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A Markedness Subhierarchy in Syntax
Optimality and Inversion in Spanish*

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0 Introduction

Spanish exhibits a case of what has been referred to by Rizzi (1991) as *residual verb second*: verb second-like facts in a certain subset of the syntactic constructions of the language. The subset of syntactic constructions showing verb second in Spanish is the set of *wh*-questions. Following the generative literature on the subject (beginning with Torrego 1984 for Spanish), I will henceforth refer to this phenomenon as *inversion*,[1] a descriptive term highlighting the fact that when a nonsubject *wh*-phrase is fronted in its clause, the residual verb second effect gives the inverted order verb–subject as opposed to the normal (i.e., base-generated) order subject–verb. There is some very interesting variation to the gross generalization that Spanish exhibits inversion in *wh*-questions. In short, whether or not a *wh*-question will require inversion in a given dialect[2] depends on two factors: whether it is a matrix or a subordinate *wh*-question, and how argumental the moved *wh*-phrase is.

This latter factor was first discovered by Torrego (1984), who noted that in her dialect, argument *wh*-phrases (*quién* 'who' and *qué* 'what') require inversion while adjunct *wh*-phrases (*dónde* 'where', *cuándo* 'when', *cómo* 'how' and *por qué* 'why') do not. Goodall (1991ab) and Suñer (1994) have noted that other dialects place the wedge between *wh*-phrase types (if any) in places other than the argument/adjunct juncture. The best way to illustrate this is with a few key dialectal examples, some (1a-c) from the works cited above and the others (1d-f) from a judgment survey of 30 speakers that I conducted in early 1995.

(1) *Examples of dialectal variation with respect to inversion*

a. No inversion with any *wh*-phrases. (Suñer 1994)
b. Inversion with argument *wh*-phrases only. (Torrego 1984, Suñer 1994)
c. Inversion with all but reason *wh*-phrases (i.e., *por qué* 'why'). (Goodall 1991ab)
d. Inversion with all *wh*-phrases in matrix clauses; all but reason *wh*-phrases in subordinate clauses. (Survey results)
e. Inversion with all but reason *wh*-phrases in matrix clauses; only argument *wh*-phrases in subordinate clauses. (Survey results)
f. Inversion with argument *wh*-phrases in matrix clauses; no inversion in subordinate clauses. (Survey results)

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[1] Torrego (1984) distinguishes between *obligatory* and *free inversion*; I concentrate on the former and call it simply *inversion*, analyzing the latter differently in §4. The reader is asked to keep in mind that when I say *inversion*, I mean Torrego's *obligatory inversion* (see fn. 16 for more on this point).

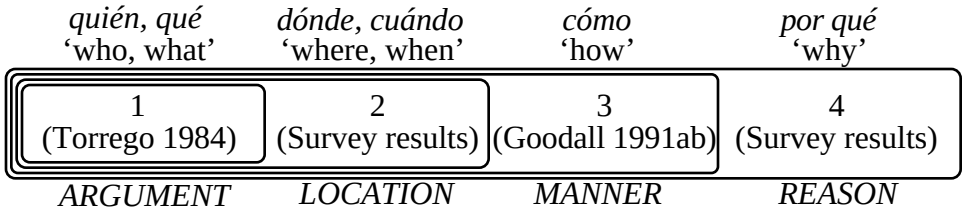
[2] I use the term 'dialect' very broadly, to refer to any variety of Spanish that is consistent with the particular patterns of inversion to be discussed in detail below. There is no direct claim made about any other properties these varieties may share, nor about their geographical clustering. See §4 for more on this point.

As far as I can tell from the cited works, the dialects in (1a-c) do not show a distinction between matrix and subordinate *wh*-questions; in any case, I have also found in my survey examples of dialects (1a) and (1c) (but not (1b); see fn. 30). These examples show part of a more intricate implicational relationship among *wh*-phrase types: inversion is either not possible (1a), required only with argument (the most argumental) *wh*-phrases (1b), or required with all but reason (the least argumental) *wh*-phrases (1c).

The diagram in (2) fills in the rest of the argumental continuum, incorporating more results from my survey. As shown, there are five patterns with respect to inversion based solely on the argumental nature of the *wh*-phrase. They are numbered 0–4 for convenience: inversion is required in the matrix/subordinate clause of dialects with pattern X with a proper subset of the *wh*-phrase types that require inversion in the matrix/subordinate clause of dialects with pattern X+1.

(2) *Implicational relationship among* wh-*phrase types*

A matrix/subordinate *wh*-question requires inversion if the *wh*-phrase is



0 = no inversion (Suñer 1994)

The dialects in (1d-f), with a matrix/subordinate distinction, are exclusively from my survey. What these examples show is a subset relationship between matrix and subordinate clause types: no dialect can require inversion with more *wh*-phrase types in a subordinate clause than in a matrix clause. Put another way:

(3) *Subset relationship between matrix and subordinate clause types*

In a given dialect, subordinate clauses display inversion with a subset of the *wh*-phrase types that matrix clauses display inversion with.[3]

What this means is that out of twenty-five conceivable combinations of matrix/subordinate inversion possibilities based on the implicational relationship (2) alone (five matrix times five subordinate), only fifteen are actual combinations, as shown by the table in (4). Following the convention adopted in (2), a number from 0 to 4 in a cell in the "Matrix" and "Subordinate" rows of the table indicates which *wh*-phrase types require inversion in *wh*-questions of that clause-type (0 = none, 1 = arguments, … , 4 = all). The twenty-five possible combinations are correspondingly labelled with the *n*th letter of the alphabet, and the actual combinations that obey the subset relationship (3) are boxed.

(4) *Conceivable dialectal possibilities (actualities boxed; obeying (3))*

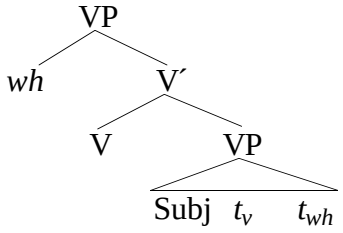
Dialects	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Matrix	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4	4	4
Subordinate	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4

[3] Note that this is not a *proper* subset relationship, since there are dialects with no matrix/subordinate distinction.

In this paper, I give a complete formal account of these facts within the framework of Optimality Theory (OT; Prince & Smolensky 1993) as applied to syntax by Grimshaw (1995). I maintain that inversion is caused by obligatory movement of the verb to the left of the subject, into the head position of the projection whose specifier is occupied by the *wh*-element. This is shown schematically in (5a); all projections are labelled VP since they are assumed to be functional projections in the extended projection (Grimshaw 1991) of the lexical verb. Central to the account is my claim that *wh*-questions without inversion involve adjunction of the *wh*-element, as in (5b).[4] Since adjunction creates no new head position, inversion is unnecessary and impossible.

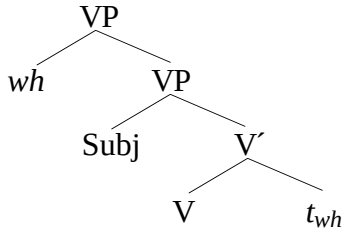
(5) *Tree and bracketed diagrams of inversion vs. no inversion*

a. *Inversion*



$[_{VP}\ wh\ [_{V'}\ V\ [_{VP}\ Subj\ t_v\ t_{wh}\ ]\ ]\ ]$

b. *Adjunction (no inversion)*



$[_{VP}\ wh\ [_{VP}\ Subj\ [_{V'}\ V\ t_{wh}\ ]\ ]\ ]$

Departing slightly from Grimshaw (1995),[5] I assume that *wh*-phrases are forced to move to a c-commanding position from which their scope is interpreted (matrix or subordinate clause-initial position) by OP-SCOPE (6a), while they prefer to move to a clause-initial *specifier* position by OP-SPEC (6b). Assuming that OP-SCOPE is an inviolable principle of interpretation, then the choice between inversion (5a) and adjunction (5b) depends on the ranking between OP-SPEC and STAY (6c), the constraint against movement.

(6) *Core principle and constraints*

a. OP-SCOPE (principle of interpretation; inviolable)
Syntactic operators must c-command the extended projection over which their scope is interpreted (matrix clause if it's a direct question, subordinate if indirect).

b. OP-SPEC (violable constraint; Grimshaw 1995)
Syntactic operators must be in specifier position.

c. STAY (violable constraint; Grimshaw 1995)
Trace is not allowed.

OP-SCOPE simply requires that syntactic operators have syntactic scope, regardless of the precise syntactic position from which the scope is taken; OP-SPEC prefers said scope to be taken from a specifier position. Since *wh*-phrases are syntactic operators, OP-SCOPE and OP-SPEC require movement of *wh*-phrases that aren't base-generated in appropriately c-commanding specifier positions. Such movement (in fact, any movement) violates STAY.

If OP-SPEC dominates STAY, then inversion will be preferred to adjunction since the *wh*-phrase will be in a specifier position, regardless of the fact that inversion incurs two STAY violations (one for *wh*-movement, one for head movement) and adjunction incurs only one (for

[4] I thank Viviane Déprez for planting the seed of this aspect of the analysis in my head. Déprez (1989, 1991) also argues for adjunction and movement to specifier (substitution) of *wh*, in a slightly different empirical and theoretical context.

[5] Apart from the separation of OP-SCOPE and OP-SPEC below, I propose that Grimshaw's constraint OB-HD (OBligatory HeaDs) is not a violable constraint. See §1.2 below for the details of this proposal.

wh-movement, required in any case by inviolable OP-SCOPE). If STAY dominates OP-SPEC, then adjunction will be preferred since the extra head movement involved in inversion is not motivated by any constraint that dominates STAY.

In §2, I discuss the issue of the "argumental nature" of *wh*-phrases. I propose that the different types of *wh*-phrases are called on by the different OP-SPEC constraints in (7a-d), which are universally ranked with respect to each other as in (7e) in what is called a *markedness subhierarchy*. The implicational relationship (2) is explained by the five different ways that STAY can be parochially ranked within the markedness subhierarchy.

(7) *OP-SPEC constraint family*

a. ARGOP-SPEC
Argument operators must be in specifier position.

b. LOCOP-SPEC
Location operators must be in specifier position.

c. MANOP-SPEC
Manner operators must be in specifier position.

d. REASOP-SPEC
Reason operators must be in specifier position.

e. *Markedness subhierarchy*
ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC

The subset relationship (3) is explained in §3 by the thirty different ways that STAY and the subordinate clause-specific constraint PROJ-PRIN(H) can be parochially ranked within the markedness subhierarchy.

(8) *Constraint regulating subordinate clauses*

PROJ-PRIN(H)
No movement into the head of a subordinate clause.

Since STAY is more *stringent* than PROJ-PRIN(H) (a violation of the latter entails a violation of the former but not vice versa), PROJ-PRIN(H) only has an independent effect when it is crucially ranked above a constraint that is itself crucially ranked above STAY.[6] The grammars predicted by the thirty different ways that STAY and PROJ-PRIN(H) can be ranked within the markedness subhierarchy are thus exactly the fifteen that obey the subset relationship (3).

Because there is only one unique output to any input in an OT grammar (save for the possibility of output candidates that tie on the constraint hierarchy), this account predicts that when adjunction (5b) is possible for a given *wh*-phrase in a given clause type in a given dialect, inversion (5a) for that *wh*-phrase in that clause type in that dialect is impossible, and vice versa. An account of the fact that the particular *word order* exemplified by inversion is possible in every dialect (Torrego's *free inversion*; see fn. 1) is given in §4, which also concludes the paper with a speculation as to why Spanish varies to the degree that it does with respect to inversion.

The account proposed here naturally explains the range of dialectal variation that exists in Spanish, solely through the interaction of conflicting constraints that are ranked and violable. This type of constraint interaction is the defining property of OT. The concept of a markedness hierarchy such as the one proposed here finds precedents in the now vast amount of work in OT: from Prince & Smolensky (1993), who propose one to explain the sensitivity of syllabification to

[6] Ranking PROJ-PRIN(H) just above STAY is no different than ranking it anywhere below STAY, because the two constraints do not themselves directly conflict. See §3 below for details.

the sonority hierarchy in phonology; to Legendre et al. (1995), who propose one to explain the sensitivity of long-distance *wh*-movement to the number of barriers crossed.

One of the main theoretical goals of this paper is to provide a case that highlights how markedness subhierarchies within OT directly explain implicational relations such as: "if an obstruent can be a coda, so can a nasal;" "if crossing one barrier is bad, so is crossing two;" "if inversion is required with a reason *wh*-phrase, it is also required with an argument *wh*-phrase." The independent rankings of conflicting constraints within a markedness subhierarchy, and the forced violation of constraints by dominating and conflicting (*crucially* dominating) constraints, explain implicational relations such as these in a straightforward manner. This effectively places the burden of grammatical variation not on the lexicon and in the form of abstract properties of already abstract categories, but on the grammar and in the form of different rankings of very general, substantive constraints, all of which are universally present, many of which conflict, and some of which are universally arrayed in markedness subhierarchies.

1 Basics of the Analysis

1.1 Grimshaw's (1995) analysis of English wh-*movement and inversion*

English has basic subject–verb–object word order. In matrix, nonsubject *wh*-questions, subject–verb word order is ungrammatical, and inversion (verb–subject word order) is required.[7] This is shown by the contrast between (9a) and (9b). The order subject–verb is obligatorily maintained in subordinate *wh*-questions, as shown in (9c-d).

(9) *English matrix and subordinate* wh-*questions*

a.	Matrix—inversion		*What has* Michael eaten?
b.	*Matrix—no inversion	*	*What* Michael *has* eaten?
c.	*Subordinate—inversion	*	I wonder *what has* Michael eaten.
d.	Subordinate—no inversion		I wonder *what* Michael *has* eaten.

Within current assumptions about syntactic structure, an analysis of inversion in English would have it that *wh*-movement, at least that of nonsubjects, *triggers* inversion in matrix clauses. More specifically, nonsubject *wh*-movement[8] creates an environment that prompts movement of the verb over the subject in matrix clauses but not in subordinate clauses.

