

OPTIMALITY AND FUNCTIONALITY:  
A CRITIQUE OF FUNCTIONALLY-BASED OPTIMALITY-THEORETIC  
SYNTAX\*

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ABSTRACT

This paper examines 'functionally-based optimality theory' (FOT), the version of optimality theory that requires that each constraint be paired with an external functional motivation. It argues that, at least as far as syntactic constraints are concerned, FOT suffers from severe deficiencies. Such a pairing incorrectly locates the form-function interplay in the mental grammar itself, rather than seeing the response of form to function as emerging from language use and acquisition. Furthermore, FOT seems incompatible with the standard OT assumption that constraints are universal. Finally, two of the functionally-motivated hierarchies that are central to FOT theorizing, the thematic and relational hierarchies, are highly problematic, while incorporating the others into an FOT analysis leads to otherwise unnecessary complexity.

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1. Syntax, phonology, and optimality theory

Syntacticians tend to gaze upon the world of phonological theorizing with wonder and envy. Phonologists appear to have their act together in ways that have long been unknown to syntacticians. For one thing, new approach after new approach in phonology seems to rally most of the field behind it. Lexical phonology, metrical phonology, and autosegmental phonology all had the effect of sparking a research program that was endorsed — if not always practiced — by a great majority of the world’s phonologists. And now for almost a decade, optimality theory (OT) has followed suit. While there are holdouts, of course, and an increasing number of individuals with reservations about the enterprise, it seems accurate to use the expression ‘swept the field’ to describe the impact of OT in phonology.

Secondly, and even more impressively, these different approaches are not at root incompatible — they simply focus on different aspects of phonological patterning. So, there is no intellectual inconsistency, say, in writing a metrical paper one year, an autosegmental the next, and having as one’s current research program the task of recasting some of the generalizations in these works in OT terms.

The world of syntactic theorizing could not be more different. Every new approach has tended to reject fundamental aspects of its predecessor. In syntax,

rival approaches are just that — for the most part at root incompatible. The move from government-binding to the minimalist program or from GPSG to HPSG entailed abandoning central hypotheses of the earlier models. Only an intellectual schizophrenic or anarchist would write an LFG paper one year and a categorial grammar paper the next, without having had severe qualms about the adequacy of the former and having been intrigued by the possibilities of the latter. And it goes without saying that there exists a plethora of ‘functionalist’ and ‘cognitive’ approaches to syntax that do not share even the questions that formal approaches ask, much less the answers. As a consequence, syntax is in a highly fragmented state.

Given the relative degree of harmony among phonologists, it might seem surprising that models of syntax have not borrowed more conceptual apparatus from phonology. Until recently, autolexical syntax (Sadock 1991) and the case in tiers theory of Yip, Maling, and Jackendoff (1987) were perhaps the sole modern approaches to syntax whose architecture had phonological roots. If phonologists know something that we (syntacticians) don’t know, then why not adapt this knowledge to our own work? The answer to this question is not a mystery — for the most part syntax is simply too different from phonology for any attempt to calque the former on the latter to meet with a great deal of success. Also, given the predominant view that the phonological component takes as its input the output of the syntactic component, phonologists *have to* pay attention to syntax, while syntacticians can — and often do — feel free to ignore the latest developments in phonology.

OT, however, promises to reverse this trend. A significant number of

syntacticians have looked to this model — one designed originally to handle phonology — for the purpose of capturing syntactic generalizations. The reason that OT has the potential for winning over syntacticians is that it is, at root, not a theory of phonology per se. Rather, it is a theory governing the interaction of constraints. Where the constraints come from is another question — a question that is independent of whether or not one has chosen the OT approach to constraint-interaction.

Despite its success in phonology, however, OT has not swept the field of syntactic theory. Predictably, perhaps, it has simply increased the fragmentation of an already-fragmented area of investigation. Part of the explanation for that fact derives from the nature of OT itself. It provides no new theory of UG per se, but merely organizes the principles provided by existing theories of UG. So in other words, assessing the adequacy of an OT syntactic analysis involves not just assessing the results of constraint-interaction in that analysis, but also the constraints themselves and, therefore, the theory that provides the constraints. In the past, one could work, say, in the MP, in LFG, or in functionalist syntax. Now, one can work in the MP, with or without an OT orientation, in LFG, with or without an OT orientation, and in functionalist syntax, with or without an OT orientation. The possibilities open to syntacticians are therefore double what they were before the advent of OT.

This paper will deal with a particular syntactic *realization* of OT, namely one in which the constraints are paired with their external functional motivations. Here, as well, syntacticians owe a debt to phonology, since such a program was well established among phonologists before it began to be applied

to syntax. However, the central theme to be developed here is that the program is not likely to be successful when applied to syntax.

The paper is organized as follows. Section 2 introduces what I call ‘functionally-based optimality theory’. This is the attempt to provide substance to the idea that constraints are universal by requiring for each a functional motivation — and in that way bridging the gap between formal and functional linguistics. Section 3 argues that such an approach faces severe theoretical and empirical difficulties. Section 4 is a brief conclusion.

## 2. Functionally-based optimality theory

This section outlines the research program that attempts to link each syntactic constraint of OT with an external functional motivation. Section 2.1 explains the appeal of such a program. Section 2.2 introduces some of the grammatical hierarchies that play a role in both formalist and functionalist work, while the following two sections outline an OT treatment of these hierarchies.

### 2.1. On the ontological status of OT constraints

The essence of OT is that constraints are universal. Indeed, such is the very first property of constraints that are mentioned in René Kager’s introduction to that approach (Kager 1999: 11). OT loses much of its appeal if purely language-particular constraints are allowed.<sup>1</sup> How does it happen that a universal shows up in the grammar of a particular language?<sup>2</sup> There are really

not that many possibilities. One is that it could be an instance of innate purely linguistic knowledge. Such has been posited, for example, for the principle of Subjacency in the government-binding theory (Hoekstra and Kooij 1988).

Another is it could be an instance of innate knowledge that is derivative of more general cognitive principles. Haspelmath (1992) considers it plausible that the principles appealed to in grammaticalization research have this property. A third possibility is that the aspect of language in question is learned, but in some sense of the term so 'useful' that all languages will manifest it. An example might be the universal fact that every language has words that refer to the sun and the moon, which presumably arises by virtue of the functional utility of being able to identify the two most prominent celestial bodies.

Interestingly, the standard assumption in OT is that all constraints are innate: 'We propose that the learner start out with an initial ranking of the constraints' (Tesar and Smolensky 1998: 237). But if all (or a large percentage) of OT constraints are innate, then we are committed to a degree of innate knowledge that far exceeds anything Chomsky ever dreamed of. Not surprisingly, this fact has led to discomfort among some OT practitioners and has engendered a program to ground constraints, directly or indirectly, in their functional utility. Bruce Hayes, an advocate of this program for phonology, takes the position that 'constraints need not necessarily be innate, but only *accessible in some way* to the language learner, perhaps by inductive grounding' (Hayes 1998: 268, emphasis in original).<sup>3</sup> According to Hayes:

... a constraint can be justified on *functional* grounds. In the case of

phonetic functionalism, a well-motivated phonological constraint would be one that either renders speech easier to articulate or renders contrasting forms easier to distinguish perceptually. From the functionalist point of view, such constraints are *a priori* plausible, under the reasonable hypothesis that language is a biological system that is designed to perform its job well and efficiently. ... Given that [Optimality Theory] thrives on principled constraints, and given that functionally motivated constraints are inherently principled, the clear route to take is to explore how much of phonology can be constructed on this basis. ... A theory of [phonetically driven Optimality-theoretic phonology] would help close the long-standing and regrettable gap between phonology and phonetics. (Hayes 1998: 246; emphasis in original)

Many other phonologists have argued for the phonetic grounding of constraints, either implying or stating outright that such grounding provides a motivated and preferable alternative to hypothesizing their innateness (see, for example, Kaun 1994; Jun 1995; Casali 1997; Morelli 1998; Kirchner 2000).

