Pied-piping with inversion in Copala Trique*

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1 Introduction

1.1 Head-initial order

Copala Trique is an Otomanguean language in the Mixtecan family which is spoken in Oaxaca, Mexico. Like most other Otomanguean and Mesoamerican languages, Copala Trique is a head-initial language. VSO is the most basic word order, with SVO a frequent alternative in elicitation contexts:

1)	Mariia^{4} a'nii^{4} chraa^{5} raa^{4} yoo^{5} a^{32}.		(SVO)
	Maria COM:put tortilla in tenate DEC		
	A'nii^{4} Mariia^{4} chraa^{5} raa^{4} yoo^{5} a^{32}.		(VSO)
	COM:put Maria tortilla in tenate DEC		

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The orthography which we use in this paper is based on the practical orthography developed by Barbara and Bruce Hollenbach of the Summer Institute of Linguistics for their translation of the New Testament. We follow their usage in the representation of the consonants, including the following conventions: <x> = [ʃ], <xr> = [ʂ] (a retroflex alveopalatal sibilant), <ch> = [tʃ], <chr> = [tʂ], <c> = [k] (before front vowels), <qu> = [k] before back vowels, [v] = [β] and <j> = [h]. <Vn> represents a nasalized vowel. Trique has five level tones (1, 2, 3, 4, 5) and three contour tones (13, 31, 32), as discussed in Hollenbach (1984). Since the practical orthography does not distinguish all eight tones, we use the numerical superscripts of Hollenbach (1984, 1992) for our tonal representations.

Glosses use the following abbreviations: COM = completive aspect, DEC = declarative, P = possessed form

'Maria put the tortilla in the tenate.'*

This example shows that prepositional phrases are also head initial.

We also find head-initial noun phrases, quantifier phrases, and number phrases:

2) chuvee[4] yo'[3] — [$_{NP}$ N Det]
dog that

'that dog'

too[5] Mariia[4] — [$_{NP}$ N NP_{POSS}]
P:tenate Maria

'Maria's tenate'†

3) vij[1] sno[5]'o[32] — [$_{QP}$ Q NP]
two man

'two men'

4) roj[1] sno[5]'o[32] — [$_{NumP}$ Num NP]
DUAL man

'men (dual)

We believe that number phrases and quantifier phrases are probably distinct phrase types in Trique, because the two may cooccur, with the NumP always inside the QP . However, it is otherwise not grammatical to have two quantifiers or two number markers in the phrase.

5) vij[1] roj[1] sno[5]'o[32] — [$_{QP}$ Q [$_{NumP}$ Num NP]]
two DUAL man

'two men'

We will also show below that quantifiers and number markers show different patterns of pied-

* A tenate is a basket made from woven dried leaves that is used to store tortillas.

† The noun *yoo*[5] is one of a number of nouns in which initial /y/ is replaced by /t/ or /d/ when the noun is possessed.

piping, further justifying a categorial distinction between them.

1.2 Interrogatives

Copala Trique is somewhat unusual (in our experience) in having no single word interrogative pronouns corresponding to 'what', 'who', and 'where'. Instead, there is a generalized interrogative *me*^{3}. *Me*^{3} plus a noun is translated as 'which':

6) me^{3} xnii^{3}
WH boy

'which boy'

Hollenbach (1992:287) describes a system of interrogatives in which this generalized interrogative combines with the third person pronouns to yield the following possibilities:

7) me^{3} zii^{5} 'who (masc.)'
WH he

me^{3} nii^{5} 'who (fem.)'
WH she

me^{3} ze^{32} 'what'
WH it

However, our consultant does not seem to make these distinctions, and uses *me*^{3} *ze*^{3} for all three of the meanings listed above.[*] So far as we can see, this does not affect our arguments.

