Focus alignment and optimal order in Zapotec[1]

George Aaron Broadwell
University at Albany
State University of New York

1 Order and PS-rules

In standard theory, phrase structure rules encode both dominance relationship and precedence relationships. Various linguists have suggested that these two ideas can be disentangled so that the PS-rules tell us only what the dominance relationships are, while a separate set of rules or principles tell us what the linear order should be. Within older government-binding theory, such ideas have been proposed by Farmer (1984) and Stowell (1981); within HPSG by Pollard and Sag (1987); and within Lexical Functional Grammar by Falk (1983).

In sharp distinction to this approach, much recent work within the Minimalist Program (Chomsky 1995) has adopted Kayne's (1994) Linear Correspondence Axiom, which can be summarized as follows

(1) "...the human language faculty is in fact rigidly inflexible when it comes to the relation between hierarchical structure and linear order. Heads must always precede their associated complement position. Adjunctions must always be to the left, never to the right...This inflexibility extends to specifiers, too, which I argue to be an instance of adjunction. Hence, specifier positions must invariably appear to the left of their associated head, never to the right." (Kayne 1994:vii)

In Kayne's view, apparent counterexamples result from the application of movement rules.

In this paper, I will argue against Kayne's LCA and in favor of the position that PS-rules encode only dominance relationships. Linear precedence, I will suggest, is the result of violable optimality-theoretic constraints. My account will be framed within the optimality-theoretic implementation of Lexical Functional Grammar proposed by Bresnan (1998).

2 Basic word order in San Dionicio Zapotec

San Dionicio Ocotepec Zapotec (hereafter SDZ) is an Otomanguean language spoken in Oaxaca, Mexico. The basic word order of this language is VSO, with prepositional phrases:

(2) Ù-díny Juàny bè'cw cùn yàg.
com-hit John dog with stick

'John hit that dog with a stick'.

The PS-rules we seem to need for SDZ are approximately as follows:

(3) S' –> (Spec), (Comp), S

S –> V, NP, NP, PP
[SUBJ] [OBJ] [ADJ]

NP –> N, {Det, NP}
[POSS]

PP –> P, NP
[OBJ]

I'll assume that the Zapotec clause is dominated by S, which is a non-endocentric category in this language, though nothing in what follows hinges crucially on this.[2] Then the following linear precedence constraints will give us the right order:

(4) X < YP (lexical categories precede non-lexical categories)
SUBJ < OBJ < ADJ (less oblique arguments precede more oblique arguments)

Wh-questions in SDZ require leftward movement of the wh-phrase:

(5) ¿Tú ù-díny Juàny cùn yàg?
what com-hit John with stick

'What did John with a stick?'[3]

*¿Ù-díny Juàny tú cùn yàg?
com-hit John what with stick

This suggests that SDZ shows the effects of a constraint like the following:

(6) Align (IntF, L, S', L)

Align the left edge of interrogative focus phrase with the left edge of S'.

This suggests a simple tableau like the following:

(7)

	Align (IntF, L, S', L)
☞¿Tú ù-díny Juàny cùn yàg? (What hit John with stick)	
*¿Ù-díny Juàny tú cùn yàg? (Hit John what with stick)	*

3 **Objects of prepositions**

When we question the object of a preposition in this language, we get a surprising result:

(8) ¿Xhí cùn ù-díny Juàny bè'cw?
what with com-hit John dog

'What did John hit the dog with?'

This pattern has been labelled 'pied-piping with inversion' (Smith Stark 1988), and it is found in all Zapotecan languages and in many other Mesoamerican languages as well. (8) is the only grammatical order for this question in SDZ. It is ungrammatical to have either of the following:

(9) a. *¿Cùn xhí ù-díny Juàny bè'cw?
with what com-hit John dog

b. *¿Xhí ù-díny Juàny bè'cw cùn?
what com-hit John dog with

The ungrammaticality of (9b) seems to be due to an undominated constraint in SDZ that forbids preposition stranding. It can be formulated as follows:

(10) *Prep stranding

A preposition must be a sister to its object.

The following ranking of constraints will select the correct candidate.