Recently, we have seen a similar turn in syntax. For example, Haspelmath (1999: 187) suggests that 'the grammatical constraints [of OT] are ultimately based on the constraints on language users' and provides a list of proposed constraints, from both phonology and syntax, that seem to reflect user-functionality. Three of these from the syntactic OT literature are presented in Table I:



name	grammatical constraint	corresponding user constraint
STAY (Grimshaw 1997, Speas 1997)	"Do not move"	Leaving material in canonical position helps the hearer to identify grammatical relationships and reduces processing costs for the speaker
TELEGRAPH (Pesetsky 1998)	"Do not pronounce function words"	Leaving out function words reduces pronunciation costs for the speaker in a way that is minimally disruptive for understanding by the hearer
RECOVERABILITY (Pesetsky 1998)	"A syntactic unit with semantic content must be pronounced unless it has a sufficiently local antecedent"	Omitting a meaning-bearing element in pronunciation makes the hearer's task of extracting the intended meaning from the speech signal very difficult unless it can be inferred from the context

Table I

Some OT constraints and their possible functional motivations (Haspelmath 1999: 185)

Joan Bresnan has also expressed the idea that constraints are functionally-motivated:

... both phonologists and functional linguists have recognized that linguistic inventories also reflect universal patterns of markedness and are often functionally motivated by perceptual and cognitive constraints. I will argue in support of this conclusion by showing how different inventories of personal pronouns across languages may be formally derived by the prioritizing of motivated constraints in Optimality Theory. (Bresnan 1997: 26)

and:

The existence of an appropriate EVAL, then, reduces to the discovery of universal constraints whose ranking generates the desired inventories of pronominal forms. We further require that these constraints be *motivated*. (Bresnan 1997: 34; emphasis in original)

In two important papers, Judith Aissen (1999; 2000) makes crucial use of grammatical hierarchies that have, for the most part, emerged from research within functional linguistics. The first paper points to a user-based constraint motivation in only one place, where it is noted that ‘the functional motivation of [a particular local conjunction of constraints] is clear: the more marked a nominal is *qua* subject/object, the more useful it is to overtly mark its grammatical function’ (1999: 703). However, the second paper has as its explicit purpose ‘to develop an approach to [differential object marking] within OT which is at the

same time formal *and* expresses the functional-typological understanding of [that phenomenon]' (2000: 4; emphasis in original). Not only does it incorporate functionally-motivated hierarchies, but it attempts to provide functional motivation for the constraints themselves. For example, a constraint that penalizes the absence of case marking is attributed to the listener-oriented principle 'minimization of perceptual confusion'. Another set of constraints are regarded as being rooted in 'iconicity', since they favor morphological marks for marked configurations. And a constraint that penalizes the morphological expression of case, on the other hand, is said to have an economy-based motivation, since it reduces the amount of structure that needs to be processed.

In the remainder of this paper, the position that the constraints of OT have functionally-motivated user-constraints associated with them will be referred to as 'functionally-based optimality theory', or 'FOT'.

## 2.2. Functionally-motivated hierarchies

Since grammatical hierarchies play such a central role both in functionalist theorizing and in the FOT attempt to bridge the results of that theorizing with formal linguistics, I will begin by outlining a few of the more important ones. Historically, the first such hierarchy proposed was the Thematic Hierarchy, one version of which is presented in (1):

- (1) Thematic Hierarchy (Bresnan and Kanerva 1989: 23): Agent > Beneficiary > Recipient/ Experiencer > Instrumental > Theme/ Patient > Location

Fillmore (1968) argued that one can predict subject choice in English and other languages by reference to the position on such a hierarchy of the thematic role (or, as he called it, the 'case' role) borne by the NP. Hierarchies of thematic roles have been appealed to in the explanation of such diverse phenomena as antecedence for reflexivization (Jackendoff 1972), argument structure in morphology (Carrier-Duncan 1985), and the choice of controller in embedded infinitivals (Culicover and Jackendoff 2001).

Grammatical relations (or functions) have also been argued to be hierarchically organized. For example, Keenan and Comrie (1977) suggested that we can explain interesting cross-linguistic facts about relativization possibilities by appealing to the following hierarchy:

- (2) Relational Hierarchy (Comrie and Keenan 1979: 650): Subject > Direct Object > Indirect Object > Oblique > Genitive > Object of Comparative

Another hierarchy of long-standing is the Animacy Hierarchy (which is often treated separately from its proper sub-hierarchy, the Person Hierarchy). Silverstein (1976) was possibly the first to notice that a wide variety of grammatical processes in a number of languages, in particular those involving word order, grammatical relation choice, and case marking, seem to be sensitive to the relative degree of animacy of the noun phrases involved. Here are more recent versions of both hierarchies:

- (3) Animacy Hierarchy (Dixon 1979: 85): 1<sup>st</sup> Person Pronoun > 2<sup>nd</sup> Person Pronoun > 3<sup>rd</sup> Person Pronoun > Proper Noun > Human Common Noun > Animate Common Noun > Inanimate Common Noun
- (4) Person Hierarchy (Croft 1990: 149): Local (1<sup>st</sup>, 2<sup>nd</sup>) > 3<sup>rd</sup>

A related hierarchy pertains to the degree of 'identifiability' of the participants in a discourse and is formulated as the Definiteness Hierarchy:

- (5) Definiteness Hierarchy (Comrie 1989: 134-136): Personal Pronoun > Proper Noun > Definite NP > Indefinite Specific NP > Non-specific NP

Finally, a number of studies have pointed to the relative 'discourse prominence' of the phrases in an utterance as a factor in grammatical patterning, where the more 'discourse prominent' element is, in some sense, more at the center of attention of the participants of the discourse. Hence, the following hierarchy:

- (6) Prominence Hierarchy (Tomlin 1985): Discourse Prominent > Not Discourse Prominent

The above hierarchies have entered into functionalist theorizing in two separate ways. First, all of the hierarchies, to one degree or another, appear to

have functional (or at least external) motivation, in that they are based on facts about language users. Intuitively, at least, all seem to arrange themselves in a decreasing degree of cognitive salience or importance. Human NPs are more central to the human experience than inanimates; agents are more central than instruments; subjects are more central than objects of prepositions; and so on. Second, and more importantly, functionalists formulate grammatical generalizations by means of direct reference to these hierarchies. In the view of Croft (1995), all universal aspects of language are functionally-motivated and representable by implicational hierarchies such as those described above. Grammars of individual languages, in this view, are (to simplify only a little) collections of statements about where particular phenomena fall on particular hierarchies.

As noted above, hierarchies of thematicity, animacy, and so on are given an OT realization in two papers by Judith Aissen (Aissen 1999; 2000). The first, which deals with subject choice, is discussed in the following sub-section; the second, which treats differential object marking from an explicitly FOT perspective, is discussed in §2.4.

### 2.3. Aissen on subject choice

Aissen (1999) characterizes the person/animacy and thematic hierarchies (and, by implication, the others as well) as ‘important results in universal grammar’ (p. 674). Languages differ with respect to the degree that subject and object choice is a function of hierarchically-organized scales of personhood,

thematic role, and prominence. The goal of her paper is to capture these different realizations in an optimality-theoretic framework. Aissen works with a proper subset of the relevant hierarchies, as follows:

- (7) Relational: Subject > Object > Oblique
- (8) Person: Local (1<sup>st</sup>, 2<sup>nd</sup>) > 3<sup>rd</sup>
- (9) Thematic: Agent > Patient
- (10) Prominence: Discourse Prominent (X) > Not Discourse Prominent (x)

Following the technique proposed in Prince and Smolensky (1993), she aligns these hierarchies harmonically, interleaving them so that the ranking within each is preserved. Hence the intuition is captured that local subjects are more natural than 3<sup>rd</sup> person subjects, agent subjects are more natural than patient subjects, and discourse prominent subjects are more natural than non-prominent subjects. The actual constraints take the form of the prohibition against some grammatical relation being linked to some element on one of the other hierarchies. Hence, they are stated as follows:

- (11) a. \*Su/Pat
- b. \*Su/x
- c. \*Obl/Local

In other words, we have universal violable constraints prohibiting subjects from being patients (11a), prohibiting subjects from being non-discourse prominent

(11b), and prohibiting oblique forms from being first or second person (11c).

