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MARKEDNESS AND SUBJECT CHOICE IN OPTIMALITY THEORY *

ABSTRACT. Among the most robust generalizations in syntactic markedness is the association of semantic role with person/animacy rank, discussed first in Silverstein (1976). The present paper explores how Silverstein's generalization might be expressed in a formal theory of grammar, and how it can play a role in individual grammars. The account, which focuses here on the role of person, is developed in Optimality Theory. Central to it are two formal devices which have been proposed in connection with phonology: harmonic alignment of prominence scales, and local conjunction of constraints. It is shown that application of harmonic alignment to scales involving syntactic relations and several substantive dimensions characterizes the universal markedness relations operative in this domain, and provides the constraints necessary for grammar construction. Differences between languages can be described as differences in the ranking of universal constraints.

0. INTRODUCTION

Among the most robust generalizations in syntactic markedness is the association of semantic role with person/animacy rank, discussed first in Michael Silverstein's (1976) paper, 'Hierarchy of Features and Ergativity'. A version of Silverstein's hierarchy is given in (1a) (the format is different than his original): 1st and 2nd person – here called the 'local' persons –

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outrank 3rd, and within the 3rd person there is a further ranking of various subcategories:

(1)a. Local person > Pronoun 3rd > Proper Noun 3rd > Human 3rd > Animate 3rd > Inanimate 3rd

b. Agent > Patient

The hierarchy in (1a) must be understood in connection with the semantic role hierarchy in (1b). Silverstein's claim is that the unmarked situation is for elements on the upper end of (1a) to be agents in transitive propositions and for elements on the lower end to be patients (Silverstein 1976, p. 123). Evidence for this is that in many languages, expression of more marked configurations is morphologically more complex than that of less marked ones. Interestingly, the markedness expressed in (1) is realized in a number of different ways: through case marking, through the category of direction (direct versus inverse), and through the category of voice (active versus passive). The generalization expressed in (1) is an important result in universal grammar, and appropriately occupies a prominent place in the typological and functional literature. The present paper explores how Silverstein's generalization might be expressed in a formal theory of grammar, and how it can play a role in individual grammars.

The account is developed within Optimality Theory (OT) (Prince and Smolensky 1993), as OT is "in many respects a formal theory of markedness" (Smolensky 1996a). Central to the account are two formal devices which have been proposed in connection with phonology: harmonic alignment of prominence scales, and local conjunction of constraints. I begin by sketching the ways in which the markedness expressed by (1) is realized. Throughout, attention is restricted to that part of the hierarchy in (1a) which concerns *person*. This narrows the scope of the present inquiry to manageable size; whether the approach suggested here extends to the rest of the hierarchy remains to be seen.

1. THE REALIZATION OF MARKEDNESS

Silverstein proposed that the markedness represented by (1) underlies split-ergative case marking in languages where the split is based on person and/or animacy (see also Dixon 1994). Table I shows case marking in a language like Dyirbal (Dixon 1972, Silverstein 1976) where, reading across, 1st/2nd person pronouns are marked when they are objects, but not when they are subjects; conversely, 3rd persons are marked when they

are subjects of transitive clauses, but not when they are objects (or subjects of intransitive clauses):[1,2]

TABLE I

Person-based split-ergative case marking system (Silverstein 1976)

	Unmarked	Marked
Local persons	Subject	Object
3rd person	Object	Subject (of transitive)
Case	Nominative/Absolutive	Accusative/Ergative

Since morphological marking coincides with syntactic markedness, systems of this sort involve a fine-grained matching of the two (Silverstein 1976, pp. 149ff). Reading down Table I, note that the maximally unmarked clause is one in which the subject is a local person and the object is 3rd person; the maximally marked clause is one in which the subject is 3rd person and the object is a local person.

Dyirbal is a dependent-marking language (Nichols 1986), one in which grammatical relations are marked on nominals themselves. Silverstein notes (1976, p. 160) and DeLancey (1981) has developed further the idea that the same markedness which is expressed through the case system in Dyirbal underlies the distribution of direct and inverse verbs in other languages. The category of direction, within which direct and inverse verbs contrast, is generally limited to head-marking languages (Nichols 1986, Klaiman 1993). Direction is relevant only in transitive clauses, with the distribution of direct and inverse verbs determined by the relative position of subject and object along some dimension. In Nocte, for example, a Tibeto-Burman language discussed in DeLancey (1981), the direct verb is used when the subject is 1st or 2nd person and the object is 3rd (the unmarked configuration), while the inverse verb is used when the subject is 3rd person and the object is 1st or 2nd (the marked configuration).

Here, the crucial assumption is that the inverse verb is the marked member of the inverse/direct opposition, an assumption motivated in Nocte by

[1] I am ignoring here some aspects of the analysis of Dyirbal which may render this discussion problematic. See the discussion in Section 5.1.

[2] This system is termed 'split-ergative' because 3rd persons are marked according to an ergative/absolutive pattern: transitive subjects are overtly marked, while intransitive subjects and transitive objects are unmarked. The marked case is called 'ergative', the unmarked case 'absolutive'. On the other hand, the local persons are marked according to a nominative/accusative pattern: subjects of all clauses are unmarked, while objects are marked. In this alignment, the marked case is called 'accusative', and the unmarked case 'nominative'.

TABLE II

Person-based direction system (Nocte, DeLancey 1981)

	Unmarked	Marked
Local persons	Subject	Object
3rd person	Object	Subject
Verb form	Direct	Inverse

the fact that the inverse category is marked by overt morphological material and the direct category by ø (DeLancey 1981). Again, morphological marking coincides with syntactic markedness.

The same markedness relations determine the distribution of voice in yet other languages (DeLancey 1981, Jelinek 1990, 1993, Givón 1994). Lummi (Coast Salish), for example, has an active/passive opposition, but the two are in partial complementary distribution, depending on the person of agent and patient (Jelinek and Demers 1993). Only the active occurs when the agent is a local person and the patient third person; only the passive occurs when the agent is 3rd person and the patient a local person.[3,4]

TABLE III

Person-based voice system (Lummi, Jelinek and Demers 1983)

	Unmarked	Marked
Local persons	Subject (Agent)	Subject (Patient)
3rd person	Object (Patient)	Oblique (Agent)
Verb form	Active	Passive

[3] DeLancey (1981) suggests the relevance of Silverstein's hierarchy to voice, citing the marginality of local person passive agents in English as evidence. The Coast Salish languages discussed here are a clearer case, if the Jelinek and Demers' (1983) analysis in terms of voice is correct. Klaiman (1991) suggests that Lummi has a direction system (see below) rather than a voice system. The question as to how Lummi should be analyzed is an important one, but as far as I can tell, neither Klaiman nor Jelinek and Demers present decisive evidence (for some discussion of the issue, see the Jelinek and Demers paper, as well as Jelinek (1993)). I assume the Jelinek and Demers analysis here.

[4] Eloise Jelinek reminds me that a clarification is needed here. 1st and 2nd person agents can be identified in Lummi passive sentences by use of oblique (3rd person) nominal adjuncts that are built on what Jelinek terms 'person-deitic' roots (Jelinek in press). These adjuncts allow reference to 1st and 2nd person, but are syntactically 3rd person, corresponding roughly to 'the one who is me/you'. These are nominals, not pronouns, and are used for contrastive focus of 1st and 2nd person.

Here, the unmarked voice (active) is only compatible with the unmarked association of person with semantic role. To express the marked association, a marked construction is required, the passive (on relative markedness of active and passive, see Greenberg 1966, p. 46).

2. LANGUAGE-PARTICULAR HIERARCHIES

Analyses of facts such as these often involve the positing of language-particular hierarchies. It is indisputable that languages vary in the elements they rank. Nonetheless, language-particular hierarchies pose significant problems for a general theory of markedness.

For the purposes of discussion, (2) lists several hierarchies which have been posited for languages with a direct/inverse opposition; (3) list hierarchies in several languages with an active/passive opposition. These illustrate how languages can vary in the inventory of elements they rank.

(2) Some hierarchies in languages with direction systems:

a. 1 > 2 > 3 (Nocte; DeLancey 1981)

b. local > proximate > obviative > inanimate (Fox; Dahlstrom 1995, p. 99)

(3) Some hierarchies in languages with voice systems:

a. local > 3 (Lummi; Jelinek and Demers 1983)
2 > 3 (Squamish; Jelinek and Demers 1983)
ø (Lushootseed; Jelinek and Demers 1983)

b. 2 > 3 animate pronoun > animate > inanimate (Chamorro; Chung 1998, p. 34)

c. proximate > obviative (Tzotzil; Aissen 1997)

(The categories *proximate, obviative* which figure in (2b, 3c) refer to subcategories within the 3rd person; see the references cited.) Thus, Nocte, Fox, and Lummi rank local persons over third, while Tzotzil does not. On the other hand, Fox and Tzotzil rank proximate over obviative within the category of 3rd person, while Nocte and the Coast Salish languages do not.[5] Chamorro ranks second person (alone) over third, and so does

[5] Aissen (1997) suggests that Chamorro also ranks 3rd person nominals in obviation status. This subsumes the ranking of animates indicated in the hierarchy in (3b).

Squamish, a property not shared with the other languages. While languages vary a good deal in which elements they rank, the rankings they do observe are largely invariant. When they are ranked, local persons always outrank 3rd; where there is ranking between proximate and obviative, proximate outranks obviative; animate always outranks inanimate, and so on. To the extent that the rankings found in particular languages instantiate universal rankings, they should not be stipulated. But this seems unavoidable when one and the same format is used to indicate both the elements ranked (a language-particular matter) and their rankings (largely universal).

There is also a descriptive problem with the hierarchies in (3), which are all designed specifically to express restrictions on the pairing of person with grammatical function. All these hierarchies are really constraints on pairings in *active* clauses (and all the sources cited in (3) restrict them accordingly). However, all of the languages listed in (3) are subject to additional restrictions in *passive* clauses which are not expressed by the hierarchies in (3): namely, in none of these languages can local persons be agents in passive clauses (Jelinek and Demers 1983; Aissen 1987, p. 63; Cooreman 1987, p. 112). This restriction is as much a consequence of the markedness expressed by the hierarchies in (1), as are the restrictions on active clauses stated in (2) and (3): the maximally unmarked situation is for local persons to be agents, hence propositions in which they are should be expressed in the unmarked voice: active, not passive.

