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## Introduction to OT Syntax

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**ABSTRACT.** To introduce OT syntax to phonologists, this paper shows how syntax benefits from the addition of Optimality Theory in the analysis of four kinds of complex phenomenon: Case, agreement, object shift, and economy of structure and movement. Adding simple markedness, faithfulness, and alignment constraints allows the simplification of the overall theory, eliminating some principles that can now be derived and simplifying the formulation of others. OT also removes the need for several classes of grammatical devices, increasing the restrictiveness of the overall theory. Even with these reduced resources, the empirical coverage of the theory is increased to include typological data and generalizations that were previously beyond the grasp of theory.

**Keywords:** Case, agreement, alignment, object shift, economy

### 1. Introduction

The goal of this paper is to introduce phonologists to OT syntax by giving several examples of work in this area showing how violable markedness, faithfulness, and alignment constraints have profitably been used to solve a range of interesting problems in syntax involving Case, agreement, word order, and economy of structure effects.

Optimality Theory (Prince and Smolensky (1993, 2004)) can be used with many different theoretical frameworks in syntax, but I will not attempt a general survey of work in this field. Instead, I will show how OT can improve and simplify the syntactic approach of Chomsky (2000). OT allows some principles to be stated more simply, and some to be eliminated entirely when the generalization follows from the interaction of independently motivated constraints. OT changes how we deal with cross-linguistic differences in syntax. OT disallows virtually all of the common toolbox in standard use to deal with cross-linguistic differences: accidental lexical gaps, stipulated feature differences on heads that alter their abilities (e.g. to license Cases or drive movement), language specific rules or principles, language specific features or structures, parameters to turn principles on or off in a language, or to weaken or strengthen their effect in different languages. Instead, all cross-linguistic differences in OT must follow from the relative ranking of a set of universal (but violable) constraints. OT also changes how principles are formulated. Pre-OT principles often contain hedges (e.g. ‘avoid’ or ‘if possible’ ) to deal with the fact that they do not always hold. Similarly, principles may contain restrictions (except ..., unless..., if and only if ) to deal with the fact that they have exceptions. In addition, principles can include directions for comparison and selecting among alternatives (e.g. ‘closest’, ‘smallest’,

‘shortest’, ‘highest’). In OT, these are unnecessary in statement of constraints since violability and comparison are built into the OT model.

OT changes how we deal with competition between principles or forms. Pre-OT, the usual practice is to try to prevent the appearance of competition by adding exceptions to principles to prevent them from applying in certain contexts, or by adding exceptions to the licensing ability of a particular head, to rule out one of the competing forms (e.g. Cases) in the appropriate context. With respect to the preservation of lexical/inherent Case, the standard view has been that elements from an earlier level are always preserved in a later level (Inviolable Faithfulness). OT freely allows competition between principles/constraints and forms, regulating it by the language-specific ranking of the violable faithfulness and markedness constraints. Removing the devices designed to forestall the possibility of competition allows principles to be stated in a simple, universal manner, and this process can lead to a re-examination of the phenomenon in question and an improved understanding of why things work as they do.

Section 2 deals with my work on Case. Competition between Cases can be resolved by faithfulness and markedness constraints, accounting for such things as the Case inventories of individual languages (e.g. whether and when lexical/inherent Cases are preserved in syntax), and for the effects attributed to Burzio’s Generalization (Burzio (1986)). Locality constraints account for why nominative objects occur with ergative and dative subjects in some languages but not in others. Section 3 deals with my work on agreement. Competition between cross-referencing devices, true agreement and pronominal clitics, can be resolved in several ways, producing the observed range of typological variants. These include a pseudo ergative agreement pattern that occurs in the absence of ergative Case. The OT prohibition against accidental lexical gaps leads directly to a simple explanation of the well-known generalization that no language has object agreement without subject agreement. In Section 4, we see a sample of the results of a large research project by Broekhuis on the typological patterns and constraints on object shift in Germanic languages. Constraints that determine the basic pattern of object shift in one language produce interesting blocking and push-up effects in double object constructions in a related language. In Section 5, we turn to the interesting work by Grimshaw on word order and competition between structures. We will see how her alignment principles that account for word order also account for economy of structure effects, without any need for economy constraints.