Since the ranking within each hierarchy is preserved under alignment, a ranking such as that depicted in (12a) will be allowed, but not one such as in (12b):

- (12) a. \*Su/Pat » \*Su/Ag  
 b. \*Su/Ag » \*Su/Pat

Agents outrank Patients in the Thematic Hierarchy, so a constraint prohibiting subject Agents cannot outrank a constraint prohibiting subject Patients.<sup>4</sup>

Let us now turn to some of Aissen’s particular analyses, beginning with English. The highest ranked relevant constraint is the one forbidding non-prominent subjects. Notice that in Tableau I, that constraint dominates the one forbidding patient subjects (i. e., \*Su/x » \*Su/Pat). Passives can be generated, then, if the Patient is prominent and the Agent is non-prominent.

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		*	**

Tableau I

English (prominent patient) (Aissen 1999: 689)



Fox has no passives at all, a result that Aissen obtains by a high ranking of the prohibition against patient subjects ( i.e., \*Su/Pat » \*Su/x).

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

Tableau II

Fox (Aissen 1999: 687)

Other languages restrict actives and passives to particular persons. Lushootseed, for example, does not allow 1<sup>st</sup> or 2<sup>nd</sup> person passive agents:

Agt ↓ Pat ⇒	1	2	3
1	-	active/*passive	active/*passive
2	active/*passive	-	active/*passive
3	active/passive	active/passive	active/passive

Table II

Distribution of voice by person in Lushootseed (Aissen 1999: 690-691)

Aissen derives this result by means of a high ranking of \*Obl/Local:

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	*!		*	*

Tableau III

Lushootseed (Aissen 1999: 691)

Lummi is like Lushootseed, except that *actives* are disallowed when the subject is 3<sup>rd</sup> person and the object is 1<sup>st</sup> or 2<sup>nd</sup> (Jelinek and Demers 1983):

Agt ↓ Pat ⇒	1	2	3
1	-	active/*passive	active/*passive
2	active/*passive	-	active/*passive
3	*active/passive	*active/passive	active/passive

Table III

Distribution of voice by person in Lummi (Aissen 1999: 692)

Aissen derives this generalization by means of a high ranking of \*Oj/Local:

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		*!			*
<del>☞</del> PASSIVE Pat/Su/1/x-Agt/Obl/3/X			*	*	**

Tableau IV

Lummi (1st person patient) (Aissen 1999: 692)

#### 2.4. Aissen on differential object marking

Aissen (2000) provides an OT account of the fact that some languages overtly case mark direct objects and some do not and that whether they do or not is a function of the degree of animacy or definiteness of that object. The higher in the hierarchy of animacy and/or definiteness the object is, the more likely it is to be case marked in a particular language. Aissen employs the following hierarchies in this paper:

(13) Animacy: Human > Animate > Inanimate

(14) Definiteness: Personal Pronoun > Proper Noun > Definite NP > Indefinite Specific NP > Non-specific NP

As Aissen notes, the correlation of overt marking with animacy and/or

definiteness appears to have a functional explanation: 'It is those direct objects which are most in need of being distinguished from subjects that are overtly case marked' (2000: 3).

Employing the technique of harmonic alignment discussed in the previous section, Aissen arrives at the following constraint rankings:

- (15) a. \*Oj/Hum » \*Oj/Anim » \*Oj/Inam  
b. \*Oj/Pro » \*Oj/PN » \*Oj/Def » \*Oj/Spec » \*Oj/NSpec

In other words, no language will prohibit inanimate objects that does not prohibit human objects; no language will prohibit non-specific objects that does not prohibit pronominal objects; and so on.

Now, then, the goal is to ensure that if in a particular language a direct object with a particular value for animacy or definiteness is case marked, then objects with animacy or definiteness values higher on their respective hierarchies will also be case marked. Aissen's first steps to achieving this result are to propose constraint (16) and locally conjoining it with the constraints of (15a-b) (see Table IV):

- (16) \* $\emptyset_C$  'Star Zero': Penalizes the absence of a value for the feature CASE.

Local conjunction of $*\emptyset_C$ with the subhierarchy on object animacy (15a)	Local conjunction of $*\emptyset_C$ with the subhierarchy on object definiteness (15b)
$*Oj/Hum \ \& \ *\emptyset_C \ \gg$ $*Oj/Anim \ \& \ *\emptyset_C \ \gg$ $*Oj/Inam \ \& \ *\emptyset_C$	$*Oj/Pro \ \& \ *\emptyset_C \ \gg$ $*Oj/PN \ \& \ *\emptyset_C \ \gg$ $*Oj/Def \ \& \ *\emptyset_C \ \gg$ $*Oj/Spec \ \& \ *\emptyset_C \ \gg$ $*Oj/NSpec \ \& \ *\emptyset_C$

Table IV

Local conjunction of  $*\emptyset_C$  with object-oriented subhierarchies (Aissen 2000: 9)

If nothing more were said, the constraints of Table IV would force case on all objects. Therefore, the next step is to propose a constraint that is, in essence, the inverse of (16), namely one that penalizes the presence of morphological case:

(17)  $*STRUC_C$ : penalizes a value for the morphological category CASE.

Aissen is now in a position to propose language-particular tableaux capturing the object case marking generalizations for each language. Consider Hebrew and Turkish. In Hebrew, all and only definite objects (i.e. personal pronouns, proper names, and other definites) are case marked. In Turkish, these objects are case marked, and specifics are as well. This result is achieved by the

relative ranking of the locally conjoined constraints of Table II and constraint (17). The competition sets consist of a case marked object and a non case marked object of the same degree of definiteness. Tableaux V and VI illustrate.

Hebrew specific, indefinite patient

Patient: specific indefinite	*Oj/Def & *ø <sub>C</sub>	*STRUC <sub>C</sub>	*Oj/Spec & *ø <sub>C</sub>	*Oj/NSpec & *ø <sub>C</sub>
Oj: specific indefinite CASE: ACC		*!		
⊘Oj: specific indefinite CASE:			*	*

Tableau V

Hebrew specific indefinite patients (Aissen 2000: 14)

Turkish specific, indefinite patient

Patient: specific indefinite	*Oj/Def & *ø <sub>C</sub>	*Oj/Spec & *ø <sub>C</sub>	*STRUC <sub>C</sub>	*Oj/NSpec & *ø <sub>C</sub>
⊘Oj: specific indefinite CASE: ACC			*	
Oj: specific indefinite CASE:		*!		*

Tableau VI

Turkish specific indefinite patients (Aissen 2000: 15)

In other words, since in Hebrew the prohibition against case marking dominates

the constraint prohibiting non-case marked specifics, it follows that that language will disallow case marked specifics. In Turkish, on the other hand, the prohibition against case marking is dominated by the constraint prohibiting non-case marked specifics. Therefore, case marked specific objects are allowed in that language. In short, given the Definiteness Hierarchy, the function of constraint (17) (\*STRUC<sub>C</sub>) is to mark the point in the hierarchy where case marking is disallowed.<sup>5</sup>

### 3. The failure of functionally-based optimality theory

Any linguist committed to a rapprochement between formal and functional linguistics will find in the FOT synthesis advocated Haspelmath, Bresnan, and Aissen an immediate intuitive appeal. If this synthesis were able to resolve the most bitter and long-standing division in the field of linguistics, that would be a marvelous result. However, upon close examination, FOT fails to bridge the gap between the two opposing tendencies. The remainder of this section will document the problems that such an approach faces. Section 3.1 raises some conceptual and empirical difficulties inherent in the idea that each constraint has a functional motivation. Section 3.2 argues that the Thematic Hierarchy is of doubtful existence as a property of UG and that, given FOT assumptions, the Relational Hierarchy cannot underlie putatively universal constraints. It goes on to argue that even where hierarchies *are* motivated, the machinery inherent to optimality theory leads to a cumbersome and un insightful treatment of the phenomena to be explained.

### 3.1. On constraints and functional motivations

This section provides evidence against the core idea of FOT, namely that constraints and functional motivations are linked in the synchronic grammar. Section 3.1.1 questions whether this idea has any empirical content. Section 3.1.2 argues that it is unlikely that there can be any correlation between the mean cross-linguistic ranking of a constraint and its functionality, while §3.1.3 argues against the idea that functional motivations are either in the grammar or associated with elements of grammar.