(11)

	*Prep strand	Align (IntF,L, S', L)	X <YP
¿Ù-díny Juàny bè'cw cùn xhí? (Hit John dog with what)		*!***	
¿Cùn xhí ù-díny Juàny bè'cw? (With what hit John dog)		*!	
¿Xhí ù-díny Juàny bè'cw cùn? (What hit John dog with)	*!		
☞¿Xhí cùn ù-díny Juàny bè'cw? (What with hit John dog)			*

This result falls out easily from the optimality theoretic point of view, but is difficult to get in standard movement analyses.

What is of special interest here is that the ordering of heads before complements is treated as a violable constraint.

4 **Against an alternative treatment**

The analysis given so far predicts that the correct tree for the winning candidate in the tableau above is the following:

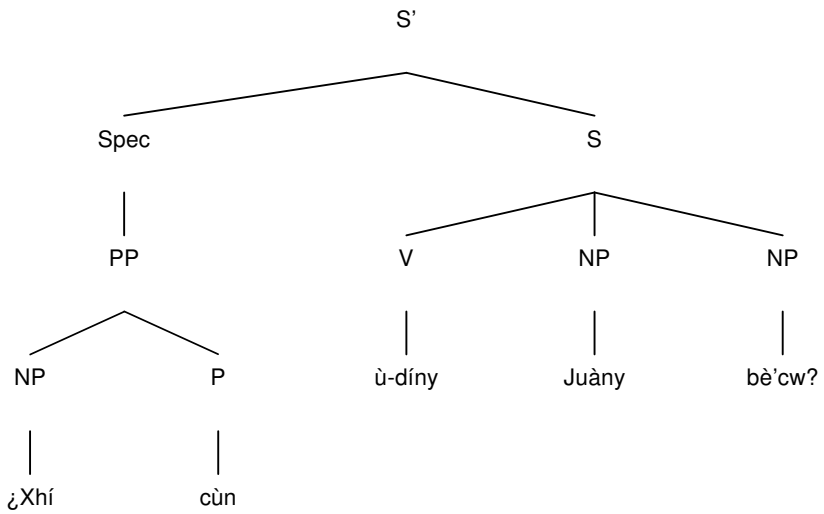

Figure 1 Proposed structure for pied-piping with inversion in SDZ

However, this structure is incompatible with the view that constituent order is fixed by the PS-rules. In particular, it is not compatible with Kayne's (1994) view that the grammar universally forces Spec-Head-Comp ordering.

A defender of Kayne's position would need to propose a derivation in which PP is first moved to Spec. Subsequent to this, the NP object is moved out of the PP to some position further to the left. In fact, an analysis like this has been suggested by Black (1994) for Quiegolani Zapotec.[4]

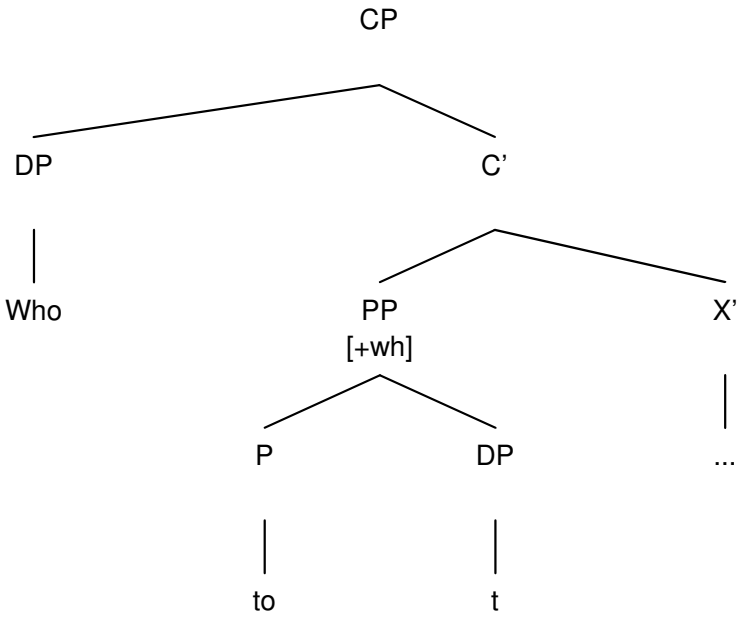

Figure 2 Proposed structure for Quiegolani Zapotec (Black 1994)

A real problem for such an approach is the preposition stranding created by the second application of a movement rule. Many languages show a restriction against preposition stranding, and within Principles and Parameters approaches there have been a variety of proposed explanations of this restriction. For example, van Riemsdijk (1978) suggest that PP is a bounding node in languages with no preposition stranding, and Kayne (1981) suggests that in languages with a restriction against preposition stranding, the preposition assigns an oblique case.