If person-based restrictions in active and passive clauses express the same markedness, then they should be expressed in a formally unified way. But in general, the hierarchies in (3) do not generalize to passive clauses because person-based constraints are different in active and passive clauses. Among other things, in all the languages except Lummi, there are no restrictions on 1st person in active clauses, but there are in passive clauses. Addition of 1st person to these hierarchies to account for the passive yields incorrect predictions about the active. The language-particular hierarchy format for representing person-based constraints seems to stand in the way of formally unifying person-based constraints in *all* clauses. In the actual practice of grammatical description, person-based restrictions in passive clauses are stated separately, with no suggestion of any substantive connection to those in active clauses. This suggests the need for a different approach Apparently it is necessary to pick out very *specific* associations of person and grammatical function, e.g., Squamish excludes 2nd person objects (relevant only in active clauses) and local person agents (relevant only in passive clauses). The fact that these very specific language-particular constraints reflect universal principles of

markedness must be expressed via the relation between universal grammar and language-particular grammars.

Language-particular hierarchies pose a particularly pressing problem for Optimality Theory: in short, they have no status. An OT-grammar is a ranking of universal constraints, but language-particular hierarchies like those of (2) and (3) are not universal constraints.

3. Eliminating Language-Particular Hierarchies

We can make headway on these various fronts by replacing language-particular hierarchies with language-particular rankings of simple, universal constraints, an approach which has been developed within Optimality Theory for phonology. In what follows, I draw heavily on ideas concerning voice and typology presented in Legendre et al. (1993), and on harmonic alignment as developed in Prince and Smolensky (1993). Once we have reconceived hierarchies as sets of ranked constraints, we can solve the conceptual and descriptive problems discussed above.

The analysis rests on a set of proposed universal prominence scales which are part of universal grammar. Some candidates for this status are listed in (4) (these correspond to a subset of those needed to account for the facts discussed below):

(4)

Person scale:	Local > 3rd [Local = 1st, 2nd]
Role Scale:	Agent > Patient
Relational Scale:	Subject > Nonsubject

For the most part, these rankings are not controversial and have been assumed (or proposed) by linguists working in a variety of frameworks.[6] Since the analyses developed below depend in a fundamental way on these scales, it is positive that a broad consensus surrounds them. In the analyses that follow, however, these scales are not taken to express markedness *per se*, but a ranking. Thus, local persons are not inherently less marked than 3rd: they are less marked *qua* (transitive) subjects and more marked *qua* objects. (This situation is what is characterized in the literature on markedness as *markedness reversal*, i.e., situations in which what is relatively marked in one context is relatively unmarked in another (Battistella

[6] On the relational scale, see, for example, Jakobson (1965/1995), Keenan and Comrie (1977), Bell (1983), Croft (1990), Bresnan (1995, 1998, forthcoming); on the person scale, see Silverstein (1976), DeLancey (1981); on the role scale, see Jackendoff (1972), Silverstein (1976), Bresnan and Kanerva (1989), Grimshaw (1990); on the obviation scale, see Wolfart (1973).

1990, Croft 1996, Battistella 1996). The analysis proposed below predicts markedness reversal in this domain.) Expressing this generalization, which I assume to be universal, requires that the person scale and the relational scale be brought into alignment (DeLancey 1981), for it is particular associations of person and grammatical function which are relatively marked or unmarked. A formal technique for aligning two prominence scales (or dimensions) is defined in Prince and Smolensky (1993), and discussed there in the context of syllable structure and sonority:

(5) Alignment. Suppose given a binary dimension D_1 with a scale X > Y on its elements {X, Y}, and another dimension D_2 with a scale a > b … > z on its elements. The harmonic alignment of D_1 and D_2 is the pair of Harmony scales:

H_x: X/a $\succ$ X/b $\succ \cdots \succ$ X/z
H_y: Y/z $\succ \cdots \succ$ Y/b $\succ$ Y/a

The constraint alignment is the pair of constraint hierarchies:

C_x: *X/z $\gg \cdots \gg$ *X/b $\gg$ *X/a
C_y: *Y/a $\gg$ *Y/b $\gg \cdots \gg$ *Y/z

(Prince and Smolensky 1993, p. 136)

In the original example, D_1 is a scale of structural positions within the syllable (Peak > Margin), and D_2 is the sonority hierarchy (where, *inter alia*, vowels > non-vowel sononants > obstruents). Harmonic alignment of the two prominence scales associates the high-ranking elements on the two scales (vowels with peaks), as well as the low-ranking elements on the two (obstruents with margins). The result is two harmony scales (H_x, H_y above), one of which concerns peaks and the other margins. (These scales contain the connective '$\succ$', which is read as 'more harmonic than'.) The scale on peaks says that it is more harmonic (less marked) for vowels to be peaks than for non-vowels, and more harmonic for non-vowel sonorants to be peaks than for obstruents; the scale on margins says that it is more harmonic for obstruents to be margins than sonorants, and more harmonic for non-vowels to be margins than vowels. The basic idea is that a position which is structurally prominent, e.g., the peak, attracts elements which are prominent along some relevant substantial dimension, e.g., sonority, while a position which is low in structural prominence, e.g., the margin, attracts elements which are low on relevant structural dimensions, e.g., sonority. Harmonic alignment thus derives markedness reversal.

Our concern here is the relative markedness (or harmony) which characterizes the association of structural positions within the *clause* (e.g., subject, object) with the dimension of person. In most languages, subject position plays a role in the clause analogous to that played by the peak in syllable structure: it is the most prominent structural position and thereby attracts elements which are relatively prominent on other substantial dimensions. In syntax, perhaps more than in phonology, there are a number of dimensions relevant to subject choice. Depending on the language, subject position may attract local persons over third, proximates over obviatives, agents over patients, and so on. It is the job of constraint ranking to adjudicate in particular languages between the various dimensions which play a role, cross-linguistically, in subject choice.

The generation of constraint hierarchies through harmonic alignment of person and grammatical relation is illustrated in Table IV (for other applications of harmonic alignment in syntax, see Artstein 1998 and Asudeh 1999). The left-hand column shows the universal scales involved, person and grammatical relation. The person scale ranks the local persons (first and second) with respect to third, but does not rank first and second with each other.[7] The relational scale is presented in skeletal form here for the sake of illustration, and simply ranks subject over nonsubject.[8]

TABLE IV

Alignment of person and grammatical relation (Encapsulated)

Scales	Harmonic Alignment	Constraint Alignment
Local > 3	Su/Local $\succ$ Su/3	*Su/3 $\gg$ *Su/Local
Su > Non-Su	Non-Su/3 $\succ$ Non-Su/Local	*Non-Su/Local $\gg$ *Non-Su/3

The middle column shows the harmony scales, which are derived through harmonic alignment (5). These express the fact that a local person subject is more harmonic (less marked) than a third person subject. Conversely, a third person nonsubject is less marked than a local person nonsubject. The relative markedness of particular associations is stated

[7] DeLancey (1981) argues that 1st and 2nd person are not universally ranked. This allows languages to differ in their ranking. Dixon (1994, pp. 88ff.) argues that 1st person usually outranks 2nd, but concedes the need to allow the opposite ranking in some cases. Several of the languages discussed here show the need for 2nd person to outrank 1st.

[8] The following abbreviations are used in tables and tableaux: Su: subject, Non-Su: nonsubject; Oj: object; Obl: passive agent (syntactic function); Agt: agent (semantic role); Pat: patient; GR: grammatical relation; Pers: person.

independently for subject and nonsubject, a point which the Australian literature in particular argues is necessary (Silverstein 1976, Dixon 1994).

The right-hand column contains the constraints which actually figure in grammar construction. These are stated as Avoid constraints, and are derived by inverting the rankings in the middle box and prefixing the Avoid operator '*'. The ranking of *Su/3 over *Su/Local means that in the absence of any relevant higher ranking constraints, a clause with a 3rd person subject will lose out in direct competition to a clause with a 1st or 2nd person subject. (I assume faithfulness to person and semantic role; given alternative expressions of the same propositional content, one with a 3rd person subject and another with a 1st or 2nd person subject, the latter will win.) The constraints in the right-hand column are proposed as universal, as are their rankings. That is, each set constitutes a *constraint subhierarchy*. The ranking of constraints in a subhierarchy is universally fixed, and expresses the universal markedness relations in this domain. Language-particular variation can be described through the interpolation of other constraints among those in a subhierarchy, but not through differences in ranking within the subhierarchy itself.

In Table IV, 'local person' subsumes first and second, and 'nonsubject' subsumes object and passive agent. In some grammars, however, relational constraints on first and second person are different, as are person constraints on direct object and passive agent. Hence, the constraints in Table IV encapsulate the more expanded set shown in Table V, where the two scales of Table IV are each decomposed, yielding a total of four scales. I use the term *Oblique* (Obl) here to refer exclusively to the syntactic relation borne by the agent in a passive clause.

TABLE V

Alignment of person and grammatical relation

Scales	Harmonic Alignment	Constraint Alignment
Local > 3	Su/Local $\succ$ Su/3	*Su/3 $\gg$ *Su/Local
1 > 3	Su/1 $\succ$ Su/3	*Su/3 $\gg$ *Su/1
2 > 3	Su/2 $\succ$ Su/3	*Su/3 $\gg$ *Su/2
Su > Non-Su	Oj/2 $\succ$ Oj/Local	*Oj/Local $\gg$ *Oj/3
Su > Oj	Oj/3 $\succ$ Oj/1	*Oj/1 $\gg$ *Oj/3
Su > Obl	Oj/3 $\succ$ Oj/2	*Oj/2 $\gg$ *Oj/3
	Obl/3 $\succ$ Obl/Local	*Obl/Local $\gg$ *Obl/3
	Obl/3 $\succ$ Obl/1	*Obl/1 $\gg$ *Obl/3
	Obl/3 $\succ$ Obl/2	*Obl/2 $\gg$ *Obl/3

Some of the constraints in the right-hand column are restricted to particular clause types: those which begin *Oj/ penalize only active clauses, since passive clauses contain no object. Those which begin *Obl/ penalize only passive clauses, since active clauses contain no passive agent. Hence, although these constraints are generated from the same initial scale (Su > Non-Su), decomposition of Non-Su into Oj and Obl yields constraints which distinguish active from passive clauses, and are ranked independently. At the same time, since these constraints are ultimately derived from alignment of the same two initial scales (the person scale, the relational scale), they express the same markedness relations. Conceptually, then, this account unifies person-based constraints in active and passive clauses while making it possible to distinguish them.

Among other dimensions which are relevant to subject choice are semantic role and thematic (discourse) prominence. These are treated here in much the same way as person, i.e., through harmonic alignment. Relevant constraints are shown in Table VI.