#### 3.1.1. The content of the claim that all constraints are motivated functionally

How strong is the claim that every constraint has a functional motivation? Perhaps in phonology there is real content to such a claim, but this is unlikely to be the case for syntax. Nobody understands or, in the foreseeable future, is likely to understand the full set of external factors that might combine to account for the properties of syntactic structure. The functionalist literature has mooted literally dozens of potential factors, ranging all the way from economy, iconicity, and parsing to love of metaphor and ‘playfulness’. In short, even the plausible external motivations are so numerous, so diverse, and so open-ended that any conceivable rule or constraint in any framework could be provided with one. In the words of Gereon Müller (1999: 232), ‘it is usually not hard to contrive *some* functional motivation for almost any given constraint’.<sup>6</sup>



To illustrate the ease with which any constraint might be ‘motivated functionally’, let us consider the two constraints that Haspelmath (1999: 186) writes would be ‘the first candidates for elimination’ if OT constraints had to be rephrased in terms of user-optimality:

(18) NO LEXICAL HEAD MOVEMENT: A lexical head cannot move

(19) LEFT EDGE (CP): The first pronounced word in CP is a function word related to the main verb of that CP

It does not seem to be too much of a challenge to provide NO LEXICAL HEAD MOVEMENT with a functional motivation. An iconicity requirement presumably keeps heads and dependents from straying too far from each other in order to facilitate semantic interpretation.

LEFT EDGE (CP) is instantiated by the mandatory presence of the *que* complementizer in French and that of *for* initiating English infinitival complements:

(20) a. Je crois que Pierre a faim.

b. \*Je crois Pierre a faim.

(21) a. I found a book for you to think about.

b. \*I found a book you to think about.

Here too there is a plausible functional motivation. LEFT EDGE (CP) aids the

hearer by providing explicit information as to clause boundaries, as well as typing the clause as finite or nonfinite. In other words this constraint plays a role in semantic interpretation. Hence we could add the material in Table Ia below to Table I.<sup>7</sup>

name	grammatical constraint	corresponding user constraint
NO LEXICAL HEAD MOVEMENT (Grimshaw 1997)	"A lexical head cannot move"	Moving a lexical head away from its dependents makes it difficult for the hearer to pair heads and dependents
LEFT EDGE (CP) (Pesetsky 1998)	"The first pronounced word in CP is a function word related to the main verb of that CP"	Not explicitly marking embedded clauses in terms of their boundaries and finiteness impedes rapid recognition of their meaning and role

Table Ia

Possible functions for NO LEXICAL HEAD MOVEMENT and LEFT EDGE (CP)

By way of illustrating the ease with which any conceivable grammatical construct might be provided with some functional motivation, consider the transformational rules of pre-principles-and-parameters approaches. Even though they formed the target of functionalist assault for their abstractness and seeming divorce from anything that might be considered user-based (see, for example, Givón 1979), they too were argued by certain linguists to have functional motivations. For example, Langacker (1974) classified

transformational rules in terms of whether they raised, fronted, or backed grammatical elements and claimed that each formal operation was designed to facilitate a particular discourse function (see also Creider 1979).

### 3.1.2. On correlations between rankings and functions

An advocate of FOT might suggest that there is, in fact, a way of supplying empirical content to the idea that constraints need to be grounded functionally. Perhaps one might expect some direct correlation between the functionality of a particular constraint and its typical cross-linguistic ranking. That is, the better motivated the constraint functionally, the higher in general we would expect its ranking to be. For example, consider the constraints that license basic word order in the clause. Clearly, in more grammars the constraint that licenses subject-before-object order dominates the constraint that licenses object-before-subject order than vice-versa. FOT might attempt to explain such a state of affairs by appealing to work such as Tomlin (1986), which argues that the former order is better motivated functionally than the latter.

Such a suggestion presents two serious problems, however. First, given the present limited state of our knowledge of what external factors are the best motivators of syntactic structure, we have no non-circular way of ranking functions. For example, we might be tempted to say that faithfulness constraints tend to be more highly ranked than markedness constraints because they play a more important function. But our only evidence for their serving a more important function is that they are more highly ranked. There exists no theory of

functionality from which it follows that faithfulness is more important than markedness.

Even in phonology, where functionality is better understood than in syntax, there is no clear relationship between the importance of the function that a constraint serves and its typical ranking. For example, Hayes (1998) devises an algorithm for showing how some constraints are more phonetically grounded than others, but does not go on to demonstrate how this translates into cross-linguistic constraint rankings. As far as I know, nobody has produced a successful demonstration along those lines.

Secondly and more seriously, to ask the question: 'Is this constraint functionally motivated?' is to ask the *wrong* question. No rule or constraint has a functional motivation in and of itself, but rather only within the total system in which it occurs. To illustrate, let us consider two constraints proposed in Grimshaw (1997), OP-SPEC (22) and HEAD-RIGHT (23):

(22) OP-SPEC: Syntactic operators must be in specifier position

(23) HEAD-RIGHT: Heads uniformly follow their complements and adjuncts

OP-SPEC, when highly ranked, 'forces' *Wh*-Movement. Is this constraint functionally motivated or not? It seems to be, since operators in specifier position play a useful role both in marking scope and reserving a 'special' position for focused elements.<sup>8</sup> What about HEAD-RIGHT? Given that there is a parsing advantage for all heads being on same side of their complements (Hawkins

1994), then this constraint is also functionally motivated. But what is *dysfunctional*, however, is for any language to rank them *both* highly. Most head-final languages do not have *Wh*-Movement and there is a good reason for that. As Hawkins (1995) has observed, any movement of an argument away from its subcategorized position creates the danger of temporary ambiguity. If the verb comes early (as in VO languages), the danger is minimized, since upon hearing the verb the hearer knows which and how many arguments to expect. But in OV languages, the verb comes *after* an object gap, thereby delaying information about the content of that gap. OV languages solve this problem in part by making arguments ‘toe the line’ — *Wh*-Movement is rare and A-movements such as Passive and Raising are in general disfavored.

In other words, all other things being equal, in grammars in which OP-SPEC is a high-ranked constraint, HEAD-RIGHT is a low-ranked one. But these are just two constraints out of the unknown total number of constraints.<sup>9</sup> For any pair — or triple, or quadruple, etc., etc. — of constraints one can ask the degree to which that association of constraints is a ‘functional’ one. After all, only the most ardent anti-structuralist would deny that grammars are tightly-integrated wholes. We are thus led to the conclusion that there is no way of correlating the functionality of a particular constraint with its mean cross-linguistic parochial ranking.<sup>10</sup>

### 3.1.3. Constraint functionality and speaker knowledge

We have seen that there is little hope in correlating the functionality of a

constraint with its ranking. But this section will defend an even stronger position, namely that the functional motivations are neither part of grammar nor linked to elements of grammar. Rather, they are wholly external to grammar and make their presence felt in language use and acquisition — and therefore in language change. FOT errs in advocating a tight constraint-function pairing.

Let us begin with a couple of simple questions about the grammar of Mary Miller, a native speaker of English. One is: ‘Why do subjects precede objects?’ The other is: ‘Why aren’t there null subjects?’ We could supply very functionalist-sounding answers to those questions: ‘Subjects precede objects because they have cognitive prominence over objects and cognitive prominence is iconically represented’; and ‘There are no null subjects because agreement is too weak to license them’.

But those are the wrong answers. Mary Miller’s grammar has those properties because the grammars of her parents and peers have them. Except in unusual historical circumstances, one’s grammar reflects to an extremely high degree the grammars of those in one’s speech community. The factor that best explains why a person’s grammar has the properties that it has is *conventionality*. Grammars differ only slightly from generation to generation. As noted by William Croft (1995: 522), this stability in a sense has a functional motivation, since it is rooted in mental routinization and social convention. More recently, Croft has made the perspicacious observation that:

... a central aspect of a speaker's use of language is convention. When I say *Who did you meet yesterday?*, I put the interrogative pronoun *Who* at the

beginning of the sentence because that is the convention of my speech community. I know the conventions of my speech community, and my use of language will serve its purpose best most of the time if I conform to the conventions of my speech community. It may be that the initial position of *Who* is partly motivated by pragmatic universals of information structure, or partly specified by an innate Universal Grammar. In fact, one (or both) of those factors may be the motivation for the origin of the convention. But that is not why I have put it there in that utterance. (Croft 2000: ms., pp. 9-10)

‘Conforming to the conventions of one’s speech community’ is not, of course, the sort of functional motivation that has been claimed to underlie constraints. Models of grammar such as FOT that see constraints as being tied synchronically to motivations such as parsing and iconicity are thus empirically off-base. Grammars do reflect the effects of motivations such as parsing pressure and pressure towards iconicity, of course. But these effects make themselves felt over historical time, and are not ‘registered’ internally to the grammars themselves. (This point is made forcefully with respect to OT phonology, and phonology in general, in Hale and Reiss 2000 and Buckley 2000). In a nutshell, the forces (functional or otherwise) that bring a construction into a language are not necessarily the same ones that keep it there. To give one example in support of this claim, consider the Modern English genitive. It may either precede or follow the noun it modifies:

- (24) a. GEN-N: Mary's mother's uncle's lawyer  
b. N-GEN: the leg of the table

The GEN-N ordering is unexpected, since English is otherwise almost wholly a right-branching language. So why do English-speaking children acquire the GEN-N ordering? The short — and 100% correct answer — is 'conventionality'. They learn that ordering because they detect it in the ambient language of their speech community. But the long answer is very interesting and drives home the great divide between the functional explanation of a grammatical change and force of conventionality that leads to the preservation of the effects of that change.

