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INTERROGATIVE POSSESSORS AND  
THE PROBLEM WITH PIED-PIPING  
IN CHOL

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In this squib, I present new data from possessive phrases in Chol (Mayan) and discuss the problem they present for standard analyses of pied-piping (see Heck 2004 and references cited therein). I argue that a theory of pied-piping in which features of a *wh*-word ‘percolate’ up to a higher maximal projection is unable to straightforwardly account for the ordering facts found in interrogative possessive constructions in Chol (also described for Tzotzil (Aissen 1996) and San Dionicio Zapotec (Broadwell 2001)). I will show that in certain derivations, feature percolation would have to both occur and not occur from the same *wh*-word at different stages in a single derivation. A derivation in which percolation happens consistently at each step results in ungrammaticality.

I argue that these facts provide evidence against an account involving feature percolation.<sup>1</sup> I adopt instead an analysis along the lines of that proposed in Cable 2007, in which feature percolation is eliminated from the grammar and *wh*-movement to Spec,CP is always the result of a relationship between C and a projection called *Q(uestion)P*. Under this analysis, so-called pied-piping is simply an instance of more familiar phrasal movement. Furthermore, while additional stipulations are required to prevent incorrect ordering under a feature percolation account, I will show that in the QP account the ungrammatical forms are ruled out as a natural consequence of the semantics of Q. I propose further that the apparent free choice between possessor extraction and pied-piping constructions in Chol can be explained as a result of where the Q head is merged, rather than by a special operation of feature percolation.

## 1 Chol Possessors

In Chol, a non-*wh*-possessor obligatorily follows the possessed noun, as shown by the contrast in (1). The possessed noun shows agreement

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<sup>1</sup> Throughout the article, I use *feature percolation* to refer specifically to percolation of features from a *specifier* up to a dominating maximal projection. I assume that features of a head project to its XP.

with the possessor in the form of an ergative/genitive prefix, traditionally called *set A* in the literature on Mayan.<sup>2</sup>

- (1) a. Tyi yajl-i [i-plato aj-Maria].  
 PRFV fall-ITV A3-plate CL-Maria  
 ‘Maria’s plate fell.’  
 b. \*Tyi yajl-i [aj-Maria i-plato].  
 PRFV fall-ITV CL-Maria A3-plate  
 ‘Maria’s plate fell.’

All Chol *wh*-words must front to a preverbal position, which I take, following work by Aissen (1992, 1996) on Tzotzil (Mayan), to be Spec,CP. Though *wh*-words may not be extracted out of external subjects or adjuncts (also noted for Tzotzil by Aissen (1996)), a *wh*-possessor inside the internal argument of the predicate (a transitive direct object or unaccusative subject) may front in one of two ways: either the *wh*-possessor may “pied-pipe” the possessum, as shown in (2a), or the *wh*-word may extract out of the possessive phrase, as shown in (2b).

- (2) a. [Maxki i-plato]<sub>i</sub> tyi yajl-i t<sub>i</sub>?  
 who A3-plate PRFV fall-ITV  
 ‘Whose plate fell?’  
 b. Maxki<sub>i</sub> tyi yajl-i [i-plato t<sub>i</sub>?]  
 who PRFV fall-ITV A3-plate  
 ‘Whose plate fell?’

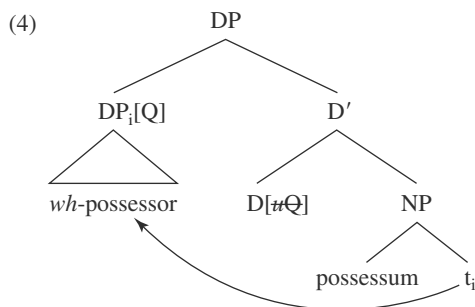
Note the difference between the order of the *wh*- and non-*wh*-possessors with respect to the possessum. While we saw in (1) that a non-*wh*-possessor obligatorily *follows* the possessed noun, a *wh*-possessor inside its possessive phrase as in (2a) must *precede* the possessed noun, as shown by the ungrammaticality of (3).