In Grimshaw's (1995) analysis, the OP-SCOPE requirement (6a) is not inviolable. Rather, it is built into OP-SPEC, so a *wh*-phrase taking scope from an adjoined position doesn't satisfy the constraint. Grimshaw also assumes an additional violable constraint, OB-HD (for OBligatory HeaDs), demanding that a projection have a (filled) head. In her system, OP-SPEC and OB-HD together trigger inversion, if both dominate STAY. OP-SPEC ranked above STAY forces *wh*-movement to the specifier position of an otherwise unnecessary functional projection c-commanding the extended projection of the lexical verb; OB-HD ranked above STAY forces the filling of the head of that functional projection by head movement. The following structure shows how this system works with the English example in (9a).[9]

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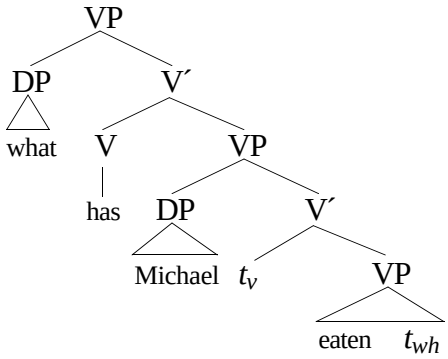
[7] Though inversion is limited to auxiliary verbs in English. See Grimshaw (1995) for detailed discussion and analysis.

[8] Since this paper is devoted in its entirety to nonsubject *wh*-movement, I will henceforth not distinguish it from subject *wh*-movement and will call it simply *wh*-movement.

[9] The symbol '»' indicates the domination relation in Optimality-theoretic notation. Constraints separated by commas within curly brackets are constraints that are not crucially ranked with respect to each other, because they do not directly conflict and intervening constraints distinguishing their respective ranking are not at issue.

(10) *{OP-SPEC, OB-HD} » STAY*



Constraints satisfied (√) / violated (*)

√OP-SPEC
√OB-HD
**STAY

The tableau in (11) shows the competition among plausible candidate outputs of the input to (10).

(11) *{OP-SPEC, OB-HD} » STAY*

Candidates: Matrix clause	OP-SPEC	OB-HD	STAY
a. $[_{VP}$ Michael $[_{V'}$ has $[_{VP}$ eaten what]]]	*!		
b. $[_{XP}$ what $[_{X'}$ ø $[_{VP}$ Michael $[_{V'}$ has $[_{VP}$ eaten t_{wh}]]]]]		*!	*
c. = (10) ☞ $[_{VP}$ what $[_{V'}$ has $[_{VP}$ Michael $[_{V'}$ t_v $[_{VP}$ eaten t_{wh}]]]]]			**

Candidate (11a) is the bare verbal projection, with nothing moved. OB-HD is fully satisfied, as is STAY; but high-ranking OP-SPEC is crucially violated, as indicated by the asterisk. Since the other two candidates fare better on OP-SPEC, this candidate loses, as indicated by the exclamation mark. Candidate (11b) satisfies OP-SPEC at the expense of STAY by moving the *wh*-phrase to the specifier of some headless XP above VP. This candidate violates high-ranking OB-HD, and so loses. Candidate (11c) satisfies OP-SPEC and OB-HD at the double expense of STAY. This is the grammatical structure that is diagrammed in (10). Since STAY is crucially low-ranked, these particular violations of STAY are irrelevant, as indicated by the shading, to this candidate's selection as *optimal*, as indicated by the pointing hand.[10]

This establishes that OP-SPEC and OB-HD dominate STAY in English. But if this is the case, how is it that auxiliaries *fail* to invert in subordinate clauses? Grimshaw's answer is that the constraint PROJ-PRIN, given below in (12), dominates OB-HD, forcing violation of OB-HD just in subordinate clauses.[11]

(12) *Constraint regulating subordinate clauses*

PROJ-PRIN
No adjunction to subordinate clauses, and no movement into the head of a subordinate clause.

[10] Further gratuitous violations of STAY are not tolerated — the optimal candidate here competes against other candidates with more STAY violations, and wins because it has less. For more discussion of optimal candidate selection in Optimality Theory, see Prince & Smolensky (1993), especially the Appendix. I purposely abstract away from any possible A-movement of the subject (e.g., from the lower Spec/VP), which may also violate STAY but is independently motivated by Grimshaw's SUBJ constraint (ranked higher than STAY in English) and so is not relevant here.

[11] The formulation of PROJ-PRIN is a generalization of proposals by Rizzi & Roberts (1989) and McCloskey (1992).

The underlined portion of the constraint is what forces the OB-HD violation; to satisfy OB-HD in a subordinate *wh*-question, there must be movement into the head of the subordinate clause, but this would violate PROJ-PRIN, so the movement is blocked if PROJ-PRIN dominates OB-HD. Leaving the *wh*-phrase in situ to avoid both the PROJ-PRIN and OB-HD violations is not an option, which shows that OP-SPEC also dominates OB-HD in English. The tableau in (13) shows this.

(13) *{PROJ-PRIN, OP-SPEC} » OB-HD » STAY*

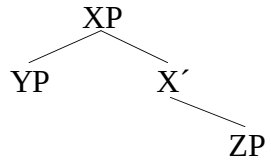
Candidates: Subordinate clause	PROJ-PRIN	OP-SPEC	OB-HD	STAY
a. $[_{VP}$ Michael $[_{V'}$ has $[_{VP}$ eaten what]]]		*!		
b. ☞ $[_{XP}$ what $[_{X'}$ ø $[_{VP}$ Michael $[_{V'}$ has $[_{VP}$ eaten t_{wh}]]]]]			*	*
c. $[_{VP}$ what $[_{V'}$ has $[_{VP}$ Michael $[_{V'}$ t_v $[_{VP}$ eaten t_{wh}]]]]]	*!			* *

The following subsection argues for an alternative to this analysis, in which OB-HD is not a violable constraint in the theory but rather an inviolable principle of X´ Theory. This proposal forms the core of the analysis of inversion in Spanish.

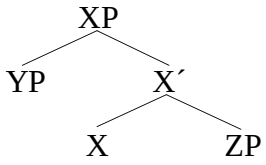
1.2 wh-*movement and inversion without OB-HD*

Consider the structures in (14), where YP and X have both been moved.

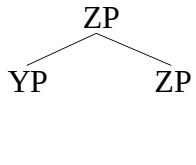
(14) *X´ Structures*

a. 

*OB-HD, *STAY

b. 

**STAY

c. 

*OP-SPEC, *STAY

Suppose YP in (14) is a syntactic operator; a *wh*-phrase. In (14a), YP has satisfied OP-SPEC by moving from ZP to the specifier of a (literally) headless projection XP above ZP, violating OB-HD and STAY once each. In (14b), YP has satisfied OP-SPEC by moving from ZP to the specifier of a projection XP headed by some X above ZP, satisfying OB-HD by inverting some head into X, violating STAY once for each of the two movements. In (14c), YP has violated OP-SPEC and STAY once each by moving from ZP to a position adjoined to ZP, vacuously satisfying OB-HD by creating no projection in need of a head.

Grimshaw (1995:§8), assuming that adjunction of *wh*-phrases as in (14c) is not an option, argues that (14a) is the representation of a *wh*-question with no inversion (such as a subordinate *wh*-question in English) and that (14b) is the representation of a *wh*-question with inversion (such as a matrix *wh*-question in English). I argue instead that there is no such thing as a headless projection like (14a). I propose that instead of OB-HD, the requirement that a projection have a head is an inviolable principle of X´ Theory. Maximal projection movements without an obligatorily following head, then, are all cases of *adjunction* to a maximal projection, as in (14c).

This type of structure satisfies OP-SCOPE but violates OP-SPEC, which I assume to be separate requirements (the latter being a violable constraint and the former being an inviolable principle of interpretation; see §1.4.2). Since matrix *wh*-questions in English display inversion,

wh-movement in this case is movement to specifier as in (14b), satisfying OP-SPEC. Since subordinate *wh*-questions in English do not display inversion, *wh*-movement in this case is adjunction as in (14c), in violation of OP-SPEC. The broad claim made here is that *all* maximal projection movements that require a following head are movements to specifer, while all maximal projection movements that do not require a following head are adjunctions.

Under this view, both *wh*-movement and inversion are explained simply by ranking OP-SPEC above STAY. For the operator to be in a c-commanding specifier position to satisfy OP-SCOPE and OP-SPEC, it must move to a projection *with a head*. The movement of the operator violates STAY. For there to be a head in this projection, a head must move into it. This movement also violates STAY. Satisfaction of OP-SPEC can thus force *two* violations of STAY.

The tableau in (16) shows the competition between two plausible candidate outputs of the input to (10). The difference between tableau (16) and tableau (11) is the absence in (16) of (a) OB-HD (OB-HD is not a violable constraint), (b) a "headless projection" candidate violating OB-HD (because that candidate would not be a legitimate X´ structure), and (c) a candidate with no *wh*-movement (because that violates inviolable OP-SCOPE). Instead, a candidate is considered with adjunction of the *wh*-phrase.

(16) *OP-SPEC » STAY*

	Candidates: Matrix clause	OP-SPEC	STAY
inv ☞	$[_{VP}$ what $[_{V'}$ has $[_{VP}$ Michael $[_{V'}$ t_v $[_{VP}$ eaten t_{wh}]]]]]		* *
adj	$[_{VP}$ what $[_{VP}$ Michael $[_{V'}$ has $[_{VP}$ eaten t_{wh}]]]]	*!	*

The first candidate in (16), labelled *inv*, shows *wh*-movement to specifier and inversion, satisfying OP-SPEC at the double expense of STAY. The second candidate, labelled *adj*, shows *wh*-adjunction and no inversion, satisfying OP-SCOPE, the inviolable principle of interpretation, at the expense of STAY, and avoiding a second violation of STAY at the expense of OP-SPEC. As the pointing hand shows, *inv* wins, because it best satisfies the constraint hierarchy: only low-ranked STAY is violated by it.

The absence of inversion in English subordinate clauses is understood here as being due to forced adjunction of *wh*-phrases to subordinate clauses. What could force this violation of PROJ-PRIN (12), half of which demands no adjunction to subordinate clauses? Grimshaw notes that "it is possible that PROJ-PRIN is properly understood as two constraints, one on adjunction and one on head movement, which both regulate subordinate clauses. In this case, it will be possible to rank them separately" (p. 23).

It seems that this separation is necessary in this OB-HDless system (in some sense; see §1.4.3). To avoid moving into the head of a subordinate clause and violating one half of PROJ-PRIN, it is necessary to adjoin the *wh*-phrase to the subordinate clause, violating the other half. This is because movement into the head of a subordinate clause, which would be forced by *wh*-movement to specifier to satisfy OP-SPEC, would violate what I call PROJ-PRIN(H) — the half of PROJ-PRIN demanding no movement into the head of a subordinate clause. This establishes that in English, PROJ-PRIN(H) dominates OP-SPEC and the other half of PROJ-PRIN, which I call PROJ-PRIN(A), since it forces violation of each. This is shown by the tableau in (17), showing the subordinate clause versions of the same candidates as (16).[12]

[12] I occasionally use P-P(H) and P-P(A) as abbreviations for PROJ-PRIN(H) and PROJ-PRIN(A), respectively.

(17) *PROJ-PRIN(H) » {OP-SPEC, PROJ-PRIN(A)}*

	Candidates: Subordinate clause	P-P(H)	OP-SPEC	P-P(A)
inv	$[_{VP}$ what $[_{V'}$ has $[_{VP}$ Michael $[_{V'}$ t_v $[_{VP}$ eaten t_{wh}]]]]]	*!		
adj ☞	$[_{VP}$ what $[_{VP}$ Michael $[_{V'}$ has $[_{VP}$ eaten t_{wh}]]]]		*	*

This time, *adj* wins because it best satisfies the relevant constraint hierarchy. Highest-ranked PROJ-PRIN(H) forces violation of OP-SPEC and PROJ-PRIN(A) with *wh*-adjunction, since *wh*-movement to specifier and inversion will violate PROJ-PRIN(H) (as shown by the failure of *inv*).[13]

The immediate benefit of dispensing with OB-HD as a violable constraint is that it cannot be differentially ranked with other constraints, enlarging the set of possible rankings and thus the set of possible grammars. For instance, Grimshaw (1995:§7) notes that the ranking in (18) predicts a grammar with *wh*-movement and inversion in matrix clauses and neither in subordinate clauses. This does not, as far as either Grimshaw or I are aware, correspond to any known language.

(18) *Problematic ranking*

PROJ-PRIN » OB-HD » OP-SPEC » STAY

Because PROJ-PRIN blocks movement into the head of a subordinate clause in this system by being ranked above OB-HD (as in English), OB-HD will be violated whenever there is subordinate clause *wh*-movement compelled by OP-SPEC. Ranking OB-HD above OP-SPEC avoids this violation of OB-HD, by blocking *wh*-movement in subordinate clauses. This is shown by the contrast in (19) between matrix and subordinate clause *wh*-movement under this ranking, using English candidates for easy comparison with the tableaux seen so far.

(19) *PROJ-PRIN » OB-HD » OP-SPEC » STAY*

a. Candidates: Matrix clause	PROJ-PRIN	OB-HD	OP-SPEC	STAY
$[_{VP}$ Michael $[_{V'}$ has $[_{VP}$ eaten what]]]			*!	
$[_{XP}$ what $[_{X'}$ ø $[_{VP}$ Michael $[_{V'}$ has $[_{VP}$ eaten t_{wh}]]]]]		*!		*
☞ $[_{VP}$ what $[_{V'}$ has $[_{VP}$ Michael $[_{V'}$ t_v $[_{VP}$ eaten t_{wh}]]]]]				* *

b. Candidates: Subordinate clause	PROJ-PRIN	OB-HD	OP-SPEC	STAY
☞ $[_{VP}$ Michael $[_{V'}$ has $[_{VP}$ eaten what]]]			*	
$[_{XP}$ what $[_{X'}$ ø $[_{VP}$ Michael $[_{V'}$ has $[_{VP}$ eaten t_{wh}]]]]]		*!		*
$[_{VP}$ what $[_{V'}$ has $[_{VP}$ Michael $[_{V'}$ t_v $[_{VP}$ eaten t_{wh}]]]]]	*!			* *

At the center of this problematic ranking is OB-HD, struggling to be satisfied under compulsion of PROJ-PRIN. With the inviolable OP-SCOPE principle forcing (at least) *wh*-adjunction, and with the splitting of PROJ-PRIN into separate constraints, the need for OB-HD is obviated and this problem all but vanishes. (See §§1.4.2–1.4.3 for more on OP-SCOPE and the splitting of PROJ-PRIN.)

[13] Since it has already been established that STAY is ranked below OP-SPEC, it is irrelevant to the decision between the candidates in this case and so has been omitted for visual convenience.

