Chapter 14

V^o-to-I^o Movement and *do*-Insertion in Optimality Theory

Sten Vikner

Vikner, Sten: 2001: V°-to-I° movement and *do*-insertion in optimality theory. Géraldine Legendre, Jane Grimshaw, & Sten Vikner (eds.): *Optimality-Theoretic Syntax*, 427-464. Cambridge MA: MIT Press.

The empirical phenomena to be discussed in this chapter are the position of the finite verb in embedded clauses (preceding or following a sentential adverbial, i.e., in I^o or in V^o) and the possibility or impossibility of *do*-insertion. For reasons of space, ways that the analysis may be extended to cover cases (mostly main clauses) where the verb may or may not move to a position to the left of the subject (i.e., to C^o) will only be briefly sketched at the end of the chapter.

To a large extent, I will base my analysis on Grimshaw's (1997) analysis of English, and attempt to modify and extend it to also cover the variation found between English, Danish, French, and Icelandic. One of my goals is to illustrate how Optimality Theory (OT) can account for language variation in terms of differences in constraint rankings between languages.

A central feature of OT (see the introductory chapter of the present volume and references there) is that constraints are taken to be relative ("soft") rather than absolute ("hard"); (1) makes the distinctions clear.

(1) a. Absolute: "If a sentence violates constraint C, it is ungrammatical."
    b. Relative: "That a sentence violates constraint C may have a certain cost, but this cost is smaller than the cost of violating constraint B, which again is less costly than a violation of constraint A."

In other words, although there is a price to be paid every time a constraint is violated, the price is not always the grammaticality of the sentence in question.

As will become clear, my particular version of OT owes a heavy debt to the principles-and-parameters framework (see Chomsky 1986; Rizzi 1990; and, e.g., Vikner 1995:3–35), although violability of constraints was not possible within this framework. Furthermore, although violability is a feature of the Minimalist framework (Chomsky 1995), this is only the case to a certain extent (see, e.g., the discussion in Vikner 1997a:12–13), although certain implementations of minimalism differ from Chomsky 1995 precisely in assigning a more central role to violability (see, e.g., Bobaljik 1995:351 and Holmberg 1997:214).

However, violability is not the only central feature of OT. Following Prince and Smolensky (1993) and Grimshaw (1997:373), I take the four ideas presented in (2) to sum up the essence of OT.

(2) a. Constraints may be violated.
b. Constraints are ranked in a hierarchy (a grammar is a particular ranking of constraints).
c. Constraints are universal, i.e., in all languages, the same constraints apply, except that they are ranked differently from language to language (language variation is variation in the constraint hierarchy).
d. Only the optimal version of a sentence is grammatical; all nonoptimal versions are ungrammatical (the optimal candidate of two is the one with the fewest violations of the highest constraint on which the two candidates differ).

By way of illustration of (2), consider the variation in position of the finite verb in English and French, as in (3) and (4), as originally discussed in Emonds 1978 and Pollock 1989. This particular difference is one of the central differences to be discussed in this chapter. The same difference, although restricted to embedded clauses, is found between Danish and Icelandic, as will be shown in more detail later.

(3) *English*
a. The actor really saw the film.
b. *The actor saw really the film.

(4) *French*
a. *L'acteur vraiment voit le film.
b. L'acteur voit vraiment le film.
The actor (sees) really (sees) the film

I am assuming (at least) two kinds of movement to take place here: the finite inflectional affix of the verb moves from I^o to V^o in (3a)/(4a), whereas the finite verb moves from V^o to I^o in (3b)/(4b).

This variation can be seen as resulting from the interaction between two constraints, which will be discussed in more detail in connection with (13) in section 14.2: *LxMv* (No Movement of a Lexical Head: violated when a verb leaves V^o) and *PrBd* (Proper Binding: violated when a trace—here in I^o—c-commands its antecedent, here in V^o). In English, the price to be paid when a trace c-commands its antecedent —that is, when something is moved downward in the tree—is smaller than the price to be paid when a lexical category (here the main verb) is moved, because the ranking is LxMv ≫ PrBd. In French, on the other hand, the ranking is PrBd ≫ LxMv, and so the cost of moving the verb out of VP is smaller than the cost of moving an element downward in the tree. (See (5) and (6).)

(5) English (and embedded clauses in Danish) LxMv ≫ PrBd
a. The actor v_j really saw_j the film. *violates PrBd* = (10d)
b. *The actor saw_j really v_j the film. *violates LxMv* = (10e)

(6) French (and embedded clauses in Icelandic) PrBd ≫ LxMv
a. *L'acteur v_j vraiment $voit_j$ le film. *violates PrBd* = (18a)
b. L'acteur $voit_j$ vraiment v_j le film. *violates LxMv* = (18b)

As we see, constraints are violable, (2a); note that both (5a) and (6b) violate a constraint and yet they are grammatical. Constraints are ranked in a hierarchy, (2b), and they are universal, (2c); note that the same constraints are found in English and French, though in a different ranking. Finally, only the optimal version of a sentence is grammatical, (2d). Both (5b) and (6a) are ungrammatical, because they are less optimal than their competitors (5a) and (6b). On the highest-ranked constraint on which there is a difference, (5a) has fewer violations than its competitor (5b), and (6b) has fewer violations than its competitor (6a).

14.1 Preliminary Assumptions

Before I begin the discussion of the analysis itself, I want to set out a few preliminary assumptions.

The competing versions of a sentence (the "candidates") are different realizations of the same input. I will follow Grimshaw (1997:375–376) and assume that "the *input* for a verbal extended projection is a lexical head plus its argument structure and an assignment of lexical heads to its arguments, plus a specification of the associated tense and aspect."

A typical set of competing candidates, in this case for an embedded negated clause, contains at least the examples in (7).

(7) *English*
a. *Although Peter saw not the film ...
b. *Although Peter not saw the film ...
c. Although Peter did not see the film ...
d. *Although Peter not did see the film ...

Now it is up to the OT linguist to figure out which constraints are relevant here and how they are ranked, so that only (7c) is optimal in English (and only (7b) in Danish, and only (7a) in French and Icelandic). When *do* is used as a so-called dummy or light verb, as in (7c), it is not part of the input. This contrasts with the use of *do* as a normal verb (e.g., in *Peter did his homework*) and also with auxiliaries like *have*, *be*, *will*, *can*, ..., all of which I take to be part of the input.

I assume that only lexical X^os/XPs are selected, and that functional X^os/XPs are projected, in the sense of Grimshaw 1991. I furthermore assume that I^o is projected (in the above-mentioned sense) by V^o and separately from V^o, and I take the subject to be base generated in SpecVP (see, e.g., Koopman and Sportiche 1991:212).

Sentential adverbials are taken to left-adjoin to VP, as in (8c). In Grimshaw 1997:383, where I^o is not always projected, the typical English declarative clause may consist only of a VP, (8a). If this were also the case in clauses containing a sentential adverbial (Grimshaw 1997:382, note 6), then the sentential adverbial (which I take to be an XP) would have to be adjoined to a V-bar (a nonmaximal category), (8b), which would clash with standard assumptions concerning X-bar theory (also incompatible with, e.g., Alexiadou 1997 and Cinque 1999, where the fixed order of adverbials is due to their being in the specifier position of different XPs between IP and VP). (See (8).)

(8) *English*
   a. I think that [$_{VP}$ the actor saw the film].
   b. I think that [$_{VP}$ the actor [$_{V'}$ actually [$_{V'}$ saw the film]]].
   c. I think that [$_{IP}$ the actor [$_{VP}$ actually [$_{VP}$ t saw the film]]].

In the analysis suggested below, adverbials are not taken to adjoin to V-bar; the word order is analyzed with the sentential adverbial being (left-)adjoined to VP and the subject in SpecIP—that is, as (8c). The constraint responsible for forcing the subject out of SpecVP is Case, since the subject needs to move to SpecIP to be assigned nominative (see Grimshaw 1997:390).

Finally, I will be using the notational conventions; see (9).

(9) a. ☞ marks the optimal candidate(s), i.e., the grammatical version(s).
   b. ! marks the fatal violation in all nonoptimal candidates.
   c. t is a trace of a maximal projection.
   d. v is a trace in the verb chain (a trace of the verb or of the inflection).
   e. — is an empty maximal projection.
   f. e is an empty X^o (either only abstract features or radically empty).
   g. Su means "subject."
   h. Ob means "object."
   i. A means "adverbial."

Note that regardless of whether the example in question is English or not, the lexical items in the corresponding tableau are always English.

14.2 The Six Basic Constraints

The basic phenomena to be considered are the various possible positions of the finite verb in Danish, English, French, and Icelandic, as frequently discussed in the

literature—for example, Emonds 1978; Pollock 1989; Holmberg and Platzack 1995; Vikner 1995, 1997b.

I will begin the analysis with the six constraints that I take to be involved in the derivation of embedded declaratives (see (10) and tableau T14.1).

(10) *Danish*
Jeg tror (at) skuespilleren virkelig så filmen.
English
I think (that) the actor actually saw the film.

Tableau T14.1 shows an analysis valid for both Danish and English. In both languages the optimal candidate is (d). Candidates (a) to (u) make up a rather extensive set of candidates, which vary with respect to three different properties: presence or absence of *do*, the position of the subject (SpecVP, SpecIP, or SpecCP), and the position of the finite verb (V°, I°, or C°).