- (3) \*[I-plato maxki]<sub>i</sub> tyi yajl-i t<sub>i</sub>?  
 A3-plate who PRFV fall-ITV  
 ‘Whose plate fell?’

Following Aissen (1996) on Tzotzil, we may capture this distinction by proposing that a *wh*-possessor in Chol must raise above the possessum to Spec,DP in order to check a strong uninterpretable [Q] feature ([*u*Q]) on D, as shown in (4).<sup>3</sup>

<sup>2</sup> Abbreviations in glosses are as follows: A3 = 3rd person ergative/genitive; CL = proper name clitic; ITV = intransitive verb suffix; PRFV = perfective aspect.

<sup>3</sup> For ease of illustration, I follow Aissen (1992) in placing Spec,NP to the right of its head in order to capture the fact that a possessor follows its possessum. I argue elsewhere that all Chol specifiers precede their heads and that postnominal possessors are derived by movement (Coon, to appear).



Here, we find a parallel with the clausal domain, in which *wh*-words must move to Spec,CP to check a strong [*u*Q] feature on the interrogative C. This account is also consistent with proposals by Cinque (1980), Torrego (1986), and others that extraction out of DP must always take place through an “escape hatch,” Spec,DP. The fact that Chol allows possessor extraction (see (2b)) provides further support for the proposal that Chol *wh*-possessors always undergo overt movement to Spec,DP.<sup>4</sup>

## 2 Multiple Possessors and the Problem for Pied-Piping

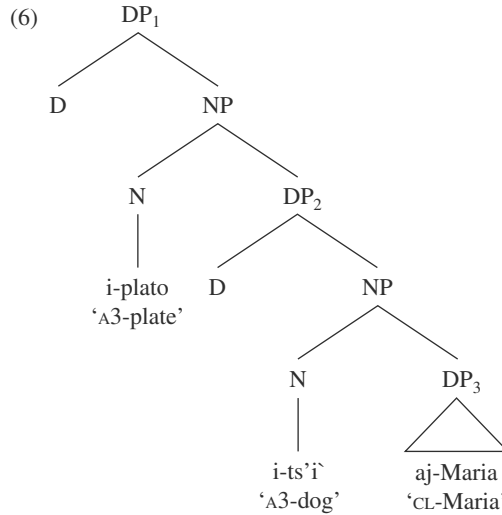
So far, the Chol data do not appear problematic for a percolation analysis of pied-piping. To account for the difference between (2a) and (2b), we could offer the following account. In the extraction case in (2b), the *wh*-possessor *maxki* ‘who’ first raises to Spec,DP of the possessive phrase to check a strong [*u*Q] feature on D. This puts it in a position from which it is able to extract out of the possessive DP to Spec,CP in order to check the [*u*Q] feature on C. In the pied-piping construction in (2a), the *wh*-possessor also raises to Spec,DP, but this time the [Q] feature of the possessor *maxki* ‘percolates’ up to the higher possessive phrase DP. Now the entire [+Q] possessive phrase is targeted for movement to Spec,CP.

The problem arises in the case of complex possessive phrases. As shown in (5), possession may be recursive in Chol. In this example, *ajMaria* is the possessor of *ts’i* ‘dog’. These two together form a larger possessor, *its’i* ` *ajMaria* ‘Maria’s dog’, which is in turn the possessor of *plato* ‘plate’. This complex possessive phrase has the structure in (6).

<sup>4</sup> Cable (2007) derives the fact that possessor extraction is impossible in English from what he calls the *QP-Intervention Condition*, which states that a QP may not intervene between a functional head and a phrase selected by that head. Crucially, Cable assumes that possessors *originate* in the specifier of the possessive DP. Since the possessive D is functional and selects its possessor, Q cannot merge with the possessor and thus the possessor alone cannot extract (see section 3 for details of QP).

