Antisymmetry and Optimality: Positional Variation in Negation*

Yukiko Morimoto
Universität Düsseldorf

August, 2002

Contents

*I am grateful to Helge Lødrup and Dieter Wunderlich for valuable discussion and comments on this work. Part of this paper was presented at the Societas Linguistica Europea conference at the University of Potsdam in July 22–25, 2002. I thank the audience for useful comments and questions. The research was carried out as part of the project in Sonderforschungsbereich (SFB) 282 'Theorie des Lexikons', supported by the German Science Foundation (DFG) . This is a pre-publication draft. Comments are much appreciated.

Abstract

A fundamental assumption about clausal organization that is rigorously explored and formalized in recent years is that phrase structure is universally asymmetric. In much of the research on the asymmetry of syntax, however, the assumption that this property of phrase structure is an inviolable universal is adopted without question. An unwanted consequence is recourse to a series of movement operations that are often difficult to motivate on empirical grounds. In this paper, I investigate positional variation in negation within Optimality Theory, and argue that once the asymmetric properties of phrase structure are taken as violable constraints on output forms, they can be integrated straightforwardly to formal theory of grammar without any lexical stipulation and movement.

1 Asymmetry of Phrase Structure

Kayne (1994) develops a theory of phrase structure based on the observation that clausal organization is fundamentally asymmetric—there is a universal preference for the left edge of a structure, so that the unmarked structure is predominantly right-branching. In particular, Kayne's theory of the 'antisymmetry of syntax' attempts to explain the following typological observations:

1. The unmarked order of head (V) and complement (O) is VO.
2. Left-specifier and leftward adjunction are universally preferred to right-specifier and right-adjunction.
3. The presence of (pronounceable) functional projections (D, I, C) is preferred by head-initial languages to head-final languages.

The generalization in 3 relates to Kayne's additional claims that (i) there is no V-to-I, I-to-C movement rightward, and (ii) we therefore find no languages with "rightward V2" (as opposed to the Germanic "leftward V2"), which requires the finite verb in the penultimate position in a clause.

These generalizations are essentially a generative formulation of universal markedness about word order as articulated, for instance, by the work of Greenberg (e.g. 1963, 1966). As Kayne notes (p.35), in the domain of CP, the generalization that left-specifier is universally more preferred to the right-specifier is typologically supported by the fact that languages that require *wh*-phrases (SpecCP) to be placed at the edge of an interrogative clause always place them at the left-edge; although many languages also express *wh*-elements in situ, there are no languages that require them on the right-edge. Within the IP domain, the support comes from the fact that SVO and SOV are cross-linguistically the most commonly attested word order types, in which the subject is the initial element, presumably in SpecIP.[1] Kayne further notes that if we assume that VSO is derived from SVO by verb movement to the head of a higher functional projection, then the subject would still be the left-specifier (of the lower functional projection). According to Greenberg (1966:70), other word order types, VOS, OVS, and OSV are "exceedingly rare".

The asymmetry of syntax characterized by these generalizations also finds empirical support in the domains of language contact and syntactic change. While newly formed contact languages, pidgins, are commonly SVO and SOV, further developed contact languages, creoles, are predominantly SVO (e.g. Holm 1988). Change in word order is always from OV to VO and never to the opposite direction (cf. Venneman 1973, Hyman 1975, Faarlund 1990, Kiparsky 1996). Kiparsky (1996) in particular argues that while the enabling cause of the change from OV to VO—i.e., what allowed the co-existence of OV and VO in the first place—in Germanic languages (e.g. English, Swedish, Yiddish) is the possibility of verb-fronting in embedded clauses

[1] We could alternatively take the subject to be in SpecVP or VP-adjoined. Any of these assumptions about subject position would support the statement in 2 above.

in these languages (which was OV like modern German and Dutch), the efficient cause—what caused VO to penetrate into the system and to eventually replace OV—is the general preference for rightward complementation independent of Germanic languages; hence it provides support for Kayne's directionality hypothesis.[2]

The asymmetry of phrase structure, then, should be an essential element of what defines Universal Grammar and simultaneously limits the space of cross-linguistic variation. Issues relating to the asymmetry of syntax have been rigorously discussed and formalized mainly from the derivational perspective, although what is taken to be the basic structure differs among researchers. Kayne's Linear Correspondence Axiom (LCA) states that asymmetric c-command invariably maps to linear precedence, and it predicts those properties of phrase structure outlined in 1–3 above. LCA therefore implies that the head-initial structure is the only structure made available by UG. OV order results from leftward (never rightward) phrasal movement. Kayne's antisymmetry hypothesis is empirically supported by subsequent work by Bianchi (1999) in the domain of headed relative clauses, and is further advanced by Moro (2000).