Tableau T14.1

	CASE	OBHD	LXMV	PRBD	STAY
a. *C [IP — v A [VP Su saw Ob	*!			*	*
b. *C [IP — saw A [VP Su v Ob	*!		*		*
c. *C [CP — saw [IP — v A [VP Su v Ob	*!		*		**
☞ d. C [IP Su v A [VP t saw Ob				*	**
e. *C [IP Su saw A [VP t v Ob			*!		**
f. *C [CP — saw [IP Su v A [VP t v Ob			*!		***
g. *C [CP Su e [IP t v A [VP t saw Ob		*!		*	***
h. *C [CP Su e [IP t saw A [VP t v Ob		*!	*		***
i. *C [CP Su saw [IP t v A [VP t v Ob			*!		****
j. *C [IP — v A [VP — did [VP Su see Ob	*!			*	*
k. *C [IP — did A [VP — v [VP Su see Ob	*!		*		*
l. *C [CP — did [IP — v A [VP — v [VP Su see Ob	*!		*		**
m. *C [IP — v A [VP Su did [VP t see Ob	*!			*	**
n. *C [IP — did A [VP Su v [VP t see Ob	*!		*		**
o. *C [CP — did [IP — v A [VP Su v [VP t see Ob	*!		*		***
p. *C [IP Su v A [VP t did [VP t see Ob				*	***!
q. *C [IP Su did A [VP t v [VP t see Ob			*!		***
r. *C [CP — did [IP Su v A [VP t v [VP t see Ob			*!		****
s. *C [CP Su e [IP t v A. [VP t did [VP t see Ob		*!		*	****
t. *C [CP Su e [IP t did A. [VP t v [VP t see Ob		*!	*		****
u. *C [CP Su did [IP t v A [VP t v [VP t see Ob			*!		*****

Tableau T14.2
(Repeated from tableau T14.1(a) and (d))

	CASE	OB-HD	LX-MV	PR-BD	STAY
a. *C [$_{IP}$ — v A [$_{VP}$ Su saw Ob	*!			*	*
☞ d. C [$_{IP}$ Su v A [$_{VP}$ t saw Ob				*	**

Tableau T14.3
(Repeated from tableau T14.1(d) and (g))

	CASE	OB-HD	LX-MV	PR-BD	STAY
☞ d. C [$_{IP}$ Su v A [$_{VP}$ t saw Ob				*	**
g. *C [$_{CP}$ Su e [$_{IP}$ t v A [$_{VP}$ t saw Ob		*!		*	***

The first of the five constraints in tableau T14.1 is *CASE*. (Every DP or DP-chain must have case. See Grimshaw 1997:390 and the case filter in Chomsky 1981:49; see also Costa, chap. 7, this volume, Samek-Lodovici 1996:169, and Woolford, chap. 16, this volume, for more elaborate OT implementations of the case filter.) CASE makes the subject leave SpecVP and move to SpecIP, on the assumption that nominative is assigned to SpecIP. Compare (a) to (d); see tableau T14.2.

OBHD (Obligatory Heads; an X^o may not be empty—see Grimshaw 1997:377 and Haider 1988:101) ensures that there are no radically empty heads. A head containing a trace is not taken to be empty. Compare (g) to (d); see tableau T14.3. I am assuming that X-bar theory forces the existence of a head (C^o in (g)) whenever the relevant specifier position is filled (SpecCP in (g), filled by the subject).

LXMV (No Movement of a Lexical Head; see Grimshaw 1997:385) punishes *så*/*saw* for leaving V^o. Compare (e) to (d); see tableau T14.4.

PRBD (Proper Binding; traces must not c-command their antecedent, an updated version of Fiengo 1977:45,53) is the (low) cost of having an 'upside-down" chain, where the trace in I^o c-commands the antecedent in V^o. This constraint is not actually necessary for verb movement in Danish and English, since no candidates are ruled out by it, but it will be necessary for verb movement in French and Icelandic; see (11) and tableau T14.9 (p. 436). PRBD is probably also relevant for other kinds of movement in Danish and English, which like verb movement in French and Icelandic go upward, not downward.

Tableau T14.4
(Repeated from tableau T14.1(d) and (e))

	CASE	OB-HD	LX-MV	PR-BD	STAY
☞ d. C [$_{IP}$ Su v A [$_{VP}$ t saw Ob				*	**
e. *C [$_{IP}$ Su saw A [$_{VP}$ t v Ob			*!		**

Tableau T14.5
(Repeated from tableau T14.1(d) and (p))

	CASE	OB-HD	LX-MV	PR-BD	STAY
☞ d. C [$_{IP}$ Su v A [$_{VP}$ t saw Ob				*	**
p. *C [$_{IP}$ Su v A [$_{VP}$ t did [$_{VP}$ t see Ob				*	***!

STAY (traces should be avoided; see Grimshaw 1997:375, and also "*trace" in Legendre et al. 1995:611 and economy of derivation in Chomsky 1991:432, 1995:145) punishes every step of every movement ("movement as last resort"). Compare (p) to (d); see tableau T14.5. Here *do* is inserted under V° (for an alternative possibility, direct insertion of *do* under I°, see section 14.4).

The ranking of the five constraints in tableau T14.1 thus causes (d) to be optimal—that is, better than its competitors (a) to (c) and (e) to (u). This is why (d) gives rise to a grammatical sentence, whereas the competitors either result in ungrammatical sentences or in a sentence that might also be analyzed as (d) (i.e., (g)).

However, (d) is not the only possible grammatical version of the sentence in question: it is also possible to leave out the complementizer *that*. The candidates in tableau T14.6 are all further candidates competing with (and parallel to) the ones already encountered above, in tableau T14.1, except that they do not contain the complementizer *that*. This illustrates one way of allowing for optionality in OT: the two winning candidates, (d) in tableau T14.1 and (d) in tableau T14.6, have the same constraint profile (as suggested by Grimshaw 1997:410; see Baković and Keer, chap. 4, this volume, and Müller 1999 for further discussion of various ways of deriving optionality). The only difference between the two tableaux containing candidates from the same competition, tableaux T14.1 and T14.6, is the absence versus presence of *that*. This is relevant for *PRPR* (Projection Principle), which is violated when there is movement into the highest X° of an embedded clause (following Grimshaw's

Tableau T14.6
(Continues and completes tableau T14.1)

		CASE	PRPR	OBHD	LXMV	PRBD	STAY
a.	* [IP — v A [VP Su saw Ob	*!				*	*
b.	* [IP — saw A [VP Su v Ob	*!	*		*		*
c.	*[CP — saw [IP — v A [VP Su v Ob	*!	*		*		**
☞ d.	[IP Su v A [VP t saw Ob					*	**
e.	* [IP Su saw A [VP t v Ob		*!		*		**
f.	*[CP — saw [IP Su v A [VP t v Ob		*!		*		***
g.	*[CP Su e [IP t v A [VP t saw Ob			*!		*	***
h.	*[CP Su e [IP t saw A [VP t v Ob			*!	*		***
i.	*[CP Su saw [IP t v A [VP t v Ob		*!		*		****
j.	* [IP — v A [VP — did [VP Su see Ob	*!				*	*
k.	* [IP — did A [VP — v [VP Su see Ob	*!	*		*		*
l.	*[CP — did [IP — v A [VP — v [VP Su see Ob	*!	*		*		**
m.	* [IP — v A [VP Su did [VP t see Ob	*!				*	**
n.	* [IP — did A [VP Su v [VP t see Ob	*!	*		*		**
o.	*[CP — did [IP — v A [VP Su v [VP t see Ob	*!	*		*		***
p.	* [IP Su v A [VP t did [VP t see Ob					*	***!
q.	* [IP Su did A [VP t v [VP t see Ob		*!		*		***
r.	*[CP — did [IP Su v A [VP t v [VP t see Ob		*!		*		****
s.	*[CP Su e [IP t v A. [VP t did [VP t see Ob			*!		*	****
t.	*[CP Su e [IP t did A. [VP t v [VP t see Ob			*!	*		****
u.	*[CP Su did [IP t v A [VP t v [VP t see Ob		*!		*		*****

1997:393 suggestion, based on Rizzi and Roberts 1996:106; see also McCloskey 1992 and Müller 1997:262, and notice that in Grimshaw 1997:393 and Baković 1998:40, PRPR is called "Pure-EP"). PRPR was not shown in tableau T14.1, because it was not violated by any of the candidates there. For PRPR to be violated, there has to be movement from V° to I°; compare (b) and (c) in tableau T14.7. I° has to be the highest X° of the embedded clause—that is, C° has to be absent; compare (a) and (c) in the same tableau. The introduction of PRPR has no consequences in this Danish/English example because the optimal candidate does not involve V°-to-I° movement. In tableau T14.8, it does not affect (b), the version of (a) without the complementizer *at*/*that*, which thus has exactly the same constraint profile as (a). Given that this constraint profile is the optimal one, both candidates are optimal and thus grammatical.

Tableau T14.7
(Repeated from tableaux T14.1(e) and T14.6(d) and (e))

	CASE	PRPR	OBHD	LXMV	PRBD	STAY	
a. *C [$_{IP}$ Su saw A [$_{VP}$ t v Ob				*!		**	= (10e)
☞ b. [$_{IP}$ Su v A [$_{VP}$ t saw Ob					*	**	= (15d)
c. * [$_{IP}$ Su saw A [$_{VP}$ t v Ob		*!		*		**	= (15e)

Tableau T14.8
(Repeated from tableaux T14.1(d) and T14.6(d))

	CASE	PRPR	OBHD	LXMV	PRBD	STAY	
☞ a. C [$_{IP}$ Su v A [$_{VP}$ t saw Ob					*	**	= (10d)
☞ b. [$_{IP}$ Su v A [$_{VP}$ t saw Ob					*	**	= (15d)

In fact, none of the candidates in tableau T14.1, violate PrPr, irrespective of whether they have movement of the finite verb, due to the presence of the complementizer *at*/*that*, which will always count as the highest head of the embedded clause.