Whatever the account of the restriction against preposition stranding, it ought to apply in equal force to extraction from a PP which is *in situ* and a PP which is in sentence-initial position.

5 **Questioning specifiers**

In SDZ, specifiers of NP normally follow the head:

(12) x-pè'cw Juàny 'John's dog'[5]
p-dog John

bè'cw re' 'that dog'
dog that

We also see pied-piping with inversion for genitives and demonstratives. Compare the following statements and questions.

(13) Juà:ny cù'á x-pè'cw Màrì:.
John com:grab p-dog Mary

'John grabbed Mary's dog.' 4:214

*Juà:ny cù'á Màrì: x-pè'cw.
John com:grab Mary p-dog

(14) ¿Tú x-pè'cw cù'á Juàny?
who p-dog com:grab John

'Whose dog did John grab?' 4:214

*¿X-pè'cw tú cù'á Juány?
p-dog who com:grab John

These sentences show that the possessor may not precede the possessed in a declarative. But in an interrogative, this is the only grammatical order. The following sentences make the same point for demonstratives:

(15) Juàny cù'á bè'cw re'
John com:grab dog that

'John grabbed that dog.'

*Juàny cù'á re' bè'cw.
John com:grab that dog

(16) ¿Tú bè'cw cù'á Juàny?
which dog com:grab John

'Which dog did John grab?'

*¿Bè'cw tú cù'á Juà:ny?
dog which com:grab John

Note that the interrogative *tú* is the equivalent of both 'who, what (animate)' and 'which (animate)' in SDZ. Within a NP, the two are differentiated by the presence of the /x-/ possessive prefix on the noun when there is a genitive. The same is true for *xhí*, which is the equivalent of both 'what (inanimate)' and 'which (inanimate)'.

As in English, it is ungrammatical to attempt to extract either a determiner or a possessive from the NP without pied-piping the NP:

(17) *¿Tú cù'á Juàny bè'cw?
which com:grab John dog

(Which did John grab dog?)

(18) *¿Tú cù'á Juàny x-pè'cw?
who com:grab John p-dog

(Whose did John grab dog?)

These facts are easily handled if we posit the following constraints:

(19) X' < specifier

X' precedes the specifier within XP

(20) *NP extraction

The specifier of NP must be a sister of N'.

Then the following tableau (for the possessive case) shows how the correct candidate is selected.

(21)

	*NP extraction	Align (IntF,L, S', L)	X' < specifier
¿Tú cù'á Juàny x-pè'cw? (Whose John grabbed dog?)	*!		
☞¿Tú x-pè'cw cù'á Juàny? (Whose dog grabbed John?)			*
¿X-pè'cw tú cù'á Juàny? (Dog whose grabbed John?)		*!	

Once again, these facts present a real difficulty for the Kaynean view of phrase structure. In this example, the initial position of specifiers seen in wh-questions must probably be taken as the basic order, with the final position of specifiers in declaratives derived via movement of the head, possibly along the following lines shown in figure 3:

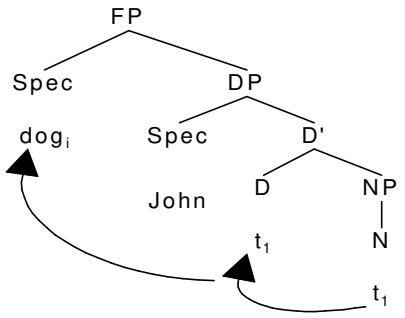

Figure 3 A possible derivation

In this tree, FP represents a maximal projection headed by some feature (possibly Case or Number) and N moves from the head of NP to the head of FP via the empty D node.

The unanswered question, of course, is why this movement must occur when the FP is *in situ* but may not appear when the phrase is pied-piped to the front of S'. One could claim that only the DP gets pied-piped, but this would raise two questions:

1.) Why is FP pied-piping is not possible? and 2.) If N is forced to move to the head of FP to check some feature, how is this feature checked if only DP is moved?