The LCA-account has also been put to test in various OV languages, perhaps most extensively in the study of Germanic OV languages. Within this perspective, various proposals have been made to achieve OV structure from the basic, universal VO order. In Zwart's (1997) account, the verb remains in VP; OV is derived by movement of complements. An alternative approach by others such as Müller (1996) and Haegeman (1998, 2001) more closely resembles Kayne's original proposal: the verb undergoes leftward movement to a higher functional head position, followed by leftward movement of the extended projection containing the remaining elements including the complements. In contrast to Kayne's LCA-account of syntactic asymmetry, in Haider's (1993, 1995, 1997a,b,c,d,e, 2000a,b, 2002, Haider and Rosengren 2002) work, OV is taken to be the basic universal structure under the Branching Condition that requires fully right-branching structure. Haider's approach only requires leftward head-movement to derive the non-basic VO structure.

These recent studies on syntactic asymmetry are important steps towards a formal theory of grammar that properly recognizes and integrates classic findings and insight on linguistic typology and universals. Despite these recent advances and further empirical support for the antisymmetry hypothesis, however, the fundamental problem still remains: all of the derivational approaches to antisymmetry require far more derivational machinery than can be independently motivated. Haider's work briefly noted above addresses this problem, and his alternative approach to asymmetry of syntax that posits OV as the basic structure attempts to overcome this problem. However, some VO languages like Bantu show independent evidence for C and CP but no such evidence for I and IP (e.g. Bresnan and Mchombo 1987, Morimoto 2000, 2001a). These languages immediately present difficulty in motivating the intermediate functional projection which is never filled by overt syntactic elements but is nonetheless required for the verb to move through to a higher functional head position. I believe that the root of the problem lies in the fact that these derivational approaches employ inviolable constraints. In addition, in derivational approaches phrase structure is the only level of representation which must characterize both universality and typological variation. The inviolability of constraints and having only a single level of representation for all syntactically relevant information leaves movement to be the only means of modeling cross-linguistic variation.

Recent work on clausal syntax in Optimality Theory has attempted to characterize the asymmetry of phrase structure from the non-derivational perspective (e.g. Grimshaw 2001, Sells 2001b, Morimoto 2001a). As noted by these earlier studies, violability of constraints on outputs uniquely employed in OT grammar makes it possible to characterize the universal preference for unmarked structure (like those in 1–3 above) and at the same time allow for a range of

[2]Hyman (1975), on the other hand, argues that the change of OV to VO in Niger-Congo is enabled (or "activated" in his term) by the afterthought (postposing) construction, and diffused by language contact. Faarlund (1990) suggests that word order change from OV to VO is motivated by functional factors, in particular for focusing effects.

variation without stipulation on (movement) features and empty nodes that are difficult to motivate on empirical grounds. Building on earlier work, this paper attempts to provide a theory of asymmetry of syntax viewed from the output-based Optimality-Theoretic perspective. The empirical domain to be explored is the placement of negation, which exhibits symmetric configuration across languages (i.e. it is subject to the directionality parameter) of negation and verbal head. I argue that symmetric structures are not the deviant or secondary structures derived from asymmetric structures as a result of movement, but they arise precisely *because of* those asymmetric properties of phrase structure—without asymmetry, we should expect no systematic parameter of head-directionality.

The discussion in this paper proceeds as follows: in section 2, I present the cross-linguistic variation in sentential negation, mainly focusing on the forms of expression. Then I briefly discuss some typological generalizations previously put forward on similar data. Section 3 examines the syntax of negation in German. I first lay out general theoretical assumptions about the role of phrase structure in representational syntax assumed throughout the present work. These assumptions will be the basis for my discussion of phrase structure in German and other languages to follow. For a comparison, in section 4, I briefly discuss the positional variation in sentential negation, drawing on data from Korean and Swedish. In the discussion of an OT approach to clausal syntax in section 5, I propose a minor (but empirically necessary and important) revision to the core system of phrase structure constraints (cf. Grimshaw 1997, 2001, Sells 2001b). In section 6 I present an OT analysis of the positional variation in sentential negation. I show that what derives the directionality parameter is precisely the set of constraints that universally prefers the asymmetric properties of phrase structure, and not the "deconstruction" of such asymmetric structure by some independent mechanism (i.e. movement).

2 Forms of Negation and Typological Observations

According to Dahl (1979), negation is most commonly expressed in one of three forms. First, negation can be expressed as an inflectional morpheme, as illustrated in (1)–(3). (1) and (2) are examples from SOV languages, and the negative morpheme is expressed as a suffix. (3) is an SVO language, and the negative morpheme is prefixal.

(1) Turkish (SOV): suffix

John elmalar-i ser-**me**-di-∅
John apples-ACC like-NEG-PAST3SG
'John didn't like apples.'