This whole line of argument presupposes that embedded clauses with and without *that* may both be winning candidates in the same competition (''candidates realizing the same input''), although they do not contain exactly the same lexical elements (in minimalist terms, they do not have the same ''numeration''; see Chomsky 1995:225). For an alternative OT analysis that takes clauses with and without *that* to be winners of different competitions, see Legendre et al. 1995; Legendre, Smolensky, and Wilson 1998 and Baković & Keer (chap. 4, this volume).

14.3 Optional vs. Obligatory Complementizers

Consider now embedded declaratives in French and Icelandic, which are derived by means of the same six constraints. In these two languages, the finite verb precedes the adverbial instead of following it, and there is also no complementizer optionality such as the one found in Danish and English: *que*/*að* 'that' is obligatory (see (11) and tableau T14.9).

(11) *French*
Je crois *(que) l'acteur voit vraiment le film.
Icelandic
Ég tel *(að) leikarinn sjái áreiðanlega myndina.
I think (that) the actor sees really the film

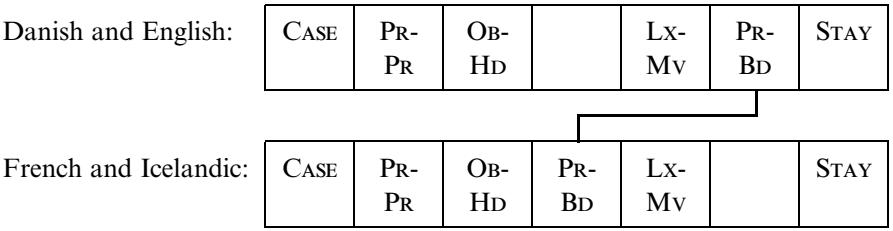
As briefly discussed at the beginning of the chapter, I propose a difference in constraint ranking between Danish/English and French/Icelandic: Danish and English have LxMv ≫ PrBd; French and Icelandic have PrBd ≫ LxMv (see tableau T14.10).

In French/Icelandic, violating LxMv (moving the verb out of VP) is thus less costly than violating PrBd (leaving the verb in V° where it is c-commanded by a

Tableau T14.9

	Case	Pr-Pr	Ob-Hd	Pr-Bd	Lx-Mv	Stay
a. *C [IP Su v A [VP t saw Ob				*!		**
☞ b. C [IP Su saw A [VP t v Ob					*	**
c. * [IP Su v A [VP t saw Ob				*!		**
d. * [IP Su saw A [VP t v Ob		*!			*	**

Tableau T14.10



coindexed trace in I°), exactly the opposite of Danish/English. Hence in tableau T14.9 (b) is optimal and (a) is not, whereas in tableau T14.1 (d) (the Danish/English parallel to (a) in the earlier tableau) was optimal and (e) (the Danish/English parallel to (b) in the earlier tableau) was not.

As I originally observed some years ago (see Grimshaw 1997:413), it now follows that the French/Icelandic complementizer *que*/*að* 'that' is obligatory. Leaving the complementizer out of the optimal (b) in tableau T14.9 results in (d), which violates PRPR, since it has movement into the highest X° of an embedded clause (parallel to a suggestion in Deprez 1994:124).

14.4 Insertion of Auxiliaries in I° and Economy of Projection

In Danish, French, and Icelandic, finite auxiliary verbs behave exactly like their non-auxiliary counterparts. All finite verbs follow the adverbial in Danish, and all finite verbs precede the adverbial in French and Icelandic (see (12) and (13)).

(12) *Danish*
Jeg tror (at) skuespilleren virkelig *ser* filmen.
French
Je crois que l'acteur *voit* vraiment le film.
Icelandic
Ég tel að leikarinn *sjái* áreiðanlega myndina.
I think that the actor (sees) really (sees) the film

(13) *Danish*
Jeg tror (at) skuespilleren virkelig *har* set filmen.
French
Je crois que l'acteur *a* vraiment vu le film.
Icelandic
Ég tel að leikarinn *hafi* áreiðanlega séð myndina.
I think that the actor (has) really (has) seen the film

This is not the case in English, however: finite main verbs follow the adverbial (like Danish), but finite auxiliaries precede the adverbial (like French and Icelandic) (see (14)).

(14) *English*
a. I think (that) the actor actually *saw* the film.
b. I think (that) the actor *has* actually seen the film.

English even has one more complication, namely, that main verb *be* behaves like an auxiliary rather than like a main verb.

To capture this distributional difference inside one and the same language, the means used in sections 14.2 and 14.3, reranking of constraints, is not available; constraint ranking is language specific, not construction specific.

The solution to be suggested here (which is an attempt to derive the analysis stipulated in Grimshaw 1997:382; see also Emonds 1994:157–164) is that the English finite auxiliary is inserted directly under I^o, in contrast to English finite main verbs and to both main and auxiliary finite verbs in Danish, French, and Icelandic, all of which are inserted under V^o.

I would like to suggest that two conflicting constraints exist: EcVP and VV^o. Depending on which is more highly ranked, (auxiliary) verbs are inserted in V^o or in I^o.

EcVP (Economy of VPs) punishes every occurrence of a VP—that is, the fewer VPs used in a derivation, the better. If this constraint is the crucial one, insertion of a verb directly under I^o is preferred, because it uses one less VP than when a verb is inserted under V^o. See (15) and tableau T14.11, and compare (b) and (c) in the tableau. I formulate this constraint as EcVP for expository reasons only; it might as well have been formulated as a more general EcXP (Economy of Maximal Projections).

VV^o (Verb in V^o) punishes chains that contain a verb but that do not include a V^o (all verbs should be inserted into their own V^o and project their own VP), so if this constraint is the crucial one, insertion of a verb under V^o is preferred. Again compare (b) and (c) in tableau T14.11. Notice that I take both main verbs and auxiliary verbs to be verbs in the sense of this constraint.

This difference between (a) and (b) on the one hand and (c) on the other is that (c) has insertion of *has* directly under I^o and therefore has one VP less than the corresponding candidate with *has* inserted under V^o, (b).

(15) *English*
I think (that) the actor has actually seen the film.

Candidates (d) to (f) correspond to (a) to (c) but lack the complementizer *that*. The presence or absence of *that* makes no difference here; the constraint profiles of (c)

Tableau T14.11
English, ex. (15)

	θFL	CASE	PR-PR	OB-HD	EC-VP	LX-MV	VV°	PR-BD	STAY
a. *C [IP Su v A [VP t has [VP t seen Ob					**!			*	***
b. *C [IP Su has A [VP t v [VP t seen Ob					**!	*			***
☞ c. C [IP Su has A [VP t seen Ob					*		*		*
d. * [IP Su v A [VP t has [VP t seen Ob					**!			*	***
e. * [IP Su has A [VP t v [VP t seen Ob			*!		**	*			***
☞ f. [IP Su has A [VP t seen Ob					*		*		*

and (f) are identical. Therefore both are optimal, accounting for the optionality of *that*. The reason there is no violation of PrPr in (f) is that although the finite verb is in the highest X^o of the embedded clause, it was not moved there. If the finite auxiliary had been moved to I^o, the relevant candidates would be (b) and (e), and since (e) will always be less optimal than (b), the optionality of *that* would have been lost.

Tableau T14.11 also contains a third new constraint, which is ranked very highly.

θ*Fl* (Theta Filter) punishes every argument not assigned a thematic role. I take thematic roles to be assigned by V^o and P^o inside their maximal projections (following Chomsky 1981 and Koopman and Sportiche 1991) and so if a main verb is inserted directly under I^o, its arguments will not be assigned their thematic roles (indeed, the sentence will not contain a VP at all). To see how this actually works, we have to consider a case where the finite verb is a thematic verb (one that assigns one or more thematic roles). The example corresponding to (c) in tableau T14.11—that is, that contains a finite main verb inserted under I^o (see (c) in tableau T14.12)—will thus lose out to its rival candidate ((a) in tableau T14.12), due to the effects of θFl (neither the subject nor the object is assigned a thematic role). Consider (16).

(16) *English*
I think that the actor (actually) saw the film.

Notice that θFl only punishes arguments that do not receive a thematic role, and not thematic roles that are not assigned to an argument. I think that the latter, unassigned thematic roles, may indeed exist in all four languages under discussion—for example, when *have* and *do* are used as auxiliary verbs. Therefore, a constraint punishing unassigned thematic roles may have to be ranked lower than θFl, which punishes the opposite: arguments that do not receive a thematic role.

Until now, the constraints discussed were part of the evaluation component of the grammar, *Eval* (see the introductory chapter), and so whether or not the optimal candidate violates a given constraint depends on the ranking of that particular constraint. Even if a given constraint is unviolated in a particular grammar, there is no guarantee that this is also the case in a different grammar. Another possibility is that a particular constraint is part of the candidate-generating component of the grammar, *Gen*. In this case it cannot possibly be violated by the optimal candidate, because *Gen* will not generate any candidates that violate it. If a constraint (e.g., θFl) is part of *Gen*, it is never violated in any languages, because *Gen* does not vary between languages; language variation results from variation in the constraint ranking in *Eval*.