## **2. Case**

We begin with some necessary background information on how Case is licensed in syntax. Two points that will be important in the OT approach are (i) all Cases must be licensed by a head, so they cannot be freely inserted (and we will ignore potential candidates with unlicensed Cases), and (ii) faithfulness is relevant to Case because Cases are licensed at two different levels, an earlier level where Case is licensed in connection with thematic roles licensing (Argument Structure or vP structure), and a later syntactic level where Case is licensed on a purely structural basis, with no reference to thematic roles. Cases licensed by different heads may compete, as may Cases licensed at different levels.

## 2.1 Case Licensing

There are two kinds of Cases, known as structural and non-structural. These are licensed at two different levels, Syntax and an earlier Argument Structure (or vP structure) level.

(1) Structural Case: licensed by a head in a spec-head or c-command relation

nominative: licensed by Infl or Tense (AUX)

accusative: licensed by V, P

(2) Non-structural Case: licensed in connection with theta role licensing

Two kinds of non-structural Case (Woolford (2006a))

Inherent Case: (the more regular instances of non-structural Case)

ergative: licensed on agents (external arguments)

dative: licensed on goals/experiencers (when these are direct arguments)

Lexical Case: (the idiosyncratic instances of non-structural Case)

Individual verbs or prepositions may lexically select a Case,

e.g. lexical accusative, dative, genitive.

What determines the inventory of Cases used in a particular language? Without OT, the absence of a particular Case in the inventory of a language is usually assumed to be either just an accidental lexical gap without explanation (e.g. there just happen to be no dative forms in the lexicon of English) or due to a feature deficiency in the relevant licensing head (e.g. V cannot license accusative Case in certain ergative languages). In contrast, under OT, every language is assumed to have access to the full inventory of Cases available in UG, and each type of head is assumed to have the same Case licensing ability cross-linguistically. What determines the inventory of Cases used in each language is determined in OT by the relative ranking in that language of the markedness and faithfulness constraints relevant to Case.

## 2.2 Basic Markedness and Faithfulness Constraints Relevant to Case

The basic markedness and faithfulness constraints relevant to Case are based on the Case Markedness Hierarchy (Woolford (2001, in press)):

(3) Case Markedness Hierarchy: ergative > dative > accusative > nominative

The markedness constraints eliminate each Case in turn, beginning with the most marked, but these are opposed by the faithfulness constraints which preserve the non-structural Cases that were licensed at the earlier level.

(4) Markedness constraints: \*ERGATIVE >> \*DATIVE >> \*ACCUSATIVE

(5) Faithfulness constraints: MAX-ERGATIVE >> MAX-DATIVE >> MAX-ACCUSATIVE

Following de Lacy (2002), the faithfulness constraints target the marked end of the Case Markedness hierarchy. Following Gouskova (2003), no constraint refers to the lowest element of the hierarchy.

## 2.3 Competition Between Structural and Non-structural Case

There can be a choice of licensed Cases for an argument, such as a non-structural Case licensed in argument structure and a structural Case based on its syntactic position. These Case

possibilities compete. Faithfulness constraints preserve the Cases licensed at Argument Structure (e.g. ergative, dative, lexical accusative) in syntax. The input to syntax is the Argument Structure level. In the following tableau, an agent (external argument) has been marked with ergative Case at this earlier level, and this Case is preserved in syntax by MAX-ERGATIVE, before \*ERGATIVE has a chance to apply.

(6)

input: NP-ergative	MAX-ERGATIVE	*ERGATIVE
a. NP-ergative		*
b. NP-nominative	*!	

However, with the opposite ranking, \*ERGATIVE >> MAX-ERGATIVE, this ergative Case will be eliminated in favor of the less marked nominative Case on a subject. (Other Cases would not be licensed on an intransitive subject.)

## 2.4 Competition Between Structural Cases

There is competition between structural Cases whenever there is more than one head in the proper structural configuration to license structural Case on an argument. In this section, we will see several situations where there is competition between nominative and accusative Case.

One such situation occurs when the sole argument of the verb remains inside the VP where it is c-commanded by both Infl (which licenses nominative Case) and V (which licenses accusative Case).

(7) [ Infl [<sub>VP</sub> V NP-nom ]]

This construction occurs in Italian where the theme argument of an intransitive verb is allowed to remain inside the VP when it is non-specific.

