When to pied-pipe and when to strand in San Dionicio Octotepec Zapotec

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In many of the prepositional languages of Mesoamerica, a *wh*-phrase (can) occur to the left of preposition.[1] This is illustrated in (1) for San Dionicio Octotepec Zapotec (SDO Zapotec), taken from Broadwell (2001, 2005):[2]

(1) Xhíí cùn ù-dííny Juààny bèh'cw?
what with PERF-hit Juan dog
'What did Juan hit the dog with?'

The derivation of (1) seems rather straightforward. The *wh*-phrase fronts to Spec, PP, supporting the process that Henk so convincingly argued for in his 1978 book, and pied-pipes the PP to Spec, CP. Aissen (1996) proposes an analysis along these lines for Tzotzil. In essence, PP internal *wh*-movement brings the *wh*-phrase high enough into the PP to enable successful checking of *wh* in Spec, CP, through cyclic spec head agreement. Why the P cannot be stranded by extracting the wh phrase from Spec, PP remains unclear in this analysis.

This squib examines what moves to Spec, PP and what strands when and where in SDO Zapotec. SDO Zapotec presents an interesting puzzle, illustrated for postnominal possessors below, but reproducible in other environments as well. Possessors are postnominal:[3]

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[1] This squib is dedicated to Henk van Riemsdijk, my first syntax teacher, thesis advisor, and friend. It could have been on empty verbs, but it ended up being about prepositions.

[2] SDO Zapotec is Otomanguean language spoken in Oaxaca. All data come from Aaron's Broadwell (2000) and his extensive handout on pied-piping in different varieties of Zapotec presented at the syntax semantic seminar at UCLA in May 2005. I follow Broadwell's glossing conventions, except that I gloss p- as POSS- and com(pletive) as PERF(ective). Broadwell expresses doubts that "a structural account for the observed variability can ever be presented" and develops an OT account. This squib sketches a structural account.

[3] The possessed NP in alienable possessive constructions is preceded by a prefix *x*, glossed as POSS. The string is in all probability derived from a relative clause structure containing a nominal small clause, as in Kayne (1994)

(2) *x- pèh'cw Juààny*
POSS-dog Juan
'Juan's dog'

When the possessor is questioned, the *wh*-phrase must appear at the left edge of the DP, and pied-pipes the DP into the left periphery of the clause. *wh*-phrases obligatorily front to CP.

(3) Túú x-pèh'cw cù'á Juààny?
who POSS-dog PERF.grab Juan
'Whose dog did Juan grab?'

Even though the *wh*-phrase moves to the left edge of the DP, further extraction appears to be blocked as the possessed noun cannot be stranded:

(4) *Túú cù'á Juààny x- pèh'cw ?
who PERF.grab Juan POSS-dog
'Whose dog did Juan grab?'

So far, these data hold no surprises. However, when 'whose dog' is embedded in a possessive construction, the possessor *must* 'strand' the possessed, and surprisingly pied-piping is excluded:

(5) **Túú** x-cùtóòny **x-míèhgw** ndé'?
who POSS-shirt POSS-friend this
'Whose friend's shirt is this?'

(6) *?Túú x-míèhgw x-cùtóòny ndé'?
who POSS-friend POSS-shirt this
'Whose friend's shirt is this?'

These patterns illustrate the following puzzle. A *wh*-possessor must move to the left periphery DP internally (*who POSS-friend*). It cannot escape to Spec,CP (**who did you see POSS-friend*), but must escape to Spec,DP (*who POSS-shirt POSS-friend*). Furthermore, pied-piping is forced for moving to Spec, CP, but excluded when moving to Spec, DP (**[who POSS-friend] POSS-shirt*). How can these patterns be made to fall out from a restrictive theory of UG?

(i) ([~~John~~ x- dog]$_j$ [[John$_i$ **[**$_{sc}$ ~~John$_i$ x dog]~~$_j$

I will sketch how these patterns fall out from the order of merger, and basic spell-out properties of SDO Zapotec. Two theoretical assumptions play an important role. The first one is that all word formation is syntactic in the sense of Koopman and Szabolcsi (2000). Thus, a bimorphemic *wh*-word like *who* is build in the syntax from a *wh* head and (silent) *someone* (or whatever the relevant structural parts will turn out to be). (Silent) *someone* moves as a phrase to Spec, *wh.* The phonological form is selected on the basis of the syntactic output. The second theoretical assumption concerns what merges where, and departs from the traditional view of how constituents are build up. In particular, a verb does not merge directly with DP, but with NP and all functional categories are merged outside VP (D [$_{VP}$ V[NP]]) (Sportiche (1996, 2002, 2005). The surface constituency of a DP is derived through movement (NP merges with D and VP moves around). PPs are not underlying constituents with P merging with DP, (Kayne, 1994, 2003). These views converge in important respects with Williams's (2003) Representation Theory. In terms of solving the puzzle at hand, this implies not just understanding where the *wh*-head of *who/what/which* is located with respect to other nominal functional categories, but also its location with respect to other heads or constructions, in the case of this squib Ps, and complex possessives. I develop these ideas below, starting with PPs.