The optimality theoretic account of constituent ordering doesn't encounter these problems. In this view, NP can have either of the two orders shown in figure 4.

Figure 4 Two possible orders for PP

The choice is determined by violable constraints, and a language like SDZ can easily show both possibilities in different contexts. This account also correctly connects the word order variation seen in NPs to that seen in the same conditions for PPs.

6 **Complications**

What happens when we attempt to question the specifier of the object of a prepostion in SDZ? The following examples show that there are two grammatical results:

(22) Ù-díny Juàny bè'cw cùn yàg ré'.
com-hit John dog with stick that

'John hit the dog with that stick.'

(23) ¿Cùn xhí yàg ù-díny Juàny bè'cw?
with which stick com-hit John dog

'With which stick did John hit the dog?'

(24) ¿Xhí cùn yàg ù-díny Juàny bè'cw?
which with stick com-hit John dog

(Which with stick did John hit the dog?)

Three other logically possible candidates are ungrammatical:

(25) *¿Xhí yàg cùn ù-díny Juàny bè'cw?
which stick with com-hit John dog

(26) *¿Yàg xhí cùn ù-díny Juàny bè'cw?
stick which with com-hit John dog

(27) *¿Xhí yàg ù-díny Juàny bè'cw cùn?
which stick com-hit John dog with

Exactly the same facts are found with the possessive:

(28) ¿Cùn tú x-cyàg ù-díny Juàny bè'cw?
with whose p-stick com-hit John dog

'With whose stick did John hit the dog?'

(29) ¿Tú cùn x-cyàg ù-díny Juàny bè'cw?
whose with p-stick com-hit John dog

(Whose with stick did John hit the dog?)

(30) *¿Tú x-cyàg cùn ù-díny Juàny bè'cw?
whose p-stick with com-hit John dog

(31) *¿X-cyàg tú cùn ù-díny Juàny bè'cw?
p-stick whose with com-hit John dog

(32) *¿Tú x-cyàg ù-díny Juàny bè'cw cùn?
whose p-stick com-hit John dog with

The two grammatical possibilities for such questions, with suggested labels, are shown below:

(33) a. Prep Wh N ..... (P-initial question)
b. Wh Prep N ..... (Wh-initial question)

Due to space restrictions, this paper only examines the P-initial questions.[6]

The key to explaining why P-initial questions occur is understanding the constraints that rule out alternative candidates. Consider again the following pair (repeated from above):

(34) ¿Cùn tú x-cyàg ù-díny Juàny bè'cw?
with whose p-stick com-hit John dog

'With whose stick did John hit the dog?'

(35) *¿Tú x-cyàg cùn ù-díny Juàny bè'cw?
whose p-stick with com-hit John dog

The candidate sentence in (37) requires a structure for PP in which two ordering constraints— X ≺ YP and X' ≺ specifier—are violated. We have seen that individually both of these constraints are outranked by Align (IntF, L, S', L). However, it seems that a candidate which simultaneously violates both ordering preferences is completely ruled out. To account for this, I will follow the now standard assumption in phonology that the conjunction of constraints may be separately ranked. The ungrammaticality of the following example also shows us that of the two ordering preferences, X ≺ YP outranks X'≺ specifier:

(36) *¿X-cyàg tú cùn ù-díny Juàny bè'cw?
p-stick whose with com-hit John dog

We can account for success of the P-initial candidate relative to the other candidates with the following tableau:

	*P-strand	X'<Spec /\ X < YP	Align (IntF,L, S', L)	X < YP	X'<Spec
¿X-cyàg tú cùn ù-díny Juàny bè'cw? (Stick whose with hit John the dog)			*	*!	
☞¿Cùn tú x-cyàg ù-díny Juàny bè'cw? (With whose stick hit John the dog)			*		*
¿Tú x-cyàg cùn ù-díny Juàny bè'cw? (Whose stick with hit John the dog)		*!		*	*
¿Tú x-cyàg ù-díny Juàny bè'cw cùn? (Whose stick hit John the dog with)	*!				*

7 **Conclusion**

In this paper, I hope to have demonstrated that an approach which accounts for word-order variation through violable constraints is able to provide a simple explanation of some otherwise difficult facts in the syntax of San Dionicio Ocotepec Zapotec. I do not doubt that it is possible to construct some account of these data which would make them compatible with Kayne's (1994) approach to phrase structure; with enough maximal projections and movements almost any conceivable word order can be derived. But I would argue that any account of these facts which fails to recognize the competition between alignment constraints and ordering constraints will fall to capture the essence of what is really going on in the language.