(2) Japanese (SOV): suffix

Taroo-wa asagohan-o tabe-**na**-katta.
Taroo-TOP breakfast-ACC eat-NEG-PAST
'Taro didn't eat breakfast.'

(3) Bantu—Kinyarwanda (SVO): prefix

Sií-n-zi igihe á-záa-garuk-(ir)-a.
NEG-I-know time he-FUT-REL-return-APPL-ASP
'I don't know when he will return.' (Kimenyi 1980:69)

Second, negation can also be expressed as an invariant (morphologically uninflected) negative particle. This is exemplified from German (4) and Swedish (5). Quite a number of languages

express negation as negative particles (e.g. English *not*, French *pas*). A negative particle is also observed commonly in verb initial languages, as exemplified in (6) from Malagasy.

(4) German (SOV): negative particle

Warum gefiel unsere Lösung dem Peter **nicht**?
why pleased our solution the Peter not
'Why did our solution not please Peter?' (Haegeman 1995:168)

(5) Swedish (SVO): negative particle

Jan köpte **inte** boken.
Jan bought NEG books
'John didn't buy books.' (Holmberg and Platzack 1988)

(6) Malagasy (VOS): negative particle

Tsy manasa lamba mihitsy ve Rakoto?
NEG wash clothes at.all Q Rakoto
'Does Rakoto not wash clothes at all?' (Rackowski and Travis 2000)

Another way to express negation is to use a negative auxiliary as shown in (7)–(8). Korean shows a postverbal negative auxiliary, and Finnish, preverbal. In these languages, the negative auxiliary and the main verb are morphologically independent words, forming a verbal complex.

(7) Korean (SOV): negative auxiliary

Na-nun phyenci-lul ssu-ci **anh-ass-ta**.
I-TOP letter-ACC write-COMP NEG-PAST-DECL
'I didn't write a letter.' (Kim 2000:2)

(8) Finnish (SOV): negative auxiliary

Minä **e-n** puhu-isi
I-NOM NEG-1SG speak-COND
'I would not speak.' (Mitchell 1991)

Several observations regarding both the form and placement of negation are noted by typologists. Dahl (1979), for example, observes that negation is typically positioned close to the verb. As illustrated in the Malagasy example in (6), verb-initial languages in particular have a strong tendency to place NEG in the immediately preverbal (= sentence-initial) position (Dahl 1979, Payne 1985, Dryer 1988).

Second, Dahl also notes that negative morphemes appearing immediately after the main verb (either as a suffix to the verb stem or as an independent word) are typically inflected (e.g. for tense, mood). This is illustrated by the examples from Turkish and Japanese in (1)–(2). On the other hand, negative morphemes appearing in (immediately) preverbal position tend to be uninflected, as exemplified in (4)–(6).

Thirdly, Dryer (1988) observes that SVO languages most commonly place NEG preverbally: 47 out of 67 languages in Dryer's typological survey display this pattern. On the other hand, many, though not an overwhelming number of, SOV languages commonly place NEG postverbally: 64 out of 117 languages display this pattern, and the rest of 39 languages in Dryer's sample express negation preverbally. Hindi and Korean in (9) and (10), whose basic word order is SOV,

exemplify the latter.

(9) Hindi (SOV) preverbal negation

anjum haar **nahĩ** banaa rah-ii hai
Anjum.F.NOM necklace.M.NOM NEG make STAT-PERF.F.SG is
'Anjum is not making a necklace.' (Butt 1994:79)

(10) Korean (SOV) preverbal negation

John-un ppang-ul **an** mek-ess-ta.
John-TOP bread-ACC NEG eat-PAST-DECL
'John didn't eat the bread.' (Kim 2000:1)

In short, the placement of negation tends to be quite uniform among verb-initial languages, but among SVO and SOV languages, it is much more variable.

Previous generative research on sentential negation has provided a more articulate structural representation of negation in particular languages. In the next section I focus my attention to the syntax of negation in German, which exhibits interesting interaction with controversial issues like the positions of adverbs and arguments. I then turn to a brief discussion of cross-linguistic variation in the position of negation, focusing mostly on Korean and Swedish.

3 Syntax of Negation in German

In this section I discuss the syntactic distribution of standard negation in German. I first lay out some fundamental theoretical assumptions about the role of phrase structure in representational syntax (section 3.1). I then establish the basic clause structure of German with particular attention to the structure of V2 and functional categories and argument positions in sections 3.2–3.3 before turning to the discussion of negation in section 3.4.