SDO Zapotec is prepositional. A *wh*-phrase can precede or follow most Ps (Broadwell reports preference for the *wh*-P order).

(7) a. Xhíí dèjts zúú bèh'cw?
what behind stand dog
'What is the dog behind?'
b. Dèjts xhíí zúú bèh'cw?
behind what stand dog
'Behind what is the dog?'

(8) a. Xhíí cùn ù-dííny Juààny bèh'cw?
what with PERF-hit Juan dog
'What did Juan hit the dog with?'
b. Cùn xhíí ù-dííny Juààny bèh'cw?
with what PERF-hit Juan dog
'What did Juan hit the dog with'

Some Ps however can only precede the *wh*-phrase (*dèhspuèhèhs* 'after', *ààxt* 'toward', *áántèhs* 'before', and *zí'cy* 'like'.

If *who* and *what* are built in the syntax, their spell-out position minimally reveals the location of the *wh*-head, a.k.a. the *wh*-feature. We can thus take the surface position of *who* and *what* as an indication of the location of the *wh*-head, as initial hypothesis. We can construe the difference between the a and b examples in (7) and (8) as one reflecting the height at which different Ps can be merged[4], with the *wh* merging *higher* than the lowest P position. The following order of merger correctly captures that all Ps precede DP complements, some Ps follow *wh*-words, and some Ps precede them.

(9) P>wh>P>D

What determines where a particular P can be merged? Broadwell (2005) argues that the native body part Ps[5] are nominal in character: let's assume that these (as well as *with*) can be merged lower than *wh*, in what I will call $P_{N,}$ as well as at the higher P level[6]. For Ps that can never follow *wh*-phrases, the lower P position seems simply never available, perhaps for principled reasons: since these are mostly temporal Ps, perhaps they can only be merged at the 'temporal' level, i.e. at a quite high level of representation. This yield the following structures (recall that *wh* here represents the morphosyntactic *wh*-feature):

(10)	[P	[	wh	[P_N [[*some/one/thing*]]]]
a.	[	[*something/someone*	wh	[**behind/with**]]]
b.	[**behind/with**	[*something/someone*	wh	[ ]]]
c.	[**before**	[*something/someone*	wh	[ ]]]

Thus, there is no movement to Spec, PP, but there is movement to Spec, wh. There is no movement of a whP, but of some smaller phrase that makes

[4] This is consistent with the fact that the internal structure of PPs consists of many layers of functional structure (Van Riemsdijk, 1990, Koopman ([1993], 2000)), and the mounting evidence that PPs are not merged as constituents Kayne (1994, 2000, 2004).

[5] See Brook Lillehaugen (forthcoming) for the behavior of these Ps in another variety of Zapotec.

[6] This analysis in essence translates Broadwell's constraints rankings in structural hierarchical terms.

up a whP. The remainder of this squib focuses on the interaction of P_N with the D and wh environment[7].

Where is the *wh*-phrase spelled out? Is it sitting in Spec, wh, or does it spell-out the features of the *wh*-head which agree with the silent phrase in Spec, i.e. is it more like an agreeing complementizer?

(11) a. [**who** wh [**behind**
<spell out *someone* as **who** if in Spec, wh>
b. [*someone* **who**[**behind**
<spell out +wh as *who* if +*animate* (via agreement)>

There are two arguments in favor of the agreeing head hypothesis as in (10b). First, even though the *wh*-phrase precedes the P, it cannot escape from the PP, and pied-piping is obligatory.

(12) a. Xhíí cùn ù-dííny Juààny bèh'cw?
what with PERF-hit Juan dog
'What did Juan hit the dog with?'
b. *Xhíí ù-dííny Juààny bèh'cw cùn?
'What did Joan hit the dog with?'

If the *wh*-word is an agreeing head, as in (10b), (12a) follows straightforwardly. The minimal constituent that must move into the left periphery of the clause must include *wh*, and that constituent includes also includes the lower P. (12b) simply cannot be formed: the *wh*-head cannot be split from the structure it dominates, i.e. there is no way to strand the complement. Silent *someone* could in principle extract into the left periphery of the clause since it is a phrase, stranding *what with* in-situ. However, *someone* does not contain the *wh*-head that the *wh*-head in the CP periphery needs. Therefore, *who* or *what* cannot remain in-situ. Pied-piping is thus obligatory.

A second argument for treating *who/what* as an agreeing head comes from the form and behavior of w*hich* phrases, which I take to be (minimally) composed of wh +D. *Which* occurs at the left edge of the DP,

[7] The surface patterns with respect to the higher P levels, as described in Broadwell (2001) follow, and will be no further discussed in this squib.