To explain the fact that possessor extraction *is* possible in languages like Chol, Cable is forced to propose that the real possessor is a null resumptive

- (5) Tyi yajl-i [i-plato [i-ts'i` aj-Maria]].  
 PRFV fall-ITV A3-plate A3-dog CL-Maria  
 'Maria's dog's plate fell.'



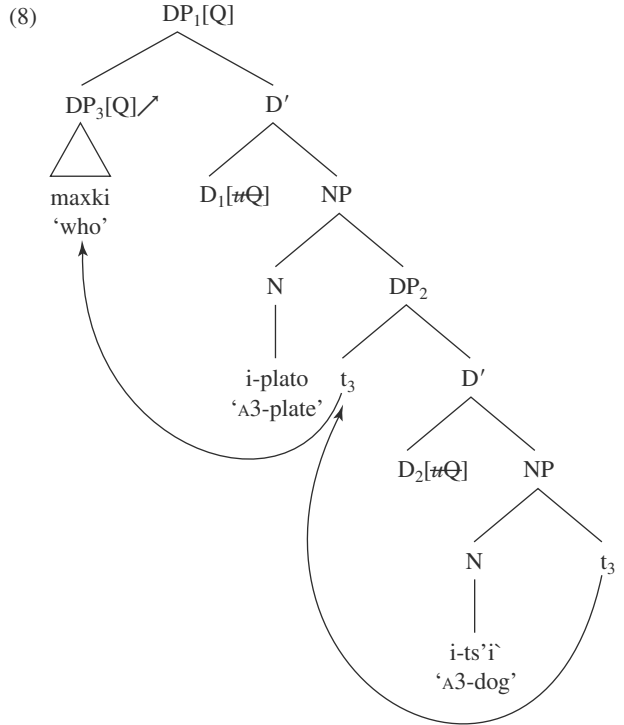
In this case, there are three possibilities for questioning the possessor: any of the three DPs from the structure in (6) may front to Spec,CP. In (7a), the *wh*-possessor DP<sub>3</sub> extracts out of the possessive phrase and fronts. In (7b), the intermediate possessor DP<sub>2</sub> fronts; and in (7c), the entire possessive phrase, DP<sub>1</sub>, fronts to Spec,CP.<sup>5</sup>

- (7) a. [Maxki]<sub>3</sub> tyi yajl-i [i-plato i-ts'i` t<sub>3</sub>]?  
 who PRFV fall-ITV A3-plate A3-dog  
 'Whose dog's plate fell?'  
 b. [Maxki i-ts'i`] <sub>2</sub> tyi yajl-i [i-plato t<sub>2</sub>]?  
 who A3-dog PRFV fall-ITV A3-plate  
 'Whose dog's plate fell?'  
 c. [Maxki i-plato i-ts'i`] <sub>1</sub> tyi yajl-i t<sub>1</sub>?  
 who A3-plate A3-dog PRFV fall-ITV  
 'Whose dog's plate fell?'

pronoun and that the QP containing the pronounced possessor *maxki* is adjoined. However, if we follow Carstens (2000), Sobin (2002), and others in proposing that subjects are generated in Spec,*n*/NP (a lexical head), the QP-Intervention Condition no longer rules out generating QP above the possessor. Instead, possessor extraction is prohibited in English because possessors do not undergo overt movement to Spec,DP (instead, they perhaps move only as high as a DP-internal functional projection) and thus cannot extract out of the DP phase (Gavruseva 2000). Here, I adopt this analysis, which both captures the English facts and allows us to avoid positing a null resumptive pronoun in Chol.

<sup>5</sup> Initial data suggest that there are independent factors governing which possessor extracts in Chol. The three sentences in (7) may differ with respect to discourse factors like topic and focus. Furthermore, speakers seem to prefer to keep inalienably possessed nouns with their possessors, though more work is needed to determine if this is the correct generalization.