3.1 The Role of Phrase Structure in Representational Syntax

In line with representational approaches like Lexical-Functional Grammar (LFG; cf. Bresnan 1982, 2001a, Dalrymple et al. 1995, Falk 2001) and OT,[3] I make the following assumptions about the architectural design of grammar:

Parallel Structures: Grammatical, semantic, and pragmatic/discourse information that is syntactically relevant are factored into different, parallel structures. In the present discussion, the relevant structures are c(onstituent)-structure and f(unctional)-structure. C-structure represents overt (= "surface") expression in a familiar X-bar scheme. It encodes categorial information and precedence and dominance relations among them. F-structure encodes grammatical and semantic information such as grammatical relations, clausal information (tense, aspect, etc), and any grammatical information expressed by inflectional elements (e.g. case, agreement, etc).

These two structures are mutually constrained by a set of correspondence principles. This architectural design permits phrase structure, which only encodes overt expression, to vary across languages and at the same time enables us to represent the "internal structure" (e.g. grammatical relations, semantic type of predicate), which is largely language-independent (at f-structure). Because phrase structure only encodes precedence and dominance relations among syntactic words and phrases, and because grammatical relations are not defined configurationally on phrase structure, every node is in principle optional.

[3] cf. Prince and Smolensky (1993), Kager (1999) for a general overview; Müller (2000) for a useful overview of some of the developments in OT syntax; Bresnan (2000), Kuhn (2001), Sells (2001a,b) for the OT-LFG approach, which is of particular relevance in the present work.

Universal constraints on representation: All constraints in LFG and OT are constraints on the well-formedness of surface forms. In OT, all constraints are universal, but they are allowed to be violated. Ranking of the constraints is the *only* source of variation.

No movement: Displaced constituents (e.g. left-/right-dislocation, topicalization, scrambling, object shift, etc) are base-generated, and no movement is assumed. Instead, the grammatical function of displaced constituents is identified through functional or anaphoric control at the level of f-structure.

3.2 V2 and Functional Categories

German exhibits two basic word order types (as characterized by Berman 2000): main-clause V2 and verb-final word order in embedded clauses (with an overt complementizer) and sentential adjuncts (e.g. relative clause). The first type is exemplified in (11).[4]

(11) a. Ich stehe jeden morgen um 6 Uhr auf.
'I get up at 6 o'clock every morning.'

b. Ich muss jeden morgen um 6 Uhr aufstehen.
'I have to get up at 6 o'clock every morning.'

c. Heute morgen bin ich um 7 Uhr aufgestanden.
'This morning I got up at 7 o'clock.'

In (11) there is no auxiliary verb, and the inflected main verb is in the second position. The example in (11b) has an inflected modal *muss* in the second position, and the infinitive verb *aufstehen* 'to get up' is placed at the end. Similarly in the non-subject initial sentence in (11c), the auxiliary *bin* is in the second position, and participle *aufgestanden* is placed at the end. Nonsubject-initial sentences like that in (11c) allow almost any kind of constituent in the first position ('Vorfeld'). A few exceptions include interjections like *ja* 'yes' and *nein* 'no', and conjunctions like *aber*/*sondern* 'but', *oder* 'or', and *und* 'and'.

All non-matrix clauses are generally verb-final as exemplified in (12). The sentence in (12a) exemplifies a sentential complement headed by *ob* 'if'; (12b) is a sentential adjunct headed by *als* 'when'; (12c) exemplifies relative clauses.

(12) a. Der Junge hat die Mutter gefragt, [ob er Süßigkeiten essen **kann**.
The boy has the mother asked if he sweets eat can
'The boy asked the mother if he can eat sweets.'

b. Ich habe etwas in deinem Schreibtisch gefunden, [als ich geputzt **habe**].
I have something in your desk(drawer) found when I cleaned have
'I found something in your drawer when I was cleaning.' SS

c. Ich male Menschen, [die fröhlich **sind**], Hunde, [die **herumlaufen**],
I draw peole who happy are dogs which run.around
Regenbogen...
rainbows
'I draw people who are happy, dogs (that are) running around, rainbows ...' SS

When a sentential *dass*-complement lacks the complementizer, the verb stays in the second position:

[4]The German examples marked as "SS" are taken from the German version of the movie *The Sixth Sense*, and those marked as "EB" are from the German version of *Erin Brockovich*. Others without sources are from my notes in a 12-week intensive German course at the Goethe-Institute in Düsseldorf, May–July 2002.