2 Pied-piping with inversion – NP and QP

2.1 Preliminaries

The head-initial order shown in the previous examples gives way, however, to other orders in interrogative contexts. This phenomenon is known as pied-piping with inversion (PPI), and it is an areal feature of Mesoamerican languages, as first noted by Smith-Stark (1988). It has been explored in some detail in San Dionicio Ocotepec Zapotec (Broadwell 1999, 2001), in Ocotepec Mixtec (Eberhardt 1999), and in Tzotzil (Aissen 1996), but it is in general only mentioned in passing in the grammars of Mesoamerican languages.

Hollenbach's (1992) excellent sketch of Copala Trique is the only source which gives information about this phenomenon, but it does not give a comprehensive description. In this paper, we will describe in more detail the facts of PPI in Copala Trique, and sketch an

[*] Mr. Fuentes recognizes *me*^{3} *zii*^{5} as variant pronunciation of *me*^{3} *ze*^{32}, but for him it does not seem to differ in its animacy features.

optimality-theoretic account of Trique pied-piping with inversion.

2.2 PPI in noun phrases

As we have said, the ordinary word order in noun phrases has the noun in initial position. When the noun phrase contains a noun and its possessor, however, our consultant José Fuentes allows both [N NP_{Poss}] and (perhaps) [NP_{Poss}N] orders:

8) tocua[4] Migee[4] [$_{NP}$ N NP_{Poss}]
P:house Mike

'Mike's house'

? Migee[4] tocua[4] [NP_{Poss}N]
Mike P:house

'Mike's house'

The noun-initial order was more frequent, and the only order we observed in connected discourse. The order in which the possessor is initial has a less clearly determined status. This order was volunteered in some utterances, but identical sentences were rejected on other occasions. If this order is truly grammatical, then we suspect it may reflect some additional prominence for the possessor, but we have not conclusively established this.

In contrast to the possibly flexible order seen in examples like those above, when a possessor is questioned, there is only one grammatical order:

9) ¿Me[3] ze[32] tocua[1] qui-ranj[5] Waan[4]?
WH N P:house com-buy Juan

'Whose house did Juan buy?'[*]

*¿Tocua[1] me[3] ze[32] qui-ranj[5] Waan[4]?
P:house WH N com-buy Juan

When the noun phrase contains a noun and a determiner, the phrase must normally be head-initial:

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[*] As Hollenbach (1992: 336, 1984:229-47) discusses, there is a tone-lowering rule which applies in this context. Specifically, the 4 tone of *tocua[4]* becomes a 1 tone. A generalization over all the environments for this tone lowering rule is difficult, but includes words at the right edge of focussed constituents

10) ve'^{3} yo'^{3}
house that

'that house'*

*yo'^{3} ve'^{3}
that house

However, if the determiner is interrogative, then the order is reversed, and only the head-final order is acceptable:

11) ¿Me^{3} ve'^{3} qui-ranj^{5} Waan^{4}?
WH house com-buy Juan

'Which house did Juan buy?'

*¿Ve'^{3} me^{3} qui-ranj^{5} Waan^{4}?
house WH com-buy Juan

The obligatory head-final order in noun phrases with interrogative possessors or determiners is an example of the phenomenon called pied-piping with inversion.

We should note here that pied-piping is the only grammatical way to question possessors or determiners. As in English, it is ungrammatical to strand the N-head:

12) *¿Me^{3} qui-ranj^{5} Waan^{4} ve'^{3}?
WH com-buy Juan house

'Which house did Juan buy?' (Lit. 'Which did Juan buy house?')

13) *¿Me^{3} ze^{32} qui-ranj^{5} Waan^{4} tocua'^{4}?
WH N com-buy Juan P:house

'Whose house did Juan buy?' (Lit. 'Whose did Juan buy house?')

2.3 PPI in quantifier phrases

As we have said, Copala Trique contains quantifier phrases in which the quantifier precedes its NP complement. The reverse order is normally ungrammatical:

* *Ve'^{3}* 'house' has an irregular possessed form *tocua'^{4}*.

14) oda^{4} ve'^{3} [$_{QP}$ Q NP]
all house

'all the houses'

*ve'^{3} oda^{4} *[$_{QP}$ NP Q]
house all

However, if we question the complement of the quantifier, then we find an obligatory head-final order:

15) ¿Me^{3} ze^{32} oda^{4} qui-ranj^{5} Waan^{4}? [$_{QP}$ NP Q]
WH N all com-buy Juan

'What did Juan buy all of?'