What will concern us here is the order of elements *within* the fronted possessive phrases in (7b) and (7c). As in the case of simple possessive phrases, the *wh*-possessor *maxki* always appears at the left edge of the fronted constituent. Note however that in (7c) the other two words *iplato its'i* appear in their base order. How is this order derived? A possible representation for the internal structure of the fronted constituent is given in (8).

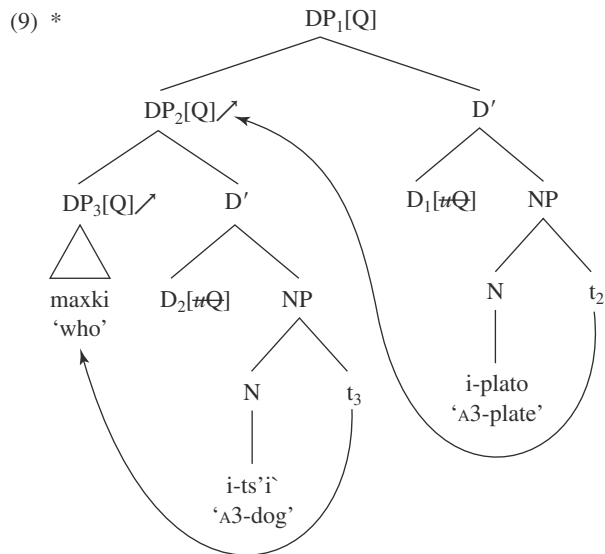


As in the derivations above, the possessor *maxki* first raises to Spec,DP<sub>2</sub> to check the [*uQ*] feature on D<sub>2</sub>. In the second step, the *wh*-possessor *maxki* again raises, this time to the specifier of the higher DP<sub>1</sub> to check D<sub>1</sub>'s [*uQ*] feature. Finally, the entire possessive phrase, DP<sub>1</sub>, raises to Spec,CP. These last two steps are where we run into problems.

As discussed above, if we make the usual assumption that only *wh*-words are targeted for *wh*-movement, then standard analyses of pied-piping require us to say that in order for the larger possessive phrase DP<sub>1</sub> to be selected for movement to Spec,CP, the [*Q*] features of the *wh*-word must “percolate” up to DP<sub>1</sub> (represented in (8) with “↗”). Note, however, that in the second step of movement—where *maxki* moves from Spec,DP<sub>2</sub> to Spec,DP<sub>1</sub>—DP<sub>2</sub> is not pied-piped along, so the *wh*-word’s features must not have percolated to DP<sub>2</sub>. In summary, feature percolation does not occur from the *wh*-possessor to DP<sub>2</sub>, but must occur from the *wh*-possessor to DP<sub>1</sub>.

Turning now to the sentence in (7b), we find exactly the opposite state of affairs: the *wh*-word DP<sub>3</sub> must raise to Spec,DP<sub>2</sub> and percolate its [Q] features up to DP<sub>2</sub>. DP<sub>2</sub> is then targeted for movement to Spec,DP<sub>1</sub>. Here, features must *not* be percolated to DP<sub>1</sub> in order for DP<sub>2</sub> to extract on its own to Spec,CP. In (7b), percolation first *does* then *does not* occur.

If feature percolation happened consistently at each point in the derivation, we would expect the ‘roll-up’ structure in (9). Just as in (8), the *wh*-possessor first fronts to the specifier position of the lower DP<sub>2</sub>. Here, *maxki*'s [Q] features percolate up to DP<sub>2</sub>, and in the second step the larger DP<sub>2</sub> fronts to Spec,DP<sub>1</sub>. Again, [Q] features percolate up to DP<sub>1</sub> and the entire possessive phrase is targeted for movement to Spec,CP.



This ‘roll-up’ derivation results in the sentence in (10a), which is judged completely ungrammatical by Chol speakers.<sup>6</sup> The correct version is repeated in (10b) for comparison.