(8) All'improvviso è entrato un uomo dalla finestra. [Italian]  
suddenly entered a man-NOM/\*ACC from the window  
'Suddenly a man entered from the window.' (Belletti (1988) (17))

One might naturally expect that simple proximity might regulate this competition, so that the closer head, V, would determine the Case of this argument, and in fact, this is what we expect under the standard theory of locality in Rizzi (1990); but this is actually the opposite of what happens. Instead, universally, Infl licenses nominative (and the construction is called 'unaccusative' because accusative is not assigned).

The same situation occurs in constructions with an experiencer subject marked with dative Case (with the licensed at Argument Structure and preserved in syntax). Since Infl has not discharged its nominative Case on the subject, nominative is available for the object. Here again, the argument inside the VP is c-commanded by two Case licensing heads in syntax, Infl and V, and their two Cases, nominative and accusative, compete. In many (but not all) languages, nominative wins this competition.

(9) [ NP-dative Infl [<sub>VP</sub> V NP-nom ]] (e.g. Icelandic, Japanese, Hindi)

- (10) Eirík-i líkar þetta hús. [Icelandic]  
 Eric-DAT likes this house-NOM  
 ‘Eric likes this house.’ (Jónsson (2003:141))

The standard non-OT way of dealing with this competition between heads is to eliminate it by claiming that the lower head, V, lacks the capacity to license accusative Case in just these situations. Burzio (1986) notes that in the constructions above with a nominative object, there is no agent subject; instead, the subject is either missing or it has a non-agent theta role such as experiencer. Burzio’s Generalization links the accusative Case licensing ability of V to the presence of an agent:

- (11) Burzio’s Generalization (Burzio (1986)) accusative  $\leftrightarrow$  agent

V licenses structural accusative Case if and only if V has an agent subject.

However subsequent work has shown that Burzio’s generalization has exceptions in both directions: verbs without an agent can license structural accusative Case, and verbs with an agent do not always do so (see a summary in Woolford (1997, 2003a)). This research has shown that the generalization has nothing to do with thematic roles such as agent, nor even a competition between the heads themselves, but instead concerns a competition between the Cases that these heads can license. That is, the generalization that holds of the above constructions is that when nominative and accusative compete, nominative wins. (See the papers in Reuland (2000) and a summary of other work leading to this conclusion in Woolford (2003a).) There have been many attempts to account for the ‘priority of nominative’ in the above constructions, most of which reduce to either a requirement that nominative always be assigned, or a requirement that nominative be assigned before accusative; however, these approaches lack the necessary flexibility to account for the fact that there are situations (which we will see below) in which the opposite result occurs, that accusative takes priority over nominative.

These exceptions are easy to deal with if we use Optimality Theory. Moreover, we can derive the effects of Burzio’s Generalization, when it does hold, from the independently motivated Case markedness constraints stated above. When nominative takes priority over accusative, it does so because these constraints favor the least marked Case that can be licensed in any situation. Since nominative is less marked than accusative, nominative is selected over accusative. The tableau below shows how, in unaccusative constructions, the competition between nominative and accusative to mark the argument inside the VP is determined by the constraint \*ACCUSATIVE:

- (12) Unaccusatives

input: NP-	*ACCUSATIVE
☞ a. Infl V NP-nominative	
b. Infl V NP-accusative	*!

For dative subject constructions in languages such as Icelandic, \*ACCUSATIVE is also responsible for the nominative object. In the tableau below, the input from Argument Structure

has non-structural dative Case on the experiencer subject, but no Case on the object. This dative is preserved by the high ranked Max-dative constraint (eliminating the candidate in (5c)). The \*DATIVE constraint has no effect here due to the fact that it is ranked below Max-dative. The next lower ranked Case markedness constraint, \*ACCUSATIVE, makes the decision among the object Cases, eliminating the (b) candidate which has an accusative object, in favor of the (a) candidate which does not.