*¿Oda^{4} me^{4} ze^{32} qui-ranj^{5} Waan^{4}? *[$_{QP}$ Q NP]
all WH N com-buy Juan

As with NPs, pied-piping is the only grammatical way to question the complement of a quantifier. Stranding the quantifier is ungrammatical:

16) *¿Me^{3} ze^{32}qui-ranj^{5} Waan^{4} oda^{4} ?
WH N com-buy Juan all

'What did Juan buy all of?'

2.4 An optimality-theoretic approach

We could account for the facts so far using a fairly simple framework. We assume that Trique shows the effect of a constraint which favors alignment of an interrogative focus with the left edge of the clause:

17) Align (IntFoc, L, CP, L) (=Wh-L)
Align the left edge of an interrogative focus with the left edge of CP.

The preference for head-initial phrases can be expressed by a second constraint applying to sister nodes, of the following sort:

18) X ≺ YP
When a non-phrasal element X and a phrasal element Y are sisters, the non-

phrasal element precedes the phrasal element.

Finally, we assume that the ungrammaticality of stranding a N or Q is due to a third constraint. We give a preliminary version of this constraint as follows:

19) *Argument-extraction (Preliminary version)
Do not extract a subpart of a (non-clausal) argument.

We are assuming that the PS-rules describe only the dominance relationships, while violable constraints determine the linear order. Within Lexical-Functional Grammar, such ideas were originally proposed by Falk (1983), and descriptions of word order using linear precedence and/or alignment constraints has figured prominently in more recent work on Optimality Theoretic Lexical-Functional Grammar (Bresnan 2000, Sells 2001, and others).

Separation of immediate dominance and linear precedence rules also figured prominently in GPSG (Gazdar, Pullum, Klein, and Sag (1985), continuing into HPSG (Pollard and Sag 1987). Within older styles of government-binding theory, such ideas were proposed by Farmer (1980, 1984) and Stowell (1981), though the idea that X-bar theory allow multiple orders of head, specifier, and complement has largely (and in our opinion, mistakenly) been abandoned in most current versions of the Minimalist Program.

Assuming these three constraints, we can give a fairly simple account of the facts so far.

20)

		*Arg-extraction	Wh-L extraction	X ≺ YP
a. stranding	¿Me^{3} ze^{32} qui-ranj^{5} Waan^{4} tocua'^{4}? WH N com-buy Juan P:house (Whose bought Juan house?)	*!		
b. PPI	☞¿Me^{3} ze^{32} tocua'^{1} qui-ranj^{5} Waan^{4}? WH N P:house com-buy Juan (Whose house bought Juan?)			*
c. Pied-piping w/o inversion	¿Tocua'^{4} me^{3} ze^{32} qui-ranj^{5} Waan^{4}? P:house WH N com-buy Juan (House whose bought Juan?)		*!	

The same account applies to PPI with quantifier phrases:

21)

		*Aux-Ext	Wh-Ext	X ≺ YP
a. stranding	¿Me[3] ze[32]qui-ranj[5] Waan[4] oda[4]? WH N com-buy Juan all 'What did Juan buy all of?'	*!		
b. PPI	☞¿Me[3] ze[32] oda[4] qui-ranj[5] Waan[4]? WH N all com-buy Juan 'What did Juan buy all of?'			*
c. Pied-piping w/o inversion	¿Oda[4] me[3] ze[32] qui-ranj[5] Waan[4]? all WH N com-buy Juan 'What did Juan buy all of?'		*!	

A remaining question for our account is what motivates the possible grammaticality of [$_{NP}$ Poss N] order in some declaratives. With the constraints we currently have, we would predict that only [$_{NP}$ N Poss] is grammatical, since the reverse order would violate the X≺ YP constraint. As we said earlier, we are still investigating the conditions under which [$_{NP}$ Poss N] is grammatical, and we leave an optimality-theoretic treatment of this for further research.