I have shown here that the same results that Grimshaw obtains with OB-HD as a violable constraint can be obtained with it as an inviolable principle of X´ Theory. Since satisfaction of OP-SPEC (or any constraint that requires movement to specifier and hence inversion) entails satisfaction of OB-HD in this view, then OP-SPEC itself can do the job in constraint rankings that OB-HD does in Grimshaw's system. OB-HD was only active in Grimshaw's system if forced to be by another constraint, specifically OP-SPEC. Thus, nothing more needs to be said about how to reanalyze/mimic the work done by OB-HD when it is embedded in a constraint hierarchy.

How a language chooses to satisfy the now inviolable requirement of OB-HD in a given context will be entirely determined by the ranking of other constraints. For instance, if it is satisfied by inversion, then STAY is ranked lower than other constraints that can be violated by head-fillers; if it is satisfied by direct insertion of a dummy head, then FULL-INT, the constraint against meaningless elements, is the lowest-ranked of such constraints; etc. Complex interactions of these and other constraints can yield "mixed" systems like English with auxiliary inversion and *do* support with main verbs in matrix but not subordinate *wh*-questions, as Grimshaw (1995) has already successfully shown.

The broad claim underlying this proposal, that all movements of maximal projections that require a following head are movements to specifier and that all movements of maximal projections that do not require a following head are adjunctions, has obvious consequences for any theory that incorporates Spec-Head "feature checking" constraints; constraints of the general form "be in some specifier" like OP-SPEC. If movement motivated by what seems to be (s-structure) feature checking does not require a following head, then it is not movement to specifer, it is adjunction. Thus, this movement cannot be motivated by feature checking in any strict sense (there is no direct Spec-Head relation), and its motivation must be found elsewhere.

Any maximal projection movements that are substitutions in some contexts and adjunctions in others, like the matrix/subordinate *wh*-question distinction in English, will need to be motivated by a "be in some specifier" constraint and an OP-SCOPE-type principle (or similar constraint, ranked highly enough). The soft prediction made by the present proposal, then, is that such movements will only be movements of syntactic operators or other elements that require syntactic scope. I leave this prediction open for future evaluation.[14]

1.3 Spanish inversion and different operator types

The previous subsection explained how the inversion pattern in English *wh*-questions can be explained without using Grimshaw's OB-HD constraint. Now we turn to Spanish. Spanish has basic subject–verb–complement/adjunct word order, as shown in (20).

(20) *Basic subject–verb–complement/adjunct word order*

a. S–V–Complement
Miguel [se comió]$_V$ la manzana.
M ate.3s the apple
'Miguel ate the apple.'

b. S–V–Adjunct
Miguel [se fue]$_V$ a casa.
M went.3s to house
'Miguel went home.'

[14] Topicalization may be a fruitful avenue for research in this area, as suggested to me by Bruce Tesar and Paul Smolensky.

Inversion is, depending on the dialect, the clause-type and the argumental nature of the *wh*-phrase, obligatory in *wh*-questions.[15] Consider the dialect in (1f), which I call Spanish$_f$ for convenience. Spanish$_f$ requires inversion with arguments but not adjuncts in matrix clauses, and with neither in subordinate clauses, as shown by the examples in (21) and (22).[16]

(21) *Spanish$_f$ matrix* wh-*questions*

a.	*Arg*–V–S		¿Qué [se comió]$_V$ Miguel? *what ate.3s M* 'What did Miguel eat?'
b.	**Arg*–S–V	*	¿Qué Miguel se comió?
c.	*Adj*–S–V		¿Dónde Miguel [se fue]$_V$? *where M went.3s* 'Where did Miguel go?'

(22) *Spanish$_f$ subordinate* wh-*questions*

a.	*Arg*–S–V	Me pregunto qué Miguel [se comió]$_V$. *wonder.1s what Miguel ate.3s* 'I wonder what Miguel ate.'
b.	*Adj*–S–V	Me pregunto dónde Miguel [se fue]$_V$. *wonder.1s where Miguel went.3s* 'I wonder where Miguel went.'

Suppose that the only distinction between operator types is the one made in Spanish$_f$, between argument *wh*-phrases (*Arg*) and adjunct *wh*-phrases (*Adj*). From the data in (21), we know that in matrix clauses, *Arg* triggers inversion while *Adj* does not. In terms of the basic analysis of §1.2 above, *Arg* satisfies OP-SPEC at the expense of an extra violation of STAY, the head movement that is not independently motivated by OP-SCOPE, while *Adj* violates OP-SPEC to better satisfy STAY.

The conclusion is that each operator type has a separate OP-SPEC constraint referring to it: ARGOP-SPEC and ADJOP-SPEC, respectively. ARGOP-SPEC must dominate STAY, since *Arg* must move to a specifier position and trigger inversion, forcing two STAY violations. On the other hand, STAY must dominate ADJOP-SPEC, since *Adj* must adjoin and not trigger inversion, forcing only one STAY violation (due to the inviolable OP-SCOPE).

The tableaux in (23) below show how decisions of optimality are made in Spanish$_f$ matrix *wh*-questions. The two relevant candidates in each case are the now familiar *inv* and *adj*. Tableau (23a) shows what happens with *Arg*. Since ARGOP-SPEC dominates STAY, *inv* wins: it is better to violate STAY a second time than to not have the operator in specifier position (ADJOP-SPEC is vacuously satisfied; there is no *Adj* in this case). Tableau (23b) shows what happens with *Adj*. Since STAY dominates ADJOP-SPEC, *adj* wins: it is better to not have the operator in specifier position than to violate STAY a second time (ARGOP-SPEC is vacuously satisfied).

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[15] Verb–subject word order is in fact always possible, even in declaratives; it is known as *free inversion* (see fn. 1). For this reason, verb–subject word order is not considered when the subject–verb word order that results from *wh*-adjunction is grammatical. See the analysis in §4 of "free" inversion.

[16] An inverted question mark '¿' before an example is in accord with Spanish orthography and not a grammaticality judgment. I leave some space between a judgment symbol and the sentence it corresponds to, as in (21b).

(23) *ARGOP-SPEC » STAY » ADJOP-SPEC*

a. Candidates: Matrix clause, Argument operator	ARGOP-SPEC	STAY	ADJOP-SPEC
inv ≈ (21a) ☞ [$_{VP}$ *Arg* [$_{V'}$ V [$_{VP}$ Subj [$_{V'}$ t_v t_{wh}]]]]		* *	
adj ≈ (21b) [$_{VP}$ *Arg* [$_{VP}$ Subj [$_{V'}$ V t_{wh}]]]	*!	*	

b. Candidates: Matrix clause, Adjunct operator	ARGOP-SPEC	STAY	ADJOP-SPEC
inv [$_{VP}$ *Adj* [$_{V'}$ V [$_{VP}$ Subj [$_{V'}$ t_v t_{wh}]]]]		**!	
adj ≈ (21c) ☞ [$_{VP}$ *Adj* [$_{VP}$ Subj [$_{V'}$ V t_{wh}]]]		*	*

With PROJ-PRIN(H) ranked above ARGOP-SPEC, the Spanish$_f$ subordinate *wh*-question examples in (22) are predicted. Since PROJ-PRIN(H) dominates ARGOP-SPEC by hypothesis and ADJOP-SPEC by transitivity, *adj* wins in subordinate clauses for both *Arg* (24a) and *Adj* (24b). It is better to not have either operator in specifier position than to violate PROJ-PRIN(H).[17]

(24) *PROJ-PRIN(H) » ARGOP-SPEC » STAY » ADJOP-SPEC*

a. Candidates: Subordinate clause, Argument operator	P-P(H)	ARGOP-SPEC	STAY	ADJOP-SPEC
inv [$_{VP}$ *Arg* [$_{V'}$ V [$_{VP}$ Subj [$_{V'}$ t_v t_{wh}]]]]	*!		* *	
adj ≈ (22a) ☞ [$_{VP}$ *Arg* [$_{VP}$ Subj [$_{V'}$ V t_{wh}]]]		*	*	

b. Candidates: Subordinate clause, Adjunct operator	P-P(H)	ARGOP-SPEC	STAY	ADJOP-SPEC
inv [$_{VP}$ *Adj* [$_{V'}$ V [$_{VP}$ Subj [$_{V'}$ t_v t_{wh}]]]]	*!		* *	
adj ≈ (22b) ☞ [$_{VP}$ *Adj* [$_{VP}$ Subj [$_{V'}$ V t_{wh}]]]			*	*

Because other Spanish dialects make the distinction between operator types that trigger inversion and those that don't in places other than the argument/adjunct juncture, OP-SPEC must be separated into different constraints that make the OP-SPEC demand on each of the different operator types. These constraints are universally arrayed in a markedness subhierarchy, reflecting the most-to-least argumental markedness scale introduced in §0 and discussed in more detail in §2.

In that section I also show how the differences between Spanish dialects with respect to inversion are generally explained by ranking STAY in different spots of the markedness subhierarchy. Those members of the markedness subhierarchy ranked *above* STAY force two violations of STAY as in (23a), while those ranked *below* STAY cannot force any violations of STAY. Only inviolable OP-SCOPE can, and it does so minimally through adjunction of the operator, as in (23b). In §3, I take up the more specific issue of the matrix/subordinate distinction as previewed in (24) vs. (23). But first, allow me to clarify some basic assumptions.

[17] This simple case shows trivial allegiance to the subset relationship (3); the more complete proof that this subset relationship is obeyed under any possible ranking of the constraints proposed is given in §3.

1.4 Some assumptions[18]

1.4.1 Input and output

Now is a good time to discuss in some detail the inputs to the competitor sets (pairs, actually) being evaluated by the constraint hierarchies in the tableaux in this paper. Following Grimshaw (1995), Samek-Lodovici (in preparation) and Grimshaw & Samek-Lodovici (1995), I assume the input of a clause to consist minimally of a triple (L, M, A) such that:

(i) L is a lexical head with its argument structure.
(ii) M is an optional marking of the arguments of L as foci, or topic-referring (see §4).
(iii) A is an assignment of lexical heads to L's arguments.

The input-output function *Gen* then generates from the input triple all possible L-headed syntactic structures S such that:

(iv) S obeys X´ Theory.
(v) Segments and projections are generated freely; projections [and heads] may move [i.e., may be overtly realized anywhere], leaving a [coindexed] trace behind [i.e., in their "base-generated" position, to satisfy the inviolable Theta Criterion].

From Samek-Lodovici (in preparation).

I also assume that scope-taking elements such as *wh*-phrases, quantifiers and the like are specified in the input for where their scope is taken from. For example, the input to a simple clause with a *wh*-phrase complement is as in (25a), and the input to a clause with a clausal complement which itself has a *wh*-phrase complement (taking narrow scope) is as in (25b). The narrow scope of the *wh*-phrase in (25b) is represented by coindexation with the lexical head of the lower clause.[19]

(25) *Inputs*

a. (V<x,y>, <x=*j*>, <y=*wh*>)

b. (V<x,y>, <x=*j*>, <y=(V_i<x,y>, <x=*m*>, <y=wh_i>)>)

The output of every input is determined by the constraint hierarchy of the language in question. Using English, if the lexical head V in (25a) is *eat*, *j* is *John*, and *wh* is *what*, then this is the input to the direct question *What did John eat?* (a matrix *wh*-question). If the first lexical head V in (25b) is *wonder*, the second is *eat*, *j* is *John*, *m* is *Mary*, and *wh* is *what*, then this is the input to the indirect question *John wonders what Mary ate* (a subordinate *wh*-question). These are the two input-types considered in this paper (with focus entering the picture in §4).

The requirement that "S obeys X´ Theory" in (iv) above of course includes my proposal in §1.2 to dispense with a violable OB-HD, making compliance with that constraint an inviolable principle of X´ Theory. In addition, following the claim that OP-SCOPE is an inviolable principle of interpretation, I assume that *wh*-elements always obey OP-SCOPE by moving to an appropriate c-commanding position, syntactically reflecting their interpretive scope. I turn to this point now.

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[18] For encouraging me to clear up the issues addressed in this subsection, I'd like to thank Viviane Déprez (§1.4.1), Veneeta Dayal (§1.4.2) and Jane Grimshaw (§1.4.2 and §1.4.3).

[19] Arguments are not marked here as foci or as topic-referring for simplicity.

1.4.2 OP-SCOPE

If OP-SCOPE is an inviolable principle of interpretation, it will always force *wh*-movement or coindexation of in situ (or partially moved) *wh*-phrases with clause-initial operators. If this is correct, then *wh*-in-situ languages will have to be analyzed as obeying OP-SCOPE along the lines of Aoun & Li's (1993ab) proposal that a sometimes overt, sometimes covert operator, coindexed with the in situ *wh*-phrase, is present clause-initially in Chinese and Japanese (see also Cheng 1991 and Li 1992). Other *wh*-in-situ phenomena, such as that observed in multiple *wh*-questions in languages like English, must be analyzed as obeying OP-SCOPE through coindexation of the in situ *wh*-phrase(s) with the moved one (absorption; see Higginbotham & May 1981). Partial *wh*-movement in languages like German, as analyzed in McDaniel (1989), involves coindexation of the partially moved *wh*-phrase with an overt scope marker, satisfying OP-SCOPE.

See Legendre et al. (1995) for a proposal within OT (but using somewhat different constraints) accounting for the differences among *wh*-in-situ languages (their example is Chinese), single *wh*-movement languages (English), and multiple *wh*-movement languages (Bulgarian). See also the work of Ackema & Neeleman (1995). The issues involved in the characterization of these different languages using the present constraints are unfortunately beyond the scope of this paper.

1.4.3 PROJ-PRIN(A)[20]

If PROJ-PRIN(A) is allowed to be ranked above PROJ-PRIN(H) and STAY, and if STAY is in turn ranked above OP-SPEC,[21] then the subset relationship (3) can be violated: subordinate clauses can require inversion with more *wh*-phrase types than matrix clauses. The tableaux in (26) show why, with a relevant total ranking: tableau (26a) shows the case for matrix clauses, where the PROJ-PRIN constraints are irrelevant; (26b) for subordinate clauses, where the PROJ-PRIN constraints make the decisions.