TABLE VI

Alignment of grammatical relation with semantic role and thematic prominence

Scales	Harmonic Alignment	Constraint Alignment
Agt > Pat	Su/Agt ≻ Su/Pat	*__Su/Pat__ ≫ *Su/Agt
Su > Oj	Oj/Pat ≻ Oj/Agt	*Oj/Agt ≫ *Oj/Pat
X > x	Su/X ≻ Su/x	*Su/x ≫ *Su/X
Su > Oj	Oj/x ≻ Oj/X	*Oj/X ≫ *Oj/x
Su > Obl	Obl/x ≻ Obl/X	*Obl/X ≫ *Obl/x

Analogous constraints were proposed in different formalism by Legendre et al. (1993). The first set (top row) concerns the association of semantic role and grammatical function, and asserts that the unmarked situation is for agent to be subject, and for patient to be object. I intend the terms ‘agent’ and ‘patient’ here to correspond to the Proto-Agent and Proto-Patient roles of Dowty (1991), roles which are conceived as cluster concepts defined in terms of P-Agent and P-Patient properties. The Proto-Agent is that argument with the greater number of P-Agent properties; the Proto-Patient is that argument with the greater number of P-Patient properties. Each role subsumes a large number of specific roles and there is no implication, for example, that the Proto-Agent acts with intentionality or is a causal agent. The constraint hierarchies in the top half of Table VI correspond to Dowty’s Argument Selection Principle (ASP), which

says that that argument with the greatest number of P-Agent properties is realized as the subject, and that argument with the greatest number of P-Patient properties is realized as the object. *Su/Pat is violated then if the argument with the greater number of P-Patient properties is realized as the subject; *Oj/Agt is violated if the argument with the greater number of P-Agent properties is realized as the object. However, these constraints differ in two important ways from Dowty's ASP. First, the ASP determines subject and object only for active, transitive clauses while the constraints *Su/Pat and Oj/Agt apply to both actives and passives. Of course, *Su/Pat is systematically violated in passive clauses, since patient subjects are *not* avoided in passive clauses: the passive functions precisely to realize the patient as subject. This underscores the second difference: *Su/Pat and *Oj/Agt are conceived as violable constraints, while Dowty's ASP is not (see also Asudeh 1999).

The constraint *Su/Pat ('avoid subject patient') (bold-faced in Table VI) is pivotal in the present analysis because it penalizes *any* passive, and depending on its ranking relative to other constraints on subject choice, can selectively admit passive clauses or can eliminate them altogether. Passive clauses may be possible, then, when some constraint higher-ranked than *Su/Pat penalizes a candidate with a patient object or an agent subject.

The second set of constraints (bottom row) deals with pressures on subject choice which are grounded in discourse prominence, i.e., are related to topicality, empathy, perspective, discourse coherence, etc. The basic insight is that the unmarked situation is for a more prominent argument to be subject and for a less prominent one to be nonsubject (Chafe 1976, Givón 1976, Keenan 1976, Kuno and Kaburaki 1977, and many others). The harmonic alignments in the middle column express this where, following Legendre et al. (1993), capital X represents a more prominent element, and lowercase x a less prominent one. I assume that the default is for all nominals to be neutral in prominence, but that asymmetries in prominence can result through the raising or depression of an argument's prominence. Again, some of the constraints in the right-hand column restrict only some clauses: *Oj/X penalizes active clauses (with prominent objects), while *Obl/X penalizes passives (with prominent agents).

The constraints in Tables II and III concern the harmonic alignment of grammatical function along three different dimensions: person, semantic role, and discourse prominence. The important point is that while the ranking of constraints within a subhierarchy is universally fixed (e.g., *Su/3 always outranks *Su/Local), cross-linguistic variation arises because the interpolation of constraints from distinct subhierarchies can yield distinct overall constraint rankings, i.e., distinct grammars. In the construction of

language-particular OT grammars, constraints which express preferences based on different dimensions can be ranked in different ways and thereby express diflerent priorities for subject choice. In Section 4, I show how voice systems with varying sensitivity to person can be described in terms of the constraints developed above. Section 5 considers in a somewhat preliminary way how the same constraints might play a role in determining the distribution of case and direction in languages like Dyirbal and Nocte.

One feature of the analyses constructed below is worth mentioning at this point: in general, the low-ranked constraints in Tables I, II, and III do not figure crucially. This is because most of the subhierarchies which play a role here contain only two members and together exhaust the relevant domain. Thus all candidates which violate the high-ranked constraint will satisfy the low-ranked one, and vice versa. In such cases, the lower-ranked constraint can play no crucial role in the evaluation and can be dropped from consideration, a practice I follow here at various points.

4. LANGUAGE-PARTICULAR RANKINGS

We consider now how the constraints of Tables II and III can be interpolated to yield particular grammars. I assume that inputs consist of a predicate-argument structure, with (proto) semantic role, relative discourse prominence, and person of each argument specified.[9] Candidates are constructed by assigning a syntactic realization to each argument. Each candidate consists of a predicate with nominal arguments, where each of the latter is associated with a set of features which represents its morphosyntactic properties, e.g., features indicating grammatical function, person, and morphological case, when case is overtly marked. Following Legendre et al. (1993) and Aissen (1997), I assume that active and passive clauses belong to the same candidate sets and thus compete with one another (see Ackema and Neeleman (1998) for an analysis in which active and passive clauses do not compete).

In OT, the class of inputs and candidate sets is universal (see especially Prince and Smolensky 1993 and Smolensky 1996b); likewise, the set of constraints is essentially universal. Consequently, the source of language-particular variation lies not in differences in the class of inputs, candidate sets, or constraints, but in the ranking of the constraints. Further, there is

[9] In assuming that information about the discourse status of arguments may be specified in inputs, I follow Legendre et al. (1993), Grimshaw and Samek-Lodovici (1998) and Sells (to appear). Sells assumes a more articulated input, where three different degrees of prominence can be indicated in the input.

no pre-filtering of inputs, and the fact that some languages have passive and some do not, for example, cannot be explained simply by assuming that the former have passive inputs (or candidates), while the latter lack them. Since passive clauses occur in some languages, the grammar of every language must evaluate passive candidates and the grammar of a language which lacks passive clauses must contain a high-ranking constraint (or constraints) which excludes such clauses. The fact that the lexicon (or morphology) of such a language lacks passive is a consequence of the language's constraint ranking. These assumptions are fundamental if OT is to provide an account of typological variation.

In none of the languages under discussion here is the agent ever realized syntactically as object. That is, *Oj/Agt, which is one of the high-ranked constraints in Table VI, is unviolated.[10] I simplify by excluding candidates corresponding to this assignment, with the result that all candidates are either active (agent → subject, patient → object) or passive (patient → subject, agent → passive agent).

4.1. *Inverse Languages*

Consider first languages like Fox and Nocte in which the markedness relations represented by (1) are expressed through the direct/inverse opposition. In such languages, all sentences are, by hypothesis, active, with grammatical function entirely determined by semantic role (see, in particular, Dahlstrom 1995 for arguments that inverse clauses in Fox are active; see LeSourd 1976 for a different view). Following ideas of Legendre et al. (1993), these languages can be described by ranking *Su/Pat (as well as *Oj/Agt) higher than any of the constraint subhierarchies which penalize associations of grammatical function with person or prominence. (These constraint subhierarchies are represented below as *GR/Pers and *GR/χ, respectively, where GR ranges over {Su, Oj, Obl}, Pers ranges over {1, 2, 3}, and χ ranges over the two degrees of prominence {X, x}.) Recall that *Su/Pat penalizes a structure in which that argument with more P-Patient properties is realized as subject.

(6) Fox/Nocte:
*Su/Pat $\gg \cdots \gg$ {*GR/Pers, *Gr/χ}

[10] Languages in which agents are realized as object are not excluded by the present set-up, but will only emerge if there are higher-ranked constraints which force the appearance of object agents. A number of analyses which posit agent objects have been proposed (see Rhodes 1990, 1994 on Ojibwe (Algonquian), Kroeger 1993 on Tagalog; see also Manning 1996 for a more general discussion and Sells (to appear) for an OT analysis in which there is no asymmetry between agent and patient in access to the grammatical functions subject and object).

Tableau I shows the evaluation of a clause whose input specifies a 3rd person agent (indicated as: Agt/3), and a 1st person patient (Pat/1). There are two candidates: one active and one passive, depending on how grammatical function is assigned to each of the two arguments. In the active candidate, the 3rd person agent is subject (indicated as: Agt/Su/3), and the 1st person patient is direct object (Pat/Oj/1); in the passive, the patient is subject (Pat/Su/1) and the agent is syntactically oblique (Agt/Obl/3). (Semantic role is marked for the candidates so that it is easier to determine satisfaction of constraints. I assume that candidates are always faithful to the semantic roles specified in the input.) Discourse prominence plays no role in determining grammatical function in this evaluation so it is omitted from the input. The high ranking constraint, *Su/Pat eliminates the passive entirely, leaving the active as the optimal candidate.

Tableau 1. Fox

V(Agt/3, Pat/1)	*Su/Pat	*GR/Pers
☞ ACTIVE Agt/Su/3-Pat/Oj/1		**
PASSIVE Pat/Su/1-Agt/Obl/3	*!	**

This accounts for the non-existence of passives, but not for the fact that the inverse form of the active verb must be used here. I return to this in Section 5.3.

4.2. *The Relevance of Thematic Prominence to Voice*

By ranking *Su/Pat lower – i.e., among the constraints which penalize particular *active* clauses – we can begin to admit passive under various conditions. Consider first a language like English. There is general agreement in the functional syntax literature that the choice between active and passive in English is primarily determined by the relative prominence of agent and patient. Crudely put: the passive is used if the patient is more prominent than the agent; the active is used if either the agent is more prominent than the patient, or if neither has greater prominence. This description is meaningful only if the term *prominence* can be given content, and this is, of course, difficult. Studies of the distribution of active and passive in English discourse suggest two factors. One has to do with attention: an individual which is the center of attention at a given moment is more prominent at that moment than one which is not (Tomlin 1985). Empathy

and topicality ('what the sentence is about') are often relevant to choosing the center of attention. The other factor is that an individual mentioned in recent, local discourse is more prominent than one not mentioned. This factor is relevant to discourse coherence: discourse coherence is increased by selecting as subject of one clause a nominal whose referent has been mentioned in the immediately preceding discourse (Thompson 1987).[11] These factors determine a ranking of nominals in a clause which I will refer to as *thematic prominence*. The preference for thematically prominent subjects and the use of passive in English to present a thematically prominent non-agent as subject is acquired early by English-speaking children (Slobin 1994).

Both Tomlin (1985) and Thompson (1987) conceive of the choice between active and passive as involving a competition for subject position between the agent and the theme:[12]

> The analysis of naturally occurring texts … reveals that the interaction of subject, agent, and thematic information can be described in a precise and explicit manner. The subject relation, for the texts examined, always takes the NP whose referent is highest in the proposed hierarchy of thematicity. … If the relative thematicity of the NPs competing for the subject relation is equal or neutralized, the subject then takes the agent. Thus the function of subject in the synchronic grammar of English, at least for this kind of communicative event, can be described as:
>
> The function of subject in English
>
> Subject encodes thematic information over agent.
>
> (Tomlin 1985, pp. 76–77)
>
> In other words, it appears that users of English are content to code the agent as subject unless broadly thematic or more local cross-clausal considerations require an alternative coding (Thompson 1987, p. 501).