3 Pied-piping and PPs

Questioning the object of a preposition yields results that are more complex than those found in NPs and QPs. For most prepositions, we have found that our consultant allows two variant word orders – one with PPI and one with preposition stranding.* Compare the following statement and the two versions which question the object of the preposition:

22) Nicun'[3] chuvee[4] xra[4] mesaa[4].
stand dog behind table

'The dog is standing behind the table.'

* In the appendix to this paper, we give data on a small number of prepositions which show a somewhat different pattern. We hope to reconcile their behavior with our more general account in future work.

23) a. ¿Me[3] ze[32] xra[1] nicun'[3] chuvee[4]? *PPI*
WH N behind stand dog

b. *? ¿Xra[4] me[3] ze[32] nicun'[3] chuvee[4]? *PP w/o inversion*
behind WH N stand dog

c. ¿Me[3] ze[32] nicun'[3] chuvee[4] xra[4] ? *P-stranding*
WH N stand dog behind

'What is the dog standing behind?'

Of the variants given, our consultant usually prefers the sentence containing the pied-piping with inversion. This is generally the first word order given in elicited sentences. However, he says that the version with preposition-stranding is perfectly fine, and occasionally volunteers this order. Hollenbach (1992:230) also records the fact that both orders are grammatical.

The fact that preposition-stranding is acceptable, while nouns and quantifiers may not be stranded shows that our constraint **Argument-extraction* is too broadly stated. We need to be able to differentiate between different types of phrases in order to get the right results.[*]

It might eventually be necessary to differentiate between a wider range of phrase types, but for our current purposes, a basic division between nominal arguments (phrases which are in the extended projection of NP , such as NP, NumP, QP) and those which are not will suffice:

24) *Nominal extraction
Do not extract a subpart of a nominal argument.

25) *Non-nominal extraction
Do not extract a subpart of a non-nominal argument.

Then as a first attempt, we could revise the tableau as follows:

			Wh-L		
		*Nonextraction			
				X ≺ YP	
					*Non-nom-extraction

[*] We believe that the Trique results are also important typologically, since they show that pied-piping is not necessarily forced by the ungrammaticality of stranding.

a. stranding	☞ ¿Me^{3} ze^{32} nicun'^{3} chuvee^{4} xra^{4}? WH N stand dog behind 'What did the dog stand behind?'				*
b. PPI	☞¿Me^{3} ze^{32} xra^{1} nicun'^{3} chuvee^{4}? WH N behind stand dog 'What did the dog stand behind?'			*	
c. Pied-piping w/o inversion	¿Xra^{4} me^{3} ze^{32} nicun'^{3} chuvee^{4}? behind WH N stand dog 'What did the dog stand behind?'		*!		

In this approach, we rank the constraints ***Non-nominal extraction*** and X≺YP equally, so that the winning candidates (a) and (b) each violate one constraint.

4 Excursis – Are these really prepositional phrases?

Hollenbach (1992) identifies only five simple prepositions in Copala Trique: *ga^{2}* 'with', *ndaa^{13}* 'until, as far as', *xco^{4}* 'beyond', *xa'nuj^{5}* 'among', and *ra^{4}* 'inside'. In her view, the other words that we have identified as prepositions are actually relational nouns. For example, we gloss *riaan^{32}* as 'to, on', but is also a noun meaning 'face'. Similarly, we gloss *ston^{3}* as'to, for', but it is also a noun meaning 'finger'.

While there is an undisputed relationship between body-part nouns and prepositions in Trique (and in Otomanguean generally), we view this relationship as a diachronic one. Synchronically, we think that there are many homophonous pairs of nouns and prepositions. However, the two behave differently in syntax, as argued in Rennells (2003).

As we have seen previously, it is possible to strand a preposition, but not a noun. This difference distinguishes the nominal and prepositional senses of many of these words. Note that when *riaan^{32}* means 'face' it cannot be stranded:

26) ¿Me^{3} ze^{32} riaan^{2} quene'e Waan^{4}?
WH N face COM:see Juan

*¿Me^{3} ze^{32} quene'e Waan^{4} riaan^{32}?
WH N COM:see Juan face

'Whose face did Juan see?'