(13) a. Ich finde, [Sie **sind** nett].
I find you are nice

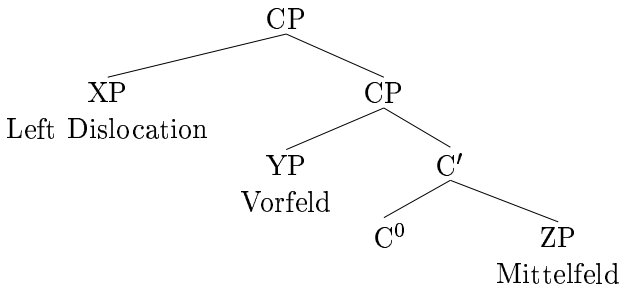
b. Ich weiß, [nur Sie **können** mir helfen].
I know only you can me help SS

The causal marker *denn* 'because' is the exception; the clause containing it requires V2, as in (14).[5]

(14) Du wirst deine Mutter sehr lange nicht sehen, denn wir fahren nach Amerika.
you will your mother very long not see because we go to America
'You won't see your mother for a very long time because we're going to America. Titanic

These two basic sets of data motivate the common assumption about the basic structure in German, given in (15), in which every root clause consists of a CP; the C^0 is filled by the finite verb, and is in complementary distribution with the complementizer in subordinate clauses (e.g. Fanselow 1987, Haider 1993, Vikner 1995, Choi 1999, Berman 2000). SpecCP is filled by any (topicalized) constituent. In subject-initial clauses, the subject fills the SpecCP position (as also argued by Kiparsky 1996).[6]

(15)



As discussed in section 4, Sells (2000, 2001b), for example, argues that in Swedish subject-initial clauses are IPs, whereas nonsubject-initial clauses are CPs. The subject therefore always occupies SpecIP. One of the controversial issues is whether the same can be assumed for German. In derivational theories of grammar this may not be much of an issue, since grammatical functions are always defined configurationally, and phrase structure is uniform across languages. On the other hand in representational or output-based theories like LFG and OT, phrase structure only encodes precedence and dominant relations and categorial realizations of overt syntactic elements. Naturally there will be a great deal of variation in such overt expression of the same semantic and grammatical content. As outlined in section 3.1, uniformity of semantic and grammatical content across languages is represented at the level of functional structure. At the level of constituent structure, any node is in principle optional. The presence of I and IP, therefore, must be empirically motivated.

Evidence that other Germanic languages like Swedish, Icelandic, and Yiddish have two-level functional projections (CP and IP) naturally comes from position of the verb. In Swedish, it is argued that subject-initial clauses are IPs, while nonsubject-initial (topicalization) clauses are CPs (e.g. Sells 2000). Example (16a) is a subject-initial sentence, and (16b), a nonsubject-initial sentence. The examples in (17) show that the initial position in a nonsubject-initial sentence must be a referential NP.

[5]Apparently clauses headed by another causal marker *weil* 'because', which has traditionally required the verb to be final now stylistically allows the verb to stay in second position. This is perhaps due to an analogy with *denn*.

[6]I will not be discussing the 'Nachfeld'; it is therefore omitted in the structure in (15).

(16) a. Jag hörde henne sjunga på radio. Swedish
I heard her sing on radio

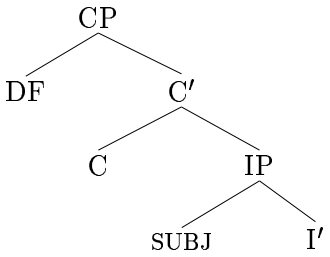
b. Henne hörde jag sjunga på radio.
her heard I sing on radio

(17) a. Jag hörde det regna på taket.
I heard it rain on the.roof

b. *Det hörde jag regna på taket.
it heard I rain on the.roof

The contrast in grammaticality between (16b) and (17b) can be explained by the following assumptions. First, the initial NP in a nonsubject-initial sentence is in SpecCP, and the NP in this position is a Discourse Function TOPIC or FOCUS; as such, it must be a referential NP. Second, the subject always occupies SpecIP. If the non-subject NP in initial position (SpecCP) must be associated with either TOPIC or FOCUS, then it immediately explains why the referential pronoun in (16b), but not the expletive pronoun in (17b), can occupy that position: discourse functions such as TOPIC and FOCUS must be either functionally or anaphorically associated with one of the argument functions selected by the predicate (cf. Bresnan and Mchombo 1987). Based on these facts, Sells proposes the two-level CP-IP structure in Swedish shown in (18).

(18) CP-IP split in Swedish



The insular Scandinavian language Icelandic (VO) displays symmetric V2, in which V2 is observed in both matrix and subordinate clauses, exemplified in (19). The existence of two functional projections CP and IP is thus clearly illustrated in symmetric V2 languages (Holmberg 1986; also Thráinsson 1986).[7]

(19) a. Það var gott [að hann **keypti** ekki bókina]. Icelandic
it was good that he bought not the.book

b. Ég veit ekki [hvers vegna Sigga **setur** aldrei hlutina á réttan stað]
I know not why Sigga puts never the.things in the.right place

Unlike Icelandic, mainland Scandinavian languages do not display symmetric V2. As we see in the Swedish examples in (20), from Platzack (1986:28), in the embedded clause the verb follows the adverbial, which normally precedes the finite verb in matrix clauses.