These conceptions clearly lend themselves to formalization through a set of ranked, violable constraints which expresses the preference for a thematically prominent subject over an agent subject. The constraint ranking in (7) expresses this and denies person *per se* a role in subject choice in English.

(7) English: *Su/x ≫ ***Su/Pat** ≫ *GR/Pers

[11] These two factors correspond fairly closely to the two topicality measures proposed in Givón (1983), and developed further in work like Cooreman (1987) and the papers in Givón (1994): referential distance (how far back is the most recent mention?), topic persistence (how many times is the referent mentioned in the next x lines?).

[12] Tomlin's conclusions were based on a study of texts taken from hockey play-by-play descriptions; Thompson's study included texts from a variety of genres: formal written English, less formal written English, informal spoken English.

*Su/x penalizes clauses with non-thematic subjects and thus favors clauses with thematic subjects. Ranking *Su/x over *Su/Pat in English represents the fact that the passive is a better choice than the active when the patient is more thematic than the agent. The evaluation of a clause with 3rd person agent/1st person patient, where the patient is specified in the input as thematically prominent (X), is shown in Tableau 2.

Tableau 2. English (prominent patient)

V(Agt/3/x, Pat/1/X)	*Su/x	*Su/Pat	*GR/Pers
ACTIVE Agt/Su/3/x-Pat/Oj/1/X	*!		**
☞ PASSIVE Pat/Su/1/X-Agt/Obl/3/x		*	**

*Su/x is violated by the active, because the subject is not prominent, but it is not violated by the passive, where the subject *is* prominent. Tableau 3 shows that when no argument is prominent, *Su/x is not decisive (both candidates violate it) and the choice between active and passive passes to *Su/Pat, which selects the active (cf. Tomlin 1985).

Tableau 3. English (no prominent argument)

V(Agt/3/x, Pat/1/x)	*Su/x	*Su/Pat	*GR/Pers
☞ ACTIVE Agt/Su/3/x-Pat/Oj/1/x	*		**
PASSIVE Pat/Su/1/x-Agt/Obl/3/x	*	*!	**

The fact that *Su/Pat dominates all the constraints which penalize particular associations of person with grammatical function eliminates a role for person per se in the determination of voice in English.[13]

[13] Kuno (1976, 1987) and Kuno and Kaburaki (1977) argue that person does play a direct role in English voice, and in particular that passive is avoided when the agent is 1st or 2nd person. This is due to the speaker's natural empathy with 1st or 2nd person, and the fact that the focus of speaker empathy prefers to occupy surface subject position. If the constraint against local person passive agents (i.e., *Obl/Local) is active in English, then it must be ranked below *Su/x, since examples with local person passive agents are grammatical in the right discourse contexts (Kato 1979). This differentiates English from the languages to be discussed below, where *Obl/Local is undominated. In the present account, person

4.3. *The Relevance of Person to Voice*

We turn now to cases in which person does play a role. As indicated earlier, exclusion of local person passive agents is quite common. Lushootseed (Coast Salish) is a language which has roughly the same distribution of active and passive as English, but in addition bars passive clauses with 1st and 2nd person agents (Jelinek and Demers 1983). This yields the voice distribution by person of agent and patient shown in Table VII:

TABLE VII

Distribution of voice by person in Lushootseed

Agt ⇓ Pat ⇒	1	2	3
1	–	active/*passive	active/*passive
2	active/*passive	–	active/*passive
3	active/passive	active/passive	active/passive

Active is possible for all combinations, but passive is not. Relative to English, Lushootseed can be described by ranking high just one of the constraints on association of grammatical function with person, *Obl/Local. *Obl/Local involves alignment with the Oblique relation (recall this refers here to the relation borne by the agent in a passive clause), so it penalizes passive clauses.

(8) Lushootseed:
*Obl/Local ≫ *Su/x ≫ ***Su/Pat** ≫ *GR/Pers

Under the ranking in (8), passive clauses with local person agents are categorically excluded, regardless of the thematic prominence of the patient. Tableau 4 shows how the active can win in a clause with a thematic patient:

itself plays no direct role in determining voice, but it can play an indirect role via empathy, since empathy is one factor in choosing the center of attention.

Tableau 4. Lushootseed

V(Agt/1/x, Pat/3/X)	*Obl/Local	*Su/x	*Su/Pat	*GR/Pers
☞ ACTIVE Agt/Su/1/x-Pat/Oj/3/X		*		**
PASSIVE Pat/Su/3/X-Agt/Obl/1/x	*!		*	*

Here, the passive violates the highest-ranked constraint and is excluded despite the fact that the patient is higher in thematic prominence than the agent.*Su/Pat dominates all other constraints which penalize associations of grammatical relation and person, reflecting the fact that aside from local person passive agents, person plays no role in determining voice in Lushootseed. The top-ranked constraint (*Obl/Local) is part of the same subhierarchy as some of the constraints encapsulated in the lowest-ranked constraint (*GR/Pers), but since *Obl/Local is the highest-ranked constraint in its own subhierarchy (see Table V), the ranking in (8) is consistent with the universal rankings of Table V. The three top-ranked constraints all come frorn distinct constraint subhierarchies (one concerning person, one concerning thematic prominence, one concerning semantic role) and may freely interpolate.

In clauses with 3rd person agents, the highest-ranked constraint is irrelevant, and both active and passive survive that constraint as candidates. Under the ranking in (8) *Su/Pat excludes *any* passive except where passive is favored over active by *Su/x, just as in English. Thus, when the patient is thematically prominent, the passive is selected (see Tableau 2). In the absence of a prominent argument, both active and passive violate *Su/x, and the choice between active and passive passes to *Su/Pat, which, as in English, selects the active as optimal (see Tableau 3).

Lummi, also Coast Salish, is like Lushootseed, except that active is *not* possible for all combinations: it is disallowed when the subject is 3rd person and the object 1st or 2nd (Jelinek and Demers 1983).

Except when both agent and patient are 3rd person, active and passive are in complementary distribution in Lummi (See Table VIII). Lummi can be described by interpolating *Oj/Local between the two high-ranking constraints of Lushootseed (8):

(9) Lummi:
*Obl/Local ≫ *Oj/Local ≫ *Su/x ≫ ***Su/Pat** ≫ *GR/Pers

TABLE VIII

Distribution of voice by person in Lummi

Agt ⇓ Pat ⇒	1	2	3
1	–	active/*passive	active/*passive
2	active/*passive	–	active/*passive
3	*active/passive	*active/passive	active/passive

The two high-ranked constraints in (9) both penalize highly marked configurations and are the high-ranked constraints within their own sub-hierarchies (see Table V). Their ranking over all the remaining constraints in *GR/Pers is thus consistent with the universal rankings of Tables II and III.

Tableau 5 shows that the ranking in (9) excludes actives with 1st person objects (likewise 2nd person objects), even when the subject is specified in the input as prominent. *Oj/Local rules out the active, so passive is the optimal form. To achieve this, it is necessary for *Oj/Local to dominate *Su/x and *Su/Pat, both of which penalize the passive in this case:

Tableau 5. Lummi (1st person patient)

V(Agt/3/X, Pat/1/x)	*Obl/Local	*Oj/Local	*Su/x	*Su/Pat	*GR/Pers
ACTIVE Agt/Su/3/X-Pat/Oj/1/x		*!			*
☞ PASSIVE Pat/Su/1/x-Agt/Obl/3/X			*	*	**

In clauses where both arguments are 3rd person, the top two constraints are irrelevant and the next two become decisive. They are ranked as in Lushootseed and English, with the same consequences: both active and passive are possible with 3rd person agent and patient, but the passive is (I assume) reserved for cases in which the patient is more thematically prominent than the agent. The preference for passive in this case is assured by the ranking of *Su/x over *Su/Pat, which fatally penalizes the active (see Tableau 2). In the absence of a prominent argument, *Su/Pat once again plays the key role, excluding the passive (see Tableau 3).

Given the adjacent ranking of *Oj/Local and *Obl/Local, one might consider combining them as *Non-Su/Local. But in fact *Obl/Local must outrank *Oj/Local to correctly determine voice in clauses where both agent and patient are local persons. In this case, only the active is possible,

despite the fact that it violates *Oj/Local. We can understand this if the passive is excluded by a higher-ranked constraint, *Obl/Local.

Tableau 6. Lummi (local person agent and patient)

V(Agt/1/x, Pat/2/x)	*Obl/Local	*Oj/Local	*Su/x	*Su/Pat	*GR/Pers
☞ ACTIVE Agt/Su/1/x-Pat/Oj/2/x		*	*		*
PASSIVE Pat/Su/2/x-Agt/Obl/1/x	*!		*	*	*

We have so far seen no reason to distinguish between 1st and 2nd person, but there are languages in which constraints on the association of person with grammatical function treat the two differently. Squamish is such a language. In particular, active clauses with 3rd person subject are excluded if the object is 2nd person. There is no analogous constraint if the object is 1st person.[14]

TABLE IX

Distribution of voice by person in Squamish

Agt ⇓ Pat ⇒	1	2	3
1	–	active/*passive	active/*passive
2	active/*passive	–	active/*passive
3	active/passive	*active/passive	active/passive

Clauses with 3rd person agent/2nd person patient are expressed then in the passive, while clauses with 3rd person agent/1st person patient allow either active or passive. Encapsulation of 1st and 2nd person constraints must be abandoned here, since the two cases are treated differently. The situation can be described by ranking *Oj/2 above *Su/Pat and *Oj/1 below, as in (10).

(10) Squamish:
*Obl/Local ≫ *Oj/2 ≫ *Su/x ≫ ***Su/Pat*** ≫ *Oj/1

[14] An analogous situation is found in Chamorro, where active clauses with 3rd person subject/2nd person object are generally excluded (Chung 1981, Cooreman 1987, pp. 96ff, Chung 1998, p. 34); similarly in K'iche' (Mayan), where active clauses with 3rd person subject/2nd person formal object are excluded (Mondloch 1981, p. 35). In both Chamorro and K'iche', active clauses with 3rd person subject/1st person object are completely grammatical.

The high ranking of *Oj/2 excludes active clauses with 3rd person subject, 2nd person object. The passive then emerges as the only choice, even though it violates *Su/Pat.