(13) Icelandic dative subject constructions

input: NP-dative NP-	MAX-DATIVE	*DAT	*ACC
☞ a. [ NP-dative Infl [ V NP-nom ] ]		*	
b. [ NP-dative Infl [ V NP-acc ] ]		*	*!
c. [ NP-nom Infl [ V NP-acc ] ]	*!		*

In general, all of the effects attributed to Burzio’s Generalization follow from \*ACCUSATIVE. In the next section, we will see how a higher ranked locality constraint can reverse this result by blocking the licensing of the nominative. But first, to complete this section, we need to clarify a couple of questions that are frequently asked with regard to the treatment of the sort of nominative-accusative clause that we find in English under this OT approach.

First, what happens to experiencer subject constructions in a language that does not have datives, such as English? Here the ranking of MAX-DATIVE and \*DATIVE are reversed, resulting in the loss of any dative that might have been licensed in Argument Structure.

(14) English experiencer subject constructions

input: NP-dative NP-	*DATIVE	MAX-DAT	*ACC
a. [ NP-dative Infl [ V NP-nom ] ]	*!		
b. [ NP-dative Infl [ V NP-acc ] ]	*!		*
☞ c. [ NP-nom Infl [ V NP-acc ] ]		*	*

Another frequently asked question is why the resulting Case pattern in typical transitive clauses in English is not nominative-nominative. Such a (d) candidate would beat the winning (c) candidate in the above tableau. This same question arises in non-OT approaches as well, and the standard answer is that heads (or at least functional heads) are limited to licensing only one Case each. This is a substantive universal that limits the range of candidates that can be considered, since all Cases must be licensed.

## 2.5 Case Locality

It turns out that not all languages allow nominative objects in dative subject constructions. In Woolford (2003b, in press), I show that in Faroese (a language that is closely related to Icelandic), the candidate (b) in the above tableau with the dative-accusative pattern wins the competition.

- (15) Mær líkar hana væl. [Faroese]  
 me-DAT likes(3sg) her(ACC) well  
 ‘I like her a lot.’ (Thráinsson et al. (2004:255))

No ranking of just the constraints in the above tableau can produce this result; instead it is caused by a higher ranked locality constraint that blocks Infl from licensing nominative Case in this construction. An important clue as to the nature of this locality constraint comes from the fact that nominative licensing inside the VP is not blocked in unaccusative constructions in Faroese.

- (16) Tað eru komnir nakrir gestir í gjár. [Faroese]  
 there are-PL come-PL some guests-NOM.PL yesterday  
 ‘Some guests came yesterday.’ (Jonas (personal communication))

This tells us that it is the presence of the closer dative subject that blocks nominative licensing in (15), because when that dative subject is not present, nominative licensing is allowed into the VP. These two patterns are shown below:

- (17) Faroese patterns: [ NP-dative Infl [ V NP-acc ] ]  
 [ Infl [ V NP-nom ] ]

Faroese prohibits an additional NP inside the nominative Case-checking/licensing domain of Infl. (This domain consists of the entire clause in the two examples above.) The relevant locality constraint enforces a *pure domain*, one that contains no additional NP inside the Case licensing domain of a head:

- (18) PURE DOMAIN: The Case-checking/licensing domain of a head must contain no NP other than the one whose Case is checked by that head.

The presence of the dative subject in (15) makes the nominative Case licensing domain of Infl impure, as in candidate (a) below. The candidate in (b) has no nominative, and thus no nominative checking domain at all. (The checking domain for V is restricted to VP.)

- (19) Faroese (dative subject verbs)

input: NP-dative NP-	PURE DOMAIN	*ACC
a. [ NP-dative Infl/T [V NP-nom ] ]	*!	
☞ b. [NP-dative Infl/T [V NP-acc ] ]		*

In contrast, when there is no additional NP present inside the nominative checking domain, there is no PURE DOMAIN violation, and Case markedness makes the decision:

- (20) Faroese (unaccusative verbs)

input: NP-	PURE DOMAIN	*ACC
☞ a. [ Infl/T [V NP-nom ] ]		
b. [ Infl/T [V NP-acc ] ]		*!

- (21) Generalization: Languages differ as to whether the presence of an additional Case is tolerated inside the nominative checking domain.

In languages such as Icelandic, these two constraints are in the opposite ranking. As a result the

PURE DOMAIN violation is tolerated in order to use the less marked nominative Case.

(22) Icelandic

input: NP-dative NP-	*ACC	PURE DOMAIN
☞ a. [NP-dative Infl/T [V NP-nom]]		*
b. [NP-dative Infl/T [V NP-acc ]]	*!	