θFl prefers main (thematic) verbs to be inserted under V^o, but says nothing about auxiliary verbs. VV^o prefers all verbs to be inserted under V^o, and EcVP prefers all

Tableau T14.12
English, ex. (16)

	θFL	CASE	PR-PR	OB-HD	EC-VP	LX-MV	VV°	PR-BD	STAY	
☞ a. C [IP Su v A [VP t saw Ob					*			*	**	= (10d)
b. C [IP Su saw A [VP t v Ob					*	*!			**	= (10e)
c. C [IP Su saw A Ob	*!*						*			

verbs to be inserted under I^o. If it is assumed that θFL is unviolable (i.e., part of *Gen*), then main verbs are generated in V^o in all languages, and only the point of insertion of auxiliary verbs (i.e., verbs that do not assign a thematic role) is subject to language variation. Either VV^o is ranked above EcVP, in which case all verbs are inserted under V^o (Danish, French, and Icelandic), or EcVP is ranked above VV^o, in which case nonthematic verbs are inserted under I^o (English).

Only if nonthematic verbs may be inserted directly under I^o (i.e., only under the English ranking) is *do*-support possible, because under the Danish/French/Icelandic ranking, nonthematic verbs like dummy *do* would also have to be inserted under V^o, in which case such an insertion would not achieve anything. The reason English has *do*-support with negation is that both V^o-to-I^o movement and I^o-to-V^o movement across negation may be avoided; see sections 14.5 and 14.6 (*do*-support with movement to C^o behaves in a parallel fashion; see Vikner 1998).

A reason for linking the auxiliary/main verb difference in English to thematic roles may be found in the following difference between auxiliary *have*/*do* and main verb *have*/*do*; see (17) and (18). Only the auxiliaries occur in I^o (as can be seen from their appearance left of negation, left of a sentential adverbial, left of a subject quantifier, in tag questions, and in VP-ellipses; Scholten 1988:3–7).

(17) *English*

a.	He	actually *did*	the dishes.	(main verb in V°)
b.	*He *did*	actually	the dishes.	(main verb in I°)
c.	He did not	*do*	the dishes.	(main verb in V°)
d.	*He *did*	not	the dishes.	(main verb in I°)
e.	*He did not	*do*	see the film.	(auxiliary verb in V°)
f.	He *did*	not	see the film.	(auxiliary verb in I°)

(18) *English*

a.	She	actually *had*	a lot of money.	(main verb in V°)
b.	*She *had*	actually	a lot of money.	(main verb in I°)
c.	She did	not *have*	a lot of money.	(main verb in V°, US)
d.	*She *had*	not	a lot of money.	(main verb in I°)
				("somewhat uncommon," Quirk et al. 1985:131)
e.	She had	not got	a lot of money.	(verb: "get," UK, informal)
f.	?She	actually *had*	earned a lot of money.	(auxiliary verb in V°)
g.	She *had*	actually	earned a lot of money.	(auxiliary verb in I°)
h.	*She did	not *have*	earned a lot of money.	(auxiliary verb in V°)
i.	She *had*	not	earned a lot of money.	(auxiliary verb in I°)

There are no such differences between auxiliary *be* and main verb *be*; both occur in I^o. (See (19).)

(19) *English*

a.	?She	actually *is*	very nice.	(main verb in V°, not stressed)
b.	She *is*	actually	very nice.	(main verb in I°)
c.	*She does not	*be*	very nice.	(main verb in V°)
d.	She *is*	not	very nice.	(main verb in I°)
e.	?He	actually *is*	working.	(auxiliary verb in V°, not stressed)
f.	He *is*	actually	working.	(auxiliary verb in I°)
g.	*He does not	*be*	working.	(auxiliary verb in V°)
h.	He *is*	not	working.	(auxiliary verb in I°)

Roberts (1985:30) and Scholten (1988:160) suggest that only verbs that do not assign thematic roles may be inserted under I°. This gives the right prediction concerning main verb *be*, which presumably does not assign a thematic role (Haegeman 1994:68; Parsons 1995:645; Williams 1994:44), unlike main verb *have|do*, but like auxiliary *have|be|do*. This is captured here by taking θFL to be inviolable (i.e., part of *Gen*), which will ensure that verbs that assign thematic roles are universally generated in V°.

Consider now what happens in Danish, where VV° is ranked above EcVP; see (20) and tableau T14.13.

(20) *Danish*

Jeg tror (at) skuespilleren virkelig har set filmen.
I think (that) actor-the really has seen film-the

In tableau T14.13, candidate (c)—which was optimal in English—loses out to (a), because it is more important in Danish that every verb chain contains a V° (VV°) than it is to keep the number of VPs to an absolute minimum (EcVP).

PrPr is not relevant here: the optimal candidate without *at* 'that' does not violate it, since there is no movement into the highest X° of an embedded clause. Candidates (a) and (d) are thus both optimal.

Consider finally what happens in French and Icelandic in (21) and tableau T14.14. Here VV° is ranked above EcVP (like Danish but unlike English).

(21) *French*

Je crois *(que) l'acteur a vraiment vu le film.

Icelandic

Ég tel *(að) leikarinn hafi áreiðanlega séð myndina.
I think (that) the actor has really seen the film

In tableau T14.14, (c)—which was optimal in English—loses out to (b), because it is more important in French and Icelandic (as in Danish) that every verb chain contains a V° (VV°) than it is to keep the number of VPs as low as possible (EcVP).

Tableau T14.13
Danish, ex. (20)

	θFL	CASE	PR-PR	OB-HD	VV°	EC-VP	LX-MV	PR-BD	STAY
☞ a. C [IP Su v A [VP t has [VP t seen Ob						**		*	***
b. *C [IP Su has A [VP t v [VP t seen Ob						**	*!		***
c. *C [IP Su has A [VP t seen Ob					*!	*			*
☞ d. [IP Su v A [VP t has [VP t seen Ob						**		*	***
e. * [IP Su has A [VP t v [VP t seen Ob			*!			**	*		***
f. * [IP Su has A [VP t seen Ob					*!	*			*

Tableau T14.14
French/Icelandic, ex. (21)

	θFL	CASE	PR-PR	OB-HD	VV°	EC-VP	PR-BD	LX-MV	STAY
a. *C [IP Su v A [VP t has [VP t seen Ob						**	*!		***
☞ b. C [IP Su has A [VP t v [VP t seen Ob						**		*	***
c. *C [IP Su has A [VP t seen Ob					*!	*			*
d. * [IP Su v A [VP t has [VP t seen Ob						**	*!		***
e. * [IP Su has A [VP t v [VP t seen Ob			*!			**		*	***
f. * [IP Su has A [VP t seen Ob					*!	*			*

PrPr is relevant in tableau T14.14; any version of the optimal candidate that lacks *que*/*að* 'that' would violate PrPr, since there would be movement into the highest X° of an embedded clause. Compare (e) to (b).

As shown in tableau T14.9, in French and Icelandic, PrBd is ranked above LxMv, whereas in Danish and English, LxMv is ranked above PrBd. When PrBd is ranked above LxMv, verbs inserted under V° move from V° to I° rather than stay in V°. Compare (a) and (b) in tableau T14.14.

So far I have discussed the ranking between EcVP and VV° independently of the ranking between LxMv and PrBd. The interaction among all four constraints is as follows.

If VV° outranks EcVP—that is, if all verbs are inserted under V°—there are two relevant possibilities: the result is French/Icelandic (all finite verbs undergo V°-to-I° movement) if PrBd outranks LxMv, and it is Danish (no finite verbs undergo V°-to-I° movement) if LxMv outranks PrBd.

If EcVP outranks VV°—that is, if nonthematic verbs are inserted under I° and thematic verbs under V°—no variation is found when the input contains a nonthematic verb, because this verb will occur in I° regardless of the ranking of the other constraints.

Variation is found with EcVP outranking VV° when there is no nonthematic verb in the input. There are three relevant possibilities: The result is English if PrBd is outranked by the other three constraints (i.e., the finite thematic verb occurs in V°). The result would be a variant of English with V°-to-I° movement of thematic verbs if LxMv were outranked by the other three constraints. Finally, the result would be another variant of English with *do*-insertion with thematic verbs in all contexts if VV° were outranked by the other three constraints.

Until now two differences in constraint ranking have been assumed:

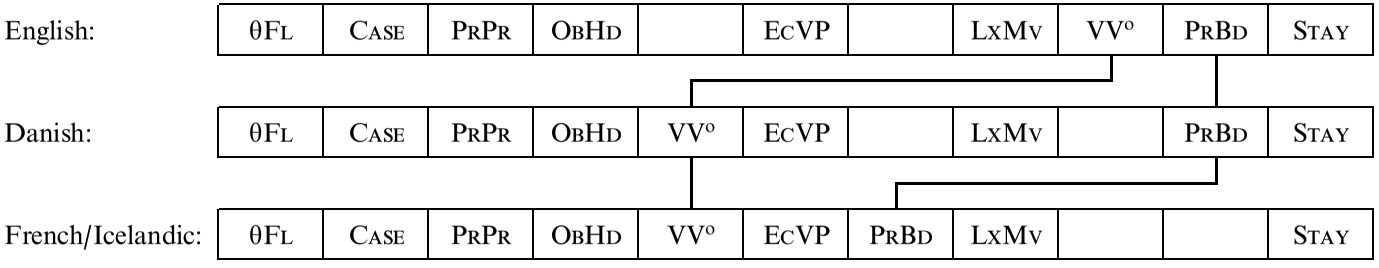
1. English/Danish differ from French/Icelandic as far as PrBd is concerned (absence vs. presence of V°-to-I° movement).
2. English differs from the other three as far as VV° is concerned (difference vs. no difference between thematic and nonthematic verbs, and also presence vs. absence of *do*-insertion); see tableau T14.15.