Tableau 7. Squamish (2nd person patient)

V(Agt/3/x, Pat/2/x)	*Obl/Local	*Oj/2	*Su/x	*Su/Pat	*Oj/1
ACTIVE Agt/Su/3/x-Pat/Oj/2/x		*!	*		
☞ PASSIVE Pat/Su/2/x-Agt/Obl/3/x			*	*	

In the case of a 1st person patient, however, there are no constraints in active clauses: as in Lushootseed, both active and passive are possible when agent is 3rd person. In the Jelinek and Demers account, 1st person is simply kept off the hierarchy, but we cannot make the analogous move here, which would be to absent the constraint *Oj/1 from the grammar of Squamish. But we can prevent it from forcing passive by ranking it below *Su/Pat, per (10). The effects of this ranking are shown in Tableau 8:

Tableau 8. Squamish (1st person patient)

V(Agt/3/x, Pat/1/x)	*Obl/Local	*Oj/2	*Su/x	*Su/Pat	*Oj/1
☞ ACTIVE Agt/Su/3/x-Pat/Oj/1/x			*		*
PASSIVE Pat/Su/1/x-Agt/Obl/3/x			*	*!	

The ranking of *Oj/1 below *Su/Pat means that the passive candidate is excluded by a higher-ranked constraint than the active, and the active therefore surfaces. (Passive with a 1st person patient will be possible, however, if the patient is discoursally prominent. Then *Su/x excludes the active, leaving the passive.) Differences in the realization of clauses with 1st and 2nd person patient are derived in this account through different rankings with respect to *Su/Pat, which plays a pivotal role. Since *Su/Pat penalizes any surviving passive candidate, passive can emerge as optimal only when the competing active is penalized by a higher-ranked constraint. The higher-ranked *Oj/2 does exactly this in the case of 2nd person patients.

The ranking of *Oj/1 below *Su/Pat means that *Su/Pat plays the decisive role in clauses with 1st person patients and determines active voice.

4.4. *Conclusion*

The preceding analyses illustrate how harmonic alignment, applied to a small number of universal scales, can yield a set of constraint subhierarchies, each of which concerns the association of grammatical function with some substantive dimension (e.g., person, semantic role, thematic prominence). The harmonic alignments shown in Tables IV, V, and VI characterize universal preferences in these associations; the constraint subhierarchies enforce the observed preferences through universal ranking of constraints. The possibility of interpolating (reranking) constraints from distinct subhierarchies makes it possible to account for the different ways in which languages prioritize these preferences.

The rankings illustrated by the languages discussed above are collected in (11):

(11)

Fox/Nocte:	*__Su/Pat__ ≫ … ≫ {*GR/Pers, *GR/χ}
English:	*Su/x ≫ *__Su/Pat__ ≫ *GR/Pers
Lushootseed:	*Obl/Local ≫ *Su/x ≫ *__Su/Pat__ ≫ *GR/Pers
Lummi:	*Obl/Local ≫ *Oj/Local ≫ *Su/x ≫ *__Su/Pat__ ≫ *GR/Pers
Squamish:	*Obl/Local ≫ *Oj/2 ≫ *Su/x ≫ *__Su/Pat__ ≫ *Oj/1 ≫ *GR/Pers

The grammars of these languages show increasing sensitivity of voice to person, reflected in the increasing domination of *Su/Pat by *GR/Pers constraints. This approach to the person hierarchy addresses the issues raised earlier. First, it draws on a set of universally ranked constraints (subhierarchies) whose ranking expresses the basic markedness relations which hold in this domain. Individual languages cannot change rankings which are universally fixed, but by interpolating constraints from distinct subhierarchies in language-particular ways, grammars can determine whether person plays any role at all in voice determination, and if it does, which elements play a role. Differences between languages lie then in the way the person constraints are ranked with respect to constraints that deal with the association of grammatical function with other substantive dimensions, like thematic prominence and semantic role.

This account also resolves the descriptive problem noted earlier: the fact that in general it is not possible to devise a single hierarchy which

works for both active and passive clauses. This stands as an obstacle to formally expressing the fact that constraints in both clause types reflect the same basic markedness relations. The constraints on the association of grammatical function/person which are derived here through harmonic alignment of prominence scales are very specific and simple: each penalizes a particular association of person with grammatical function. Because of the particular grammatical functions that they reference (e.g., object, oblique (= passive agent)), some constraints penalize only active clauses and some penalize only passives. The reanalysis of language-particular hierachies as a set of simple, ranked constraints thereby provides the specificity and flexibility needed to handle constraints which apply only to one clause type or the other. At the same time, because language-particular rankings of these constraints are constrained by those of the universal subhierarchies from which they are drawn, they reflect the universal markedness expressed by those subhierarchies.

5. LOCAL CONJUNCTION WITH *Ø

In the absence of interference from other constraints, those which penalize marked associations of person and grammatical function will lead to grammars in which unmarked associations are optimized. Of the languages discussed above, Lummi comes the closest to realizing this situation: active clauses never contain 3rd person subjects with local person objects, and passive clauses never contain 3rd person subjects with local person agents. The other languages realize this situation to varying degrees. On the other extreme are languages like Fox, Nocte, and Dyirbal in which *marked* associations routinely surface because the unmarked configuration is excluded by a higher ranked constraint, *Su/Pat. But it is not the case that these languages are indifferent to the markedness of particular associations of person and grammatical function. Indeed, as seen earlier, one of the striking characteristics of these languages is that they *do* register the markedness of particular associations either through case marking or a direction system. It makes sense to try to describe such languages using the constraints derived above, since these constraints already express the relative markedness of various person/grammatical function associations.

Consider the evaluation of a clause with 3rd person subject/1st person object in a language like Nocte in which all clauses are active (Tableau 9 is a more specific version of Tableau 1).

Tableau 9. Fox

V(Agt/3/x, Pat/1/x)	*Su/Pat	*Su/3	*Oj/1
☞ ACTIVE Agt/Su/3/x-Pat/Oj/1/x		*	*
PASSIVE Pat/Su/1/x-Agt/Obl/3/x	*!		

The active involves a marked configuration, as shown by violations of high-ranking *Su/3 and *Oj/1, but the configuration is tolerated because these constraints are dominated by *Su/Pat. Nonetheless, the markedness of the configuration (3rd person subject, 1st person object) is expressed in Nocte, which requires the marked verbal category – the inverse. The question then is how to use constraints like *Su/3 and *Oj/1 in the description of these clauses, despite their apparent irrelevance to the evaluation in Tableau 9.

The association of marked configuration with marked expression is a fundamental idea in markedness theory (Jakobson 1939/1984, Greenberg 1966). Hence the question of how this property might be expressed formally is an important one. I pursue here a suggestion by Paul Smolensky (p.c.), that it might be expressed through *local conjunction* of a constraint hierarchy with a constraint which penalizes zero exponence. Local conjunction is a formal operation which conjoins existing constraints (Smolensky 1995).

(12) The local conjunction of C_1 and C_2 in domain D, C_1 & C_2, is violated when there is some domain of type D in which both C_1 and C_2 are violated.

The intuition behind constraint conjunction is that "two constraint violations are worse when they occur in the same location" (Smolensky 1995). This idea is formalized by imposing a universally fixed ranking of C_1 & C_2 with respect to each of its component constraints (Smolensky 1995):

(13) Universally, C_1 & C_2 dominates C_1, C_2.

In the present case, the idea is that the presence of a marked category is bad, but zero expression of a marked category is worse.

The analysis involves two general constraints beyond those already discussed: *ø (read: 'star zero') and *STRUC (read: 'star structure'). The constraint *ø can be understood as expressing the idea that morphological

categories should be expressed. This is in tension with another principle, *STRUC, which penalizes linguistic structure and is understood broadly to exclude features, nodes, etc. (Prince and Smolensky 1993, p. 25). Both *ø and *STRUC are very general constraints and will be subscripted here to make specific reference to particular categories.

We want to express the idea that it is more harmonic for a marked association to be morphologically marked than it is for an unmarked association. Subhierarchies which express the relative markedness of person/GR associations already exist (Tables V, VI). So does *ø, which penalizes absence of morphological expression. Conjunction of *ø with the subhierarchies of Tables V and VI yields a subhierarchy which expresses exactly the idea described above, as long as the ranking of the resulting subhierarchy is predetermined by that of the input subhierarchy. I assume (14) then:

(14) The local conjunction of C_1 with subhierarchy [$C_2 \gg C_3 \gg \cdots \gg C_n$] yields the subhierarchy [C_1 & $C_2 \gg C_1$ & $C_3 \gg \cdots C_1$ & C_n].

The subhierarchies which locally conjoin with *ø are listed in the left column of Table X; the subhierarchies which result from local conjunction with *ø are listed in the right column. Per (14), the rankings which characterize the subhierarchies on the right are all predetermined by those of the subhierarchies on the left.

TABLE X

Conjunction of *ø with subhierarchies from Table V

Subhierarchies involving alignment of grammatical function and person	Conjunction of subhierarchies with *ø
*Su/3 ≫ *Su/2	*ø & *Su/3 ≫ *ø & *Su/2
*Su/3 ≫ *Su/1	*ø & *Su/3 ≫ *ø & *Su/1
*Oj/2 ≫ *Oj/3	*ø & *Oj/2 ≫ *ø & *Oj/3
*Oj/1 ≫ *Oj/3	*ø & *Oj/1 ≫ *ø & *Oj/3

The subhierarchies on the right express the fact that it is more marked for a 3rd person subject to be associated with zero exponence than for a 1st or 2nd person subject; and inversely, more marked for a 1st or 2nd person object to be associated with zero exponence than a 3rd person object. Since the ranking of the locally conjoined constraints (right column) is predetermined by that of the subhierarchies from which they are derived,

the derived constraints express directly the basic idea that marked configurations are more likely to be morphologically marked than unmarked ones. These rankings thus represent the intuition which Silverstein (1976) is at pains to develop.

To see how these constraints might figure in actual grammar construction, I consider case marking in languages like Dyirbal (Sections 5.1–5.2). I discuss briefly in Section 5.3 how these constraints might be used to describe the direction system of a language like Nocte.

5.1. *Split Ergativity*[15]

The literature on case marking in the Australian languages (Silverstein 1976, Blake 1977, Dixon 1994) establishes that it is common for 3rd persons to be overtly case marked when they function as subjects of transitive clauses, but to be unmarked as objects or as subjects of intransitive clauses; on the other hand, it is common for 1st and 2nd persons to be overtly case marked when they function as objects, but not as subjects. The following implicational universals appear to hold:

(15)a. If 3rd person objects are case-marked, then so are local person objects.

b. If local person subjects are case-marked, then so are 3rd person subjects.

