contained within a conjunct cannot (in English) pied-pipe the entire coordinate structure. This is illustrated below.

(108) **No-Pied-Piping of Conjunction by a Single Wh-Word (in English)** [47]

      a.   (?) [Bill and **who**] did you meet?
      b.   ?? [**Who** and Bill] did you meet?

      c.   (?) [[John's books] and [**whose** paintings]] did you sell?
      d.   ?? [[**whose** paintings] and [John's books]] did you sell?

Interestingly, however, if *both* conjuncts contain wh-words, then the two wh-words together can pied-pipe the entire coordinate structure.

(109) **Pied-Piping of Conjunction is Possible if Both Conjuncts Contain Wh-Words**

      a.   [**Where** and **when**] did you see him?
      b.   [[**Whose** books] and [**whose** paintings]] did you sell?

As noted by many analysts, the facts above bear a striking resemblance to the Coordinate Structure Constraint (CSC), which prevents movement operations from targeting a single constituent within a coordinate structure.

(110) **Illustration of the Coordinate Structure Constraint**

      a.   * **Who**$_1$ did you [[meet Bob] and [thank t_1]] ?
      b.   **Who**$_1$ did you [[meet t_1] and [thank t_1]] ?

Naturally, then, analysts have sought to reduce the facts in (108) and (109) to the CSC. Under the common assumption that pied-piping structures are derived via an operation of 'feature percolation', a straightforward means for doing so would be to postulate that feature percolation is subject to the CSC (cf. Heck 2004). In a system like ours, however, which does not make use of an operation of feature percolation, how are these facts to be captured?

     One account of these facts might follow under the assumption that CSC is ultimately about *Agreement* rather than *movement*.[48] Consider the following constraint.

---

[47] Note that such pied-piping is somewhat improved if the wh-word is in the second conjunct rather than the first. Thus, (108a,c) are noticeably better than (108b,d). I have no account of this apparent contrast.

[48] Note, however, that this assumption is highly controversial, and receives a rather direct and difficult challenge from the phenomenon of 'first conjunct agreement (FCA)'. I refer the reader to Babyonyshev (1996) for arguments that FCA demonstrates that Agreement is *not* sensitive to the CSC in the way suggested by our condition in (111). On the other hand, I also refer the reader to Aoun, Benmamoun & Sportiche (1994, 1999) for a theory of FCA which is consistent with the condition in (111).
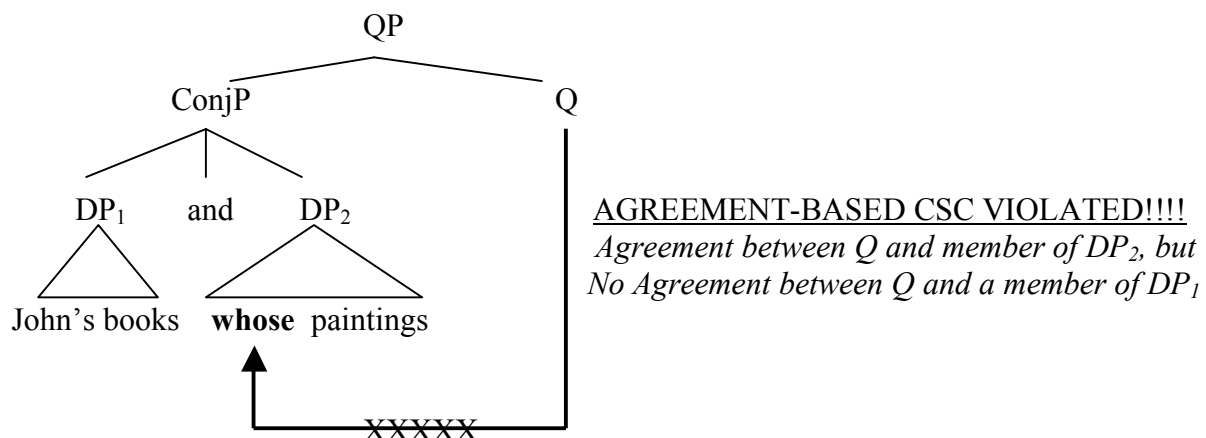
(111) **The Coordinate Structure Constraint for Agreement**

If an Agreement relation holds between A and B, and B is contained within conjunct D of a coordinate structure (C and D), then an agreement relation *also simultaneously* holds between A and some element within C.