[7]Yiddish also shows symmetric V2, providing evidence for the CP-IP split (e.g. Diesing 1990, Vikner 1995).

(20) a. Jag frågade om Erik verkligen **hade** skrivit boken. Swedish
I asked if Erik really had written the.book

b. Här är boken, som Erik troligen **har** skrivit.
Here is the.book that Erik probably has written

c. Jag är säker på att Erik inte **har** skrivit den här boken
I am sure on that Erik not has written this here book
'I am sure that Erik has not written this book.' Platzack (1986:28)

Other Scandinavian languages such as Danish and Norwegian are the exact parallel with Swedish, displaying the main-clause V2 and embedded-clause "V3", where an adverb precedes the finite verb. This is illustrated in (21) from Danish and in (22) from Norwegian (see, for example, Weerman 1989 for Danish, Taraldsen 1986 for Norwegian; also Vikner 1995 for a comparative study).[8]

(21) a. manden **har** ikke set en bog. Danish
the.man has not seen a book

b. jeg mener [at manden ikke **har** set en bog].
I believe that the.man not has seen a book (Weerman 1988:27)

(22) a. Jens skjønte ikke dette spørsålet. Norwegian
Jens understood not this question

b. Dette spørsmålet skjønte Jens ikke
this question understood Jens not

c. Vi vet [at Jens ikke **skjønte** dette spørsmålet].
we know at Jens not understood this question

The evidence for the existence of IP in mainland Scandinavian languages from the perspective of verb position in embedded clauses is therefore not directly observable. Indirect evidence for the existence of IP and I^0 in the mainland Scandinavian languages comes from a series of syntactic change that took place in Germanic languages.

Kiparsky (1996) argues that the shift from OV to obligatory/optional VO in Germanic languages was due to the development of obligatory/optional verb-fronting to the second position—the newly created functional head I—in embedded clauses. The claim that the development of verb-fronting took place before the shift in VP headedness in those languages is uncontroversial (cf. Rögnvaldsson and Thráinsson 1990, van Gelderen 1993, Kiparsky 1996). With respect to the current state of these languages, Rgnvaldsson and Thráinsson (1990) argue that while modern mainland Scandinavian languages have lost verb-fronting, modern Icelandic retained it. Platzack (1996:190) also shows that Old Swedish had embedded V2, like modern Icelandic. Note the position of the negation relative to the verb:

[8]Helge Lødrup (p.c. 8/19/02) informs me that in the Norwegian example in (22), the negation *ikke* is often placed in front of the subject.

(23) a. hvi kristne män **räddos** ei pino — Old Swedish
why Christian men dreaded.3pl not pain
'why Christian men did not fear pain"

b. varför kristna män ej **fruktade** pina — Modern Swedish
why Christian men not dreaded.3pl pain

According to Kiparsky (p.c. 8/12/02), the change in word order in embedded clauses in Old Swedish took place around the 17th Century. This word order change is often attributed to loss of inflectional morphology (e.g. Falk 1993, Platzack 1996). As argued by Kiparsky (1997), even after the verb no longer occupied I due to the loss of inflectional morphology, IP could have remained for other reasons, such as positionally licensing the subject.

Given this historical picture, it follows that all Germanic VO languages must have an extra functional projection between CP and VP, which hosted the fronted verb prior to the shift in the VP headedness. According to Kiparsky (1996) Germanic OV language in which there was no shift in VP headedness also did not develop general verb-fronting. Thus in contrast to Germanic VO languages, where some of them have lost verb-fronting (mainland Scandinavian languages) and others retained it (Icelandic, Yiddish), OV languages such as German, Dutch, Frisian (e.g. deHaan and Weerman 1986) and West Flemish (cf. Haegeman 1992, 2001) uniformly display head-finality in embedded clauses.

To summarize, among the Germanic V2 languages, VO languages such as Swedish, Danish, and Norwegian show evidence of I. In symmetric V2 languages such as Icelandic, C is filled by a complementizer and I by a finite verb in embedded clauses. Non-symmetric head-initial V2 languages show historical evidence for I. OV languages such as German, Dutch, and Frisian, on the other hand uniformly show verb-finality in subordinate clauses, and C and I are never filled by overt syntactic elements simultaneously. Indeed, as will be illustrated in section 6, asymmetry of phrase structure predicts that OV languages uniformly lack the extra layer of functional projection (IP).

The presence/absence of V2, VP headedness, and the presence/absence of evidence for the two-level CP-IP, or any functional projections, should then all be predicted to covary. These correlating facts are often obscured by the analysis in which a common phrase structure is used to capture the universality of syntactic properties. In such analysis, I is needed in all V2 languages for the verb to move through to C, but I is never filled by an overt element in OV languages (see for example an analysis of West Flemish by Haegeman 1992). The motivation for the movement is therefore only theory-internal.