Old English 1000 years ago was largely left-branching with dominant orders of OV and GEN-N.<sup>11</sup> This is the correlation motivated by parsing efficiency (Hawkins 1994). The shift to VO order in the Middle English period was matched by a shift to N-GEN order. A text count of 85% N-GEN has been reported for Middle English in Kirby (1998) and Fischer (1992). We don't know details of why this happened. Lightfoot (1991) suggests that as tokens of VO order in main clauses increased, cues that English was OV declined, leading English to be reanalyzed as VO underlyingly.<sup>12</sup> But then, after a certain time, everything started to reverse itself, with the text count of GEN-N order increasing dramatically. Why did this reversal occur? According to Kroch (1994), it may have been a result of the two genitives becoming 'functionally differentiated'. The GEN-N construction became favored for animates while the N-GEN construction has tended to be reserved for inanimates (see also



Wedgwood 1995 and Kirby 1998).

Now, then, what would the relation be between the OT constraints that license these two orders in Modern English and the functional motivations that gave rise to them? The answer is that it is so indirect as to be uninteresting. The current state of the English genitive is a product of over a thousand years of changes, many functionally motivated when they occurred, but preserved in the language primarily by the force of conventionality. Yes, it was undoubtedly parsing pressure that led Old English to be predominately GEN-N. That pressure no longer exists, but the order does. If the need for 'functional differentiation' is part of the explanation for why that order was preserved, one challenges any advocate of FOT to demonstrate that that particular functional force is a motivating factor in the grammars of English speakers today and to identify the particular constraints to which this factor is linked. Among other problems that would need to be addressed is the fact that the functional differentiation is only partial. That is, inanimates can occur in the GEN-N construction (*the table's leg* is not horribly unacceptable) and animates can occur in the N-GEN construction (*the mother of the lawyer*).

The point is that languages are filled with structures that arose in the course of history to respond to some functional pressure, but, as the language as a whole changed, ceased to be very good responses to that original pressure. Such facts are challenging to any theory like FOT, in which the sentences of a language are said to be a product of constraints that must be functionally motivated.<sup>13</sup>

Hale and Reiss (2000) and Buckley (2000) point out that FOT confounds

what we know with how what we know *got to be* what we know. Parsing ease, desire for functional differentiation, pressure for an iconic relationship between form and meaning, and so on are indeed forces that shape grammars. These forces influence adult speakers, in their use of language, to produce variant forms consistent with them. Children, in the process of acquisition, hear these variant forms and grammaticalize them. In that way, over time, certain functional influences leave their mark on grammars. There is no place — indeed no *need* — for the functional forces to match up in a one-to-one fashion with particular constraints internal to any particular grammar. As Hale and Reiss stress with respect to FOT approaches to phonology:

Phonology is not and should not be grounded in phonetics since the facts that phonetic grounding is meant to explain can be derived without reference to *phonology*. Duplication of the principles of acoustics and acquisition inside the grammar violates Occam's razor and thus must be avoided. (Hale and Reiss 2000: 162)

They go on to observe that 'Computational theories aren't inherently functionalist; people are functionalist' (p. 166). UG specifies what a possible human language is and characterizes the formal properties of individual languages. But it provides no explanation for why some grammars are more common than others. Nor should it, given the existence of perfectly reasonable function-based explanations for the typological distribution of grammatical elements (for more remarks along these lines, see Newmeyer 1998a).

### 3.2. Functional motivation vs. innateness

If one takes the mainstream OT position that the full set of constraints is innate, then one has ‘solved’ the learnability problem for constraints. There *is* no problem, though, of course, explaining the acquisition of language-particular rankings still presents more than a minor challenge. But what about FOT? It is by no means clear how the requirement that each grammatical constraint have an accompanying ‘user constraint’ can be made to be compatible with constraints being universal. The central theme of the functionalist literature is that functional motivation is an *alternative* to innateness. Functionalists argue that by showing how grammars are rooted in language-external functional and cognitive human attributes, the idea of an innate UG can be dispensed with:

Indeed, because the functionalist working hypothesis about innate linguistic abilities is that they are part of a more general cognitive-learning schema, the avenue of ‘explaining’ some phenomenon by declaring the rule describing it to be innate is not available... (Foley and Van Valin 1984: 13)

It would be nothing less than bizarre to claim that all constraints are *both* innate and functionally motivated. As Haspelmath (1999: 184) has trenchantly observed, ‘[functional] justifications are irrelevant in a theory that assumes innate constraints’. But if some constraints are functionally motivated but *not*

innate, then how could the full set of constraints possibly be universal? For example, consider a language L in which one never finds operators (i.e. *wh*- and other quantifier-like elements) in specifier position. Presumably in the grammar of L, OP-SPEC would have to be a very low ranked constraint. If OP-SPEC is simply innate, then the child learning L would, in the acquisition process, keep ‘demoting’ it to a lower and lower ranking. But if constraints are functionally-motivated, there would be no reason for the child acquiring L to acquire OP-SPEC at all! Hence, given FOT, constraints cannot be universal.

### 3.3 Grammatical hierarchies and FOT

The grammatical hierarchies discussed by Aissen and incorporated into her version of OT are interesting in that they are plausibly both innate attributes of UG and functionally-motivated. Consider the statement that humans are higher ranked than nonhumans, agents are higher ranked than patients, and so on. It is not implausible that we are born with some sort of knowledge of ‘cognitive importance’, i.e., that animates are more central to human cognition than inanimates, that agents are more central than patients, and so on. It would seem that FOT might be on safe ground, then, in positing these (externally motivated) hierarchies to be part of UG. If the hierarchies are innate attributes of human cognition, then the dilemma discussed above with respect to parochial constraints such as OP-SPEC does not arise.

Section 3.3.1, however, argues that the Thematic Hierarchy is not part of UG. Section 3.3.2 makes the point that the Relational Hierarchy is provided by

UG only in a non-functionally-based theory that permits knowledge of morphosyntax without exposure to evidence leading to that knowledge. Section 3.3.3 will go to question whether an insightful treatment of differential object marking is possible given the assumptions of FOT or, indeed, given optimality-theoretic assumptions in general.