However, when *riaan^{32}* means 'to', it can be stranded:

27) Me^{3} ze^{32} cataj^{3} Waan^{4} "ca'vee" riaan^{32}?
WH N COM:say Juan yes to

‘Who did Juan say “yes” to?’

We take the view that the part of speech is the primary determinant of the acceptability of stranding. Therefore, we take *riaan*^{32} ‘face’ to be a N and *riaan*^{32} ‘to’ to be a P.

A second difference between the nominal and prepositional uses of such words is in the previously mentioned possibility of fronting a possessive NP. However, a non-interrogative object of a preposition may not be fronted:

28) riaan$_3^2$ ‘unj^1 [$_{NP}$ N Poss]
face 1sg

‘my face’

‘unj^1 riaan^{32} [$_{NP}$ Poss N]
1sg face

29) riaan$_3^2$ ‘unj^1 [$_{PP}$ P NP]
to 1sg

‘to me’

*‘unj^1 riaan^{32} [$_{PP}$ NP P]
1sg face

Again, we think this word order difference is best dealt with by positing homophonous N/P pairs, rather than treating all instances as nominal. For this reason, we have analysed the constituents seen in the preceding section as prepositional phrases, rather than noun phrases.

5 Disconnected orders

Returning to the issue of word order in questions, Copala Trique shows yet another frequent order in which the interrogative *me*^{3} is separated from the noun and reordered before a preposition, quantifier, or number marker:

30) ¿Me^3 xcoo^1 ze^{32} c-ota’ Waan^4 chraa^4? [$_{PP}$ Wh P N]
WH behind N COM-put Juan tortilla

‘What did Juan put the tortilla behind?’

31) ¿Me^3 oda^1 ze^3 qui-ranj^5 Waan^4? [$_{QP}$ Wh Q N]
WH all N COM-buy Juan

‘What did Juan buy all of?’

32) ¿Me[3] roj[1] ze[32] qui-ranj[5] Waan[4]? [$_{NumP}$ Wh Num N]
WH DUAL N COM-buy Juan

'What (dual) did Juan buy?'

Following Broadwell (2001) on Zapotec, we call this the 'disconnected'order, since the P, Q, or Num appears to disrupt the constituency of the following phrase.

For PPs and QPs, the disconnected order occurs as a variant of PPI order:

33) a. ¿Me[3] xcoo[1] ze[32] c-ota' Waan[4] chraa[4]? *disconnected*
WH behind N COM-put Juan tortilla

'What did Juan put the tortilla behind?'

b. ¿Me[3] ze[32] xcoo[3] c-ota' Waan[4] chraa[4]? *PPI*
WH behind N COM-put Juan tortilla

'What did Juan put the tortilla behind?'

34) a. ¿Me[3] oda ze[32] 1 qui-ranj[5] Waan[4]? *disconnected*
WH all N COM-buy Juan

'What did Juan buy all of?'

b. ¿Me[3] ze[32] oda[1] qui-ranj[5] Waan[4]? *PPI*
WH N all COM-buy Juan

'What did Juan buy all of?'

For NumP, the disconnected order is the only one which is grammatical. Both PPI and pied-piping without inversion are rejected:

35) a. ¿Me[3] roj[1] ze[32] qui-ranj[5] Waan[4]? *disconnected*
WH DUAL N COM-buy Juan

'What (dual) did Juan buy?'

b. *¿Me[3] ze[32] roj[1] qui-ranj[5] Waan[4]? *PPI*
WH N DUAL COM-buy Juan

'What (dual) did Juan buy?'

c. *¿Roj[1] me[3] ze[32] qui-ranj[5] Waan[4]? *PP w/o inversion*
DUAL WH N COM-buy Juan

'What (dual) did Juan buy?'