This approach predicts and accounts for the fact that ergative languages divide into the same two types. Ergative languages with the Icelandic ranking have ergative-nominative Case patterns, while ergative languages with the Faroese ranking have ergative-accusative patterns. Additional effects of this PURE DOMAIN constraint involving Case changes when the object moves out of the VP (Woolford (in press)).

So far, this section has focused only on abstract Case. Following syntax, other constraints determine whether and when each abstract Case is spelled out morphologically. It is common for marked abstract Case features not to be spelled out in the presence of marked person features such as first and second, which produces the well-known ergative split in languages such as Dyirbal where ergative Case is only morphologically visible on third person subjects (Woolford (to appear)).

### 3. Agreement

Just as different Cases compete with each other, so do different forms of agreement. Optimality Theory helps to regulate this competition. Moreover, with Optimality Theory, we can use a simpler, more restrictive version of Agreement Theory that covers a broader range of empirical patterns.

Under this version of Agreement Theory, verbal agreement is largely parasitic on abstract Case. True agreement is normally limited to cross-referencing nominative arguments, regardless of whether these are subjects or objects.<sup>1</sup> (Doubling) pronominal clitics can cross-reference any argument, but must match that argument in Case (Woolford (2006b)). This inventory of cross-referencing devices is potentially available in every language (Richness of the Base), but if and when each form is used in a particular language is determined by constraint ranking (Woolford (2003c)). There is a basic pressure to cross-reference arguments, expressed by the XREF constraint below, and this pressure is opposed by the markedness of the agreement and pronominal clitic forms used to do so.

(23) XREF            Cross-reference every argument.

(24) \*AGR            no true agreement

(25) \*CLITIC        no pronominal clitics

The relative ranking of these three basic constraints determine which of these cross-referencing devices a language uses, if any. If either markedness constraint is ranked above XREF, the language will not use that cross-referencing device:

- (26) a. \*CLITIC >> XREF >> \*AGR      The language uses only agreement.  
 b. \*AGR >> XREF >> \*CLITIC      The language uses only pronominal clitics.  
 c. \*AGR, \*CLITIC >> XREF      The language uses neither.

### 3.1 Competition Between Cross-Referencing Forms

A common pattern in languages (e.g. Spanish) is to have true agreement with nominatives, and to double accusative and dative arguments with pronominal clitics (subject to restrictions on clitic doubling in the language). In such languages, one does not see a nominative pronominal clitics. Prior to OT, the usual assumption was that such languages simply lack nominative clitics (an accidental lexical gap). With OT, we can capture the intuition that there is no need for nominative clitics when true agreement does the job of cross-referencing nominatives. Under the ranking \*CLITIC >> \*AGR, the language will reject pronominal clitics in favor of true agreement whenever possible. Since true agreement is associated with Infl, and thus with nominatives, this is possible only for nominatives, producing the common pattern of true agreement with nominatives but pronominal clitics cross-referencing arguments with other Cases. But this result has more important ramifications than merely accounting for a gap in the lexicon, as we see in the next section.

### 3.2 No Object Agreement Without Subject Agreement

The theory sketched above now predicts a well-known typological generalization, that no language allows object agreement without subject agreement. The more theoretically accurate way to state this generalization is that if a language cross-references any argument(s), it will cross-reference nominatives. Since at least some subjects are nominative in any language, this means that if any arguments are cross-referenced, at least some subjects will be among the arguments cross-referenced. It is not possible for a language to cross-reference only non-nominatives. How does this generalization follow from the theory?

To understand this, let us take two situations in turn. First, if the language uses true agreement, it necessarily cross-references nominatives, since true agreement is normally limited to nominatives. So the only chance for a language not to cross-reference nominatives would be if it used only pronominal clitics, but not true agreement. However, under OT, there are no accidental gaps in the lexicon and pronominal clitics potentially come in all Cases, including nominative. There is no way for a languages that makes use of pronominal clitics *not* to have access to nominative clitics. These cannot simply be ‘missing’ from the lexicon.