First, note that, under the assumption that all movement is a reflex of Agreement, the condition in (111) is sufficient to account for the data in (110a) and (110b). In brief, sentence (110a) is impossible because it would require the matrix interrogative C head to bear an Agree relation only with an element of the second conjunct, and not also the first. However, (110b) is possible because in this structure the interrogative C head bears an Agree relation with elements within both conjuncts.

Now let us see how the condition in (111) might account for the data in (108) and (109). Recall that, since English is a Q/Wh-Agreement language, an Agreement relation must hold between the Q-particle and the wh-word that it binds. Recall also that, according to our Q-based theory of wh-fronting, the Q-particle binding a wh-word always dominates the fronted phrase of the wh-question. Under this account, then, it follows that the structures in (108) violate condition (111). The structure below illustrates.
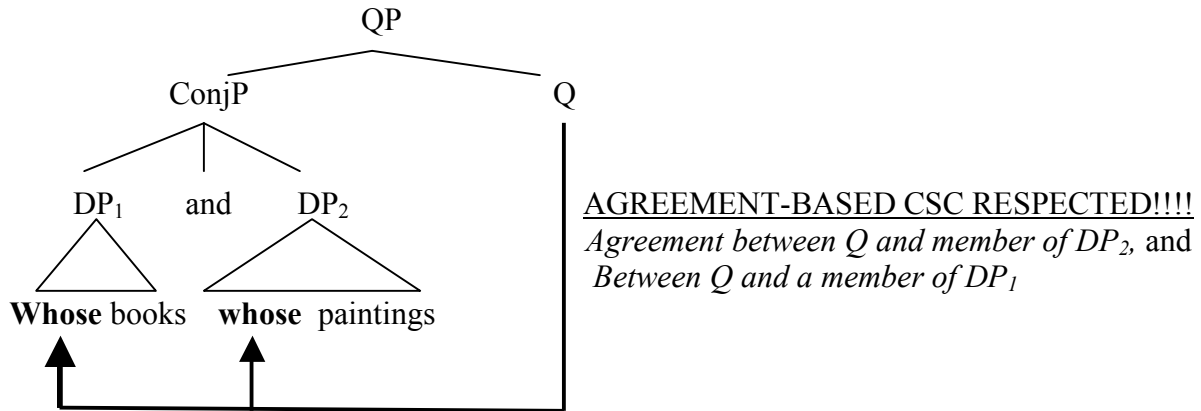
(112) **No-Pied-Piping of Conjunction by a Single Wh-Word (in English)**

AGREEMENT-BASED CSC VIOLATED!!!!
Agreement between Q and member of DP_2, but
No Agreement between Q and a member of DP_1

According to this analysis, the problem with the structures in (108) is that the Q-particle sitting above the pied-piped coordination only Agrees into *one* of the two conjuncts. It follows, then, that if a wh-word were added to the other conjunct of these structures, then they should be well-formed. The following illustrates.

(113) **Pied-Piping of Conjunction is Possible if Both Conjuncts Contain Wh-Words**

QP

ConjP   Q

DP₁   and   DP₂   AGREEMENT-BASED CSC RESPECTED!!!!
                        Agreement between Q and member of DP₂, and
Whose books whose paintings   *Between Q and a member of DP₁*

Thus, we find that, when combined with the statement of the CSC in (111), our analysis accurately predicts the contrast between (108) and (109). Furthermore, this account successfully derives these data from the same condition responsible for the similar, classic CSC facts in (110).

      Finally, let us consider what our Q-based account predicts for the non-Agreement languages like Japanese and Tlingit. Clearly, since our account ties the impossibility of configurations like (108) to the necessity of Agreement between the Q and the wh-word, it follows that such configurations should be licit in non-Agreement languages. It has indeed been noted that wh-questions in Japanese seem to violate the CSC (Cheung 2003). The wh-operator of a Japanese wh-question can be located within a coordination, without the other conjunct of the coordination containing a wh-word.

(114) **Apparent Violations of the CSC in Japanese**

    Taro-wa   [niku to **nani**]-o   katta ka?
    Taro-TOM   meat and what-ACC   buy Q
    What is the thing x such that Taro bought meat and x?