Let us first examine NP and QP, where the disconnected order is a variant of the PPI order. We believe the essence of the phenomenon is that speakers use disconnected orders as an alternative to violating the X ≺ YP constraint. If we have an order like 'which behind book', then it is still true that the preposition precedes a portion of the object.

Accordingly, it seems that we must interpret the X ≺ YP constraint in a slightly different way:

36) X ≺ YP (revised)

When a non-phrasal element X and a phrasal element Y are sisters, the non-phrasal element must precede a.) all of the phrasal element or b.) some portion of the phrasal element.

Thus the disconnected orders manage to get the Wh-phrase in the initial position, and also manage to get the head to precede a portion of the object.

However, the disconnected orders must violate some other constraint, or we would expect that they would be the only grammatical option. Modifying an idea in Broadwell (2001), we call this constraint Integrity (Spec-N):

37) Integrity (Spec-N)

A noun and its specifier must form a constituent at c-structure.

This constraint needs to be weighted equally with X ≺ YP and *Non-nominal-extraction

Then the following tableaux correctly predict that both the disconnected and the PPI candidates are grammatical:

38)

		*Nom-	Wh-L	X ≺ YP	Intergrity (Spec-N) *Non-nom-extraction
a. stranding	☞ ¿Me^{3} ze^{32} nicun'^{3} chuvee^{4} xra^{4} ? WH N stand dog behind 'What did the dog stand behind?'				*
b. disconnected	☞ ¿Me^{3} xra^{1} ze^{32} nicun'^{3} chuvee^{4} ? WH behind N stand dog 'What did the dog stand behind?'				*
c. PPI	☞¿Me^{3} ze^{32} xra^{1} nicun'^{3} chuvee^{4}? WH N behind stand dog 'What did the dog stand behind?'			*	
c. Pied-piping w/o inversion	¿Xra^{4} me^{3} ze^{32} nicun'^{3} chuvee^{4}? behind WH N stand dog 'What did the dog stand behind?'		*!		

		*Arg	Wh-L extraction	X ≺ YP	Integrity (Spec-N)
a. stranding	¿Me^{3} ze^{32}qui-ranj^{5} Waan^{4} oda^{1} ? WH N com-buy Juan all 'What did Juan buy all of?'	*!			
b. disconnected	☞¿Me^{3} oda^{1} ze^{32} qui-ranj^{5} Waan^{4}? WH all N com-buy Juan 'What did Juan buy all of?'				*
b. PPI	☞¿Me^{3} ze^{32} oda^{1} qui-ranj^{5} Waan^{4}? WH N all com-buy Juan 'What did Juan buy all of?'			*	

c. Pied-piping w/o inversion	¿Oda[1] me[3] ze[32] qui-ranj[5] Waan[4]? all WH N com-buy Juan 'What did Juan buy all of?'		*!			

Finally, we need to account for the fact that the disconnected order is the only one available for NumP.

In our view, this is probably due to the fact that the two number markers – *roj*[1] 'dual' and *nij*[3] 'plural' – have a status somewhat like that of proclitics. In contrast to ordinary quantifiers, Trique speakers are reluctant to use the number markers without some following noun. We could formalize this intuition with a constraint of the following sort:

39) Align (Num, R, N, L)*

Align the right edge of a number marker with the left edge of some noun.

We will thus attribute the ungrammaticality of PPI with NumP to the fact that inversion yields an order in which the number marker does not precede a noun. The tableau will be as follows:

		*Arg-extraction	Align (Num, R, N, L)	Wh-L	X ≺ YP	Integrity (Spec-N)
a. stranding	¿Me[3] ze[32]qui-ranj[5] Waan[4] roj[1]? WH N com-buy Juan DUAL 'What did Juan buy all of?'	*!	*			
b. disconnected	☞¿Me[3] roj[1] ze[32] qui-ranj[5] Waan[4]? WH DUAL N com-buy Juan 'What did Juan buy all of?'					*
b. PPI	¿Me[3] ze[32] roj[1] qui-ranj[5] Waan[4]? WH N DUAL com-buy Juan 'What did Juan buy all of?'		*!		*	