These generalizations follow from the universal rankings established in Table X and encapsulated in (16), if *ø is understood to penalize the absence of morphological case (*ø is subscripted with 'C' to represent this):

(16)a. $*ø_C$ & *Su/3 $\gg$ $*ø_C$ & *Su/Local

b. $*ø_C$ & *Oj/Local $\gg$ $*ø_C$ & *Oj/3

[15] For a different approach to the split ergativity of Dyirbal within OT, see Woolford (to appear). There are three main differences between her approach and mine. First, Woolford's approach makes no formal or systematic use of hierarchy alignment, though some of her principles reflect effects derived here through harmonic alignment. Second, Woolford regards the case split of Dyirbal subjects as involving different morphological realization of the same abstract Case, but takes that of objects to involve different abstract Cases. Since her proposals deal only with abstract Case, it does not deal with the realization of subjects. Third, Woolford's account is developed within the structural assumptions of the Minimalist program, in which distinct abstract Cases correspond to distinct structural positions. Thus, Woolford assumes that morphologically marked objects occupy a different structural position than unmarked ones.

Some domain must be specified for local conjunction (see (12)). For case marking, the relevant domain is a nominal projection. Then, the ranking in (16a) asserts that it is more marked for a 3rd person subject not to be case-marked than for a local person subject. Therefore, if local person subjects are case marked, 3rd persons must also be (= (15a)). Conversely, it is more marked for a local person object not to be case marked than for a 3rd person object. Hence, if 3rd persons are case marked, local person objects must also be (= (15b).

Dyirbal instantiates this system in a particularly clean way. Four case-marking 'patterns' result from the independent case marking of subject and object. These are shown in Table XI in order of increasing markedness (compare the chart in Silverstein (1976, p. 151)):

TABLE XI

Case marking in Dyirbal

Marked ↓ Unmarked

	Acc - Nom	Abs - Erg
Local subject–3rd object	S	O
Local subject–local object	O S	
3rd subject–3rd object		O S
3rd subject–local object	O	S

The maximally unmarked clause (top line) is one in which the subject is a local person, and the object 3rd person. In this case, neither argument is case marked. The maximally marked clause (bottom line) is one in which the subject is 3rd person and the object is a local person; both arguments are case marked in such clauses. The other two combinations (middle lines) are intermediate in markedness, with one argument case marked and the other not.

Dyirbal seems then to provide clear evidence for the existence of the subhierarchies in (16a,b). However, in the absence of any other constraints, the rankings in (16) will penalize zero marking on all subjects and on all objects, forcing overt case marking in all instances. This is not what is found, so there must be some other constraint involved. Following a suggestion of Paul Smolensky (p.c.), let us suppose that the relevant constraint is *STRUC. By penalizing structure (here, case specification), *STRUC delimits the point at which zero exponence is preferred by the grammar over morphological expression. Ranking it between the two constraints in

each of (16a,b), for example, yields a system in which marked associations are overtly marked and unmarked ones are not, exactly the Dyirbal system. The overall ranking of constraints for Dyirbal is given then in (17), with $^{*}ø_{C}$ penalizing the absence of case marking and $^{*}\text{STRUC}_{C}$ penalizing its presence. The ranking between the top constraints is not fixed; likewise for the bottom two constraints.

(17) {$^{*}ø_{C}$ & *Su/3, $^{*}ø_{C}$ & *Oj/Local} ≫ $^{*}\text{STRUC}_{C}$ ≫ {$^{*}ø_{C}$ & *Su/Local, $^{*}ø_{C}$ & Oj/3}

To see how this works, we consider several evaluations. As before, each candidate is a feature structure which specifies (*inter alia*) values for PERSON, GRAMMATICAL RELATION, and morphological CASE. I assume that nominals are *optionally* specified for CASE. Specification for case means that CASE is morphologically expressed; absence of such specification means that CASE is not morphologically expressed, i.e., it is ø. There are four candidates, arrived at by associating each nominal argument independently with the presence or absence of case. The domain of local conjunction is some node within the nominal projection, so the conjoined constraints are evaluated internal to each nominal constituent. Thematic prominence appears to play no role in Dyirbal case marking and is omitted from input and candidates. Consider first the maximally unmarked clause type, one with a 1st person subject, 3rd person object. In this case, the winner should be that candidate in which neither argument is case marked.

Tableau 10. Dyirbal (1st person subject/3rd person object)

V(Agt/1, Pat/3)	*ø$_c$& *Su/3	*ø$_c$& *Oj/Loc	*Struc$_c$	*ø$_c$ & *Su/Loc	*ø$_c$ & Oj/3
Agt/Su/1/Case-Pat/Oj/3			*!		*
Agt/Su/1-Pat/Oj/3/Case			*!	*	
☞ Agt/Su/1-Pat/Oj/3				*	*
Agt/Su/1/Case-Pat/Oj/3/Case			*!*		

Neither of the top two constraints is applicable since no candidate has a 3rd person subject or a local person object. Since no candidate violates *Su/3 or *Oj/Loc, no candidate can violate a local conjunction containing one of these constraints (per (12)). The next constraint is $^{*}\text{STRUC}_{C}$, which is violated once by the candidates which specify Case for one argument, and twice by the one which specifies it for both. Thus, the candidate with no case marking wins. The last two constraints penalize zero marking in relatively unmarked configurations and are irrelevant here because they are ranked below $^{*}\text{STRUC}_{C}$. The ranking in (17) gives the right result here.

Consider now the maximally marked clause type: one with a 3rd person subject and 1st person object. Both subject and object are marked and each

requires morphological expression (i.e., overt case). Only one candidate in fact provides it. The other three each violate one or both of the top two constraints which penalize ø marking in clauses with marked associations.

Tableau 11. Dyirbal (3rd person subject/1st person object)

V(Agt/3, Pat/1)	*$ø_c$& *Su/3	*$ø_c$& *Oj/Loc	*$Struc_c$	*$ø_c$ & *Su/1	*$ø_c$ & Oj/3
Agt/Su/3/Case-Pat/Oj/1		*!	*		
Agt/Su/3-Pat/Oj/1/Case	*!		*		
Agt/Su/3-Pat/Oj/1	*!	*			
☞Agt/Su/3/Case-Pat/Oj/1/Case			**		

The two intermediate cases involve clauses in which both arguments are third person, or both are local persons. These are 'mixed' types in that one argument involves an unmarked association of person and grammatical function, the other a marked association. Accordingly, one argument is case marked and the other is not (see Table XI). The ranking of constraints proposed in (17) treats these cases correctly. Verification is left to the reader.

There are a number of problems with the account just sketched, which will not be solved here, but should be noted. The first is that the discussion above assumes a universal notion of 'subject', which is associated in Dyirbal transitive clauses with the agent. Dixon has argued that subject is not a universal notion and, in particular, that it is not useful in Dyirbal. In its place, he posits two types of syntactic relations. One is the relation 'syntactic pivot', which is associated with that nominal which functions as the 'pivot' of a cross-clausal construction (Dixon 1979, Foley and Van Valin 1987, Dixon 1994); the other includes the syntactic relations A and S, which correspond to the agent argument of a transitive clause and the sole argument of an intransitive clause. The syntactic pivot in Dyirbal transitive clauses is consistently the patient, not the agent. Hence, if the pivot is to be equated with subject (in my sense), the analysis proposed here is not correct, since it identifies the subject with the agent. Harmonic alignment of person with semantic role would, however, give the right results, and would be more in line with the analyses of Dixon and Silverstein.

A possibly related problem is that this analysis makes incorrect claims about *intransitive* clauses in Dyirbal, where the subject is never marked. The constraint [*ø & *Su/3] is evaluated internal to each nominal and has no access to information outside the nominal. But the presence or absence of an object in the clause is crucial in determining case marking on 3rd person subjects, since they are case marked only in the presence of an object, i.e., only in transitive clauses. Since the subhierarchy in (16a) does

not distinguish transitive from intransitive clauses, it leads to outputs in which overt case marking is forced for *all* 3rd person subjects. This is not insoluble, as it is possible to devise more complex constraints which draw the correct distinction between transitive and intransitive subjects. (For example, local conjunction of [$^*ø_c$ & *Su/3] with *Oj/Pers (where Pers ranges over the three persons) derives a contraint which penalizes a 3rd person subject without case marking only in a clause containing an object; note that the outer conjunction must take the clause as its domain.) What is at issue, though, seems to be the functional motivation for case marking, which is generally seen as distinguishing subject from object. But the need to distinguish subject from object arises only in transitive clauses. The fact that the constraints in (16a) are only relevant then in transitive clauses seems reasonable, but the present analysis does not restrict them to transitive clauses. What appears to be needed here is a more systemic view of case marking, one which can formally express the functional motivation for case marking.

A final problem concerns the availability of both $^*ø$ and *STRUC for local conjunction. The functional motivation of locally conjoining $^*ø$ with subhierarchies like those of Table V which express the relative markedness of particular associations of person and grammatical function is clear: the more marked a nominal is *qua* subject/object, the more useful it is to overtly mark its grammatical function. From the functional perspective, it is pointless to locally conjoin the same subhierarchies with *STRUC, since the result would favor overt marking where it is least needed, and penalize it where it is most needed. However, formally, there is nothing in the present system which prevents local conjunction of the subhierarchies in Table V with *STRUC, and this would yield a set of ranked constraints which could entirely neutralize the predictions derived above.

5.2. *Split-Ergativity and Constraint Reranking*

The Dyirbal pattern is a common one among the Australian languages, but within the limits sketched above (see (15)) there is a great deal of language-particular variation concerning which elements are marked according to a nominative-accusative system and which according to an ergative-absolutive system. Some of this variation has to do with features that we have not discussed explicitly here (e.g., animate vs. inanimate, proper nouns vs. common, singular vs. plural); hopefully techniques like those used here will extend to such cases and it would be interesting to see whether they do. But some of the variation has to do with features which do figure in the constraints proposed here. We show briefly here that some of these cases can be easily described by *constraint reranking*.

According to Blake (1977), Aranda (Pama-Nyungan group) has an ergative-absolutive system for 3rd person, and for 1st person singular (i.e., case marked when transitive subject), while 2nd person singular is marked according to a nominative-accusative system (not case-marked as subject).[16] The distribution of case in Aranda parallels the distribution of voice in Salish, with the 1st and 2nd person distinguished, and the 1st person treated on a par with 3rd person. Case marking of subjects in Aranda can be described by the ranking in (18), where [*$ø_C$ & *Su/1] dominates *STRUC_C which in turn dominates [*$ø_C$ & *Su/2] (compare (18) with the ranking in (17):[17]

(18) *$ø_C$ & *Su/3 ≫ *$ø_C$ & *Su/1 ≫ *STRUC_C ≫ *$ø_C$ & *Su/2.