(26) *PROJ-PRIN(A) » PROJ-PRIN(H) » STAY » OP-SPEC*

a. Candidates: Matrix clause		P-P(A)	P-P(H)	STAY	OP-SPEC
inv	$[_{VP}$ *wh* $[_{V'}$ V $[_{VP}$ Subj $[_{V'}$ t_v t_{wh}]]]]			**!	
adj ☞	$[_{VP}$ *wh* $[_{VP}$ Subj $[_{V'}$ V t_{wh}]]]			*	*

b. Candidates: Subordinate clause		P-P(A)	P-P(H)	STAY	OP-SPEC
inv ☞	$[_{VP}$ *wh* $[_{V'}$ V $[_{VP}$ Subj $[_{V'}$ t_v t_{wh}]]]]		*	**	
adj	$[_{VP}$ *wh* $[_{VP}$ Subj $[_{V'}$ V t_{wh}]]]	*!		*	*

As shown in §3, the interactions among only PROJ-PRIN(H), STAY and OP-SPEC are both *necessary* to guarantee the subset relationship (3) and *sufficient* to decide between the two relevant candidates, *inv* and *adj*, in matrix and subordinate clauses. This means that the ranking in (26) must somehow be avoided.

I suggest here three alternatives for avoiding this problem. One alternative is that PROJ-PRIN(A) is simply low-ranked (below PROJ-PRIN(H), at least) in the grammars of all Spanish dialects. This is not interesting because it doesn't explain the universality of the subset relationship

[20] I thank Jane Grimshaw and Paul Smolensky for very helpful discussions concerning the entire issue of PROJ-PRIN(A).

[21] Since there is more than one OP-SPEC constraint, this should say more precisely "… ranked above *the relevant member of the OP-SPEC family*". I take this obvious point for granted in what follows and at various other points of this paper.

(3). Another alternative is that PROJ-PRIN(A) is universally lower-ranked than PROJ-PRIN(H). Constraints that are universally ranked with respect to each other are of course not unheard of; I am proposing a set of those myself in this paper in the form of a markedness subhierarchy. However, the constraints in the markedness subhierchy make the same demand (the OP-SPEC demand) on different linguistic objects (different types of *wh*-phrases), while the PROJ-PRIN constraints make different demands (no movement into the head, no adjunction) on the same linguistic object (subordinate clauses). There is no foolproof diagnostic for whether a pair of constraints are candidates for universal ranking with respect to each other, but this difference is striking.

Both of these alternatives try to avoid the problem by keeping PROJ-PRIN(A) as a constraint separate from PROJ-PRIN(H), but subverting its activity somehow. As Paul Smolensky has pointed out to me in a personal communication, one would like to find evidence that further supports the separation of the two constraints in a given grammar, as Grimshaw (1995:23) originally noted. This evidence would have to consist of a third constraint that crucially intervenes between them, able to force violation of the lower one (presumably PROJ-PRIN(A)) and in turn able to be violated under pressure by the higher one (PROJ-PRIN(H)). I am not aware of any such evidence at present.

The third, most interesting alternative is that PROJ-PRIN(A) and PROJ-PRIN(H) really *are* one constraint, as Grimshaw originally proposed, but that violation of the PROJ-PRIN(H) part of the constraint is somehow worse than violation of the PROJ-PRIN(A) part of the constraint, at least when it comes to movement of the sort being investigated here. This alternative could build on the fact that *wh*-movement and inversion, a violation of PROJ-PRIN(H), creates two levels of structure on top of a subordinate clause (one X´-level, one XP-level) while adjunction, a violation of PROJ-PRIN(A), creates only one (an XP-level). This interpretation of the once again unified PROJ-PRIN constraint would thus be parallel to STAY (one violation for adjunction, two for inversion), and could perhaps be completely reduced to a more specific version of STAY in this sense. However, if STAY governs A-movement as well as A´- and head-movement in OT, as assumed by Grimshaw (1995), then this reduction is probably too strong, as it predicts a vast number of (unattested, it seems) matrix/subordinate distinctions with respect to movement.

All of this is a reflection of the poor understanding we have of the specific formulation of the PROJ-PRIN constraint(s), and of the exact nature and extent of matrix/subordinate distinctions. However, the claim that there is/are constraint(s) regulating just subordinate clauses and not just matrix clauses, and that violating one (part) of the constraint(s) is worse than violating the other, satisfies a necessary condition of the present analysis: that the matrix/subordinate distinction, in particular the subset relationship (3), be captured. Satisfaction of sufficient conditions demanding complete explanatory adequacy in the form of perfectly formulated constraints is, I think, important but secondary to this goal. I leave this issue for future research to shed light on.

2 The Markedness Scale of Operator Types

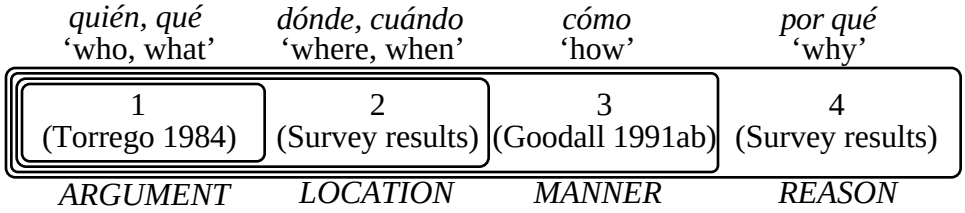
Spanish dialects vary as to what type of *wh*-phrase triggers inversion. In this paper I restrict myself to the simple operators *quién* ‘who’, *qué* ‘what’, *dónde* ‘where’, *cuándo* ‘when’, *cómo* ‘how’, and *por qué* ‘why’. Future research will connect the analysis of the facts involving these elements with the facts involving other operators.

I have conducted a cross-dialectal judgment survey and have found that in all dialects that exhibit inversion in matrix *wh*-questions, it is required with the argument operators *quién* ‘who’ and *qué* ‘what’. A subset of these dialects also requires inversion with the (spatio-temporal) location operators *dónde* ‘where’ and *cuándo* ‘when’. A subset of this subset also demands inversion with the manner operator *cómo* ‘how’. Finally, a subset of this latter subset requires

inversion with all operators, the only other one considered here being the reason operator *por qué* 'why'. With respect to inversion in *wh*-questions, then, the picture of Spanish dialects that emerges is (27), repeated from (2).

(27) *Implicational relationship among* wh-*phrase types*

A matrix/subordinate *wh*-question requires inversion if the *wh*-phrase is



0 = no inversion (Suñer 1994)

Pattern 1, with inversion only required with *who* and *what*, corresponds to the dialect analyzed in Torrego (1984) and Suñer (1994).[22] Pattern 3, with inversion required with everything but *why*, is the dialect analyzed in Goodall (1991ab). Patterns 2 and 4 have emerged from my survey. A fifth pattern, which I refer to as pattern 0, requires no inversion at all. This corresponds to another dialect discussed in Suñer (1994).

This implicational relationship runs from what I am calling most to least "argumental", with arguments being on the more argumental side and reasons being on the less argumental side. Why is the space of possibilities divided up in just this way? This question is of course very difficult to answer, and I will not even attempt to answer it here in any fundamental way. However, there are obvious precedents in the literature to the markedness scale uncovered here, and I make reference to those precedents here.

Distinctions very similar to the ones made among the operator types above (argument, location, manner, and reason) are made in the recent literature under the general heading of *referentiality* (see in particular Rizzi 1990 and Cinque 1990), following Huang's (1982) seminal analysis of the differences between arguments and adjuncts with respect to long-distance extractability. Legendre et al. (1995) interpret the distinctions made in the literature "on a hierarchy of participants to an event with central participants (agent, patient [≈ arguments — E.J.B.]) at one end and exterior conditions at the other (manner, reason). The grammar of a particular language selects a cut-off point on the hierarchy which dichotomizes it into two parts which the syntax treats differently" (p. 21).

Once seen in this scalar way, rather than as an arbitrary-sounding distinction between 'referential' and 'nonreferential', this referentiality hierarchy seems to be the same one underlying the argumental markedness scale uncovered here. In particular, arguments are on one end while manner and reason are on the other. This indicates the existence of a general referentiality hierarchy to which the syntax of each language is differentially sensitive.

But are they indeed the same? The cut-off points in the markedness scale that the different Spanish dialects make affect the syntax of inversion, rather than the syntax of long-distance extraction that is sensitive to the referentiality hierarchy. However, it is not predicted that each language will make one and only one cut-off point in any hierarchy or markedness scale, as may be implied here. For instance, there are crucial differences, in terms of the exact constraints responsible, between the analysis of inversion detailed below and the analysis of long-distance

[22] I occasionally represent Spanish forms with their English glosses in italics to simplify the text.

extraction given in Legendre et al. (1995). Like the sonority scale in phonology, the referentiality hierarchy may simply underlie various independent markedness subhierarchies.[23,24]

Though the parallels here are striking and worthy of further investigation, I hesitate to claim that one and the same referentiality hierarchy underlies the syntax of both long-distance extraction and inversion. Of course, I do not rule out this possibility — I only wish to see more than my meager sample of simple operators put to the test of a rigorous judgment survey, taking into account all aspects known or suspected to be related to referentiality: argument structure, theta-roles, discourse-linking, connectedness to the predicate, and so on. Until this is done, I must rely only on my limited findings, solid though they may be, and refer to the scale as more-or-less "argumental", to emphasize my ambivalence about jumping on the referentiality bandwagon.

As noted by Legendre et al. (1995): "A proper treatment of the referentiality hierarchy, [or *any* hierarchy — E.J.B.] and typological variation in the cut-off point, should be naturally handled by OT (much as the sonority hierarchy in Prince and Smolensky 1993)" (p. 22). This reference is to the significant advance in the understanding of markedness in phonology that was made by Prince & Smolensky (1993) within OT. Their general proposal was that the individual members of certain constraint families (sets of constraints making the same demands on different types of linguistic objects) are universally ranked with respect to each other, defining a constraint subhierarchy that reflects a markedness scale, or a *markedness subhierarchy*. Other constraints can be parochially ranked with respect to the individual members of the markedness subhierarchy, predicting all and only language types conforming to the markedness scale.

The fact that no dialect of Spanish divides the world of operators any differently than in (27) by itself implies the existence of such a markedness scale; the fact that it parallels similar distinctions in other languages merely enforces the implication. It can be said that in Spanish, argument operators require inversion more than location operators, which require it more than manner operators, which require it more than reason operators. In terms of the analysis of *wh*-movement and inversion in §1, an argument *wants to be in specifier position* more than a location more than a manner more than a reason, since movement to specifier is what triggers inversion.

To account for the Spanish facts with respect to the observed markedness scale, I propose that each type of operator (argument, location, etc.) has its own OP-SPEC constraint, defined individually in (28a–d), repeated from (7a-d). These constraints are members of the OP-SPEC constraint family, which defines a markedness subhierarchy because its members are universally ranked with respect to each other as in (28e), repeated from (7e).[25] I will henceforth refer to (28e) as "the markedness subhierarchy."

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[23] I thank Paul Smolensky for pointing this out to me.

[24] In the context of argument/adjunct asymmetries with respect to long-distance extractability, Rizzi (1990) argues that a referential theta-role is indexed and can thus satisfy the ECP through binding, while nonreferential theta-roles are not indexed and thus must satisfy the ECP through the more local government relation. In this theory, UG distinguishes indexed from non-indexed theta-roles, but the grammar of each language must distinguish referential from nonreferential theta-roles because this is variable. By separating referentiality from indexing in this way, Rizzi inadvertently predicts that each language *will* make one and only one cut-off point in the referentiality hierarchy.

[25] Paul Smolensky points out to me in a personal communication that the markedness subhierarchy responsible for differences in long-distance extractability can be understood as the *local conjunction* (see Smolensky 1995 for a definition) of a more general referentiality hierarchy and the MINLINK family of constraints. Though not decomposed as such here, (28e) may ultimately be understood as the local conjunction of the referentiality hierarchy and OP-SPEC. In this way, the referentiality hierarchy parallels the sonority hierarchy in phonology, since the latter hierarchy is the basis of a number of constraint families in phonology (through local conjunction, according to Smolensky), many if not all of which are assumed to be arrayed in markedness subhierarchies following Prince & Smolensky (1993:§9).

(28) *OP-SPEC constraint family*

a. ARGOP-SPEC
Argument operators must be in specifier position.

b. LOCOP-SPEC
Location operators must be in specifier position.

c. MANOP-SPEC
Manner operators must be in specifier position.

d. REASOP-SPEC
Reason operators must be in specifier position.

e. *Markedness subhierarchy*
ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC

A conflicting constraint like STAY (and PROJ-PRIN(H); see §3) can be ranked anywhere in this subhierarchy. As demonstrated with Spanish$_f$ in §1.3, any of the constraints in (28) that is ranked above STAY will force two violations of STAY to be satisfied. All operators of the type whose OP-SPEC constraint is ranked below STAY will be moved, because of inviolable OP-SCOPE, but to an adjoined position rather than to a specifer, so as to only violate STAY once. Below we examine the ranking needed for each of the dialects in turn.

2.2 Typological effects with the markedness subhierarchy 1: STAY

The five different possible ways to rank STAY in the markedness subhierarchy are given below in (29). Each ranking predicts the grammar of the pattern of inversion described below it, also using the now familiar numbering convention. The parochial ranking of STAY in each case is highlighted with shadowed characters.

(29) *Typological effects with the markedness subhierarchy*

a. **STAY** » ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
⇒ Adjunction of all operators (pattern 0)

b. ARGOP-SPEC » **STAY** » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
⇒ Inversion only with argument operators (pattern 1)

c. ARGOP-SPEC » LOCOP-SPEC » **STAY** » MANOP-SPEC » REASOP-SPEC
⇒ Inversion only with argument and location operators (pattern 2)

d. ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » **STAY** » REASOP-SPEC
⇒ Inversion with all but reason operators (pattern 3)

e. ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC » **STAY**
⇒ Inversion with all operators (pattern 4)

The following subsections explain in detail how the predictions are borne out for each case in (29). Since we are not considering PROJ-PRIN(H) until §3, the predictions are made for the five dialects with no matrix/subordinate distinction. The remaining dialects are left to be explained along with the matrix/subordinate distinction in §3.

2.2.1 Pattern 0: no inversion

As shown by the data in (D0), all *wh*-movements without inversion in matrix and subordinate *wh*-questions in the dialect with pattern 0 are grammatical.

(D0) *Pattern 0: Data*

a. *Arg*–S–V (Me pregunto) qué Miguel [se comió]$_V$
(wonder.1s) what M ate.3s
'What did Miguel eat? / I wonder what Miguel ate.'

b. *Loc*–S–V (Me pregunto) dónde Miguel [se fue]$_V$
(wonder.1s) where M went.3s
'Where did Miguel go? / I wonder where Miguel went.'

c. *Man*–S–V (Me pregunto) cómo Miguel [se comportó]$_V$
(wonder.1s) how M behaved.3s
'How did Miguel behave? / I wonder how Miguel behaved.'

d. *Reas*–S–V (Me pregunto) por qué Miguel [se enojó]$_V$
(wonder.1s) why M got-mad.3s
'Why did Miguel get mad? / I wonder why Miguel got mad.'