### 3.3.1. The Thematic Hierarchy

There is reason for strong doubt that there exists a Thematic Hierarchy provided by UG. That seems to be the best explanation for the fact that after over three decades of investigation, nobody has proposed a hierarchy of theta-roles that comes close to working. Here is just a sampling of the versions of the Thematic Hierarchy that have been proposed over the years:

(25) Versions of the Thematic Hierarchy:

a. Fillmore (1968: 33)

Agent > Instrumental > Objective

b. Jackendoff (1972)

Agent > Location/ Source/ Goal > Theme

c. Ostler (1980)

(relational predicates) Theme > Goal > Source > Path

(actional predicates) Source > Path > Theme > Goal

- d. Givón (1984: 139)  
Agent > Dative/ Beneficiary > Patient > Locative > Instrument/  
Associative > Manner
- e. Kiparsky (1985: 20)  
Agent > Source > Goal > Instrument > Theme > Locative
- f. Carrier-Duncan (1985: 7)  
Agent > Theme > Goal/ Source/ Location
- g. Larson (1988: 382-383)  
Agent > Theme > Goal > Location (and other obliques)
- h. Wilkins (1988: 211)  
Agent > Patient > Location/ Source/ Goal > Theme
- i. Randall (1988: 138) (for effects of lexical rules on argument structure)  
Theme > Agent > Instrument/ Source/ Path/ Goal/ Location/ ...
- j. Bresnan and Kanerva (1989: 23); Bresnan and Moshi (1990: 169); Alsina  
(1996: 688)  
Agent > Beneficiary > Recipient/ Experiencer > Instrumental > Theme/  
Patient > Location

- k. Baker (1989: 544)  
Agent > Instrument > Patient/ Theme > Goal/ Location
- l. Grimshaw (1990: 8)  
Agent > Experiencer > Goal/ Source/ Location > Theme
- m. Jackendoff (1990: 261)  
Agent > Patient/Beneficiary > Theme > Source/ Goal/ Reference Object >  
Identificational Goal/ Reference Object
- n. Langacker (1990)  
Agent > Instrument > Patient/ Mover/ Experiencer ('Energy Flow  
Hierarchy' for subject choice)  
Agent > Experiencer > Other ('Initiative Hierarchy')
- o. Speas (1990: 16)  
Agent > Experiencer > Theme > Goal/ Source/ Location > Manner/ Time
- p. Dowty (1991); Rugemalira (1994)  
Proto-Agent > Proto-Patient
- q. Kiefer (1995)  
Actor > Agent > Beneficiary > Theme/Patient > Instrument

r. Van Valin and Lapolla (1997: 127) (continuum in terms of LS (=logical structure) argument positions) — this is an elaboration of Foley and Van Valin (1984:59)

Agent > Effector/ Mover/ User/ etc. > Location/ Perceiver/ Cognizer/  
Experiencer/ etc. > Theme/ Stimulus/ Implement/ etc. > Patient/ Entity

The theory of proto-thematic roles argued for in Dowty (1991) is often taken as the solution to the problem of too many thematic hierarchies, and, in fact, Aissen (1999) adopts it. Dowty argued that the proliferation of theta-roles seen in the literature can be dispensed with in favor of two cluster-concepts called 'Proto-Agent' and 'Proto-Patient'. The particular role borne by a particular argument is determined by the number of entailments that the verb gives it. Dowty outlined these entailments as follows:

Contributing properties for the Agent Proto-Role (Dowty 1991):

- a. volitional involvement in the event or state
- b. sentience (and/or perception)
- c. causing an event or change of state in another participant
- d. movement (relative to the position of another participant)
- e. exists independently of the event named by the verb

Contributing properties for the Patient Proto-Role:

- a. undergoes change of state
- b. incremental theme



- c. causally affected by another participant
- d. stationary relative to movement of another participant
- e. does not exist independently of the event, or not at all

Dowty suggests that the argument whose predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject of the predicate; the argument having the greatest number of Proto-Patient entailments will be lexicalized as the direct object.

Unfortunately for the proto-theta-role approach, it is not difficult to find transitive verbs whose subjects and objects do not measure up to Dowty's thematic criteria for them. Consider such stative predicates as *receive*, *inherit*, *undergo*, and *sustain*. To illustrate the problem, let us measure sentence (26) against Dowty's proto-agent entailments (27):

(26) John received a letter from Mary

- (27)
- a. VOLITION: *Mary*
  - b. SENTIENCE / PERCEPTION: d.n.a.
  - c. CAUSATION: *Mary*
  - d. MOVEMENT: *the letter*
  - e. INDEPENDENT EXISTENCE: *John, Mary*

*John* is a 'Proto-Agent' only by one-half of one test, while *Mary* passes two and one half. Hence, one would predict that *Mary*, not *John*, should be subject.

One might, on the other hand, choose to interpret Dowty's criteria as governing the *necessary* properties of the roles associated with each predicate, rather than focusing on individual sentences (such as (26)) in which that predicate occurs. By this interpretation, the verb *receive* fares no better, as Table V illustrates.

<b>Proto-Agt properties</b>	<b>[recipient]</b>	<b>[theme]</b>	<b>[source]</b>
Volition	no	no	no
Sentience	no	no	no
Cause	no	no	no
Movement	no	yes	no
Independent existence	yes	yes	yes
<b>Total</b>	<b>1</b>	<b>2</b>	<b>1</b>
<b>Proto-Pat properties</b>	<b>[recipient]</b>	<b>[theme]</b>	<b>[source]</b>
Change of state	no	no	no
Incremental theme	no	no	no
Causally affected	yes?	yes	no
Relatively stationary	yes	no	no
No independ. existence	no	no	no
<b>Total</b>	<b>2</b>	<b>1</b>	<b>0</b>

Table V

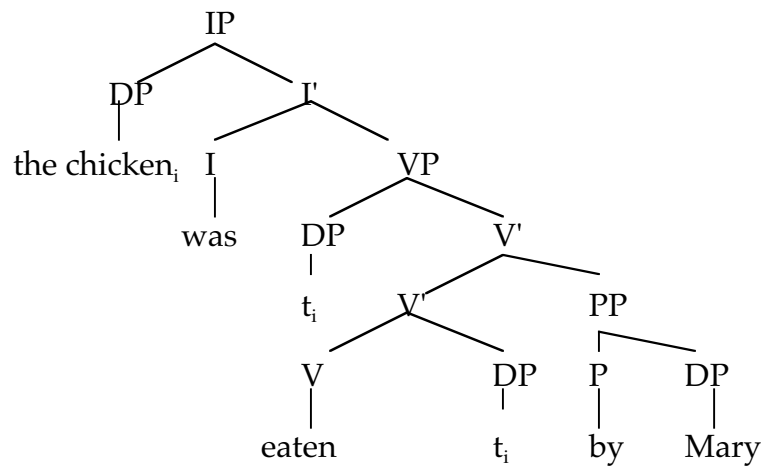
Proto-Agent and Proto-Patient properties of the verb *receive*

If the assignments in Table V are correct, then for the verb *receive*, the theme should be the subject and the recipient should be the direct object, i.e., we should have sentences like \**A package received John from Mary*. As far as subject properties are concerned, the theme necessarily moves and has an independent existence, while the only necessary property of the recipient is its independent existence. (Note that sentences like *The wall received a coat of paint* illustrate that the recipient need not be sentient.) As far as object properties are concerned, recipients are, I believe, always causally affected by another participant and stationary relative to the movement of another participant.

It is worth pointing out that passive sentences (and most likely A-movements in general) pose a lethal problem for the attempt to link any approach that incorporates the UTAH (Baker 1988) and the hypothesis of proto-thematic-roles.<sup>14</sup> Consider the active-passive pair (28a-b). For the past two decades, or longer, it has been assumed that (28b) has a derivation schematically represented as (29) (the intermediate trace in [Spec, VP] may or may not be required given current 'minimalist' assumptions):

- (28) a. Mary ate the chicken.  
b. The chicken was eaten by Mary.

(29)



Such a derivation, however, violates the UTAH. *Mary* has identical  $\Theta$ -roles in (28a) and (28b) and, therefore, by the UTAH, would have to be in identical D-structure positions in those two sentences. But agent phrases of passives have not been analyzed as originating in deep subject ([Spec, IP]) position since before Emonds (1970) — and the Theta-Criterion, of course, explains *why* they cannot originate there. So we have a fundamental conflict between the UTAH and the Theta-Criterion. Worse, however, is the fact that (29) leads to the assignment of the wrong  $\Theta$ -roles, given a Dowtyan analysis. The argument with the most proto-Agent properties is not a deep subject; indeed the deep subject, being empty, has no thematic properties at all. That presents no problems for a semanticist like Dowty, who rejects null elements in syntactic derivations, but is highly problematic for the standard principles-and-parameters approaches. Even worse, the agent phrase can be omitted:

(30) The chicken was eaten.

As Dowty makes clear in his paper, in sentences with only one DP argument, that argument is assigned the subject position by default. But in (52b), *the chicken* needs to be an underlying direct object.