The general framework adopted in the present work, OT-LFG (cf. Bresnan 2000, Kuhn 2001, Sells 2001a,b, among others), employs the universal input and universal constraints on the well-formedness of surface morphosyntactic expression. It therefore allows us to characterize both universal phrase structure properties (or tendencies) and at the same time explain cross-linguistic variation by ranking of these constraints without recourse to movement.

3.3 Argument Positions

I Now turn to the internal structure of the Mittelfeld (ZP in (15)), first with respect to argument positioning and then the sentential negation (section 3.4).

Following Reuland (1990) and Haider (1993), Kiparsky (1996) proposes a bare VIP without a syntactically separate I projection for Germanic OV languages (with particular reference to Old English). This is consistent with the claims that German lacks the functional category I, and that there is no rightward V-to-I movement and functional heads always take their complement on their right, also argued explicitly in Kiparsky (1996). In LFG Berman (2000) takes the Mittelfeld ZP in (15) to be VP, whereas Choi (1999) posits the exocentric category S, which is motivated for languages without lexically identifiable functional category I (cf. Kroeger 1993,

King 1995). As German is a scrambling language, order of NP arguments in the Mittelfeld is relatively free (e.g. Haider 1997d, Haider and Rosengren 1998, 2002, among many others).[9] Haider and Rosengren (1998) argue that scrambled NPs are left-adjoined to VP, as schematized in (24).[10]

(24) $[_{VP}\ \mathrm{XP}_i\ [_{VP}\ \ldots\ \mathrm{e}_i\ \ldots\ \mathrm{V}]]$

For the present purposes, it is sufficient to assume that the projection in the Mittelfeld is VP, without further distinction between that and VIP or S, and arguments and (most) adverbs are VP-adjoined. A similar proposal is made by Kiss (2001) in the HPSG approach for argument positions and by Haider (1997c) for the position of adverbs in German. Additionally I assume that object NPs may appear in VP-internal position. For example, the canonical order of DO and IO is DO-IO, when both are full NPs, as shown in (25a). When one of the NPs is a pronoun, the pronoun must precede the NP regardless of the grammatical function. In (25b), DO is pronominal, and in (25c), IO. When both objects are pronominal, the order is DO-IO, as shown in (25d).[11]

(25) a. Der Vater hat **seinem Sohn**$_{IO}$ **ein Fahrrad**$_{DO}$ gekauft.
The father has his son a bicycle bought

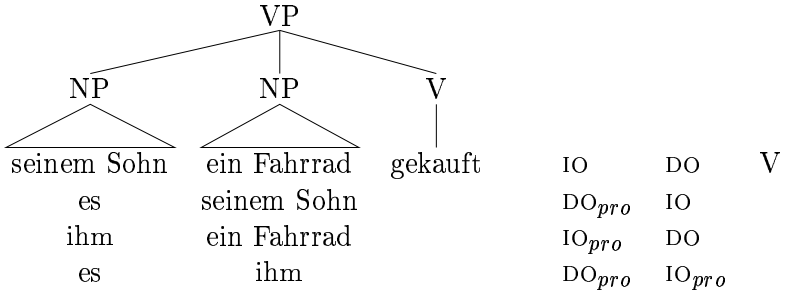
b. Der Vater hat **es**$_{DO}$ **seinem Sohn**$_{IO}$ gekauft.
The father has it his son bought

c. Der Vater hat **ihm**$_{IO}$ **ein Fahrrad**$_{DO}$ gekauft.
The father has him a bicycle bought

d. Der Vater hat **es**$_{DO}$ **ihm**$_{IO}$ gekauft.
The father has it him bought

In all of the examples (25), both objects can be generated inside VP, as shown in (26).

(26)



Note that when the sentence with an oblique (PP) argument is negated, negation typically appears before the oblique argument. As will be discussed in section 3.4, the fact that negation generally appears closest to the head-final verb position within VP but before the oblique argument suggests that arguments can be generated in the immediate projection of VP as well.

Now consider the example in (27). Here the adverbial *auch* 'also' follows the direct object.

[9] Following Haider and Rosengren (1998), I assume that only arguments scramble, and adverbs and predicates topicalize but do not scramble within the projection of the verb.