14.5 Negation, the HMC, and Insertion of Empty *do* in I°

For negated clauses, no further ranking differences between the languages are necessary, just one additional constraint, the Head Movement Constraint (HMC), which may be taken as being ranked immediately below EcVP in all four languages.

In earlier versions of this chapter, I attempted to explain the different effects of negation in the four languages by saying that Neg° could not be part of the verb

Tableau T14.15



chain in English (*not* being an X° in Neg°), but the verb could move through Neg° in the other three (Danish *ikke*, French *pas*, Icelandic *ekki* being XPs in SpecNegP). This could be achieved by two constraints *NegX°* and *NegXP*, which would be ranked one way in English and the other way in the other three languages. However, such an approach does not seem particularly insightful.

I now want to show that it is possible to use only constraints independently necessary: *VV°* (as seen above) and the *HMC* (see Travis 1984:131; Baker 1988:53; Rizzi 1990:11). I would like to suggest that the *HMC* is violated whenever Neg° intervenes in the verb chain in any of the four languages (i.e., when I° c-commands Neg° and Neg° c-commands V°). This is least controversial for English, where *not* has often been taken to be in Neg°, and therefore to block the formation of a chain between V° and I° (Pollock 1989:397; Roberts 1993:338, note 21). (See (22) and tableau T14.16.)

(22) *English*
I think (that) the actor did not see the film.

HMC punishes every X° that intervenes in an X° chain (i.e., that is c-commanded by a link of an X° chain and itself c-commands another link in the same X° chain) unless it is bound by the antecedent (the lexical element) of the chain. Neg° is taken to be such a potential intervening element when the verb moves across it. It does not matter whether the movement would have been downward (compare (a) and (e) in tableau T14.16) or upward (compare (b) and (e)). If tableau T14.16 had not contained a negation, there would have been no *do*-insertion and (a) would have been more optimal than (e).

EcVP (Economy of VPs) means the fewer VPs, the better, hence the preference for a *do* inserted under I° rather than under V°. Compare (d) and (e).

I assume that *did* is in I° in (e) and (j), an assumption based on the fact that it precedes *not*, and I also assume that it has been inserted directly under I°, since otherwise its presence in I° would violate PrPr in (j). This is how the optionality of *that* is achieved: with *did* inserted under I°, the two candidates with and without *that* have the same constraint profile; see (e) and (j). If *did* had been inserted under V°, the two candidates with and without *that* would not have had the same constraint profile because of PrPr; see (d) and (i).

Insertion of *do* under I° violates VV°, just as insertion of *have* or *be* under I° does. In all three cases, the verb will neither be in V° nor have a trace in V° (see also section 14.7). In English, however, this violation of VV° has no consequences: the candidate that violates it, (e) in tableau T14.16, is still optimal, because the competing candidates all have more violations of higher-ranking constraints than (e).

I also take HMC to be violated for Danish, French, and Icelandic when Neg° intervenes in the verb chain. However, in these three languages, such a violation is preferable to a violation of VV°—that is, a verb chain across Neg° is preferable to

Tableau T14.16
English, ex. (22)

	θFL	CASE	PR-PR	OB-HD	EC-VP	HM-C	LX-MV	VV°	PR-BD	STAY
a. *C [IP Su v not [VP t saw Ob					*	*!			*	**
b. *C [IP Su saw not [VP t v Ob					*	*!	*			**
c. *C [IP Su v not [VP t did [VP t see Ob					**!	*			*	***
d. *C [IP Su did not [VP t v [VP t see Ob					**!	*	*			***
☞ e. C [IP Su did not [VP t see Ob					*			*		*
f. * [IP Su v not [VP t saw Ob					*	*!			*	**
g. * [IP Su saw not [VP t v Ob			*!		*	*	*			**
h. * [IP Su v not [VP t did [VP t see Ob					**!	*			*	***
i. * [IP Su did not [VP t v [VP t see Ob			*!		**	*	*			***
☞ j. [IP Su did not [VP t see Ob					*			*		*

do-insertion. This is due to the independently motivated higher ranking of VV° in these three languages than in English; see section 14.4. The HMC itself is ranked the same in all four languages, below EcVP and above LxMv. This analysis presupposes that something like the stray affix filter (see Baker 1988:140) applies and is either very highly ranked or inviolable—that is, that the verbal affix in I° has to be affixed to a verb. (See (23) and tableau T14.17.)

(23) *Danish*
Jeg tror (at) skuespilleren ikke så filmen.
I think (that) actor-the not saw film-the

VV° (Verb in V°) punishes verb chains that do not include a V°. In tableau T14.17, compare (e)—which was optimal in English—to (a), which lost in English because it violates HMC.

LxMv (No Movement of a Lexical Head) punishes *så* 'saw' for leaving V°. Compare (b) and (a).

EcVP (Economy of VPs) means the fewer VPs, the better. Compare (c) and (a).

PrPr is not relevant here. The version of the optimal candidate lacking *at* 'that' does not violate it, since there is no movement into the highest X° of an embedded clause. Candidates (a) and (f) are thus both optimal.

In French and Icelandic, the picture is only slightly different, due to the different ranking of PrBd, which also entails a difference with respect to the complementizer-less version of the optimal candidate; see (24) and tableau T14.18.

(24) *French*
Je crois *(que) l'acteur ne voit pas le film.
Icelandic
Ég tel *(að) leikarinn sjái ekki myndina.
I think (that) the actor sees not the film

VV° (Verb in V°) punishes verb chains that do not include a V°. Compare (e) in tableau T14.18 (which was optimal in English) to (b) (which lost in English because it violates HMC and LxMv).

PrBd (Proper Binding) punishes *voit*/*sjái* 'sees' for staying in V°, which forces V°-to-I° movement. Compare (a) and (b).

EcVP (Economy of VPs) means the fewer VPs , the better. Compare (d) and (b).

PrPr is relevant here. Any version of the optimal candidate lacking *que*/*að* 'that' would violate it, because there would be movement into the highest X° of an embedded clause. Compare (g) and (b).

Let me finally point out that I do not necessarily want to suggest that the negative elements *pas*, *ikke*, and *ekki* have to be X° elements that c-command the VP. Rather, I only want to suggest that irrespective of the actual XP/X° status of the lexical ele-

Tableau T14.17
Danish, ex. (23)

	θFL	CASE	PR-PR	OB-HD	VV°	EC-VP	HM-C	LX-MV	PR-BD	STAY
☞ a. C [IP Su v not [VP t saw Ob						*	*		*	**
b. *C [IP Su saw not [VP t v Ob						*	*	*!		**
c. *C [IP Su v not [VP t did [VP t see Ob						**!	*		*	***
d. *C [IP Su did not [VP t v [VP t see Ob						**!	*	*		***
e. *C [IP Su did not [VP t see Ob					*!	*				*
☞ f. [IP Su v not [VP t saw Ob						*	*		*	**
g. * [IP Su saw not [VP t v Ob			*!			*	*	*		**
h. * [IP Su v not [VP t did [VP t see Ob						**!	*		*	***
i. * [IP Su did not [VP t v [VP t see Ob			*!			**	*	*		***
j. * [IP Su did not [VP t see Ob					*!	*				*

Tableau T14.18
French/Icelandic, ex. (24)

	θFL	CASE	PR-PR	OB-HD	VV°	EC-VP	HM-C	PR-BD	LX-MV	STAY
a. *C [IP Su v not [VP t saw Ob						*	*	*!		**
☞ b. C [IP Su saw not [VP t v Ob						*	*		*	**
c. *C [IP Su v not [VP t did [VP t see						**!	*	*		***
d. *C [IP Su did not [VP t v [VP t see						**!	*		*	***
e. *C [IP Su did not [VP t see					*!	*				*
f. * [IP Su v not [VP t saw Ob						*	*	*!		**
g. * [IP Su saw not [VP t v Ob			*!			*	*		*	**
h. * [IP Su v not [VP t did [VP t see						**!	*	*		***
i. * [IP Su did not [VP t v [VP t see			*!			**	*		*	***
j. * [IP Su did not [VP t see					*!	*				*

ment of negation, Neg^o (like SpecNegP) may block the formation of a verb chain across it in any of the four languages.

It has often been assumed about NegP-spec that irrespective of whether SpecNegP is lexically filled by a negation, it cannot be part of an A-bar-chain. Note that English has negative islands even though *not*/*n't* is (or could be) an X^o (Cinque 1990:80; Rizzi 1990:15). The same can be said about Neg^o; it cannot form part of the verb chain. Where exactly *not*, *pas*, *ikke*, and *ekki* actually are, in SpecNegP, Neg^o, or somewhere else, is a different question (for a discussion of the possibilities with respect to Italian and related languages, see Zanuttini 1997:23, 101). This means that the above analysis is compatible with Roberts's (forthcoming: note 12) suggestion that X^o can block XP-movements and vice versa as long as they have the same type of features (in this case operator features).

14.6 Negation and Insertion Under I^o of Auxiliaries or of Empty *do*

To account for clauses with negation and auxiliaries, no further constraints and no further differences in constraint ranking are necessary. It follows from the rankings already suggested that neither in English nor in the other three languages is *do*-insertion possible. Consider first English; see (25) and tableau T14.19.

(25) *English*
I think (that) the actor has not seen the film.