Even if something like proto-thematic roles could be motivated for subject and object choice, more fine-grained roles would still be necessary for other facets of the grammar. This fact undercuts any theoretical parsimony argument for reducing the number of roles to two. For example, a tradition in word-formation studies going back at least as far as Carrier-Duncan (1985) states morphological generalizations in terms of a variety of theta-role labels. Or consider the analyses of control phenomena in Sag and Pollard (1991) and Culicover and Jackendoff (1999). In the latter analysis, the controller is identified differently for different verb classes, verbs in each class picking a particular theta-role as controller. For example, the controller might be an Agent (31a), an Addressee (31b), a Patient (31c), a Recipient (31d), a Source (31e), or a Holder (31f) (the controller is identified in bold-face):

- (31) a. **Mary** attempted to take a vacation.  
b. Bill told **Mary** to come visit him.  
c. I persuaded **John** to see the doctor.  
d. We taught **the dog** to roll over.  
e. **Sam** promised Mary to write more often.  
f. Tom required **Alice** to hand in the assignment.

I see no way to handle the control facts by appealing only to the roles Proto-Agent and Proto-Patient.<sup>15</sup>

In short, while grammatical processes might well have to refer to individual thematic roles, there is little evidence for a Thematic Hierarchy forming an integral part of UG.

### 3.3.2. The Relational Hierarchy

Let us now turn to the Relational Hierarchy. It is repeated below as (32):

(32) Relational Hierarchy: Subject > Direct Object > Indirect Object >  
Oblique > Genitive > Object of Comparative

Are grammatical relations innate constructs? Frameworks that accord them the status of grammatical primitives, such as relational grammar and lexical-functional grammar (LFG) have tended to answer this question in the affirmative. For example, Steven Pinker, writing from an LFG perspective, has remarked:

The child is assumed to know, prior to acquiring a language, the overall structure of the grammar, the formal nature of the different sorts of rules it contains, and the primitives from which those rules might be composed.

(Pinker 1984: 31)

Pinker goes on to suggest that the child uses semantic bootstrapping to identify agentive arguments of active action predicates as subjects and then expects ‘without further learning’ (p. 44) that entities labeled SUBJ will be the leftmost NP daughter of S, can be controlled by an argument of a matrix predicate, and so on.

Such a view seems consistent with standard versions of OT. If constraints involving reference to grammatical relations are innate, then it follows that grammatical relations are innate. But, for the reasons discussed in §3.2, if the ‘F’ of FOT has any meaning, then FOT has no choice but to abandon the idea of innate constraints. For FOT, a constraint can be universal only if it is manifested morphosyntactically in every language.<sup>16</sup> Van Valin and Lapolla (1997), however, provide evidence that grammatical relations are not universally instantiated.<sup>17</sup> That is, they demonstrate that not all languages present evidence to the language learner that would lead him or her to posit distinct grammatical relations such as ‘subject’, ‘direct object’, and so on. Such relations can be motivated for a particular grammar only when semantic oppositions are neutralized morphosyntactically. English is typical in this respect. Consider the following active – passive pair:

- (33) a. John kills the ducklings.  
b. The ducklings are killed by John.

It is the agreement pattern that is of interest to us. The verb agrees in (33a) with the agent and in (33b) with the patient. In other words, agreement is not purely

semantically-determined; rather it needs to make reference to some morphosyntactic category, in this case the 'subject'. Languages differ, of course, as to which processes exhibit neutralization of semantic oppositions for morphosyntactic purposes and therefore provide evidence for grammatical relations. In those languages in which agreement is subject to purely semantic conditions, there is no argument derivable from this process for the existence of distinct grammatical relations in that language.

Now, as it turns out, there exist languages in which there is *never* restricted neutralization of semantic roles. Based on the work of Mark Durie (1985; 1987), Van Valin and Lapolla identify Acehnese as one such language and Primus (1999) makes the same point with respect to Guarani and Tlingit. No learner of these languages would be led to posit a distinction between subjects and objects. Therefore, grammatical relations are not universal, nor can any hierarchy involving them be universal. FOT is forced either to give up the universality of constraints or, more seriously, to explain how speakers can have in their grammars functionally-motivated constraints for which they have no evidence.<sup>18</sup>

### 3.3.3. The FOT treatment of differential object marking

The principal objection that can be raised against the treatment of differential object marking in Aissen (2000) is not based on its empirical inadequacy, but rather on its conceptual complexity. The FOT framework requires far more theoretical machinery than is necessary to capture the relevant



generalizations. The remainder of this section will support this assertion.

The generalization that Aissen's analysis is designed to capture is simply stated, as in (34) (Aissen 2000: 2):

- (34) The higher in prominence a direct object, the more likely it is to be overtly case marked.

I now present an analysis that captures this generalization in a simpler manner than Aissen's (see §2.4). First, assume that the Animacy Hierarchy and the Definiteness Hierarchy (repeated below) are provided by UG,<sup>19</sup> with each position on each hierarchy indexed along the lines indicated:

- (35) Animacy Hierarchy: 1<sup>st</sup> Person Pronoun<sub>a</sub> > 2<sup>nd</sup> Person Pronoun<sub>b</sub> > 3<sup>rd</sup> Person Pronoun<sub>c</sub> > Proper Noun<sub>d</sub> > Human Common Noun<sub>e</sub> > Animate Common Noun<sub>f</sub> > Inanimate Common Noun<sub>g</sub>
- (36) Definiteness Hierarchy: Personal Pronoun<sub>a</sub> > Proper Noun<sub>b</sub> > Definite NP<sub>c</sub> > Indefinite Specific NP<sub>d</sub> > Non-specific NP<sub>e</sub>

Now assume the following universal principle governing object case marking:<sup>20</sup>

- (37) Grammars in which object case is overtly marked choose a point on the Animacy and/or Definiteness Hierarchies and mark case at that point and at every point of higher prominence.

The grammars of Hebrew and Turkish will include the following statements:

- (38) a. Hebrew: Object case-mark point c on the Definiteness Hierarchy.  
b. Turkish: Object case-mark point d on the Definiteness Hierarchy.

Universal principle (34) and language-particular statements such as (38) capture the essence of object case marking cross-linguistically and replace the bulk of the theoretical machinery the Aissen proposes.

In large part, the complexities of Aissen's analysis are due to the general nature of OT. In that framework there is no way for a correct form to emerge without competition between rival forms. Therefore one needs to set up a proliferation of candidate sets, simply to ensure that a 'winner' results. So for each language with object case marking it is necessary to posit a separate tableau in which, for each point on the relevant hierarchy, a case-marked form and a non-case-marked form compete with each other (see Tableaux V and VI). The fundamental problem with such an approach can be appreciated by means of an analogy. Suppose that Smith and Jones are weight-lifters who train with weights of 100, 200, 300, 400, and 500 pounds. Smith is able to lift a 200 pound weight (and, of course, all lighter ones) and Jones is able to lift a 300 pound weight (and, of course, all lighter ones). How might we provide an efficient characterization of their abilities? First, we would state a 'principle' like (39):

- (39) If an individual can lift a weight of  $x$  pounds, then he or she can lift a

lighter weight.

Second, we would characterize the limits of Smith's and Jones's abilities as follows:

- (40) a. Smith can lift 200 pounds.  
b. Jones can lift 300 pounds.

To handle the same generalizations the 'OT way', however, we would have to posit a set of tableaux for Smith and Jones, one for each weight category, and ranked constraints in which weight categories are locally conjoined with a constraint that penalizes the lack of the ability to lift weights. Surely my alternative analysis is both conceptually simpler and equal in its empirical coverage.

It is never clear from a reading of the OT literature how literally (in terms of claims about I-Language) one is to take the tableaux that form the centerpiece of every OT analysis. If tableaux like V and VI are simply metaphorical in nature, then one would have to object that such metaphors do little to promote understanding. But a non-metaphorical interpretation seems remote. Could it really be the case that for each language, for each degree of definiteness, case marked and non-case marked objects are in a separate competition in speakers' heads with each other? If OT is incapable of formulating the following generalization in so many words — that in language L objects with property  $x$  are case marked and objects with property  $y$  are not case marked — then one

would have to conclude that that framework is less than appealing as an approach to UG.

One might object that while empirically the analyses are equivalent, at a metatheoretical level they differ. The constraints of Aissen's analysis have explicit functional motivation, as is required by FOT. For example, Aissen attributes constraint (16), which penalizes the absence of case marking, to a hearer-based need for clarity. The constraints of Table IV, which locally conjoin (16) with the animacy and definiteness object-oriented subhierarchies, are regarded as being rooted in 'iconicity', since they favor morphological marks for marked configurations. Constraint (17), on the other hand, is said to have an economy-based motivation, since it reduces the amount of structure that needs to be processed. Since such constraints (arguably) are motivated by their functions, one might claim that the extra complexity of the FOT analysis is justified.