### 3.3 Pseudo-ergative Agreement Patterns

It is possible for a language to limit its pronominal clitics to one per clause. This is a possible result of a highly ranked alignment constraint requiring all clitics to be aligned to a particular edge, such as the left edge of VP:

- (27) Clitic alignment constraint: CLITIC<sub>[VP]</sub>      ALIGN (clitic, Rt, VP, Lft)

Only one clitic can be perfectly aligned to a particular edge. Trying to align an additional clitic

to that edge necessarily creates an alignment violation, because one of the two clitics necessarily intervenes between the other and the edge in question.

(28) Clitic alignment violation:            clitic clitic [VP            (\*CLITIC[VP )

This violation is not tolerated if the clitic alignment constraint is ranked high enough.<sup>2</sup> A particular interesting pattern results from the following ranking:

(29) CLITIC<sub>[X</sub> >> XREF >> \*AGR >> \*CLITIC (>> other clitic alignment constraints)

The effect of this ranking is that the preferred cross-referencing device in the language is a pronominal clitic, but these are limited to one per clause. Agreement is possible as a less preferred device (but limited to nominatives as usual). The resulting agreement pattern can look ergative, even though it consists of only nominative and accusative elements. How is this possible?

This pseudo-ergative pattern results from this ranking for the following reasons. In intransitives, the sole argument will be cross-referenced with the preferred device, a pronominal clitic. In transitives, only one argument can be cross-referenced with a clitic, so the other must use agreement. But since agreement is limited to nominatives, the clitic will have to be used to cross-reference the accusative object.

(30) The Pseudo-Ergative Cross-Referencing Pattern

Clause type:	Case	Cross-Referencing Device
intransitive	nominative	nominative clitic
transitives	nominative	true agreement
	accusative	accusative clitic

Since the nominative and accusative clitics never co-occur in the same clause, there is no need for them to be morphologically distinguished for Case. If the nominative and accusative clitics look alike, the resulting pattern looks ergative: intransitive subjects and transitive objects are cross-referenced with (what looks like) the same form, while transitive subjects are cross-referenced with a different form. This pseudo-ergative pattern occurs in languages such as Selayarese (South Sulawesi), where we see in the examples below that transitive second person subjects are cross-referenced with a prefix *mu-*, in contrast to intransitive subjects, which take a suffix, *-ko*. The suffix form is a classic second position clitic, as we can see from the examples in (31) where the third person clitic *-i* attaches to whatever comes first in the clause.

(31) a. **mu**-pallu=**i**    juku?-iñjo    ri koronj.            [Selayarese]  
           2<sup>nd</sup>-cook=3<sup>rd</sup>    fish-DEF    in pan  
           ‘You cooked the fish in the pan.’

b. ri koronj=**i**    **mu**-pallu    juku?-iñjo  
           in pan=3<sup>rd</sup>    2<sup>nd</sup>-cook    fish-DEF  
           ‘In the pan you cooked the fish.’            (Finer (1999) (11))

(32) ak-kelong=**ko**  
           int-sing=2<sup>nd</sup>  
           ‘You sang.’            (Finer (1999) (2a))

With OT, this kind of pattern is predicted from the basic independently motivated constraints

stated above. Without OT, it looks as if there must be a covert ergative Case system, but under that view, things are backwards in that the second position clitics would have to be analyzed as true agreement (with nominative intransitive subjects and nominative objects), while the agreement form which occurs in the fixed position prefixed to the verb would have to be analyzed as an ergative clitic. Moreover, closely related languages look much less ergative due to other constraints that are involved in the decision as to whether true agreement or a nominative clitic is used to cross reference subjects in particular situations (Woolford (2006c)).

#### **4. Object Shift in Scandinavian Languages**

Syntax has a phenomenon that I have suggested is something like coda conditions on syllables in phonology (Woolford (1999)). Clauses in syntax have a VP external region, paralleling the onset position in the syllable and a VP internal region paralleling the coda. Just as many languages prohibit consonants with certain features in the coda, many languages prohibit objects with certain features inside the VP: the repair of moving object out of the VP is known as object shift. There is much typological variation in the patterns of object shift. It is well known that the Scandinavian languages divide into three types: one with no object shift, one with object shift limited to pronouns, and one where even non-pronoun objects shift out of the VP. Parameters turning these types of object shift off/on in different languages would not predict the additional complexities that occur in double object constructions. Broekhuis (2006b) shows that interesting blocking and push-up effects emerge in double object constructions when the second object has features that should make it shift, but the first object does not. In the push-up effect, the second object forces the first to move along with it; in the blocking effect, the presence of the first object blocks the movement of the second. The complex generalizations for Danish and for Icelandic can be expressed in (my) prose as follows:

(33) Danish Generalizations:

- For single objects: Pronoun objects always shift; non-pronoun objects never do.
- For double objects: Pronoun objects always shift except when preceded by a non-pronoun object that represents new information. (blocking)  
Non-pronoun objects representing old information never shift except when followed by a pronoun object. (push-up)  
Non-pronoun objects representing new information never shift.

(34) Icelandic Generalizations:

- For single objects: All objects representing old information always shift.
- For double objects: Pronoun objects always shift.  
Non-pronoun objects representing old information always shift unless preceded by an object representing new information. (blocking)  
Non-pronoun objects representing new information never shift except when followed by a pronoun object. (push up)

Broekhuis (2006b) shows that these push-up and blocking effects follow automatically from the same few constraints whose ranking produces the three basic types of object shift languages. Here I will give only a sample of this interesting work, focusing on Icelandic and Danish.

Broekhuis uses two constraints that drive object shift, and two constraints that block it. I simplify these constraints here; see Broekhuis (2006a, 2006b) for the exact formulations:

- (35) D-PRONOUN Definite pronouns must move outside of the VP.
- (36) EPP(CASE) Objects with Case (i.e. not PPs) must move out of VP.
- (37) \*MOVE Do not move.
- (38) ALIGN FOCUS Align objects representing new information (in focus) (AF) to the right edge of the clause.

For single objects, the relative ranking of \*MOVE with respect to D-PRONOUN and EPP(CASE) turns pronoun object shift and general object shift on/off in a language. The AF constraint captures the fact that objects representing new information do not shift (in single object constructions). In double object constructions, an additional, independently motivated constraint preserves the linear order of objects, preventing the second object from jumping over the first:

- (39) RELMIN Preserve the relative order of objects.

For reasons of space, I refer the reader to Broekhuis (2006b) for the data, focusing here on how these constraints produce some of the complex generalizations stated above. In the tableau below, we see why a non-pronoun object can be pushed up by a following pronoun in Danish, even though normally non-pronoun objects never shift in Danish. The pronoun has to shift out of the VP (due to D-PRONOUN), but if it shifts alone, jumping over the NP, it violates RELMIN (as in (d)). So the pronoun forces the preceding NP to shift along with it, as in (c). (Due to a higher constraint not discussed here, V always raises.)

- (40) Danish object shift: a push-up effect

input: Adv V NP(old) pronoun(old)	REL-MIN	AF	D-PRO	*MOVE	EPP(CASE)
a. [ V Adv [ <sub>VP</sub> NP pronoun ]]			*!		**
b. [ V NP Adv [ <sub>VP</sub> pronoun]]			*!	*	*
c. [ V NP pronoun Adv [ <sub>VP</sub> ]]				**	
d. [ V pronoun Adv [ <sub>VP</sub> NP ]]	*!			*	*

If the NP in the above tableau represented new information, AF (which is ranked above D-PRONOUN) would block it from leaving the VP, and candidate (a) would win (blocking). We see this in the tableau below.

(41) Danish object shift: a blocking effect

input: Adv V NP(old) pronoun(old)	REL-MIN	AF	D-PRO	* MOVE	EPP (CASE)
a. [ V Adv [ <sub>VP</sub> NP pronoun ]]		*	*		**
b. [ V NP Adv [ <sub>VP</sub> pronoun ]]		**!	*	*	*
c. [ V NP pronoun Adv [ <sub>VP</sub> ]]		**!		**	
d. [ V pronoun Adv [ <sub>VP</sub> NP ]]	*!			*	*

In contrast, this blocking does not occur with pronouns in Icelandic, due to the higher rank of D-PRONOUN >> AF in that language, as we see in the following tableau:

(42) Icelandic object shift: a stronger push-up effect by pronouns

input: Adv V NP(new) pronoun(old)	D-PRO	RE L-MIN	AF	* MOVE	EPP (CASE)
a. [ V Adv [ <sub>VP</sub> NP pronoun ]]	*!		*		**
b. [ V NP Adv [ <sub>VP</sub> pronoun ]]	*!		**	*	*
c. [ V NP pronoun Adv [ <sub>VP</sub> ]]			**	**	
d. [ V pronoun Adv [ <sub>VP</sub> NP ]]		*!		*	*

An interesting generalization about these languages is that only the types of objects that shift as single objects in Icelandic can be pushed up in Danish double object constructions. This system shows that the AF constraint on (non-pronoun) NP shift that is obviously active in Icelandic single object constructions is present and active in Danish as well, although it has an effect only in double object constructions.