Adding *do* serves no purpose here (following Grimshaw 1997:384), since *have* may itself be base generated in I^o, so that the HMC is not violated anyway. This means that adding *do* will merely cost an extra VP, namely, the VP of nonfinite *have*; compare (e) to (d) in tableau T14.19. Notice that this presupposes that auxiliaries like *have* in the tableau are part of the input, as mentioned in section 14.1.

The complementizer is optional; any version of the optimal candidate without *that* would not violate PrPr, because there is no movement into the highest X^o of an embedded clause. Candidate (d) and a version of (d) without *that* would thus have the same (optimal) constraint profile.

EcVP punishes (a) and (b) (optimal in Danish and in French/Icelandic respectively), which have more VPs than (d). Because *have* does not assign any thematic roles, base generating it in I^o, as in (d), will not violate θFl, but only VV^o.

Next consider Danish, where there are no relevant changes compared to the negated finite main verb in tableau T14.17; see (26) and tableau T14.20.

(26) *Danish*
Jeg tror (at) skuespilleren ikke har set filmen.
I think (that) actor-the not has seen film-the

Tableau T14.19
English, ex. (25)

	θFL	CASE	PR-PR	OB-HD	EC-VP	HM-C	LX-MV	VV°	PR-BD	STAY
a. *C [$_{IP}$ Su v not [$_{VP}$ t has [$_{VP}$ t seen Ob					**!	*			*	***
b. *C [$_{IP}$ Su has not [$_{VP}$ t v [$_{VP}$ t seen Ob					**!	*	*			***
c. *C [$_{IP}$ Su v not [$_{VP}$ t did [$_{VP}$ t have [$_{VP}$ t seen Ob					**!*	*			*	****
☞ d. C [$_{IP}$ Su has not [$_{VP}$ t seen Ob					*			*		*
e. *C [$_{IP}$ Su did not [$_{VP}$ t have [$_{VP}$ t seen Ob					**!			*		**

Tableau T14.20
Danish, ex. (26)

	θFL	CASE	PR-PR	OB-HD	VV°	EC-VP	HM-C	LX-MV	PR-BD	STAY
☞ a. C [$_{IP}$ Su v not [$_{VP}$ t has [$_{VP}$ t seen Ob						**	*		*	***
b. *C [$_{IP}$ Su has not [$_{VP}$ t v [$_{VP}$ t seen Ob						**	*	*!		***
c. *C [$_{IP}$ Su v not [$_{VP}$ t did [$_{VP}$ t have [$_{VP}$ t seen Ob						***!	*		*	****
d. *C [$_{IP}$ Su has not [$_{VP}$ t seen Ob					*!	*				*
e. *C [$_{IP}$ Su did not [$_{VP}$ t have [$_{VP}$ t seen Ob					*!	**				**

VV^{o} punishes (d) in tableau T14.20 (optimal in English) because *har* 'has' has no trace in V^{o}, as opposed to (a). LxMv punishes (b) (optimal in French/Icelandic) because *har* 'has' leaves V^{o}, as opposed to (a). EcVP punishes (c), which has more VPs than (a). The complementizer is optional, since any version of the optimal candidate lacking *at* 'that' would not violate PrPr, because there is no movement into the highest X^{o} of an embedded clause. Candidate (a) and a version of (a) without *at* would have the same (optimal) constraint profile.

Finally, consider French and Icelandic. Here there are also no relevant changes compared to the negated finite main verb in tableau T14.18; see (27) and tableau T14.21.

(27) *French*
Je crois *(que) l'acteur n' a pas vu le film.
Icelandic
Ég tel *(að) leikarinn hafi ekki séð myndina.
I think (that) the actor has not seen the film

VV^{o} punishes (d) in tableau T14.21 (optimal in English) because *a*/*hafi* 'has' has no trace in V^{o}, as opposed to (b). PrBd punishes (a) (optimal in Danish), because *a*/*hafi* 'has' stays in V^{o}, as opposed to (b). EcVP punishes (c), which has more VPs than (b). The complementizer is obligatory. Any version of the optimal candidate without *que*/*að* 'that' would violate PrPr, since there would be movement into the highest X^{o} of an embedded clause.

14.7 Constraints Are Never Switched Off

An important difference between OT and the principles-and-parameters framework (Chomsky 1986; Rizzi 1990) is that nothing in OT directly corresponds to parameters (see also section 1.3 in chap. 1). In a certain sense, one might say that ranking V-V^{o} above EcVP corresponds to a particular setting of a particular parameter, namely, one that makes thematic and nonthematic verbs behave alike in Danish, French, and Icelandic. Correspondingly, one might expect that ranking VV^{o} below EcVP corresponds to a different setting of the same parameter, namely, the one that forces a difference between thematic and nonthematic verbs in English. But whereas in principles-and-parameters terms, this might have meant switching off the parameter that forces a difference between thematic and nonthematic verbs, there is no switching off constraints in OT: even in English where VV^{o} is ranked below EcVP, VV^{o} is still active. (See (28) and tableau T14.22)

(28) *English*
I think that the actor (actually) saw the film.

Tableau T14.21
French/Icelandic, ex. (27)

	θFL	CASE	PR-PR	OB-HD	VV°	EC-VP	HM-C	PR-BD	LX-MV	STAY
a. *C [IP Su v not [VP t has [VP t seen Ob						**	*	*!		***
☞ b. C [IP Su has not [VP t v [VP t seen Ob						**	*		*	***
c. *C [IP Su v not [VP t did [VP t have [VP t seen Ob						***!	*	*		****
d. *C [IP Su has not [VP t seen Ob					*!	*				*
e. *C [IP Su did not [VP t have [VP t seen Ob					*!	**				**

Tableau T14.22
English, ex. (28)

	θFL	CASE	PR-PR	OB-HD	EC-VP	HM-C	LX-MV	VV°	PR-BD	STAY	
☞ a. C [IP Su v A [VP t saw Ob					*				*	**	= (10d)/(24a)
b. C [IP Su saw A [VP t v Ob					*		*!			**	= (10e)/(24b)
c. C [IP Su did A [VP t see Ob					*			*!		*	

VV^{o} must be ranked below EcVP to allow insertion directly under I^{o} (of auxiliaries or dummy *do*); see for example (c) in tableau T14.11 or (e) in tableau T14.16. Nevertheless, VV^{o} is still active, in that it serves to exclude (c) in tableau T14.22, because nothing is gained by inserting *do* in I^{o} here. It would not mean using one less VP, nor would it prevent movement out of V^{o}, since (a) also has only one violation of EcVP and no violation of LxMv.

In addition to punishing the insertion of verbs directly under I^{o}, VV^{o} thus also does the work here that Grimshaw's (1997:381) "Full Interpretation" (FI) does in her analysis, in that it punishes the use of dummy *do* (which she calls "light verb" *do*).

Corresponding to Grimshaw's (1997:386–387) suggestion for FI, VV^{o} may also have to be a gradient constraint, so that it would be violated to a lesser extent by dummy *do* than by dummy *divulge* or dummy *domesticate*. Dummy *do*, dummy *divulge*, and dummy *domesticate* would all violate VV^{o} because (some of) their lexical/categorial properties would be ignored if they were not inserted under V^{o}. However, the violation incurred by dummy *do* would be smaller than the violations incurred by other verbs, because *do* has fewer lexical/categorial properties than other verbs, and so when *do* is used as a dummy or light verb, fewer lexical/categorial properties have to be ignored (exactly how to quantify this is anything but straightforward). This view would also necessitate that *do* be seen as having fewer lexical/categorial properties than even, for example, *be* and *have*, to ensure that the light verb used with negation (and in questions and other subject-auxiliary inversion contexts) is *do* rather than *be* or *have*.

The reason for the well-formedness of a string corresponding to (c) in tableau T14.22 with emphatic/contrastive stress on *do* (i.e., . . . *that the actor DID see the film*) is precisely that something *is* gained by inserting *do* here (by allowing a violation of VV^{o}), namely, that a violation of the HMC is avoided, under the assumption (see Trachtenberg 1996) that emphasis is an independent functional head between I^{o} and V^{o}, much like Neg^{o}. (See (a) and (e) in tableau T14.16.) In Danish, for instance, where V-V^{o} is ranked higher than HMC, the analysis correctly predicts that emphasis, like negation, does not make any difference for the position of the verb, (the example is . . . *at skuespilleren virkelig SÅ filmen*, '. . . that the actor really SAW the film'); see (a) and (e) in tableau T14.17.

Finally, another shortcoming of a putative "dummy *do*-parameter" should be noted, namely, that it would lead us to expect that languages either do or do not have a dummy *do*. This is not the case. Although Danish, French, and Icelandic do not have *do*-insertion the way English does, they all do have a so-called verbum vicarium—that is, a verb that substitutes for other verbs under certain circumstances. Furthermore, these verbs are the straightforward translations of *do*: Icelandic *gera*, Danish *gøre*, and French *faire*. (See (29).)

(29) *Icelandic*
Haltu á blýantinum eins og ég *geri*.
Danish
Hold på blyanten ligesom jeg *gør*.
English
Hold the pencil as I *do* (it).
French
Tiens le crayon comme je le *fais*.

Exactly how to analyze these examples is not completely clear, however, since all of them would seem to involve optionality, in that "full" versions are also possible—for example, *Hold the pencil as I hold it*. Presumably it would be possible to take the price of using *do* as a light verb (i.e., the price of ignoring some of its lexical/categorial properties) to be more than offset by the gain of not having to use a full VP-structure containing an object coreferent with an object in the matrix clause.