That would be true, however, only if it were correct to pair the constraints of a synchronic grammar with their functional motivations. But as I have argued (see §3.1), it is *not* correct. Hence, the more complex FOT approach is not motivated at a metatheoretical level either.

#### 4. Conclusion

This paper has examined 'functionally-based optimality theory' (FOT), the version of optimality theory that requires that each constraint be paired with an external functional motivation. It has argued that, at least as far as syntactic constraints are concerned, FOT suffers from severe deficiencies. Such a pairing

incorrectly locates the form-function interplay in the mental grammar itself, rather than seeing the response of form to function as emerging from language use and acquisition. Furthermore, FOT seems incompatible with the standard OT assumption that constraints are universal. Finally, two of the functionally-motivated hierarchies that are central to FOT theorizing, the thematic and relational hierarchies, are highly problematic, while incorporating the others into an FOT analysis leads to otherwise unnecessary complexity.

## FOOTNOTES

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<sup>1</sup> Along these lines, in their comments on a language-particular *r*-insertion rule proposed in McCarthy (1993), Halle and Idsardi (1997) make the reasonable observation that:

Conceptually, reliance on arbitrary stipulation that is outside the system of Optimality is equivalent to giving up on the enterprise. Data that cannot be dealt with by OT without recourse to rules are fatal counterexamples to the OT research program. (Halle and Idsardi 1997: 26)

McMahon (2000) argues that many of the allegedly universal constraints of OT phonology are ‘effectively language-specific, and that OT cannot in fact function without the addition of parochial rules, or mechanisms which in some way mimic the operations found in traditional derivational models’ (p. 10).

<sup>2</sup> Many universals of language of course are not part of linguistic knowledge, but rather are an emergent (i.e. epiphenomenal) result of some other principle or principles, which themselves might be innate or learned. For example, it is a

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universal that no language has prefixes that does not also have suffixes. Children do not ‘know’ this fact; rather, it appears to be an epiphenomenal by-product of the fact that processing considerations favor suffixes over prefixes (Hall 1992).

<sup>3</sup> According, to Hayes, ‘the formal system of grammar characteristically reflects principles of good design’ (p. 276). But he is clear that not all ‘good design’ is necessarily ‘functional’ — for example he feels that the tendency of phonological systems toward symmetry has no evident functional explanation.

<sup>4</sup> It is important to stress that from the fact that \*Su/Ag never outranks \*Su/Pat, it does not follow that no language allows agent objects. Such languages indeed exist. As Aissen notes (p. 686): ‘Languages in which agents are realized as object ... will only emerge if there are higher-ranked constraints which force the appearance of object agents’.

<sup>5</sup> Differential case marking with respect to animacy is handled in analogous fashion. Aissen goes on to discuss the handling of ‘two-dimensional’ differential object marking, in which marking is sensitive to *both* definiteness and animateness. Given the considerable space that would be required to present her treatment and the fact that any critique of her approach to one-dimensional marking carries over ipso facto to that of two-dimensional, the latter will not be discussed here.

<sup>6</sup> Müller, however, goes on to give examples of constraints which he feels lack functional motivation (see below, footnote 8).

<sup>7</sup> Haspelmath has informed me (p. c.) that the lack of generality of these two constraints led him to regard them as lacking corresponding user constraints. That the constraints of Table Ia lack generality compared to those of Table I is

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certainly correct. But the reasonable conclusion from that fact is that the functional motivations for the former are weaker than those for the latter, not that the former have no functional motivations at all.

Robert Levine points out (p. c.) that it is often legitimate to move dependents away from heads, as in (i):

- (i) [Rumors t] I have heard from time to time [that John was a double agent].

The extraposition in (i) does not violate NO LEXICAL HEAD MOVEMENT. Presumably it is motivated by its role in parsing efficiency, which prefers (for VO languages) a late appearance of heavy constituents (Hawkins 1994).

<sup>8</sup>Müller (1999), however, argues that OP-SPEC is *not* functionally motivated. As he points out, *wh*-phrases are not necessarily (semantic) operators, some cases of *Wh*-Movement have to be partly undone semantically, all *wh*-phrases can in principle be interpreted in situ, and *wh*-phrases may respect OP-SPEC by undergoing partial movement to an embedded non-scope position. It is not clear how an advocate of FOT would respond to these points.

<sup>9</sup> Only a few dozen or so papers have been published in OT syntax to date, handling only small fragments of only a few dozen languages. Yet well over a hundred constraints have already been proposed. Gereon Müller has pointed out (p. c.) that given that local conjunction is recursive (and harmonic alignment potentially recursive), there is the danger of generating infinite sets of constraints for natural language.



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<sup>10</sup> David Odden (p. c.) has suggested that local conjunction of constraints might provide a way of insuring the ranking dissociation of OP-SPEC and HEAD-RIGHT. For example, if OP-SPEC&HEAD-LEFT universally dominated OP-SPEC&HEAD-RIGHT, then we would predict the (general) absence of *Wh*-Movement in verb-final languages. Such a solution is well worth exploring. My main reservation about such an approach comes from the fact that literally dozens of properties correlate with direction of headedness and therefore (presumably) dozens of constraints would need to be locally conjoined. The net result of such an approach would be the explosion in the number of constraints needed by several orders of magnitude.

<sup>11</sup> Lightfoot (1999: 117) notes that in limited circumstances, N-GEN order and split genitive order were possible as well.

<sup>12</sup> Lightfoot (1999: 119) gives examples of split genitives in Middle English. Unlike in Old English, the element to the right in the split genitive does not have to bear a thematic relation with the element to the left, a state of affairs that Lightfoot ties to Case theory.

<sup>13</sup> Along these lines, Janet Fodor has in several publications stressed that functionally-motivated principles can be incorporated into grammars without those principles being computed in the grammars. See, for example, Fodor (1984) and the discussion in Newmeyer (1998b: 152). For attempts to computationally model the effect of function on form over time, see Kirby (1998) and Briscoe (2000).

<sup>14</sup> According to the UTAH (Uniformity of Theta Assignment Hypothesis), identical thematic relationships between items are represented by identical

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structural relationships between those items at the level of D-structure. Virtually all principles-and-parameters approaches adopt the UTAH, I believe. See Baker (1997; to appear) for an attempt to effect a linkage between the UTAH and Dowtyan proto-roles and for criticism of this attempt, see Newmeyer (to appear).

<sup>15</sup> See Primus (1999) for arguments that even for the linking of grammatical relations and thematic roles, more proto-roles are needed than Proto-Agent and Proto-Patient. Primus motivates the need for the role 'Proto-Recipient'.

<sup>16</sup> In Chomskyan versions of UG theory, universals need not be exemplified morphologically or syntactically in every language. They are simply available to the learner and will be activated for grammatical purposes if there is evidence for them in the primary data. Functionalist approaches, however, reject the idea of uninstantiated (i. e. innate) morphosyntactic knowledge (again, see §3.2).

<sup>17</sup> In mainstream transformational approaches, grammatical relations have generally been defined derivatively in terms of configurational structure, so the question of their innateness/universality has been discussed only in the context of the innateness/universality of particular structural configurations. A subject, for example, was originally defined simply as an NP immediately dominated by S. The situation is more complicated now, given the VP-internal subject hypothesis. In principles-and-parameters accounts, there are several 'subject positions', each correlated with different subject properties, and not all which need be filled in every language (see McCloskey 1996 for discussion).

<sup>18</sup> Individual languages might still hierarchize grammatical relations, of course. For example, Pollard and Sag (1992) make a strong case that anaphor binding in English is sensitive to such a hierarchy.

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<sup>19</sup> These are by no means uncontroversial assumptions. Hierarchies of animacy have been implicated in phenomena as diverse as noun classification, numeral classifiers, number marking, and voice systems, as well as object marking. It remains to be seen whether there is a smooth mapping from one hierarchy to another, as would be required if UG itself provides the Animacy Hierarchy. (I am indebted to William Croft for discussion of this issue.)

<sup>20</sup> Things are somewhat more complicated, since, as Aissen notes, some languages optionally case marked objects and such NPs are intermediate in the hierarchies between those obligatorily case-marked and those not case-marked. The grammars of such languages will select two points on the relevant hierarchy.

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