Assuming that the Q-particle in (114) is initially merged as an adjunct to the entire coordinate structure (cf. Hagstrom 1998), we find that our analysis of (108) and (109) provides a straightforward account of these facts, under which there is no real violation of the CSC. The following illustrates.

(115) **Base Structure of the Apparent Violations of the CSC in Japanese**

ConjP

ConjP   Q
                ka

DP₁   *to*   DP₂

niku   ***nani***

65
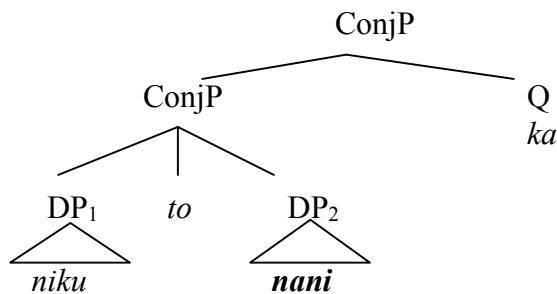
Under this analysis, any Agreement between the interrogative C head and the Q-particle *ka* does not violate the CSC, because the Q-particle is not contained within a conjunct of the coordinate structure. Moreover, no violation of the CSC is entailed by the presence of the Q-particle *ka* outside the coordination, because there is no Agreement between Q and the wh-word in Japanese.

We find, then, that our theory of the CSC in (111) can account for the apparent inactivity of the CSC in Japanese wh-questions. Therefore, the behavior of Japanese wh-questions provides some additional support for our Agreement-based theory of the CSC, and thus also for our Q-based theory of the interaction between pied-piping and coordination.

6. Conclusion

In the preceding sections, we have seen that our Q-based, 'eliminativist' theory of pied-piping is able to account for a wide range of properties that pied-piping structures have been observed to exhibit across languages. Indeed, the results detailed above cover a substantial portion of the facts concerning pied-piping that have received focused attention in the prior literature (cf. Heck 2004, 2007; Horvath 2007). We find, then, that while our Q-based account denies the existence of (true) 'pied-piping', it nevertheless provides a versatile – though properly constrained – tool for the analysis of those structures that have traditionally been thought to exemplify the phenomenon.

To reiterate the concluding message of this paper's introduction, the viability of our Q-based theory is a result of much potential significance. Not only does it cast doubt upon certain widely-shared assumptions regarding movement, it strongly challenges the very existence of a phenomenon that until now has been accepted as an observed reality. Most importantly, we find that if we simply change one basic assumption regarding the nature of wh-fronting – a change independently motivated by the grammar of Tlingit – then we needn't deviate from the null hypothesis that operations targeting the features of a given lexical item apply only to the maximal projection of that item.

Finally, let us note that these results, in turn, motivate a more general research project, one pursued at greater length by Cable (2007). As we've seen, the perspective of this project is that the 'Q-particle' overtly pronounced in Tlingit, Sinhala and Japanese is a structural component of the wh-questions of all human languages, including all wh-fronting languages. Unfortunately, because of the phonological invisibility of this 'Q-particle' in the most well-studied wh-fronting languages, the important role played by this element in a variety of phenomena has not been recognized. For this reason, many phenomena surrounding wh-operators have been incorrectly analyzed, often resulting in complications to grammatical theory that have long been tolerated as empirically necessary. In this paper, we have argued that pied-piping structures are one example of such a phenomenon. Cable (2007) also examines several other cases where the adoption of the Q-based analysis in (9) may provide new insights into classic puzzles surrounding wh-operators.[49] Thus, a more general message of both this paper and

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[49] This paper has already mentioned several of the phenomena that Cable (2007) argues Q-particles to play a role in: P-stranding, left-branch extraction, interactions between Superiority, pied-piping and Intervention-Effects. Besides these, Cable (2007) also discusses the role that Q-particles may play in free relatives, as well as two other phenomena intimately related to pied-piping: so-called 'secondary wh-fronting' (Heck 2004, 2007) and 'massive pied-piping' (Heck 2004). Cable (2007) argues that the Q-based analysis in (9) can provide important advances in our understanding of all these issues.

Cable (2007) is that the Q-based structure in (9) is a very real component of human language, one with numerous wide-ranging consequences.

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