This ranking penalizes a 1st person subject without case marking, forcing overt (i.e., ergative) case;[18] on the other hand, it penalizes a 2nd person subject with case marking, forcing zero exponence (i.e., nominative case). This case shows how the incursion of ergative case marking into the local persons is modeled by the reranking of *Su/Pers constraints over *STRUC. The extreme case will be one in which *all* subject constraints are so ranked (in (19) and (20), X ranges over any of the dimensions which are aligned with grammatical function):

(19) *$ø_C$ & *Su/X ≫ *Struc_C ≫ *$ø_C$ & *Oj/X

The result will be a language with ergative (not split-ergative) case marking: all transitive subjects are marked for case, but no objects. Examples are apparently found in Australia, as well as in other parts of the world. Blake (1977) classifies Yalarnga and Rembarnga as instances.

Incursions of the accusative system into the 3rd person is also found in Australia, often with various subclasses of 3rd person treated differently (Silverstein 1976, Blake 1977). A simple case where apparently all 3rd persons (as well as all local persons) are case marked according to an accusative system is Ngarluma (Blake 1977). In this case, the ranking would be that of (20):

(20) *$ø_C$ & *Oj/X ≫ *STRUC_C ≫ *$ø_C$ & *Su/X

[16] Apparently 1st and 2nd person plurals pattern like 2nd person singular. This does not follow from the constraint ranking proposed here.

[17] Case marking of objects is like Dyirbal, so the object-referring constraints would be ranked with respect to *STRUC as in Dyirbal.

[18] Again, it is necessary to restrict this constraint to transitive clauses, since case marking of 1st person in Aranda is limited to such clauses.

In languages with this ranking, all objects but no subjects carry case marking. Many case marking systems of Europe approximate this system, though ø marking of inanimate (neuter) objects is common.

5.3. *Direction*

As mentioned earlier, Silverstein (1976) and DeLancey (1981) both elaborate the idea that (person-based) direction systems are based on the same markedness relations as (person-based) split-ergative case-marking systems but express this markedness through head marking rather than dependent marking. Here I consider briefly how the constraints developed so far for a language like Dyirbal might apply to a language like Nocte.

One basic difference is that markedness is expressed on the predicate, not on the nominal dependents themselves. This suggests, first of all, that the domain for evaluation of the conjoined constraint set (*ø & *GR/Pers) must be some projection of V rather than N, and, second, that features of the verb's nominal arguments must be present in the V projection, e.g., via abstract agreement. Further, the category involved is not morphological case, but direction. Hence *ø must penalize zero expression of direction, not case. The constraint $*ø_D$ ('express direction') will be satisfied when the category of direction is overtly marked and violated when it is not. In Nocte, the inverse verb carries a morphological mark and so satisfies $*ø_D$; the direct verb carries no morphological mark, and thus violates $*ø_D$. Correspondingly, $*\text{STRUC}_D$ penalizes expression of direction and is satisfied in Nocte by the direct verb and violated by the inverse.

There is another difference: namely, the distribution of direct and inverse in Nocte requires simultaneous reference to properties of both subject and object. In Nocte, the direct form is used in the following subject-object combinations: 1-2, 1-3, 2-3, 3-3, and the inverse is used elsewhere (2-1, 3-1, 3-2); i.e., the inverse is used in the most marked clause-types, those with 3rd person subject and local person object, as well as in clauses with 2nd person subject and 1st person object.[19] There is a natural way to model this situation in the present framework, namely through local conjunction of the subject and object subhierarchies established in Section 4. Local conjunction automatically yields a ranking of the constraints referencing all combinations of subject and object by person.[20]

[19] Most of the Nocte system can be described by reference solely to subject or object: all clauses with 1st person objects require inverse forms; all clauses with 3rd person objects require direct forms. But in clauses with 3rd person subjects or 2nd person objects, information about both subject and object is needed.

[20] Several steps are involved in reaching the ranking in the right-hand side of Table XII. Assume that the four constraints on the left-hand side are A $\gg$ B and C $\gg$ D. There are two

TABLE XII

Local conjunction of GR/Person subhierarchies

Subhierarchies	Conjunction of subhierarchies
*Su/3 ≫ *Su/Local *Oj/Local ≫ *Oj/3	*Su/3 & *Oj/Local ≫ {*Su/3 & *Oj/3, *Su/Local & *Oj/Local} ≫ *Su/Local & *Oj/3

The ranking in Table XII (right-hand side) corresponds directly to the markedness registered in Table XI and thus correctly expresses the relative markedness of all combinations of subject and object by person: the most marked clause is one with a 3rd person subject/local person object; the least marked is one with a local person subject/3rd person object; and other combinations are unranked with respect to one another. The ranking which characterizes the subhierarchy on the right-hand side of Table XII is completely determined by constraint conjunction (see fn. 20, and is (proposed as) universal. There should be no language in which a clause with a local person subject/3rd person object is treated as more marked than one with a 3rd person subject/3rd person object, and so on. Grammars of particular languages may differ, then, in how the constraints in Table XII are ranked with respect to constraints like *ø or *STRUC, but they will not differ in the ranking of the subhierarchy.

Active in the grammar of Nocte, then, are the basic constraints in the left column of Table XII, the conjoined constraints in the right column, and a further set of constraints formed by local conjunction of the latter with $*ø_D$. This local conjunction yields a further subhierarchy whose ranking is strictly determined by that of the input subhierarchy (again, per (14)):

(21) $*ø_D$ & *Su/3 & *Oj/Loc ≫ {$*ø_D$ & *Su/3 & *Oj/3, $*ø_D$ & *Su/Loc & *Oj/Loc} ≫ $*ø_D$ & *Su/Loc & *Oj/3

---

ways to conjoin these two subhierarchies: 1) A conjoins with each of C and D; B conjoins with each of C and D. (2) C conjoins with each of A and B; D conjoins with each of A and B. This yields:

(1) A & C ≫ A & D
B & C ≫ B & D
(2) C & A ≫ C & B
D & A ≫ D & B

Since conjunction is symmetric, this yields a partial ordering of the four constraints:

(3) A & C ≫ {A & D, B & C} ≫ B & D

The distribution of direct and inverse can be characterized by interpolating $^{*}\text{STRUC}_{\text{D}}$ among the constraints in (21). This predicts that if direction is overtly marked for relatively unmarked configurations, it must be overtly marked for more marked ones. For a language like Nocte, where direct verbs have no morphological mark and inverse verbs do, the ranking in (22) describes the distribution of direct and inverse verbs:[21]

(22) Nocte: $\{^{*}\text{ø}_{\text{D}}$ & *Su/3 & *Oj/Loc, $^{*}\text{ø}_{\text{D}}$ & *Su/2 & *Oj/1$\} \gg$ $^{*}\text{STRUC}_{\text{D}} \gg {}^{*}\text{ø}_{\text{D}}$ & *GR/Pers

This ranking penalizes the direct verb (ø) whenever the subject is 3rd person and the object is a local person, and when the subject is 2nd person and the object 1st; it penalizes the inverse verb in all other cases. Crucially, no reranking of the subhierarchy in (21) is involved in Nocte, simply interpolation of $^{*}\text{STRUC}_{\text{D}}$.

6. CONCLUSION

Let us step back and review how the constraints employed in the analysis presented here and their rankings were derived. Aside from *ø and *STRUC, *all* the constraints and most of their rankings are derived through two operations, alignment and local conjunction, operating on two proposed universal scales (Local> 3; Su > Non-Su) and decompositions of those scales. Alignment generates the constraints listed in the A cell of Table XIII. These function by themselves in person-driven *voice* systems. The remaining constraints are generated by local conjunction. Those in B involve local conjunction of *ø with the constraints in A; those in C involve local conjunction of the constraints in A with one another, and those in D involve local conjunction of *ø with the constraints in C.

The intuitions behind these applications of local conjunction are sound: conjunction with *ø expresses the basic idea that morphological complexity is associated with marked configurations; local conjunction of the subject/person and object/person subhierarchies with one another expresses the relative markedness of clauses depending on person of *both* subject and object.

The B constraints play a key role in languages with person-driven case and direction systems, where reference to a single nominal argument is sufficient. With the caveat discussed at the end of Section 5.1, Dyirbal is

[21] The ranking in (22) does not, however, suffice to describe a language like Fox, in which both direct and inverse verbs carry a morphological mark.

TABLE XIII

Constraint subhierarchies summarized

A.	*Su/3 ≫ *Su/Local *Oj/Local ≫ *Oj/3
B.	*ø & *Su/3 ≫ *ø & *Su/Local *ø & *Oj/Local ≫ *ø & *Oj/3
C.	*Su/3 & *Oj/Local ≫ {*Su/3 & *Oj/3, *Su/Local & *Oj/Local} ≫ *Su/Local & *Oj/3
D.	*ø & [*Su/3 & *Oj/Local] ≫ {*ø & [*Su/3 & *Oj/3], *ø & [*Su/Local & *Oj/Local]} ≫ *ø & [*Su/Local & *Oj/3]

such a language. Those of D are relevant in languages where case marking or direction marking requires global reference to properties of both subject and object, e.g., Nocte. The constraints in C are not by themselves crucial in any of the analyses discussed above, but would be relevant in a language where voice was determined jointly by subject and object, e.g., in a language where voice was driven by a hierarchy of the form 1 > 2 > 3. Of course, their existence is required if the constraints in D are to be derived through local conjunction.

It is striking that starting with so little (a small number of prominence scales, harmonic alignment and local conjunction), it is possible to construct grammars which succeed not only in characterizing the facts of individual languages, but do so within a universal theory of markedness. The analyses developed here depend crucially on harmonic alignment and local conjunction and thereby endorse a role for these operations in constraint generation. Further, the key role of harmonic alignment and local conjunction highlights certain structural parallels between phonology and syntax, parallels which have informed markedness theory, but have remained largely unexpressed in generative approaches to grammar.

REFERENCES

Ackema, Peter and Ad Neeleman: 1998, 'Conflict Resolution in Passive Formation', *Lingua* **104**, 13–29.

Aissen, Judith: 1987, *Tzotzil Clause Structure*, Reidel Publishers, Dordrecht.

Aissen, Judith: 1997, 'On the Syntax of Obviation', *Language* **73**, 705–50.

Artstein, Ron: 1998, 'Hierarchies'. Paper available at http://www.eden.rutgers.edu/∼artstein/publications.html.

Asudeh, Ash: 1999, 'Linking, Optionality, and Ambiguity in Marathi: An Optimality Theory Analysis', Paper available at http://www.stanford.edu/∼asudeh/.