14.8 A Brief Sketch of the Analysis of Main Clauses

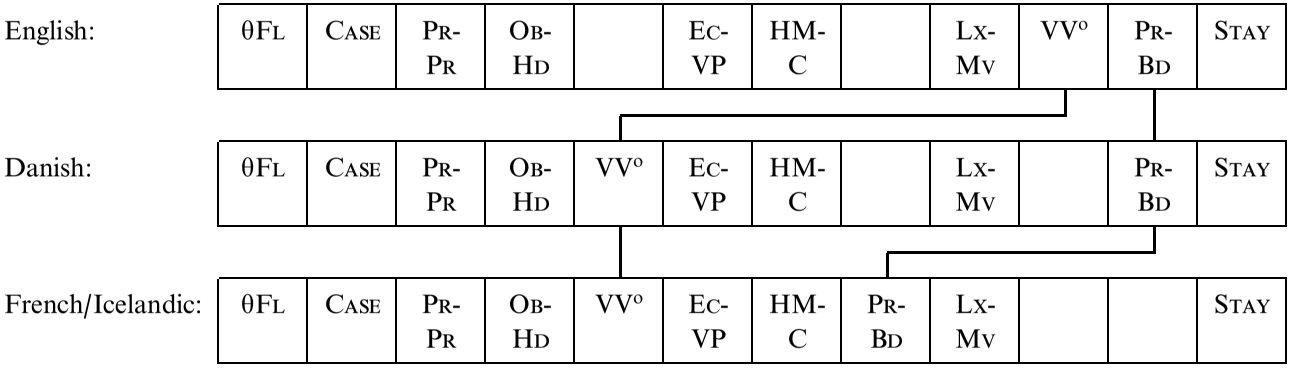
Until this point, only two differences in constraint ranking have been assumed, namely, the two already shown in tableau T14.15. In fact, the only difference compared to T14.23 is the introduction of HMC between EcVP and LxMv in all four languages.

Unfortunately, space does not permit a close examination of main clauses, which is also the reason we will not see any syntactic differences between French and Icelandic. Such a close examination (see Vikner 1998) would reveal two important differences with respect to verb second: whereas all four languages have V2 main clauses when the initial element is a *wh*-element, only Danish and Icelandic have V2 in non-*wh*-initial main clauses. Another difference concerns subject-initial main clauses, where English never has V2 (*Peter actually saw the film*), not even in questions (*Who actually saw the film?*).

To account for these different variations concerning V2, three more constraints would have to be introduced (following Grimshaw 1997 and Baković 1998): *OpSp* (operators in specifier position), *WhSp* (*wh*-operators in specifier position), and *OpSc* (operators in scope position). Operators here include *wh*-operators and topicalized constituents. A scope position is any position that c-commands the IP.

V2 in main clause questions is driven by WhSp, which forces nonsubject *wh*-elements to move to SpecCP; see also the *wh*-criterion (Rizzi 1996:64; Müller 1997: 263). V2 in non-*wh* main clauses is driven by OpSp, which forces nonsubject operators (including both *wh*-operators and topicalized constituents) to move to SpecCP. WhSp would thus be ranked highly in all four languages, whereas OpSp is ranked highly in Danish and Icelandic but low in English and French.

Tableau T14.23



The movement of subjects to a position outside IP is forced in Danish, French, and Icelandic by the high ranking of OpSc, and avoided in English by a low ranking of the same constraint.

The V2 verb movement itself is driven by a different constraint, ObHd, which also drives many other types of X°-movement; see, for example, Grimshaw 1997 and Baković 1998. This is different from the *wh*-criterion, which drives both *wh*-movement and V°-movement. Whether the verb undergoing V2 is *do* or a verb also present in the input depends on the ranking, so that only English (with LxMv ≫ VV°) will insert *do* in such contexts. In the other three languages (with VV° ≫ LxMv), it is less expensive to move a verb out of VP than to insert a dummy verb.

In accounting for V2 in OT by means of the two constraints WhSp and OpSp, it is possible to avoid the trap of binary parameters, whereby languages either have to have a particular property (e.g., V2) or not to have it. Languages may have a lot of V2—that is, "real" V2 (Danish/Icelandic)—or have just a little V2, namely, "residual" V2 (English/French). Furthermore, by having WhSp be a more restricted version of (i.e., a subset of) OpSp, the (hopefully correct) prediction is made that there are no languages that have V2 in topicalizations but not in questions.

A more complete picture would thus have four different variations among the languages (as shown in tableau T14.24):

1. The variation concerning *PrBd* accounts for the variation in V°-to-I° movement.
2. The variation concerning *VV°* accounts for the variation concerning *do*-insertion and also for whether nonthematic verbs behave like thematic ones or not.
3. The variation concerning *OpSp* accounts for the variation in non-*wh* V2.
4. The variation concerning *OpSc* accounts for the variation in subject questions.

14.9 Conclusions

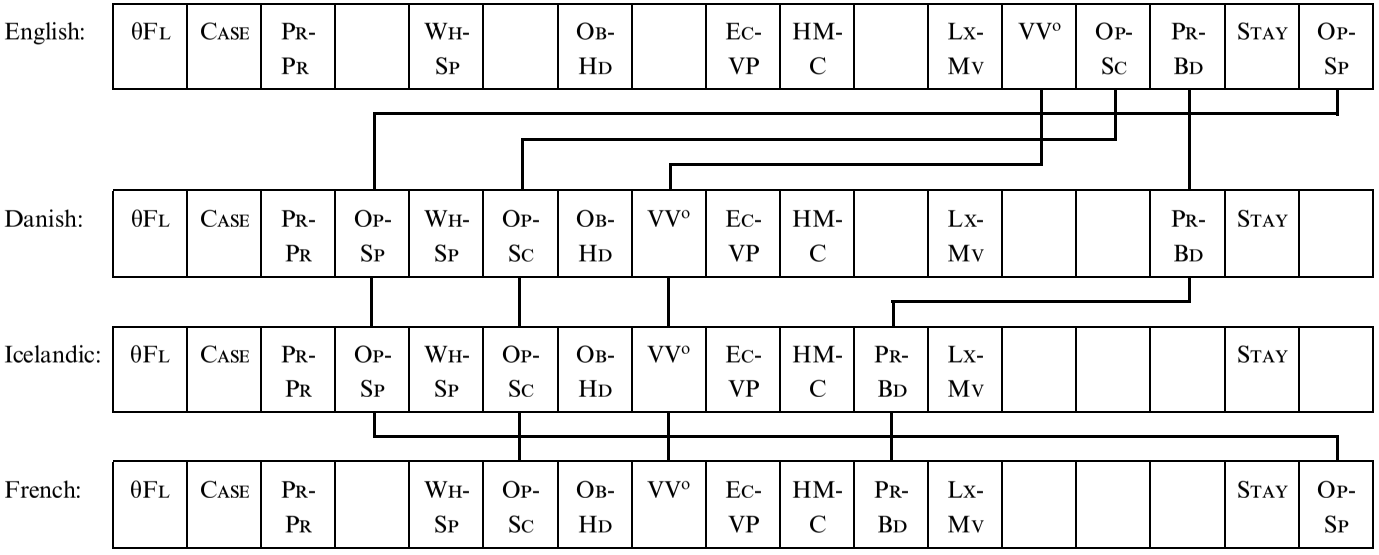
OT syntax allows the existence of constraints that are violated by the optimal candidate but still rule out other candidates. Examples are *EcVP* (an implementation of economy of projection), *Stay* (an implementation of economy of derivation), and *VV°*.

OT syntax also allows the existence of constraints that are both violated by the optimal candidate in some language and nevertheless still rule out other candidates in another language. Examples are *HMC*, *LxMv*, and *PrBd*.

This treatment of the *HMC* makes possible a unified treatment of NegP across the languages, in particular of the blocking effects of Neg° and NegP-spec.

Also made possible are principled accounts of the position of the finite verb in embedded clauses, of why *do* and other nonthematic verbs are inserted under I° in English, though not in the other languages, of why there is no *do*-insertion with

Tableau T14.24



auxiliaries in English, and of when the complementizer *that|que|að|at* is optional and when it is obligatory.

The interaction between the four crucial constraints is as follows.

If VV° outranks EcVP—that is, if all verbs are inserted under V°— there are two relevant possibilities: the result is French/Icelandic (all finite verbs undergo V°-to-I° movement) if PrBd outranks LxMv, and it is Danish (no finite verbs undergo V°-to-I° movement) if LxMv outranks PrBd.

If EcVP outranks VV°—that is, if nonthematic verbs are inserted under I° and thematic verbs under V°—no variation is found when the input contains a nonthematic verb, since this verb will occur in I° regardless of the ranking of the other constraints.

Variation is found with EcVP outranking VV° when there is no nonthematic verb in the input. There are three relevant possibilities: The result is English if PrBd is outranked by the other three constraints (i.e., the finite thematic verb occurs in V°). The result would be a variant of English with V°-to-I° movement of thematic verbs if LxMv were outranked by the other three constraints. Finally, the result would be another variant of English with *do*-insertion with thematic verbs in all contexts if VV° were outranked by the other three constraints.

Because the facts discussed in this chapter (the position of finite main verbs and of finite auxiliary verbs in embedded clauses with and without negation in Danish, English, French, and Icelandic) may now be seen as connected and deriving from common sources, and because their derivation in earlier (principles-and-parameters) accounts (e.g., Vikner 1995) involved a number of stipulations no longer necessary in the present analysis, I hope to have shown that OT syntax allows us to take a significant step forward in the analysis of verb movement.