- (10) a. \*[Maxki i-ts'i` i-plato]<sub>i</sub> tyi yajl-i t<sub>i</sub>?  
 who A3-dog A3-plate PRFV fall-ITV  
 ‘Whose dog’s plate fell?’  
 b. [Maxki i-plato i-ts'i`]<sub>i</sub> tyi yajl-i t<sub>i</sub>?  
 who A3-plate A3-dog PRFV fall-ITV  
 ‘Whose dog’s plate fell?’

<sup>6</sup> Note that while the ungrammatical Chol sentence in (10a) parallels the word order in its grammatical English counterpart, the English sentence does not involve the roll-up derivation in (9); instead, it directly reflects the possessor-possessum ordering independently found in English.

Thus, in order to achieve the correct surface order for (7b) and (7c) using a standard pied-piping account, we have to say that the interrogative DP *maxki* both does and does not percolate features at different steps in the same derivation. For the extraction case in (7a), on the other hand, feature percolation does not take place at all. Consistent feature percolation, as in (9), results in ungrammaticality.

One possibility would be to stipulate that feature percolation in Chol may occur *at most once* during the derivation. Specifically, we could say that the [Q] feature of a *wh*-word has some special property that is ‘‘used up’’ by percolation. Of course, we would want to know exactly what this property is, and what it means for it to be ‘‘used up.’’ Furthermore, we would want to understand why it does not need to be used at all (as in the extraction case in (7a)), and why percolation may happen either late or early in the derivation. I take it to be an advantage of the proposal I develop below that it does not require this special property.

Before presenting the QP analysis, I briefly review a second possibility. Similar ordering facts within complex possessors were first noted for Chol’s cousin Tzotzil by Aissen (1996) and then for unrelated San Dionicio Zapotec by Broadwell (2001). Both authors rule out the ungrammatical roll-up derivation in (9) by appealing to the *Consistency Principle*, first proposed in Longobardi 1991:95.

- (11) *Consistency Principle* (as reformulated in Aissen 1996: 484)<sup>7</sup>

An XP immediately expanding a [+N] category on the non-recursive side is directionally consistent in every projection.

The basic idea here is that Tzotzil and Zapotec are generally right-branching; in the ungrammatical (9), we find an expanded left-side specifier. I illustrate below that my proposal does not require appeal to a branching principle, and I show that the ungrammatical roll-up derivation is ruled out independently by the semantics of Q.

### 3 QP

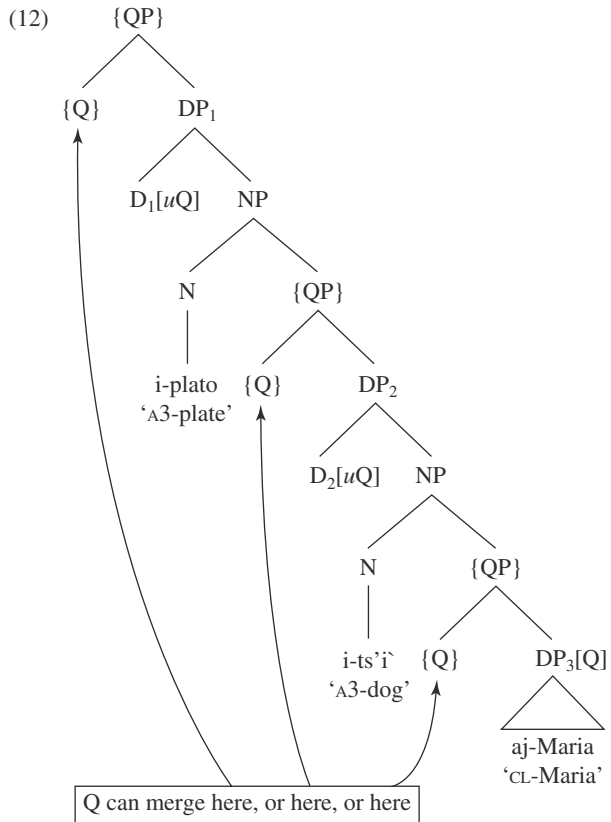
*Wh*-movement is standardly thought to involve a relationship between an interrogative C and a *wh*-word. Cable (2007), developing in part a proposal in Hagstrom 1998, adds a third element: a question particle, Q. Drawing on evidence from the Na-Dene language Tlingit, in which the Q head is overt, Cable provides crosslinguistic support for his claim that Q is present in all languages. In the QP analysis, *wh*-movement never involves a relationship between the interrogative C and the *wh*-word itself. Instead, overt *wh*-movement to Spec,CP targets