Battistella, Edwin: 1990, *Markedness: The Evaluative Superstructure of Language*, SUNY Press, Albany.
Battistella, Edwin L.: 1996, *The Logic of Markedness*, Oxford University Press, Oxford.
Bell, Sarah J.: 1983, 'Advancements and Ascensions in Cebuano', in David M. Perlmutter (ed.), *Studies in Relational Grammar 1*, University of Chicago Press, Chicago, pp. 143–218.
Blake, Barry J.: 1977, *Case Marking in Australian Languages*, Australian Institute of Aboriginal Studies, Canberra.
Bresnan, Joan: 1995, 'Linear Order vs. Syntactic Rank: Evidence from Weak Crossover', in Katie Beals et al. (eds.), *Papers from the Thirtieth Regional Meeting of the Chicago Linguistics Society*, CLS, Chicago, pp. 57–89.
Bresnan, Joan: 1998, 'Morphology Competes with Syntax: Explaining Typological Variation in Weak Crossover Effects', in Pilar Barbosa et al. (eds.), *Is the Best Good Enough?*, MIT Press, Cambridge, Massachusetts, pp. 59–92.
Bresnan, Joan: forthcoming, *Lexical-functional Syntax*, Blackwell, Oxford.
Bresnan, Joan and Jonni Kanerva: 1989, 'Locative Inversion in Chichewa: A Case Study of Factorization in Grammar', *Linguistic Inquiry* **20**, 1–50.
Chafe, Wallace: 1976, 'Givenness, Contrastiveness, Definiteness, Subjects, Topics, and Point of View', in Charles Li (ed.), *Subject and Topic*, Academic Press, New York, pp. 25–55.
Chung, Sandra: 1981, 'Transitivity and Surface Filters in Chamorro', in J. Hollyman and A. Pawley (eds.), *Studies in Pacific Languages and Cultures, in Honour of Bruce Biggs*, Linguistic Society of New Zealand, Aukland, pp. 311–332.
Chung, Sandra: 1998, *The Design of Agreement: Evidence from Chamorro*, University of Chicago Press, Chicago.
Cooreman, Ann: 1987, *Transitivity and Discourse Continuity in Chamorro Narratives*, Mouton de Gruyter, Berlin.
Croft, William: 1990, *Typology and Universals*, Cambridge University Press, Cambridge.
Dahlstrom, Amy: 1995, 'Morphology and Syntax of the Fox (Mesquakie) Language', unpublished manuscript, University of Chicago.
DeLancey, Scott: 1981, 'An Interpretation of Split Ergativity', *Language* **57**, 626–657.
Dixon, R. M. W.: 1972, *The Dyirbal Language of North Queensland*, Cambridge University Press, Cambridge.
Dixon, R. M. W.: 1979, 'Ergativity', *Language* **55**, 59–138.
Dixon, R. M. W.: 1994, *Ergativity*, Cambridge University Press, Cambridge.
Dowty, David: 1991, 'Thematic Proto-Roles and Argument Selection', *Language* **67**, 547–619.
Foley, William and Robert Van Valin: 1987, *Functional Syntax and Universal Grammar*, Cambridge University Press, Cambridge.
Givón, Talmy: 1976, 'Topic, Pronoun and Grammatical Agreement', in Charles Li and Sandra Thompson (eds.), *Subject and Topic*, Academic Press, New York, pp. 149–188.
Givón, Talmy (ed.): 1983, *Topic Continuity in Discourse*, John Benjamins, Amsterdam.
Givón, Talmy (ed.): 1994, *Voice and Inversion*, John Benjamins, Amsterdam.
Greenberg, Joseph H.: 1966, *Language Universals, with Special Reference to Feature Hierarchies*, Mouton, The Hague.
Grimshaw, Jane: 1990, *Argument Structure*, The MIT Press, Cambridge, Massachusetts.
Grimshaw, Jane and Vieri Samek-Lodovici: 1998, 'Optimal Subjects and Subject Universals', in Pilar Barbosa et al. (eds.), *Is the Best Good Enough?*, MIT Press, Cambridge, Massachusetts, pp. 193–219.

Jackendoff, Ray: 1972, *Semantic Interpretation in Generative Grammar*, The MIT Press, Cambridge, Massachusetts.

Jakobson, Roman: 1939/1984, 'Zero Sign', in Linda Waugh and Morris Halle (eds.), *Russian and Slavic Grammar: Studies, 1931–1981*, Mouton, Berlin, pp. 151–160.

Jakobson, Roman: 1965/1995, 'Quest for the Essence of Language', in Linda Waugh and Monique Monville-Burston (eds.), *On Language – Roman Jakobson*, Harvard University Press, Cambridge, Massachusetts, pp. 407–421.

Jelinek, Eloise: 1990, 'Grammatical Relations and Coindexing in Inverse Systems', in Katarzyna Dziwirek, Patrick Farrell and Errapel Mejías-Bikandi (eds.), *Grammatical Relations: A Cross-Theoretical Perspective*, CSLI Publications, Stanford, California, pp. 227–246.

Jelinek, Eloise: 1993, 'Ergative 'Splits' and Argument Type', in Jonathan Bobaljik and Colin Phillips (eds.), *Papers on Case and Agreement I*, MIT Working Papers in Linguistics, Vol. 18, MIT Department of Linguistics and Philosophy, Cambridge, Massachusetts, pp. 15–42.

Jelinek, Eloise: in press, 'Predicate Raising in Lummi, Straits Salish', in Andrew Carnie and Eithne Guilfoyle (eds.), *The Syntax of Verb-Initial Languages*, Oxford University Press, Oxford.

Jelinek, Eloise and Richard Demers: 1983, 'The Agent Hierarchy and Voice in Some Coast Salish Languages', *International Journal of American Linguistics* **49**, 167–185.

Kato, Kazuo: 1979, 'Empathy and Passive Resistance', *Linguistic Inquiry* **10**, 149–152.

Keenan, Edward: 1976, 'Towards a Universal Definition of "subject" ', in Charles Li and Sandra Thompson (eds.), *Subject and Topic*, Academic Press, New York, pp. 303–333.

Keenan, Edward and Bernard Comrie: 1977, 'Noun Phrase Accessibility and Universal Grammar', *Linguistic Inquiry* **8**, 63-100.

Klaiman, M. H.: 1991, *Grammatical Voice*, Cambridge University Press, Cambridge.

Klaiman, M. H.: 1993, 'The Relationship of Inverse Voice and Head-marking in Arizona Tewa and Other Tanoan Languages', *Studies in Language* **17**, 343–370.

Kroeger, Paul: 1993, *Phrase Structure and Grammatical Relations in Tagalog*, CSLI, Stanford, California.

Kuno, Susumu: 1976, 'Subject, Theme, and the Speaker's Empathy – A Reexamination of Relativization Phenomena', in Charles Li (ed.), *Subject and Topic*, Academic Press, New York, pp. 417–444.

Kuno, Susumu: 1987, *Functional Syntax*, University of Chicago Press, Chicago.

Kuno, Susumu and Etsuko Kaburaki: 1977, 'Empathy and Syntax', *Linguistic Inquiry* **8**, 627–672.

Legendre, Géraldine, William Raymond and Paul Smolensky: 1993, 'An Optimality-theoretic Typology of Case and Grammatical Voice Systems', *Proceedings of the Nineteenth Annual Meeting of the Berkeley Linguistics Society*, Berkeley Linguistics Society, Berkeley, pp. 464–478.

LeSourd, Philip: 1976, 'Verb Agreement in Fox', in Judith Aissen and Jorge Hankamer (eds.), *Harvard Studies in Syntax and Semantics 2*, Harvard University Linguistics Department, Cambridge, Massachusetts, pp. 445–528.

Manning, Christopher: 1996, *Ergativity. Argument Structure and Grammatical Relations*, CSLI, Stanford, California.

Mondloch, James: 1981, *Voice in Quiche-Maya*, unpublished Ph.D. dissertation, SUNY at Albany.

Nichols, Johanna: 1986, 'Head-marking and Dependent-marking Grammar', *Language* **62**, 56–119.

Prince, Alan and Paul Smolensky: 1993, *Optimality Theory: Constraint Interaction in Generative Grammar*, RuCCS Technical Report No. 2, Rutgers University Center for Cognitive Science, Piscataway, NJ.

Rhodes, Richard: 1990, 'Obviation, Inversion, and Topic Rank in Ojibwa', *Proceedings of the Sixteenth Annual Meeting of the Berkeley Linguistics Society*, special session on general topics in American Indian linguistics, Berkeley, BLS, pp. 101–115.

Rhodes, Richard: 1994, 'Agency, Inversion, and Thematic Alignment in Ojibwe', *Proceedings of the Twentieth Annual Meeting of the Berkeley Linguistics Society*, BLS, Berkeley, pp. 431–446.

Sells, Peter: to appear, 'Form and Function in the Typology of Grammatical Voice Systems', in Géraldine Legendre, Jane Grimshaw, and Sten Vikner (eds.), *Optimality-Theoretic Syntax*, MIT Press, Cambridge, Massachusetts.

Silverstein, Michael: 1976, 'Hierarchy of Features and Ergativity', in R. M. W. Dixon (ed.), *Grammatical Categories in Australian Languages*, Australian Institute of Aboriginal Studies, Canberra, pp. 112–171.

Slobin, Dan: 1994, 'Passives and Alternatives in Children's Narratives in English, Spanish, German, and Turkish', in Barbara Fox and Paul Hopper (eds.), *Voice: Form and Function*, John Benjamins, Amsterdam, pp. 341–364.

Smolensky, Paul: 1995, 'On the Internal Structure of the Constraint Component Con of UG', handout of talk, UCLA, 7 April.

Smolensky, Paul: 1996a, 'On the Comprehension/Production Dilemma in Child Language', *Linguistic Inquiry* **27**, 720–731.

Smolensky, Paul: 1996b, *The Initial State and 'Richness of the Base' in Optimality Theory*, Report JHU-CogSci-96-4, Dept. of Cognitive Science, Johns Hopkins University, Baltimore.

Thompson, Sandra: 1987, 'The Passive in English: A Discourse Perspective', in Robert Channon and Linda Shockey (eds.), *In Honor of Ilse Lehiste*, Foris, Dordrecht, pp. 497–511.

Tomlin, Russell: 1985, 'Interaction of Subject, Theme, and Agent', in Jessica Wirth (ed.), *Beyond the Sentence: Discourse and Sentential Form*, Karoma Publishers, Ann Arbor, pp. 61–80.

Wolfart, H. Christoph: 1973, 'Plains Cree: A Grammatical Study', *Transactions of the American Philosophical Society N.S.* **63**(5).

Woolford, Ellen: to appear, 'Case Patterns', in Géraldine Legendre, Jane Grimshaw, and Sten Vikner (eds.), *Optimality-Theoretic Syntax*, MIT Press, Cambridge, Massachusetts.

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