## 5. Word Order and Economy of Structure

The standard parameters that determine head position in syntax, head left or head right, are very close to alignment constraints which require a head such as V to be on the left or right edge of its projection V' or VP. Thus translation of these head position parameters into an OT analysis is an obvious idea and there are many versions of such an analysis in the OT literature. In this section, we will focus on some very interesting work by Grimshaw (2001) which uses alignment to create competition among elements for particular edges. This approach is exciting because it derives economy of structure and economy of movement effects without any need for actual economy principles or constraints.

- (43) HEADLFT Every X-zero is at the left edge of an X-max.  
ALIGN (X-zero, Lft, XP, Lft)

- (44) SPECLEFT      Every specifier is at the left edge of an X-max.  
ALIGN (Spec, Lft, XP, Lft)
- (45) COMPLFT      Every complement is at the left edge of an X-max.  
ALIGN (Comp, Lft, XP, Lft)
- (46) OBLIGATORY HEAD (OB-HD)      A projection has a head.
- (47) OBLIGATORY SPECIFIER (OB-SPEC)      A projection has a specifier.

The ranking of these constraints produces the basic word order of each language, because it regulates the competition between the specifier, head, and complement to align to the left edge of the XP that contains these elements.

- (48) Ranking for English:                      SPECLEFT >> HDLFT >> COMPLFT  
[<sub>XP</sub> spec [<sub>X</sub> head complement ]]                      \*                      \*\*
- (49) Ranking for Japanese:                      SPECLEFT >> COMPLFT >> HDLFT  
[<sub>XP</sub> spec [<sub>X</sub> complement head ]]                      \*                      \*\*

### 5.1 Economy of Structure Effects

These same constraints eliminate the need for economy constraints or an economy principle requiring structures with as few elements and projections as possible. The reason is that the more elements and/or projections there are in a tree, the more violations of the above alignment constraints. Every structure with a Spec, head, and a complement violates two of the above alignment constraints, regardless of their order. Every structure with two of these elements violates one of these alignment constraints. So the more elements in the structure, the more violations of alignment. Similarly, adding a projection always results in some additional violation of the above constraints. Thus adding a projection must always be motivated by the need to satisfy a higher ranking constraint.

### 5.2 Economy of Movement

Under the Copy theory of Movement, any movement creates an additional element in the tree. If an extra projection is required to provide a landing site for the movement, then this extra structure produces additional violations of the above constraints, and is thus dispreferred (unless required by a higher ranking constraint). Grimshaw's result would follow even if the constraints were formulated slightly differently, as long as the basic insight is maintained: if the independently motivated constraints that produce word order and regulate projections inherently conflict, the result is economy effects, without the need for a specific economy principle.

## 6. Conclusion

Adding OT to a standard approach such as that of Chomsky (2000) allows us to simplify and improve the standard this approach in several ways. Using simple markedness, faithfulness, and alignment constraints, we can derive (and thus eliminate) some principles such as Burzio's generalization and the economy principles. We can simplify the formulation of other principles by removing language that refers to violability and comparison. We can make the theory more

restrictive by eliminating all other sources of cross-linguistic differences besides constraint ranking: no accidental lexical gaps, no feature differences for the same head, no differences in the licensing ability of heads, no differences in what Cases can be licensed. Moreover, we can account for certain well-known typological generalizations such as why languages never have object agreement without subject agreement.

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## Notes

<sup>1</sup>The limited possibilities for mismatch between agreement and Case are discussed in Woolford (2006b).

<sup>2</sup>Grimshaw (2001) shows that gradient alignment determines the linear order of multiple pronominal clitics in Romance.

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