Note

I would like to thank Eric Baković, Fabian Heck, Gunnar Hrafn Hrafnbjargarson, Jóhannes Gísli Jónsson, Takeo Kurafuji, Edward Keer, Gereon Müller, Nicole Nelson, Alan Prince, Luigi Rizzi, Ian Roberts, Ramona Römisch-Vikner, Vieri Samek-Lodovici, Tanja Schmid, Halldór Ármann Sigurðsson, Paul Smolensky, Melissa Trachtenberg, Carl Vikner, Ralf Vogel, Colin Wilson, and Heike Zinsmeister, and in particular Jane Grimshaw and Géraldine Legendre. Thanks also to participants in classes at the Universities of Stuttgart, Geneva, Iceland, Lund, and Rutgers University, and to audiences at talks given at the Hopkins Optimality Theory Workshop/University of Maryland Mayfest (Baltimore), at the Minimal Link Condition Workshop (Potsdam), and at the Universities of Amsterdam, Cologne, Groningen, Leiden, Tilburg, Tromsø, Tübingen, Utrecht, Venice, Johns Hopkins University, the Netherlands Institute for Advanced Study (Wassenaar), and the Arbeitsgruppe Strukturelle Grammatik (Max-Planck-Gesellschaft, Berlin). The research reported here was supported by the Deutsche Forschungsgemeinschaft as part of the project *The Optimality-Theoretic Syntax of German from a Comparative Germanic Perspective* (Grant MU 1444/2-1, Principal Investigators: G. Müller, S. Vikner).

References

Alexiadou, Artemis. 1997. *Adverb Placement*. Amsterdam: Benjamins.

Baker, Mark. 1988. *Incorporation*. Chicago: University of Chicago Press.

Baković, Eric. 1998. Optimality and Inversion in Spanish. In Pilar Barbosa, Danny Fox, Paul Hagstrom, Martha McGinnis, and David Pesetsky (eds.), *Is the Best Good Enough? Optimality and Competition in Syntax*, 35–58. Cambridge, Mass.: MIT Press.

Bobaljik, Jonathan. 1995. Morphosyntax: The Syntax of Verbal Inflection. Doctoral dissertation, MIT, Cambridge, Mass.

Chomsky, Noam. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.

Chomsky, Noam. 1986. *Barriers*. Cambridge, Mass.: MIT Press.

Chomsky, Noam. 1991. Some Notes on Economy of Derivation and Representation. In Robert Freidin (ed.), *Principles and Parameters in Comparative Grammar*, 417–454. Cambridge, Mass.: MIT Press.

Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, Mass.: MIT Press.

Cinque, Guglielmo. 1990. *Types of A-Bar-Dependencies*. Cambridge, Mass.: MIT Press.

Cinque, Guglielmo. 1999. *Adverbs and Functional Heads: A Cross-Linguistic Perspective*. New York: Oxford University Press.

Deprez, Viviane. 1994. A Minimal Account of the That-t Effect. In Guglielmo Cinque, Jan Koster, Jean-Yves Pollock, Luigi Rizzi, and Raffaella Zanuttini (eds.), *Paths Towards Universal Grammar: Studies in Honor of Richard Kayne*, 121–135. Washington, D.C.: Georgetown University Press.

Emonds, Joseph. 1978. The Verbal Complex of V′-V in French. *Linguistic Inquiry* 9: 151–175.

Emonds, Joseph. 1994. Two Principles of Economy. In Guglielmo Cinque, Jan Koster, Jean-Yves Pollock, Luigi Rizzi, and Raffaella Zanuttini (eds.), *Paths Towards Universal Grammar: Studies in Honor of Richard Kayne*, 155–172. Washington, D.C.: Georgetown University Press.

Fiengo, Robert. 1977. On Trace Theory. *Linguistic Inquiry* 8(1): 35–61.

Grimshaw, Jane. 1991. Extended Projection. Ms., Brandeis University, Waltham, Mass.

Grimshaw, Jane. 1997. Projection, Heads, and Optimality. *Linguistic Inquiry* 28(3): 373–422.

Haegeman, Liliane. 1994. *Introduction to Government and Binding Theory*. 2nd ed. Oxford: Blackwell.

Haider, Hubert. 1988. Matching Projections. In Anna Cardinaletti, Guglielmo Cinque, and Giuliana Giusti (eds.), *Constituent Structure: Papers from the 1987 GLOW Conference*, 101–121. Dordrecht: Foris.

Holmberg, Anders. 1997. The True Nature of Holmberg's Generalization. In Kiyomi Kusumoto (ed.), *NELS 27*, 203–217. GLSA, University of Massachusetts, Amherst.

Holmberg, Anders, and Christer Platzack. 1995. *The Role of Inflection in Scandinavian Syntax*. New York: Oxford University Press.

Koopman, Hilda, and Dominique Sportiche. 1991. The Position of Subjects. *Lingua* 85: 211–258.

Legendre, Géraldine, Paul Smolensky, and Colin Wilson. 1998. When Is Less More? Faithfulness and Minimal Links in *Wh*-Chains. In Pilar Barbosa, Danny Fox, Paul Hagstrom, Martha

McGinnis, and David Pesetsky (eds.), *Is the Best Good Enough? Optimality and Competition in Syntax*, 249–289. Cambridge, Mass.: MIT Press and *MIT Working Papers in Linguistics*.

Legendre, Géraldine, Colin Wilson, Paul Smolensky, Kristin Homer, and William Raymond. 1995. Optimality and *Wh*-Extraction. In J. Beckman, L. Walsh Dickey, and S. Urbanczyk (eds.), *University of Massachusetts Occasional Papers 18: Papers in Optimality Theory*, 607–636. GLSA, University of Massachusetts, Amherst.

McCloskey, James. 1992. *Adjunction, Selection, and Embedded Verb Second*. Linguistics Research Report LRC-92-07. University of California, Santa Cruz.

Müller, Gereon. 1997. Partial *Wh*-Movement and Optimality Theory. *Linguistic Review* 14: 249–306.

Müller, Gereon. 1999. Optionality in Optimality-Theoretic Syntax. *Glot International*, 4(5): 3–8.

Parsons, Terence. 1995. Thematic Relations and Arguments. *Linguistic Inquiry* 26(4): 635–662.

Pollock, Jean-Yves. 1989. Verb Movement, Universal Grammar, and the Structure of IP. *Linguistic Inquiry* 20(3): 365–424.

Prince, Alan, and Paul Smolensky. 1993. *Optimality Theory: Constraint Interaction in Generative Grammar*. Technical Report TR-2, Center for Cognitive Science, Rutgers University, New Brunswick, N.J., and Technical Report CU-CS-696-93, Department of Computer Science, University of Colorado, Boulder. Available at http://www.ruccs.rutgers.edu/publicationsreports.html.

Quirk, Randolph, Sidney Greenbaum, Geoffrey Leech, and Jan Svartvik. 1985. *A Comprehensive Grammar of the English Language*. London: Longman.

Rizzi, Luigi. 1990. *Relativized Minimality*. Cambridge, Mass.: MIT Press.

Rizzi, Luigi. 1996. Residual Verb Second and the *Wh*-Criterion. In Adriana Belletti and Luigi Rizzi (eds.), *Parameters and Functional Heads*, 63–90. New York: Oxford University Press.

Rizzi, Luigi, and Ian Roberts. 1996. Complex Inversion in French. In Adriana Belletti and Luigi Rizzi (eds.), *Parameters and Functional Heads*, 91–116. New York: Oxford University Press.

Roberts, Ian. 1985. Agreement Parameters and the Development of English Modal Auxiliaries. *Natural Language and Linguistic Theory* 3(1): 21–58.

Roberts, Ian. 1993. *Verbs and Diachronic Syntax*. Dordrecht: Kluwer.

Roberts, Ian. Forthcoming. Head Movement. In Mark Baltin and Chris Collins (eds.), *Handbook of Syntactic Theory*. Oxford: Blackwell.

Samek-Lodovici, Vieri. 1996. Constraints on Subjects: An Optimality Theoretic Analysis. Doctoral dissertation, Rutgers University, New Brunswick, N.J.

Scholten, Christina. 1988. Principles of Universal Grammar and the Auxiliary Verb Phenomenon. Doctoral dissertation, UCLA, Los Angeles.

Trachtenberg, Melissa. 1996. Emphatic Affirmation in English and Danish. Ms., Rutgers University, New Brunswick, N.J.

Travis, Lisa. 1984. Parameters and Effects of Word Order Variation. Doctoral dissertation, MIT, Cambridge, Mass.

Vikner, Sten. 1995. *Verb Movement and Expletive Subjects in the Germanic Languages*. New York: Oxford University Press.

Vikner, Sten. 1997a. The Interpretation of Object Shift, Optimality Theory, and Minimalism. In *Working Papers in Scandinavian Syntax* 60, 1–24. University of Lund.

Vikner, Sten. 1997b. V^o-to-I^o Movement and Inflection for Person in All Tenses. In Liliane Haegeman (ed.), *The New Comparative Syntax*, 189–213. London: Longman.

Vikner, Sten. 1998. V2, V^o-to-I^o Movement, *do*-Insertion, and Negation in Optimality Theory. Ms., University of Stuttgart.

Williams, Edwin. 1994. *Thematic Structure in Syntax*. Cambridge, Mass.: MIT Press.

Zanuttini, Raffaella. 1997. *Negation and Clausal Structure*. New York: Oxford University Press.