Ranking STAY above all of the OP-SPEC constraints as in (29a) explains the facts in this dialect. No operator can violate STAY twice just to be in specifier position. However, OP-SCOPE demands that the operator move. STAY is a violable constraint, but violation of a constraint under compulsion of higher-ranked constraints is necessarily minimal in OT: the less violations of a lower-ranked constraint it takes to satisfy a higher-ranked constraint, the better (see fn. 10). To satisfy OP-SCOPE, all it takes is adjunction of the operator, violating STAY the least one can; once. Any attempt to satisfy one of the OP-SPEC constraints by putting the operator in a specifier position and requiring head movement violates STAY one too many times.

The constraint tableaux in (T0) show how decisions of optimality are made in this dialect, using the data in (D0). Because STAY outranks all of the OP-SPEC constraints, *adj* always wins.[26]

(T0) *Pattern 0: Tableaux*

a. Candidates: Argument operator		STAY	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ qué [$_{V'}$ se comió [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]	**!				
adj ☞	[$_{VP}$ qué [$_{VP}$ Miguel [$_{V'}$ se comió t_{wh}]]]	*	*			

b. Candidates: Location operator		STAY	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ dónde [$_{V'}$ se fue [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]	**!				
adj ☞	[$_{VP}$ dónde [$_{VP}$ Miguel [$_{V'}$ se fue t_{wh}]]]	*		*		

[26] I adopt the following practice with these demonstrative tableaux: constraint columns corresponding to OP-SPEC constraints that are irrelevant to the candidates at hand (because the operator type they refer to is not at issue) are shaded — these constraints are vacuously satisfied. The other (relevant) constraint columns are boxed in thicker lines.

c. Candidates: Manner operator		STAY	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ cómo [$_{V'}$ se comportó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]	**!				
adj ☞	[$_{VP}$ cómo [$_{VP}$ Miguel [$_{V'}$ se comportó t_{wh}]]]	*			*	

d. Candidates: Reason operator		STAY	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ por qué [$_{V'}$ se enojó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]	**!				
adj ☞	[$_{VP}$ por qué [$_{VP}$ Miguel [$_{V'}$ se enojó t_{wh}]]]	*				*

2.2.2 Pattern 1: inversion with argument operators

As shown by the data in (D1), inversion is obligatory in matrix and subordinate *wh*-questions with argument operators (compare a/a´) but impossible with the other operator types (b–d) in the dialect with pattern 1.

(D1) *Pattern 1: Data*

a. *Arg*–V–S (Me pregunto) qué [se comió]$_V$ Miguel
(wonder.1s) what ate.3s M
'What did Miguel eat? / I wonder what Miguel ate.'

a´. **Arg*–S–V * (Me pregunto) qué Miguel [se comió]$_V$

b. *Loc*–S–V (Me pregunto) dónde Miguel [se fue]$_V$
(wonder.1s) where M went.3s
'Where did Miguel go? / I wonder where Miguel went.'

c. *Man*–S–V (Me pregunto) cómo Miguel [se comportó]$_V$
(wonder.1s) how M behaved.3s
'How did Miguel behave? / I wonder how Miguel behaved.'

d. *Reas*–S–V (Me pregunto) por qué Miguel [se enojó]$_V$
(wonder.1s) why M got-mad.3s
'Why did Miguel get mad? / I wonder why Miguel got mad.'

Ranking STAY below ARGOP-SPEC but above the other OP-SPEC constraints as in (29b) explains the facts in this dialect: only argument operators can violate STAY twice to be in specifier position. OP-SCOPE demands that the other operators move too, but minimal violation of STAY will ensure that the movement will be an adjunction and not a movement to specifier.

The constraint tableaux in (T1) show how decisions of optimality are made in this dialect. Because ARGOP-SPEC outranks STAY, *inv* wins in (T1a), but because STAY outranks the other three OP-SPEC constraints, *adj* wins in (T1b,c,d).

(T1) *Pattern 1: Tableaux*

a. Candidates: Argument operator		ARG OP-SPEC	STAY	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC
inv ☞	[$_{VP}$ qué [$_{V'}$ se comió [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]		**			
adj	[$_{VP}$ qué [$_{VP}$ Miguel [$_{V'}$ se comió t_{wh}]]]	*!	*			

b. Candidates: Location operator		ARG OP-SPEC	STAY	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ dónde [$_{V'}$ se fue [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]		**!			
adj ☞	[$_{VP}$ dónde [$_{VP}$ Miguel [$_{V'}$ se fue t_{wh}]]]		*	*		

c. Candidates: Manner operator		ARG OP-SPEC	STAY	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ cómo [$_{V'}$ se comportó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]		**!			
adj ☞	[$_{VP}$ cómo [$_{VP}$ Miguel [$_{V'}$ se comportó t_{wh}]]]		*		*	

d. Candidates: Reason operator		ARG OP-SPEC	STAY	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ por qué [$_{V'}$ se enojó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]		**!			
adj ☞	[$_{VP}$ por qué [$_{VP}$ Miguel [$_{V'}$ se enojó t_{wh}]]]		*			*

2.2.3 Pattern 2: inversion with argument and location operators

As shown by the data in (D2), inversion is obligatory in matrix and subordinate *wh*-questions with argument and location operators (compare a/a´ and b/b´) but impossible with the other operator types (c–d) in the dialect with pattern 2.

(D2) *Pattern 2: Data*

a. *Arg*–V–S (Me pregunto) qué [se comió]$_V$ Miguel
(wonder.1s) what ate.3s M
'What did Miguel eat? / I wonder what Miguel ate.'

a´. **Arg*–S–V * (Me pregunto) qué Miguel [se comió]$_V$

b. *Loc*–S–V (Me pregunto) dónde Miguel [se fue]$_V$
(wonder.1s) where M went.3s
'Where did Miguel go? / I wonder where Miguel went.'

b´. **Loc*–S–V * (Me pregunto) dónde Miguel [se fue]$_V$

c. *Man*–S–V (Me pregunto) cómo Miguel [se comportó]$_V$
(wonder.1s) how M behaved.3s
'How did Miguel behave? / I wonder how Miguel behaved.'

d. *Reas*–S–V (Me pregunto) por qué Miguel [se enojó]$_V$
(wonder.1s) why M got-mad.3s
'Why did Miguel get mad? / I wonder why Miguel got mad.'

Ranking STAY below LOCOP-SPEC (and necessarily below ARGOP-SPEC as a result) but above the other OP-SPEC constraints as in (29c) explains the facts in this dialect: only argument and location operators can violate STAY twice to be in specifier position.

The constraint tableaux in (T2) show how decisions of optimality are made in this dialect. Because ARGOP-SPEC and LOCOP-SPEC outrank STAY, *inv* wins in (T2a,b), but because STAY outranks the other two OP-SPEC constraints, *adj* wins in (T2c,d).

(T2) *Pattern 2: Tableaux*

a. Candidates: Argument operator	ARG OP-SPEC	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv ☞ [$_{VP}$ qué [$_{V'}$ se comió [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]			**		
adj [$_{VP}$ qué [$_{VP}$ Miguel [$_{V'}$ se comió t_{wh}]]]	*!		*		

b. Candidates: Location operator	ARG OP-SPEC	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv ☞ [$_{VP}$ dónde [$_{V'}$ se fue [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]			**		
adj [$_{VP}$ dónde [$_{VP}$ Miguel [$_{V'}$ se fue t_{wh}]]]		*!	*		

c. Candidates: Manner operator	ARG OP-SPEC	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv [$_{VP}$ cómo [$_{V'}$ se comportó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]			**!		
adj ☞ [$_{VP}$ cómo [$_{VP}$ Miguel [$_{V'}$ se comportó t_{wh}]]]			*	*	

d. Candidates: Reason operator	ARG OP-SPEC	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv [$_{VP}$ por qué [$_{V'}$ se enojó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]			**!		
adj ☞ [$_{VP}$ por qué [$_{VP}$ Miguel [$_{V'}$ se enojó t_{wh}]]]			*		*

2.2.4 Pattern 3: inversion with argument, location and manner operators

As shown by the data in (D3), inversion is obligatory in matrix *wh*-questions with argument, location, and manner operators (compare a/a´, b/b´ and c/c´) but not with reason operators (d) in the dialect with pattern 3.

(D3) *Pattern 3: Data*

a. *Arg*–V–S (Me pregunto) qué [se comió]$_V$ Miguel
(wonder.1s) what ate.3s M
'What did Miguel eat? / I wonder what Miguel ate.'

a´. **Arg*–S–V * (Me pregunto) qué Miguel [se comió]$_V$

b. *Loc*–S–V (Me pregunto) dónde Miguel [se fue]$_V$
(wonder.1s) where M went.3s
'Where did Miguel go? / I wonder where Miguel went.'

b´. **Loc*–S–V * (Me pregunto) dónde Miguel [se fue]$_V$

c. *Man*–S–V (Me pregunto) cómo Miguel [se comportó]$_V$
(wonder.1s) how M behaved.3s
'How did Miguel behave? / I wonder how Miguel behaved.'

c´. **Man*–S–V * (Me pregunto) cómo Miguel [se comportó]$_V$

d. *Reas*–S–V (Me pregunto) por qué Miguel [se enojó]$_V$
(wonder.1s) why M got-mad.3s
'Why did Miguel get mad? / I wonder why Miguel got mad.'

Ranking STAY below MANOP-SPEC (and necessarily below ARGOP-SPEC and LOCOP-SPEC as a result) but above REASOP-SPEC as in (29d) explains the facts in this dialect: only argument, location and manner operators can violate STAY twice to be in specifier position.

The constraint tableaux in (T3) show how decisions of optimality are made in this dialect. Because STAY outranks REASOP-SPEC, *adj* wins in (T3d), but because the other three OP-SPEC constraints outrank STAY, *inv* wins in (T3a,b,c).

(T3) *Pattern 3: Tableaux*

a. Candidates: Argument operator	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	STAY	REAS OP-SPEC
inv ☞ [$_{VP}$ qué [$_{V´}$ se comió [$_{VP}$ Miguel [$_{V´}$ t_v t_{wh}]]]]				**	
adj [$_{VP}$ qué [$_{VP}$ Miguel [$_{V´}$ se comió t_{wh}]]]	*!			*	

b. Candidates: Location operator	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	STAY	REAS OP-SPEC
inv ☞ [$_{VP}$ dónde [$_{V´}$ se fue [$_{VP}$ Miguel [$_{V´}$ t_v t_{wh}]]]]				**	
adj [$_{VP}$ dónde [$_{VP}$ Miguel [$_{V´}$ se fue t_{wh}]]]		*!		*	

c. Candidates: Manner operator	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	STAY	REAS OP-SPEC
inv ☞ [$_{VP}$ cómo [$_{V'}$ se comportó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]				**	
adj [$_{VP}$ cómo [$_{VP}$ Miguel [$_{V'}$ se comportó t_{wh}]]]			*!	*	

d. Candidates: Reason operator	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	STAY	REAS OP-SPEC
inv [$_{VP}$ por qué [$_{V'}$ se enojó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]				**!	
adj ☞ [$_{VP}$ por qué [$_{VP}$ Miguel [$_{V'}$ se enojó t_{wh}]]]				*	*

2.2.5 Pattern 4: inversion with all operators

As shown by the data in (D4), inversion is obligatory in matrix *wh*-questions with all operators in the dialect with pattern 4.

(D4) *Pattern 4: Data*

a. *Arg*–V–S (Me pregunto) qué [se comió]$_V$ Miguel
(wonder.1s) what ate.3s M
'What did Miguel eat? / I wonder what Miguel ate.'

a´. **Arg*–S–V * (Me pregunto) qué Miguel [se comió]$_V$

b. *Loc*–S–V (Me pregunto) dónde Miguel [se fue]$_V$
(wonder.1s) where M went.3s
'Where did Miguel go? / I wonder where Miguel went.'

b´. **Loc*–S–V * (Me pregunto) dónde Miguel [se fue]$_V$

c. *Man*–S–V (Me pregunto) cómo Miguel [se comportó]$_V$
(wonder.1s) how M behaved.3s
'How did Miguel behave? / I wonder how Miguel behaved.'

c´. **Man*–S–V * (Me pregunto) cómo Miguel [se comportó]$_V$

d. *Reas*–S–V (Me pregunto) por qué Miguel [se enojó]$_V$
(wonder.1s) why M got-mad.3s
'Why did Miguel get mad? / I wonder why Miguel got mad.'

d´. **Reas*–S–V * (Me pregunto) por qué Miguel [se enojó]$_V$

Ranking STAY below all of the OP-SPEC constraints as in (29e) explains the facts in this dialect: all operators can violate STAY twice to be in specifier position.

The constraint tableaux in (T4) show how decisions of optimality are made in this dialect. Because all of the OP-SPEC constraints outrank STAY, *inv* always wins.[27]

[27] Note that this is the ranking that accounts for English matrix *wh*-questions where there is inversion with all operators, hence Grimshaw's (1995) monolithic OP-SPEC.

(T4) *Pattern 4: Tableaux*

a. Candidates: Argument operator	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC	STAY
inv ☞ [$_{VP}$ qué [$_{V'}$ se comió [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]					**
adj [$_{VP}$ qué [$_{VP}$ Miguel [$_{V'}$ se comió t_{wh}]]]	*!				*

b. Candidates: Location operator	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC	STAY
inv ☞ [$_{VP}$ dónde [$_{V'}$ se fue [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]					**
adj [$_{VP}$ dónde [$_{VP}$ Miguel [$_{V'}$ se fue t_{wh}]]]		*!			*

c. Candidates: Manner operator	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC	STAY
inv ☞ [$_{VP}$ cómo [$_{V'}$ se comportó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]					**
adj [$_{VP}$ cómo [$_{VP}$ Miguel [$_{V'}$ se comportó t_{wh}]]]			*!		*

d. Candidates: Reason operator	ARG OP-SPEC	LOC OP-SPEC	MAN OP-SPEC	REAS OP-SPEC	STAY
inv ☞ [$_{VP}$ por qué [$_{V'}$ se enojó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]					**
adj [$_{VP}$ por qué [$_{VP}$ Miguel [$_{V'}$ se enojó t_{wh}]]]				*!	*

2.3 Concluding remarks

In this section I have provided an analysis of *wh*-movement and inversion in Spanish dialects with no matrix/subordinate distinction, explaining the limited variation in the obligatoriness of inversion by proposing a markedness subhierarchy of OP-SPEC constraints within which STAY can be ranked anywhere. The fact that there is no other kind of variation is directly explained by the markedness subhierarchy: Universal Grammar sets the relative ranking of the OP-SPEC constraints, and there is no way to disturb this ranking except by parochial ranking of a conflicting constraint within the markedness subhierarchy, like STAY.