* This constraint is undominated, so its ranking is somewhat uncertain. We tentatively rank it above Wh-L, since there are some cases where Wh-L is violated (see Appendix).

c. Pied-piping w/o inversion	¿Roj[1] me[3] ze[32] qui-ranj[5] Waan[4]? DUAL WH N com-buy Juan 'What did Juan buy all of?'		*!	*		

6 Conclusion

Though there are a number of questions about Copala Trique pied-piping with inversion that remain to be answered in future research, we believe that we have shown that a fairly small number of constraints can successfully capture the rather complex patterns of behavior found in this area of Trique grammar.

Though time prevents us from a detailed comparison to the Zapotec data, we will also note here that nearly all the constraints used in the description of the Trique data have been previously used in the description of San Dionicio Ocotepec Zapotec.[*] The fact that this set of constraints is also capable of describing the rather different system found in Trique bolsters our believe that they are the appropriate theoretical tools for understanding why languages show pied-piping with inversion.

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[*] The one exception is the constraint Align (Num, R, N, L), which serves to force Trique number markers to appear adjacent to a noun. San Dionicio Ocotepec Zapotec also has number markers which participate in the pied-piping with inversion phenomenon, but they do not seem to require adjacency to a noun.

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8 Appendix – Two problematic prepositions

8.1 The unstrandable, uninvertable prepositions *naa*^{13} 'toward, until' and *azej*^{2} 'since'

While the pattern we have just describes is true of the majority of prepositions we have investigated, we have also discovered a small number of prepositions which show a different pattern. Consider the preposition *naa*^{13} 'toward, until' as representative of this group. *Naa*^{13} occurs in pied-piped but uninverted order, and resists P-stranding or PPI.*

40) a. ¿Naa^{13} me^{3} chuma'^{3} chee^{5} Waan^{4}? *PP w/o inversion*
toward WH town walk Juan

b. *¿Me^{3} chuma'^{3} naa^{13} chee^{5} Waan^{4}? *PPI*
WH town toward walk Juan

c. *¿Me^{3} chuma'^{3} chee^{5} Waan^{4} naa^{13}? *P-stranding*
WH town walk Juan toward

'Which town did Juan walk toward?

* *Naa*^{13} has *ndaa*^{13} as a variant pronunciation. With respect to this preposition, Hollenbach (1992:230-231) says "the object of *ndaa*^{13} 'until' can be questioned in various ways, thought not all speakers accept them all." She cites all three forms in (40) as grammatical, at least for some speakers.

Azej^{2} *'since'* shows the same pattern. It might be possible to account for these data with a constraint that forces these prepositions to align with a following noun phrase Align (Prep, R, NP, L), but we leave formalization for future work.

8.2 The bewildering preposition *ga*^{2} 'with'

Another problematic preposition is *ga*^{2} 'with'. This preposition shows the widest range of syntactic variability of any we have examined. It appears with PPI**,** pied-piping without inversion, the disconnected pattern, stranded, and in a peculiar order in which the stranded preposition is reordered to a position before the direct object:

41)	a.	¿Me^{3} ze^{32} ga^{2} a'ne^{3} Waan^{4} chruun^{5}? WH N with com:cut Juan wood 'What did Juan cut the wood with?'	*PPI*
	b.	¿Me^{3} ga^{2} ze^{32} a'ne^{3} Waan^{4} chruun^{5}? WH with N com:cut Juan wood	*disconnected*
	c.	¿Ga^{2} me^{3} ze^{32} a'ne^{3} Waan^{4} chruun^{5}? with WH N com:cut Juan wood	*PP w/o inversion*
	d.	¿Me^{3} ze^{32} a'ne^{3} Waan^{4} chruun^{5} ga^{2} ? WH N com:cut Juan wood with	*stranding*
	e.	¿Me^{3} ze^{32} a'ne^{3} Waan^{4} ga^{2} chruun^{5} ? WH N com:cut Juan with wood	*reordering*

Of these variants, (e) with reordering has been volunteered on some occasions and rejected on others.