Notes

1. Thanks are due to Lee Bickmore, Javier Gutierrez Rexach, Ed Keer, Jerrold Sadock, and Robert Van Valin for helpful discussions of this paper. Special thanks to Luisa Martínez, who supplied all the data.

The orthography for SDZ is adapted from the practical orthographies for other Zapotec languages spoken in the Valley of Oaxaca. In the SDZ orthography, <x> = /ʒ/ before a vowel and /ʃ/ before a consonant, <xh> = /ʃ/, <dx> = /dʒ/, <ch> = /ʧ/, <c> = /k/ before back vowels, <qu> = /k/ before front vowels, and <eh> = /ɛ/. SDZ is a language with four contrastive phonation types: breathy <Vj>, creaky <VV>, checked <V'>, and plain <V>.

Glosses use the following abbreviations: com = completive aspect, p = possessed.

2. As suggested by King (1995) and Bresnan (1998), Universal Grammar allows clauses with both endocentric (IP) and lexocentric (S) organizations. Some VSO languages are best analyzed with the LFG analogue of head-movement to INFL; others show a flatter syntax.

3. SDZ uses the wh-word *xhí* 'what, which' for inanimates and *tú* 'who, what, which' for animates (both people and animals). I've glossed the examples with the appropriate English wh-word.

4. Quiegolani Zapotec is distantly related to SDZ, but shows the same basic word-order patterns for questions of this type. Black (1994:171) insightfully notes the problems with this structure and suggests that the correct solution may require constraint ranking. She notes that the observed data could be derived if the Wh-criterion (requiring a Wh-phrase in [Comp, Spec]) outranks the ECP (which rules out preposition-stranding, on the assumption that P is not a proper governor).

Although Black does not develop an optimality-theoretic solution for her data, her suggestion was an inspiration for the treatment of SDZ given in this paper.

5. In SDZ alienable possession, the possessed N has a /x-/ prefix, and the initial consonant of the noun stem is devoiced. In a few cases there are irregular changes to the initial consonant, e.g. *yàg* 'stick', *x-cyàg Juàny* 'John's stick'.

6. For a fuller version of this paper which includes a discussion of the analysis of the wh-initial pattern, please see http://www.albany.edu/anthro/fac/broadwell.htm.

References

Black, Cheryl. 1994. Quiegolani Zapotec syntax. PhD thesis. University of California, Santa Cruz.

Bresnan, Joan. 1998. Optimal syntax. Ms. Stanford University. (Available at http://www-lfg.stanford.edu/lfg/bresnan/pt3.ps.)

Chomsky, Noam. 1995. The minimalist program. Cambridge, MA: MIT Press.

Falk, Yehuda. 1983. Constituency, word order, and phrase structure rules. Linguistic Analysis 11:331-360.

Farmer, Ann, 1984. Modularity in syntax: A study of Japanese and English. Cambridge, MA: MIT Press.

Grimshaw, Jane. 1991. Extended projection. Ms. Dept. of Linguistics and Center for Cognitive Science, Rutgers University.

Grimshaw, Jane. 1997. Projection, heads, and optimality. Linguistic Inquiry 28:73-422.

Kayne, Richard. 1981. On certain differences between French and English. Linguistic Inquiry 12:349-71.

Kayne, Richard. 1994. The antisymmetry of syntax. Cambridge, MA: MIT Press.

King, Tracy Holloway. 1995. Configuring topic and focus in Russian. Stanford: CSLI.
Pollard, Carl and Ivan Sag. 1987. Information-based syntax and semantics. Stanford:CSLI.
Smith Stark, Thomas. 1988. 'Pied-piping' con inversion en preguntas parciales. Ms. Centro de estudios lingüísticos y literarios, Colegio de México y Seminario de lenguas indígenas.
Stowell, Timothy. 1981. Origins of phrase structure. PhD thesis, MIT.
van Riemsdijk, Henk. 1978. A case study in syntactic markedness: The binding nature of prepositional phrases. Dordrecht: Foris.