Factoring OB-HD out of the set of rankable/violable constraints has had two important, interdependent effects on the overall analysis in this section which are worth pointing out here. First, OB-HD isn't among the constraints that can be ranked in different spots of the markedness subhierarchy, and as such does not needlessly predict a larger typology of possible grammars. Second, and more directly relevant, the analysis relies crucially on the distinction between *wh*-movement and inversion and *wh*-adjunction. A dominating OP-SPEC constraint must force two violations of STAY rather than one — this crucially distinguishes OP-SCOPE, which only demands that operators have scope, from OP-SPEC, which prefers said scope to be taken from a specifier

position. This cannot be achieved with OB-HD thrown into the works of *Con* (the set of constraints provided by UG), as argued in §1.2.

Finally, it is worth noting here that I have been assuming all operators to be base-generated within the lower V´, as the careful reader may have noted from the candidates considered in the tableaux. Absolutely nothing hinges on this assumption, however: there is no reference made by any of the constraints as to where the traces of the operators should be. There is only a constraint against the trace (STAY) and constraints on where the operators themselves should be (the OP-SPEC constraints). The analysis is compatible with the possibility that sentential adverbial operators, like *why*, are base-generated clause-initially (as proposed by Rizzi 1990:51). The crucial STAY violation distinguishing *inv* from *adj* is the head-movement, not the *wh*-movement. If *inv* is to be the winner, *why* is base-generated in a clause-initial specifier position (forcing head movement); if *adj* is to win, *why* is base-generated in a clause-initial adjoined position.[28]

3 The Matrix/Subordinate Distinction

In this section, I provide an analysis of the matrix/subordinate *wh*-question distinction in Spanish with respect to inversion, which I argue involves the free ranking of another constraint (like STAY) in the rigid markedness subhierarchy. This constraint is part of Grimshaw's (1995) PROJ-PRIN constraint, following the slight reworking in §1.2 of Grimshaw's insightful analysis of the parallel matrix/subordinate distinction in English.

3.1 Inversion in subordinate clauses

The same range of variation that exists in Spanish matrix *wh*-questions exists in subordinate *wh*-questions, but with a crucial generalization to be noted: there are no dialects that require inversion with more operator types in subordinate *wh*-questions than in matrix *wh*-questions. This is the subset relationship (3), repeated below in (30).

(30) *Subset relationship between matrix and subordinate clause-types*

In a given dialect, subordinate clauses display inversion with a subset of the *wh*-phrase types that matrix clauses display inversion with.

To make the point of (30) clearer, recall that what I have been calling patterns 0–4 up to this point have only been given those labels with respect to inversion in both matrix and subordinate *wh*-questions, when there is no matrix/subordinate distinction. I have been ignoring the fact that dialects can be classified along both the matrix and subordinate dimension. If any combination of these variations were possible, we would have 5 x 5 = 25 different dialectal possibilities. According to (30), however, only fifteen of the possibilities are actualities. I repeat (4) as (31) below, showing the twenty-five different dialectal possibilities, with the actualities obeying (30) boxed. In addition, the dialects already accounted for in §2 (those without a matrix/subordinate distinction) are shaded.[29]

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[28] Rizzi's actual proposal was to base-generate the sentential adverbial operator in Spec/CP, but this is simply because Spec/CP is assumed to be the only place for operators. Given the freedom of choice between clause-initial specifier and adjoined position in the analysis proposed here, I allow myself the slight reinterpretation of his proposal seen in the text.

[29] The only varieties in (31) not attested in my survey are G, M and Y. Given the strength of the generalization, I interpret this as a gap due to the small scale of the survey (30 native speakers). It may seem initially curious that these unattested varieties are all ones where with no matrix/subordinate distinction: 1/1, 2/2 and 4/4. However, it is hard to maintain this curiosity when one considers that 1/1 is Torrego's (1984) dialect, and that the other two egalitarian varieties, 0/0 and 3/3, are strongly attested in my survey both in the number of speakers and in the consistency of their judgments.

(31) *Conceivable dialectal possibilities (actualities boxed; obeying (30))*

Dialects	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y
Matrix	0	0	0	0	0	1	1	1	1	1	2	2	2	2	2	3	3	3	3	3	4	4	4	4	4
Subordinate	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4	0	1	2	3	4

In the following subsections I show how the independent parochial ranking possibilities of PROJ-PRIN(H) and STAY in the markedness subhierarchy accounts for the subset relationship (30).

3.2 PROJ-PRIN(H) and STAY: the "stringency" relation[30]

As was demonstrated in §1.2, what the ranking of PROJ-PRIN(H) above OP-SPEC does in English is part of the work that STAY would do were it ranked above OP-SPEC — it demands *wh*-adjunction (no inversion), but in subordinate *wh*-questions only. OP-SPEC ranked above STAY, in turn, predicts inversion in matrix clauses. If PROJ-PRIN(H) does not dominate an OP-SPEC constraint that itself dominates STAY then, a distinction between matrix and subordinate *wh*-questions with respect to inversion is predicted not to exist.

As pointed out to me by Alan Prince (personal communication), this follows from the fact that STAY is *more stringent* than PROJ-PRIN(H). A violation of PROJ-PRIN(H) entails a violation of STAY but not vice versa, because movement into the head of a subordinate clause (what PROJ-PRIN(H) militates against) entails a trace (what STAY militates against) but not vice versa. In addition, STAY and PROJ-PRIN(H) do not directly conflict with each other. STAY demands everything that PROJ-PRIN(H) demands, and more. This is what it means for two constraints to be in a stringency relation.

Prince notes that this quite common stringency relation is often confused with Prince & Smolensky's (1993) Paninian relation, as defined in (32a). The definitions in (32b–d) are definitions relevant to the understanding of (32a) and of (33), a useful theorem based on the Paninian constraint relation.

(32) *The Paninian constraint relation (and supporting definitions)*

a. *Dfn. Paninian relation.* Let S and G be two constraints. S *stands to* G *as special to general in a Paninian relation* if, for any input *i* to which S applies non-vacuously, any parse of *i* which satisfies S violates G.

b. *Dfn. Non-vacuous application.* A constraint C *applies non-vacuously* to an input *i* if C separates Gen(*i*), the set of candidate output parses of *i* admitted by UG.

c. *Dfn. Separation.* A constraint C *separates* a set of structures if C is satisfied by some members of the set and violated by others.

d. *Dfn. Activity.* A constraint C is *active* on an input *i* in a constraint hierarchy CH if C separates the set of candidate output parses of *i* which are admitted by the portion of CH which dominates C.

(33) *Panini's Theorem on constraint-ranking*

Let S and G stand as specific to general in a Paninian constraint relation. Suppose S and G are part of a constraint hierarchy CH, and that G is active in CH on some input *i*. Then if G » S, S is not active on *i*.

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[30] I thank Alan Prince and Paul Smolensky for helping me understand the details of the issues addressed in this subsection.

By Panini's Theorem, the relative ranking of two constraints in a Paninian relation is rather simple to determine: if the special constraint is active on some input, then it outranks the general constraint; if it is not active on any input, the general constraint outranks it. This seems similar to the stringency relation, but as Prince points out in an unpublished proof, the similarity is illusory.

First and foremost, the definition of a Paninian relation between two constraints S and G requires *conflict* between the constraints: "S stands to G as special to general in a Paninian relation if, for any input *i* to which S applies non-vacuously, any parse of *i* which satisfies S violates G." This isn't the case between constraints related by stringency, as defined in (34).

(34) *Stringency*

a. *Dfn. Stringency relation.* Let S and G be two constraints. S *stands to* G *as special to general in a stringency relation* if, for any input *i* to which S applies non-vacuously, any parse of *i* which violates S also violates G.

Secondly, "there is in fact no unqualified guarantee that … domination by the general constraint [e.g., STAY — E.J.B.] inactivates the more specific one [e.g., PROJ-PRIN(H) — E.J.B.]." This is a quote from Prince's proof, which aims to "establish some conditions under which inactivation [of the special constraint under stringency — E.J.B.] can be guaranteed." Here I want to establish one condition under which *activation* of the special constraint under stringency can be guaranteed — what I call *independent activity*. This condition is defined in (35) below. It is of course not meant to be the only condition under which a special constraint under stringency can be independently active; it is simply the one that has emerged in the present context.

(35) *Condition on independent activity*

Let S and G stand as specific to general in a stringency constraint relation. Suppose S and G are part of a constraint hierarchy CH, and that given an input *i*, S and G both separate Gen(*i*), the set of candidate outputs of *i* admitted by UG. S is *independently active* on *i* if there is some constraint C such that (i) C separates Gen(*i*), (ii) C conflicts with both S and G on Gen(*i*) and (iii) S » C » G.

STAY is more stringent than PROJ-PRIN(H), and the OP-SPEC constraints conflict with both STAY and PROJ-PRIN(H). By the definition in (35), PROJ-PRIN(H) is independently active in the following schema: PROJ-PRIN(H) » some OP-SPEC constraint » STAY.

The following simple demonstration with a monolithic OP-SPEC constraint makes the point. When either PROJ-PRIN(H) or STAY is ranked highest among the constraints OP-SPEC, STAY, and PROJ-PRIN(H), the result is *wh*-adjunction in subordinate *wh*-questions: violation of OP-SPEC is preferred to a violation of PROJ-PRIN(H), or to the entailed second violation of STAY (the first being caused by *wh*-movement, always compelled by inviolable OP-SCOPE). This is shown in the tableaux in (36a–d). When OP-SPEC is ranked highest, the result is *wh*-movement to specifier and inversion: the violation of PROJ-PRIN(H) and the concomitant second STAY violation are preferred to violation of OP-SPEC. This is shown in (36e,f).

(36) *OP-SPEC, STAY, and PROJ-PRIN(H): subordinate* wh*-questions*

a.	P-P(H)	OP-SPEC	STAY
inv	*!		* *
adj ☞		*	*

b.	P-P(H)	STAY	OP-SPEC
inv	*!	* *	
adj ☞		*	*

c.	STAY	P-P(H)	OP-SPEC
inv	**!	*	
adj ☞	*		*

d.	STAY	OP-SPEC	P-P(H)
inv	**!		*
adj ☞	*	*	

e.	OP-SPEC	P-P(H)	STAY
inv ☞		*	* *
adj	*!		*

f.	OP-SPEC	STAY	P-P(H)
inv ☞		* *	*
adj	*!	*	

Matrix and subordinate *wh*-questions are predicted to be identical with respect to inversion in (36b–f). Recall that PROJ-PRIN(H) is vacuously satisfied in matrix clauses. (36b,c,d) predict *wh*-adjunction in both matrix and subordinate *wh*-questions because STAY is ranked above OP-SPEC; (36e,f) predict *wh*-movement to specifier and inversion in both matrix and subordinate *wh*-questions because OP-SPEC dominates both STAY and PROJ-PRIN(H).

Only (36a) predicts a distinction between matrix and subordinate clauses. PROJ-PRIN(H), as we see in the tableau, chooses *adj* as optimal in subordinate clauses. Since PROJ-PRIN(H) is vacuously satisfied in matrix clauses, the next highest constraint, OP-SPEC, chooses *inv* as optimal in matrix clauses. This is the schema necessary for independent activity of PROJ-PRIN(H) by the condition in (35): PROJ-PRIN(H) (= S) » OP-SPEC (= C) » STAY (= G).

So, even though there are thirty different ways to rank STAY and PROJ-PRIN(H) within the markedness subhierarchy, only fifteen distinguishable systems emerge from these rankings, predicting exactly the boxed options in (31). Some of those rankings have one or more of the OP-SPEC constraints ranked between PROJ-PRIN(H) and STAY as in (36a), predicting a matrix/subordinate distinction; others do not meet the condition in (35) and as such predict no matrix/subordinate distinction with respect to inversion.

3.3 Typological effects with the markedness subhierarchy 2: PROJ-PRIN(H) and STAY

The thirty different possible ways to rank all of the constraints, obeying the markedness subhierarchy, are given below in (37). Shaded blocks of rankings are rankings that all make the same grammatical predictions. Note that within each of these shaded blocks, PROJ-PRIN(H) is always ranked either just above or somewhere below STAY, which is itself in the same spot of the markedness subhierarchy. This configuration stifles the independent activity of PROJ-PRIN(H) with respect to these constraints, because it does not meet the condition in (35). Counting nonshaded rankings and shaded blocks of rankings as one each, there are fifteen distinguishable grammars in (37).