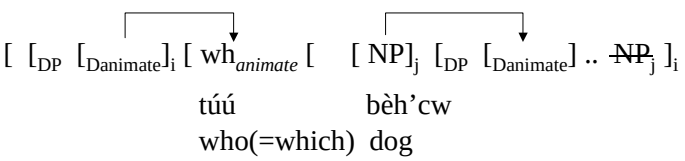
pointing to wh>D, and its form is homophonous with bare *who* (túú) or bare *what* (xhíí) depending on the animacy of the NP[8].

(13) Xhíí cyààg cù'á Juààny?
what stick PERF.grab Juan
'Which stick did Juan grab?'

(14) Túú bèh'cw cù'á Juààny?
who dog PERF.grab Juan
'Which dog did Juan grab?'

This suggests that all instances of *who* and *what* are *wh*-heads agreeing in animateness with some constituent in their Spec. Interpretive differences follow from the other structural parts that are present. Let me make the derivation of *which*- forms more precise. Demonstratives in SDO Zapotec are at the right edge, *bèh'cw …rè* 'dog …that', and thus trigger pied-piping to Spec, DP. Let us assume that the D determiner which is part of *which* shares this property with the demonstrative head: it triggers pied-piping to its left, and agrees in animacy with the D. The remnant DP subsequently moves to the Spec of the *wh*-head, where it triggers agreement on the *wh* head. (15) results from the following (incomplete, i.e. VP movements are not shown) derivation: merge NP, merge D, move NP to Spec, DP, (spec head) agreement for animacy, merge *wh*, move DP, spec head agreement, spell out {wh, animate} as túú, spell out NP as *bèh'cw*.

(15)



To form a *wh*-question, the minimal constituent that carries the wh feature fronts to Spec, CP.

(16) Túú bèh'cw cù'á Juààny?
who dog PERF.grab Juan
'Which dog did Juan grab?'

[8] The same holds in Malagasy: *iza* 'who' and *inona* 'what'; *zaza iza* ' child which'; *trano inona* 'house which'.

Nothing special needs to be said to exclude stranding of *dog*, which simply cannot be derived.

Which phrases should behave in the same way as *who* and *what* with respect to Ps, as they spell out the same head. This seems correct: combining a (low) P with *which* phrases leads to the lower P splitting the DP. Pied-piping is forced because *what* is in the wh head position:

(17) Xhíí cùn cyààg ù- dííny Juààny bèh'cw?
what with stick PERF-hit Juan dog
'which stick did Juan hit the dog with?'

Why is DP internal pied-piping excluded?

(18) *Xhíí cyààg cùn ù-dííny Juààny bèh'cw?
what stick with PERF-hit Juan dog
'What stick did Juan hit the dog with?'

Again, this directly falls out from the hierarchy in (9): low (body part) Ps are sandwiched between *wh* and D. The order *which stick with* simply cannot be formed from this order of merger: it would require *wh* to merge *below* the lowest P, contrary to what we have seen. In other words, (18) is not a pied-piping problem.

Let us finally return to possessors, which were the starting point of this squib. That *wh*-phrases must occur to the left of the possessed noun reveals a hierarchy wh> D (cf (3) '*who POSS.dog)*. If this structure is further embedded in a possessive construction, the possessor must extract, stranding the possessed NP:

(19) Túú x-cùtóòny x-míèhgw ndé'?
who POSS-shirt POSS-friend this
'Whose friend's shirt is this?'

(20) Túú x-cùtóòny míèhgw ndé'?
who POSS-shirt friend this
'Which friend's shirt is this?'

According to the logic of this squib, it must be the case that the *wh*-feature of the lower possessor can only merge *outside* the complex possessive construction, and cannot merge within. Silent *someone* moves apparently long distance as a phrase:

(21) [*someone*[wh [poss-shirt [poss friend [~~*someone*~~]]]]

This further predicts that the *wh*-phrase should appear to the left of the low P:

(22) Túú cún x-cùtóòny x-míèhgw
who with POSS-shirt POSS-friend
'with whose friend's shirt'

We can now answer why (23) and (24) are excluded:

(23) *?Túú x-míèhgw x-cùtóòny ndé'?
[[who poss-friend] poss-shirt] this
'Whose friend's shirt is this?'

(24) *x-cùtóòny túú x- míèhgw ndé'?
POSS-shirt who POSS-friend this
'The shirt of whose friend is this?'

These strings can only be formed if *wh* can be merged inside the complex possessive construction, contrary to our earlier conclusion. Thus, these examples are excluded because the *wh*-feature must be merged *outside* the complex possessive construction, not because of a constraint on pied-piping.

The question of how this follows from the architecture of the grammar remains an important one for future research. If this squib is on the right track, however, the answer to this squib's title is completely determined by the order of merge and general constraints on movement.

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