<sup>7</sup> As originally formulated for Italian by Longobardi, the Consistency Principle was restricted to *lexical* categories because the specifiers of I and C in Italian *can* be complex. Aissen (1996) notes that Longobardi did not assume the DP hypothesis. DP is not a lexical category, but Aissen proposes that Longobardi would still want it to be subject to the Consistency Principle. She thus argues that the principle should be restricted to [+N] categories, rather than to lexical categories.



the question phrase, QP, which contains the *wh*-word. In ‘‘pied-piping’’ cases, the QP simply dominates the *wh*-word and other material. QP undergoes regular phrasal movement to Spec,CP. This analysis eliminates the mechanism of feature percolation from the grammar altogether. I will not go into details of Cable’s analysis here, but I will show how this approach can explain the patterns we find in Chol without recourse to special restrictions.

Recall that there are three possibilities for questioning the possessor of a complex possessive phrase, shown in (7). In addition to yielding the correct order of elements within the fronted complex possessive phrases, as I will demonstrate below, a QP-fronting analysis provides a straightforward way to explain the apparent optionality between the *wh*-extraction and different ‘‘pied-piped’’ forms in (7). The optionality reduces to the familiar optionality of lexical choice: the Q head is free to merge with any [+Q] DP. The difference between the constructions in (7) is then a structural one, stemming from where in the derivation the Q head merges. The DP with which the Q head merges is the one that will front to Spec,CP, as shown in (12). I go through each case in detail.



As in the cases above, each D head in an interrogative Chol possessive phrase contains a strong uninterpretable [ $uQ$ ] feature. Now we have two elements with interpretable [Q] features to check [ $uQ$ ]: the *wh*-word *maxki* and QP. Also as in the cases above, the interrogative C, like the D, contains a strong [ $uQ$ ] feature, which must be checked in the same manner. These assumptions, combined with the proposal that all movement obeys locality (Chomsky 1995), give the correct order.

To derive the extraction sentence in (7a), the Q head merges with  $DP_3$ , which contains only the *wh*-possessor *maxki*. When  $D_2$  is merged, its strong [ $uQ$ ] feature probes for an interpretable [Q] feature, finds QP, and attracts it to its specifier. The same happens with  $D_1$ : its strong [ $uQ$ ] feature finds QP and attracts it to Spec, $DP_1$ . Finally, the strong [ $uQ$ ] feature on C attracts the QP. In this case, QP contains only the *wh*-possessor *maxki*, correctly giving the sentence in (7a).

In a sentence like (7b), the Q head is merged with the intermediate possessor,  $DP_2$ . First, the *wh*-possessor in  $DP_3$  is attracted to Spec, $DP_2$  to satisfy the strong [ $uQ$ ] feature on  $D_2$ . Next, the Q head merges with  $DP_2$ .  $D_1$  is merged. Its [ $uQ$ ] feature probes the structure and this time finds the closest [Q] feature on QP. QP is attracted to Spec, $DP_1$ . Again, feature percolation does not take place, so when C is merged, the closest [Q] feature it finds is on QP (not on  $DP_1$ ). QP is then attracted to Spec,CP, resulting in what appears to be pied-piping, but is in fact regular phrasal movement of QP containing the intermediate possessor  $DP_2$ .