(37) *Thirty ranking permutations*

1	PROJ-PRIN(H) » STAY » ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
2	STAY » PROJ-PRIN(H) » ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
3	STAY » ARGOP-SPEC » PROJ-PRIN(H) » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
4	STAY » ARGOP-SPEC » LOCOP-SPEC » PROJ-PRIN(H) » MANOP-SPEC » REASOP-SPEC
5	STAY » ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » PROJ-PRIN(H) » REASOP-SPEC
6	STAY » ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC » PROJ-PRIN(H)

7	PROJ-PRIN(H) » ARGOP-SPEC » STAY » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
8	ARGOP-SPEC » PROJ-PRIN(H) » STAY » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
9	ARGOP-SPEC » STAY » PROJ-PRIN(H) » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
10	ARGOP-SPEC » STAY » LOCOP-SPEC » PROJ-PRIN(H) » MANOP-SPEC » REASOP-SPEC
11	ARGOP-SPEC » STAY » LOCOP-SPEC » MANOP-SPEC » PROJ-PRIN(H) » REASOP-SPEC
12	ARGOP-SPEC » STAY » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC » PROJ-PRIN(H)
13	PROJ-PRIN(H) » ARGOP-SPEC » LOCOP-SPEC » STAY » MANOP-SPEC » REASOP-SPEC
14	ARGOP-SPEC » PROJ-PRIN(H) » LOCOP-SPEC » STAY » MANOP-SPEC » REASOP-SPEC
15	ARGOP-SPEC » LOCOP-SPEC » PROJ-PRIN(H) » STAY » MANOP-SPEC » REASOP-SPEC
16	ARGOP-SPEC » LOCOP-SPEC » STAY » PROJ-PRIN(H) » MANOP-SPEC » REASOP-SPEC
17	ARGOP-SPEC » LOCOP-SPEC » STAY » MANOP-SPEC » PROJ-PRIN(H) » REASOP-SPEC
18	ARGOP-SPEC » LOCOP-SPEC » STAY » MANOP-SPEC » REASOP-SPEC » PROJ-PRIN(H)
19	PROJ-PRIN(H) » ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » STAY » REASOP-SPEC
20	ARGOP-SPEC » PROJ-PRIN(H) » LOCOP-SPEC » MANOP-SPEC » STAY » REASOP-SPEC
21	ARGOP-SPEC » LOCOP-SPEC » PROJ-PRIN(H) » MANOP-SPEC » STAY » REASOP-SPEC
22	ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » PROJ-PRIN(H) » STAY » REASOP-SPEC
23	ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » STAY » PROJ-PRIN(H) » REASOP-SPEC
24	ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » STAY » REASOP-SPEC » PROJ-PRIN(H)
25	PROJ-PRIN(H) » ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC » STAY
26	ARGOP-SPEC » PROJ-PRIN(H) » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC » STAY
27	ARGOP-SPEC » LOCOP-SPEC » PROJ-PRIN(H) » MANOP-SPEC » REASOP-SPEC » STAY
28	ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » PROJ-PRIN(H) » REASOP-SPEC » STAY
29	ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC» PROJ-PRIN(H) » STAY
30	ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC » STAY » PROJ-PRIN(H)

The following subsections explain how this is all so. Instead of going through each of the thirty rankings, I have decided to concentrate on only six of them (rankings 13–18), all with STAY ranked between LOCOP-SPEC and MANOP-SPEC, and considering the possible rerankings of PROJ-PRIN(H) only. Since PROJ-PRIN(H) is irrelevant to matrix clauses, this stable ranking of STAY predicts pattern 2 in matrix clauses (henceforth, Matrix 2) — only argument and location operators require inversion (see §2.2.3 for details). Generalizing this demonstration of subordinate *wh*-question patterns with Matrix 2 to the other combinations of matrix and subordinate *wh*-question patterns is a straightforward exercise left to the reader.

Keeping the ranking of STAY constant in this way, each of the different rankings of PROJ-PRIN(H) may or may not predict different patterns in subordinate clauses, as detailed under the rankings in (38) below. PROJ-PRIN(H) only makes an independently active distinction between matrix and subordinate *wh*-questions when it is ranked above an OP-SPEC constraint that is itself ranked above STAY, as in (38a) and (38b). Rankings (38c–f), all with PROJ-PRIN(H) ranked either just above or somewhere below STAY, make the same grammatical prediction: no distinction between matrix and subordinate *wh*-questions.

(38) *Typological effects with the markedness subhierarchy: Matrix 2, Subordinate …*

a. 𝙿-𝙿(𝙷) » ARGOP-SPEC » LOCOP-SPEC » 𝚂𝚃𝙰𝚈 » MANOP-SPEC » REASOP-SPEC
   ⇒ Adjunction of all operators in subordinate clauses (Subordinate 0)

b. ARGOP-SPEC » 𝙿-𝙿(𝙷) » LOCOP-SPEC » 𝚂𝚃𝙰𝚈 » MANOP-SPEC » REASOP-SPEC
   ⇒ Inversion only with arguments in subordinate clauses (Subordinate 1)

c. ARGOP-SPEC » LOCOP-SPEC » 𝙿-𝙿(𝙷) » 𝚂𝚃𝙰𝚈 » MANOP-SPEC » REASOP-SPEC

d. ARGOP-SPEC » LOCOP-SPEC » 𝚂𝚃𝙰𝚈 » 𝙿-𝙿(𝙷) » MANOP-SPEC » REASOP-SPEC

e. ARGOP-SPEC » LOCOP-SPEC » 𝚂𝚃𝙰𝚈 » MANOP-SPEC » 𝙿-𝙿(𝙷) » REASOP-SPEC

f. ARGOP-SPEC » LOCOP-SPEC » 𝚂𝚃𝙰𝚈 » MANOP-SPEC » REASOP-SPEC » 𝙿-𝙿(𝙷)
   ⇒ Inversion only with arguments and locations in both clause-types (Subordinate 2)

In the same style as §2.2, the following subsections explain in detail how the predictions are borne out for each case in (38). Since the relevant data can be read from the following tableaux and/or mixed-and-matched from that given in §2.2, I have not bothered to repeat it separately here.

3.3.1 Matrix 2, Subordinate 0: no inversion in subordinate clauses

All *wh*-movements without inversion in subordinate *wh*-questions in the dialect with Matrix 2, Subordinate 0 are grammatical. Ranking PROJ-PRIN(H) above all of the OP-SPEC constraints as in (38a) explains the facts in this dialect. No operator can violate PROJ-PRIN(H) just to be in specifier position in this dialect. However, OP-SCOPE demands that the operator move. To satisfy OP-SCOPE, all it takes is adjunction of the operator, avoiding the PROJ-PRIN(H) violation (but of course violating PROJ-PRIN(A); see §1.4.3). Any attempt to satisfy one of the OP-SPEC constraints by putting the operator in a specifier position fatally violates PROJ-PRIN(H).

The constraint tableaux in (T2/0) show how decisions of optimality are made for subordinate clauses in this dialect. Because PROJ-PRIN(H) outranks all of the OP-SPEC constraints, *adj* always wins.

(T2/0) *Matrix 2, Subordinate 0: Tableaux*

a.	Candidates: Subordinate clause, Argument operator	P-P(H)	ARG OP-SPEC	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ qué [$_{V'}$ se comió [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]	*!			**		
adj ☞	[$_{VP}$ qué [$_{VP}$ Miguel [$_{V'}$ se comió t_{wh}]]]		*		*		

b.	Candidates: Subordinate clause, Location operator	P-P(H)	ARG OP-SPEC	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ dónde [$_{V'}$ se fue [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]	*!			**		
adj ☞	[$_{VP}$ dónde [$_{VP}$ Miguel [$_{V'}$ se fue t_{wh}]]]			*	*		

c. Candidates: Subordinate clause, Manner operator		P-P(H)	ARG OP-SPEC	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ cómo [$_{V'}$ se comportó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]	*!			**		
adj	☞ [$_{VP}$ cómo [$_{VP}$ Miguel [$_{V'}$ se comportó t_{wh}]]]				*	*	

d. Candidates: Subordinate clause, Reason operator		P-P(H)	ARG OP-SPEC	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ por qué [$_{V'}$ se enojó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]	*!			**		
adj	☞ [$_{VP}$ por qué [$_{VP}$ Miguel [$_{V'}$ se enojó t_{wh}]]]				*		*

3.3.2 Matrix 2, Subordinate 1: inversion with arguments in subordinate clauses

Inversion is obligatory in subordinate *wh*-questions with argument operators but impossible with the other operator types in the dialect with Matrix 2, Subordinate 1. Ranking PROJ-PRIN(H) below ARGOP-SPEC but above the other OP-SPEC constraints as in (38b) explains the facts in this dialect: only argument operators can violate PROJ-PRIN(H) to be in specifier position. OP-SCOPE demands that the other operators move, but PROJ-PRIN(H) will ensure that the movement will be an adjunction and not a movement to specifier, as desired.

The constraint tableaux in (T2/1) show how decisions of optimality are made for subordinate clauses in this dialect. Because ARGOP-SPEC outranks PROJ-PRIN(H), *inv* wins in (T2/1a), but because PROJ-PRIN(H) outranks the other three OP-SPEC constraints, *adj* wins in (T2/1b,c,d).

(T2/1) *Matrix 2, Subordinate 1: Tableaux*

a. Candidates: Subordinate clause, Argument operator		ARG OP-SPEC	P-P(H)	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv	☞ [$_{VP}$ qué [$_{V'}$ se comió [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]		*		**		
adj	[$_{VP}$ qué [$_{VP}$ Miguel [$_{V'}$ se comió t_{wh}]]]	*!			*		

b. Candidates: Subordinate clause, Location operator		ARG OP-SPEC	P-P(H)	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv	[$_{VP}$ dónde [$_{V'}$ se fue [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]		*!		**		
adj	☞ [$_{VP}$ dónde [$_{VP}$ Miguel [$_{V'}$ se fue t_{wh}]]]			*	*		

c. Candidates: Subordinate clause, Manner operator	ARG OP-SPEC	P-P(H)	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv [$_{VP}$ cómo [$_{V'}$ se comportó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]		*!		**		
adj ☞ [$_{VP}$ cómo [$_{VP}$ Miguel [$_{V'}$ se comportó t_{wh}]]]				*	*	

d. Candidates: Subordinate clause, Reason operator	ARG OP-SPEC	P-P(H)	LOC OP-SPEC	STAY	MAN OP-SPEC	REAS OP-SPEC
inv [$_{VP}$ por qué [$_{V'}$ se enojó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]		*!		**		
adj ☞ [$_{VP}$ por qué [$_{VP}$ Miguel [$_{V'}$ se enojó t_{wh}]]]				*		*

3.3.3 Matrix 2, Subordinate 2: no matrix/subordinate distinction

There is no matrix/subordinate distinction in the dialect with Matrix 2, Subordinate 2. Ranking PROJ-PRIN(H) just above or anywhere below STAY, as in (38c-f), will guarantee this result: from any such point in the hierarchy, PROJ-PRIN(H) does not meet the condition in (35) needed for it to be independently active with respect to the other constraints considered here, and as such cannot make a decision between the candidates that the more general STAY would not make itself.

The constraint tableaux in (T2/2) show how decisions of optimality are made for subordinate clauses in this dialect. PROJ-PRIN(H) and STAY are shown to be unranked with respect to each other, but are both ranked together in the same spot of the markedness subhierarchy. This emphasizes that fact that the ranking of PROJ-PRIN(H) simply doesn't matter once it is fails to meet the condition in (35); that is, once it is not ranked above STAY with an intervening OP-SPEC constraint. Because ARGOP-SPEC and LOCOP-SPEC outrank PROJ-PRIN(H) and STAY, *inv* wins in (T2/2a,b), but because STAY outranks the other two OP-SPEC constraints, *adj* wins in (T2/2c,d).

(T2/2) *Matrix 2, Subordinate 2: Tableaux*

a. Candidates: Subordinate clause, Argument operator	ARG OP-SPEC	LOC OP-SPEC	P-P(H)	STAY	MAN OP-SPEC	REAS OP-SPEC
inv ☞ [$_{VP}$ qué [$_{V'}$ se comió [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]			*	**		
adj [$_{VP}$ qué [$_{VP}$ Miguel [$_{V'}$ se comió t_{wh}]]]	*!			*		

b. Candidates: Subordinate clause, Location operator	ARG OP-SPEC	LOC OP-SPEC	P-P(H)	STAY	MAN OP-SPEC	REAS OP-SPEC
inv ☞ [$_{VP}$ dónde [$_{V'}$ se fue [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]			*	**		
adj [$_{VP}$ dónde [$_{VP}$ Miguel [$_{V'}$ se fue t_{wh}]]]		*!		*		

c. Candidates: Subordinate clause, Manner operator	ARG OP-SPEC	LOC OP-SPEC	P-P(H)	STAY	MAN OP-SPEC	REAS OP-SPEC
inv [$_{VP}$ cómo [$_{V'}$ se comportó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]			*!	**!		
adj ☞ [$_{VP}$ cómo [$_{VP}$ Miguel [$_{V'}$ se comportó t_{wh}]]]				*	*	

d. Candidates: Subordinate clause, Reason operator	ARG OP-SPEC	LOC OP-SPEC	P-P(H)	STAY	MAN OP-SPEC	REAS OP-SPEC
inv [$_{VP}$ por qué [$_{V'}$ se enojó [$_{VP}$ Miguel [$_{V'}$ t_v t_{wh}]]]]			*!	**!		
adj ☞ [$_{VP}$ por qué [$_{VP}$ Miguel [$_{V'}$ se enojó t_{wh}]]]				*		*

Note that if PROJ-PRIN(H) is ranked immediately above STAY, it technically makes the decision in (T2/2c,d). However, STAY makes exactly the same decision from its point in the hierarchy. This shows clearly that as long as PROJ-PRIN(H) is not ranked above an OP-SPEC constraint that is itself ranked above STAY, it isn't independently active. More specifically, it shows that there can be no evidence (modulo other constraints that may crucially interact with these) that would force a choice between the rankings in (32c-f), since they all have the same consequence — no matrix/subordinate distinction with respect to inversion.

3.4 Concluding remarks

This section has completed the analysis of *wh*-movement and inversion in Spanish matrix and subordinate clauses. Given that there are five ways to display inversion (not at all, with argument operators, with argument and location operators, etc.) and given a distinction between matrix and subordinate clauses, there are in principle twenty-five different dialectal possibilities. However, only fifteen of these obey the subset relationship (30): there are no dialects that require inversion with more operator types in subordinate *wh*-questions than in matrix *wh*-questions.

The subset relationship itself follows from the fact that a constraint regulating only subordinate clauses, understood to be PROJ-PRIN(H) in this analysis, exists in the set of constraints provided by UG. The fifteen dialects follow from the interaction of the constraints: whenever PROJ-PRIN(H) is ranked just above or anywhere below STAY, its independent effects are never felt, rendering many different rankings indistinguishable from one another.

Single rankings consistent with each of the fifteen distinguishable grammars are displayed for easy reference and comparison in (39). The letters of the alphabet to their left correspond to the boxed dialectal possibilities (the dialectal actualities) of (31). All rankings where PROJ-PRIN(H) immediately dominates STAY or where STAY dominates PROJ-PRIN(H) are collapsed into rankings where STAY and PROJ-PRIN(H) are not ranked with respect to each other but are in the same spot of the markedness subhierarchy, since it was shown in this section that all of those rankings have the same effect.

(39) *Fifteen distinguishable grammars*

A {STAY, PROJ-PRIN(H)} » ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
F PROJ-PRIN(H) » ARGOP-SPEC » STAY » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
G ARGOP-SPEC » {STAY, PROJ-PRIN(H)} » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC
K PROJ-PRIN(H) » ARGOP-SPEC » LOCOP-SPEC » STAY » MANOP-SPEC » REASOP-SPEC
L ARGOP-SPEC » PROJ-PRIN(H) » LOCOP-SPEC » STAY » MANOP-SPEC » REASOP-SPEC
M ARGOP-SPEC » LOCOP-SPEC » {STAY, PROJ-PRIN(H)} » MANOP-SPEC » REASOP-SPEC
P PROJ-PRIN(H) » ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » STAY » REASOP-SPEC
Q ARGOP-SPEC » PROJ-PRIN(H) » LOCOP-SPEC » MANOP-SPEC » STAY » REASOP-SPEC
R ARGOP-SPEC » LOCOP-SPEC » PROJ-PRIN(H) » MANOP-SPEC » STAY » REASOP-SPEC
S ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » {STAY, PROJ-PRIN(H)} » REASOP-SPEC
U PROJ-PRIN(H) » ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC » STAY
V ARGOP-SPEC » PROJ-PRIN(H) » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC » STAY
W ARGOP-SPEC » LOCOP-SPEC » PROJ-PRIN(H) » MANOP-SPEC » REASOP-SPEC » STAY
X ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » PROJ-PRIN(H) » REASOP-SPEC » STAY
Y ARGOP-SPEC » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC » {STAY, PROJ-PRIN(H)}

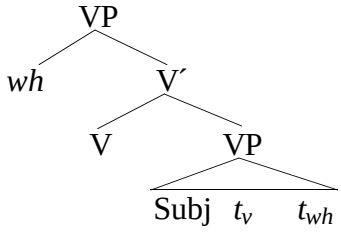
This analysis shows clearly how a large number of constraint permutations distinguish a number of actual grammars that is significantly smaller than the number of permutations. This follows from the only way that very general, conflicting constraints are allowed to interact in OT: through domination, and nothing else.

4 On Optionality and Learning[31]

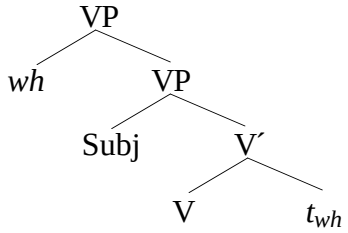
As mentioned in §0, the OT analysis of inversion in this paper predicts that when adjunction (40b) is possible for a given *wh*-phrase in a given clause-type in a given dialect, inversion (40a) for that *wh*-phrase in that clause-type in that dialect is impossible.

(40) *Tree diagrams of inversion vs. no inversion*

a. *Inversion*



b. *Adjunction (no inversion)*



However, the particular *word order* exemplified by inversion, *wh*–verb–subject, is grammatical for every *wh*-phrase in both clause-types in every dialect. Is this optionality, when *wh*–subject–verb

[31] I thank Jane Grimshaw for encouraging me to pursue the issues addressed in this section.

word order (that exemplified by adjunction) is also grammatical? Suppose that it is. There are three obvious ways to encode optionality in Optimality Theory, listed in (41).[32]

(41) *Three ways to encode optionality in OT*

a. Candidates in free variation incur the same constraint violations.

b. Constraints distinguishing candidates in free variation are tied; i.e. not crucially ranked with respect to each other.

c. Speakers are in control of two (or more) total rankings, each candidate in free variation being predicted by one of the rankings.

For obvious reasons, (41a) is not the right way to encode this supposed optionality. Inversion violates STAY (and PROJ-PRIN(H), where applicable); adjunction violates one of the OP-SPEC constraints. If inversion and adjunction incurred the same constraint violations, there would always be optionality! As Grimshaw noted at her MIT talk (see fn. 33), it is extremely difficult to engineer the candidates and constraints such that candidates in free variation violate the same constraints. Among other things, if one of those candidates in optimal in any other language or dialect, then so is/are the other candidate(s), by definition — if they violate the same constraints, they violate the same constraints, under any ranking.

Now consider the tied constraints idea in (41b). Suppose we have the following partial ranking, where LOCOP-SPEC and STAY are unranked with respect to each other.

(42) *Partial ranking with tied constraints*

ARGOP-SPEC » {LOCOP-SPEC, STAY} » MANOP-SPEC » REASOP-SPEC

This ranking will predict that inversion and adjunction will be in free variation with location operators only; argument operators will require inversion and manner and reason operators will require adjunction. No dialect like this exists. This shows not only that this is not a good way to encode the present case of supposed optionality, but also that this may not be a good way to encode optionality in general: it predicts grammars that do not exist.

The idea in (41c) is out for similar reasons. If a speaker can be in control of more than one total ranking, then they could be in control of the two rankings in (43), which make the same predictions as the ranking in (42) above.

(43) *Two total rankings*

a. ARGOP-SPEC » LOCOP-SPEC » STAY » MANOP-SPEC » REASOP-SPEC

b. ARGOP-SPEC » STAY » LOCOP-SPEC » MANOP-SPEC » REASOP-SPEC

This is not to say that bidialectism of this sort is strictly impossible — presumably, bilingualism has to be captured in this way, and perhaps differences in register and other such things — but it can't be possible to account for optionality.

The only option left is to claim that this is a case of *apparent optionality*, in Grimshaw & Samek-Lodovici's (1995) sense — when there is a choice between inversion word order and adjunction word order, they are each the optimal analysis of a different input. Adjunction, as I have argued, is the optimal analysis of the inputs discussed so far when STAY and/or PROJ-PRIN(H) dominates the relevant OP-SPEC constraint. Inversion is the optimal analysis of these

[32] For those familiar with Grimshaw's (handout from her) talk at the MIT Optimality in Syntax Workshop on May 20, 1995, I have added (41c) to her list of ways to encode optionality in OT for completeness.

inputs when the relevant OP-SPEC constraint dominates STAY and PROJ-PRIN(H). The same word order as inversion must be the optimal analysis of another input.

Of course, we cannot simply declare an arbitrary difference between inputs to achieve this goal. Fortunately, this is not necessary — there is a clear difference between the orders *wh*–verb–subject and *wh*-subject–verb when they are both available. The former reflects the general availability in Spanish of verb–subject order, even in declaratives (see fn. 16), which is referred to in the generative literature as *free inversion*: "free" movement of the subject to the right of the verb phrase (see in particular Torrego 1984 and references cited there). As has been argued for Italian in Samek-Lodovici (1994, in preparation) and Grimshaw and Samek-Lodovici (1995), this movement is not "free" but rather obligatory for unstressed, contrastively focused arguments — in this case, subjects.[33] This obligatoriness can be tested with the following diagnostics, among others (see the references cited above).

(44) *Question–answer pairs*

Q:	¿Quién se fue?	*Who left?*
A:	Miguel.	*Miguel.*
	Se fue Miguel.	*left Miguel.*
	*Miguel se fue.	*Miguel left.*

(45) *Association with* solamente 'only'

a.	Solamente se fue Miguel.	*Only left Miguel.*
b.	*Solamente Miguel se fue.	*Only Miguel left.*

The first diagnostic (44) is a *wh*-question–answer pair, where the phrase in the answer corresponding to the *wh*-word (the subject) must be contrastively focused. Of course, the question can be answered simply with the phrase itself, as in the first answer. However, if the answer is a complete sentence, then only one option is available — with the subject realized post-verbally.[34] The second diagnostic (45) is focus association with the adverb *solamente* 'only', where the subject must again be realized post-verbally to be associated with the adverb.

The exact same contrasts can be replicated when there is an option between *wh*–verb–subject and *wh*–subject–verb word orders in *wh*-questions. The subject–verb order simply cannot be used in contexts where the subject is supposed to be contrastively focused. I use here examples based on my own judgments; these diagnostics have not received the benefit of a full-fledged survey, but I have checked them with speakers with patterns different from my own.[35]

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[33] See Bonet (1990) for similar observations about Catalan. Bonet's analysis differs from that of the references cited in the text in that she assumes the postverbal, constrastive focus position of the subject to be its base-generated position, a right-branching Spec/VP, where the subject can optionally stay rather than move to the canonical Spec/IP position. This position is then given a contrastive focus interpretation and special intonation by components separate from the syntax.

[34] The preverbal subject answer is possible only if the subject is stressed, another way to realize contrastive focus. For discussion of this issue, see Grimshaw & Samek-Lodovici (1995); as they do, I treat the two ways of realizing contrastive focus as separate phenomena. Since stressing is always a possible way to realize contrastive focus, I won't point this out for subsequent examples. An example marked as ungrammatical is so under regular intonation, with no subject stress.

[35] Since I speak the Matrix 4, Subordinate 3 dialect, I can only use subordinate *wh*-question examples with *por qué* 'why' — that's the only place where I allow adjunction and hence also a distinct contrastively focused subject word order.

(46) *Question–answer pairs*

Q: ¿Quién es que te preguntas por qué se enojó?
Who is it that you wonder why he got mad?

A: Miguel.	*Miguel.*
Me pregunto por qué se enojó Miguel.	*I wonder why got mad Miguel.*
*Me pregunto por qué Miguel se enojó.	*I wonder why Miguel got mad.*

(47) *Association with* solamente 'only'

a. Quiero saber por qué solamente se enojó Miguel.
I want to know why only got mad Miguel.

b. *Quiero saber por qué solamente Miguel se enojó.
I want to know why only Miguel got mad.

What these diagnostics show is that contrastive focus is by no means just an (obligatory) interpretation of a syntactic option, but rather an interpretive property of the input that motivates a deviation from the syntactic norm. The norm in Spanish is subject–verb word order, arising in declaratives and in some *wh*-questions (depending on the speaker, the clause-type, and so forth). The deviation motivated by contrastively focused subjects is verb–subject word order. Recall from §1.4.1 that the input of a clause has an optional marking M of the arguments of the lexical head L as (contrastive) foci or topic-referring. Arguments marked as foci are subject to the following constraint (the subscript *f* here is for "focus").[36]

(48) *Constraint on foci*

ALIGNFOCUS: ALIGN (XP_f, Left, YP, Right)
Align the left edge of contrastively focused constituents with the right edge of a maximal projection. Failed by non-aligned foci.

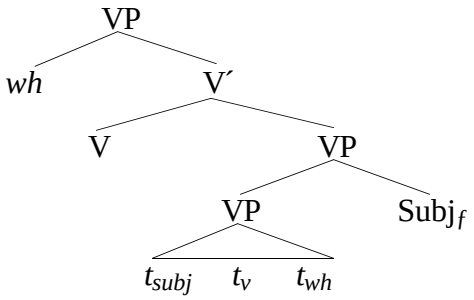
From Grimshaw & Samek-Lodovici (1995)

When properly ranked in a constraint hierarchy, this constraint demands that an argument marked as contrastively focused be adjoined to a maximal projection. Details aside (see (Grimshaw and) Samek-Lodovici's work), a contrastively focused subject must be right-adjoined to VP to satisfy this constraint. Assuming movement is required to achieve this goal, the resulting structure is shown schematically in (49) for a *wh*-question in Spanish. In (49a), we have a structure with a contrastively focused subject accompanied by *wh*-movement and inversion; in (49b), a structure with a contrastively focused subject accompanied by *wh*-adjunction and no inversion.

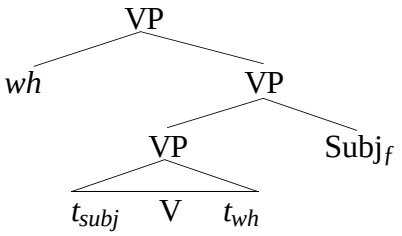
[36] The formulation of the constraint in (48) follows the generalized alignment schema proposed by McCarthy & Prince (1993). All that matters for our purposes is its structural consequence, shown below in (49).

(49) *Contrastively focused subject movement*

a. *with inversion*



b. *with adjunction*



Both structures in (49) are string-wise identical, each for different reasons, to plain inversion (i.e., without contrastively focused subject movement; compare (40a)). Plain inversion is precisely the structure predicted not to be allowed by my analysis if adjunction is possible. We therefore have an explanation for the fact that this word order is always grammatical: it's always available through contrastively focused subject movement, whether inversion itself is obligatory or not.

Analysis of some of the similarities and differences between Italian and Spanish with respect to contrastive focusing can be found in Samek-Lodovici (in preparation). A complete analysis of this phenomenon in Spanish is unfortunately beyond the scope of this paper, and so this explanation must await further investigation.

4.2 Why so many dialects?

Whether the explanation above is correct or not, the fact remains that the word order in question, that exemplified by inversion, is always a grammatical possibility. This fact may explain why there are so many dialects of Spanish. I should warn the reader that the remarks to be made here are entirely speculative, and may raise more questions than they attempt to answer.[37]

Stromswold (1990) notes in her study of the acquisition of the English auxiliary system that children learn auxiliary inversion in English matrix *wh*-questions in surprisingly distinct stages. First, there is a stage when they do not invert at all. Then, they begin to invert with *who* and *what*. *Where*, *when* and *how* come next (the order of the individual stages here is not as clear), and finally inversion is acheived with *why*. Perhaps not surprisingly, this parallels the proposed markedness subhierarchy.

Suppose language acquisition proceeds through the demotion of constraints, as in the learning algorithm proposed by Tesar & Smolensky (1993). Combining the inversion acquisition data with the constraint demotion idea, the acquisition of inversion can be seen as tentative demotion of STAY down the markedness subhierarchy, tentative in the sense that it proceeds in stages as if it were making sure not to go too far, possibly making errors.[38] First, STAY will be at the top of the hierarchy, and no inversion will be possible. Then, STAY will jump down a notch to just below ARGOP-SPEC, allowing inversion only with *who* and *what*. In the end, if one is acquiring English anyway, STAY will end up at the bottom of the markedness subhierarchy.

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[37] The following emerged from what was already very speculative discussion of various issues with Paul Smolensky. However, he is not responsible for anything said here.

[38] I restrict myself here to matrix clauses, and so do not discuss PROJ-PRIN(H). Similar comments apply to this constraint as apply to STAY, of course.

Now consider the situation for any Spanish learner. Whether the dialect she is learning requires inversion or not, she is hearing sentences with the word order of inversion: in some if not all cases, it is the result of contrastively focused subject movement. There seem to only be weak discourse-related cues telling the learner whether a given sentence has a contrastively focused subject or not (structural focus need not be accompanied by any special intonation or stress, *pace* Bonet 1990). The learner can thus misinterpret contrastively focused subject movements as inversions or vice-versa — the former mistakenly triggering demotion of STAY, the latter mistakenly blocking demotion of STAY.

As a consequence of this ambiguous input, a learner's entire input experience may violate the subset relationship (30) or the markedness subhierarchy, but their grammar won't — eventually, the learner arrives at a grammar (a ranking) that obeys both. This is because the markedness subhierarchy is universally defined, and the subset relationship (30) is a consequence of a stringency relationship between the universal constraints STAY and PROJ-PRIN(H) and all of their possible interactions within the markedness subhierarchy.

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