Finally, when the Q head is merged with  $DP_1$ , the full possessive phrase is fronted, as in (7c). This derivation works as follows. The strong [ $uQ$ ] feature on  $D_2$  probes for a matching [Q] feature and finds the [+Q] *wh*-possessor  $DP_3$ , which it attracts to its specifier position. The second step proceeds similarly:  $D_1$  attracts the [+Q] possessor  $DP_3$  to its specifier. Now the Q head merges with  $DP_1$ , and QP dominates the entire possessive phrase. When C merges, its strong [ $uQ$ ] feature attracts the highest [+Q] element: QP. The QP, this time containing the entire possessive phrase, is raised to Spec,CP. Again, the result creates the illusion of pied-piping, but is again nothing more than XP-fronting.

In each construction, the [ $uQ$ ] features of D heads are checked by the *wh*-possessor  $DP_3$  only until the Q head is merged in the derivation. Once Q is merged, it is always the highest [+Q] element, and any remaining [ $uQ$ ] features are checked by raising QP (and whatever QP contains). Note that within this analysis, the fact that the *wh*-possessor *maxki* always appears at the left edge of the fronted constituent is a consequence of the strong [ $uQ$ ] features on interrogative D heads. The *amount* of material fronted to Spec,CP is governed by where in the derivation the Q head merges. I propose that this separation is necessary and that each formal mechanism (a strong [ $uQ$ ] feature on interrogative D and the presence of QP) is independently motivated.

#### 4 Ruling Out Roll-Up

We have seen that the QP account, along with standard assumptions about locality of movement, can correctly derive the three grammatical Chol structures without recourse to percolation. Crucially, we also want to rule out the ungrammatical roll-up structure from (9). Since in this roll-up structure each of the three possessor DPs undergoes movement, the only way to derive such a sentence would be to merge multiple Q heads in the derivation. But Cable's (2007) theory independently predicts that a structure with a single *wh*-word and multiple Q heads will be uninterpretable by the semantics. I briefly outline how.

In Cable's analysis, Q particles are focus-sensitive operators (Rooth 1985). Focus-sensitive operators (e.g., English *only*) take focus-semantic values as arguments. The focus-semantic value of a focused element is a set of alternatives of the same semantic type. *Wh*-words have *only* a focus-semantic value: the set of focus-alternatives of identical semantic type and animacy (Beck 2006). For example, the focus-semantic value of *maxki* 'who' is the set of all humans. When a Q head is merged with an interrogative possessive phrase, it closes off the focus-alternatives projected by the *wh*-word *maxki*. The focus-alternatives are then not passed up to the higher Q particle. Since no focus-alternatives are passed up, and since Q takes focus-semantic values as arguments, the higher Q particle does not receive an argument of the right semantic type. As a consequence, for any *wh*-word, at most one Q particle may be present (see Cable 2007:130–158 for details). While a percolation account must stipulate that percolation can happen at most once to rule out roll-up, the fact that only a single Q can merge is independently required by the semantics of Q.

#### 5 Conclusion

In this squib, I have presented original data from possessive constructions in the Mayan language Chol, and I have argued that the cases that seem to involve pied-piping of complex possessors cannot easily be explained by standard analyses of feature percolation. To derive the correct order within the fronted possessive phrase, we must stipulate that feature percolation may occur at most once during the derivation—but it is free to occur either late or early in the derivation. Percolation is also free to not occur at all, as when the *wh*-possessor extracts. I have argued that a QP analysis is able to explain the Chol facts without using this special operation.

I have illustrated how an analysis of *wh*-movement that involves a relation between a C head and a QP (rather than between C and the *wh*-word itself), as proposed by Cable (2007), straightforwardly captures the Chol facts. The apparent optionality between extraction and pied-piping is not the result of an optional operation. Rather, it stems from where in the derivation the Q head merges: Q is free to combine with any [+Q] DP. The ungrammatical roll-up derivation—which percolation proposals must rule out by stipulation—is

automatically rejected in this account by the semantics of Q. The grammar is simplified: what gave the illusion of a separate mechanism (percolation, pied-piping) is nothing more than regular phrasal movement.

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