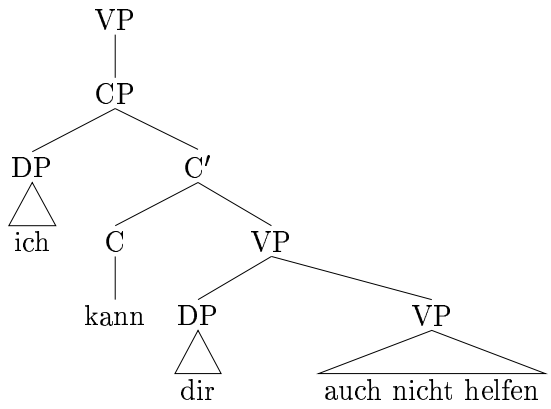
[10] In the present discussion, I do not assume that scrambling is derived by NP movement as in (24).

[11] Choi (1999) argues that relative order of the NPs in German is in part determined by their information status—relative newness or topicality. Haider and Rosengren (1998:9), on the other hand, argue that scrambling is truly optional, because unscrambled structures can produce different semantic/pragmatic interpretations that scrambled structures represent; scrambling only reduces the number of possible pragmatic interpretations. However, we see in (25) that when pronouns are involved, ordering is in fact quite restricted, and is conditioned by information structure (the relevant notion being that of definiteness).

Assuming that *auch* is positioned no lower than SpecVP, the object must be higher up, in the VP-adjoined position. The structure of the relevant (bracketed) part is shown in (28).

(27) Gleich nachdem deine Eltern geschieden wurden, war deine Mama bei einem Arzt wie mir. Er hat ihr nicht geholfen. **Deswegen glaubst du, [ich kann dir auch nicht helfen]**.
'Soon after your parents got divorced, your mom went to see a doctor like me. He didn't help her. **So you think [I cannot help you either]**.' SS

(28)



An object may appear even higher up in the structure. For example, in German time adverbials canonically appear before objects, as shown in (29a). However when the object is a pronoun, it precedes the time adverbial (29b). As shown by the brackets, in (29a) the object is sister to V *gemacht*, and the time adverb *gestern* is adjoined to VP. In (29b), the object is also VP-adjoined above the adverb.

(29) a. Wir haben [$_{VP}$ gestern [$_{VP}$ [$_{V'}$ die Hausaufgabe gemacht]]].
we have [$_{VP}$ yesterday [$_{VP}$ [$_{V'}$ the homework done]]]

b. Wir haben [$_{VP}$ sie [$_{VP}$ gestern gemacht]].
we have [$_{VP}$ it.FEM [$_{VP}$ yesterday done]]
*Wir haben gestern sie gemacht.

The object can also precede the subject when the subject is new(er) information or non-referential (as in *jemand* 'someone'):

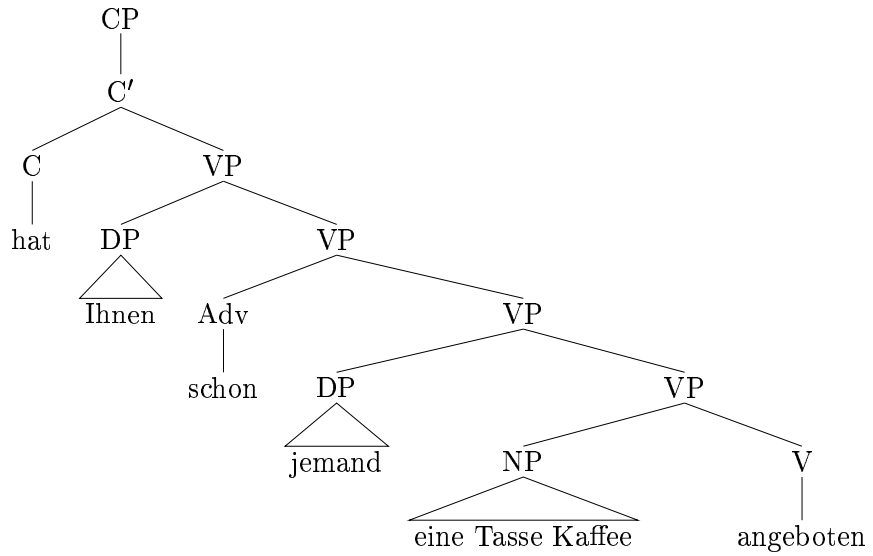
(30) a. Kann ihm die Frau helfen?
can him.DAT the woman.NOM help
'Can the lady help him?

b. Hat dir jemand wehgetan?
has you.DAT someone.NOM hurt
'Has someone hurt you?' SS

c. Hat Ihnen schon jemand eine Tasse Kaffee angeboten?
has you.DET already somebody.NOM a cup coffee.ACC offered
'Has anyone offered you a cup of coffee?' EB

The sentence in (30c), for example, can be assigned the following structure, where every constituent between the two heads *hat* and *angeboten*, except for the accusative object (*eine Tasse Kaffee*), is VP-adjoined.

(31)



In short, the data in (27)–(30) suggest that the structural position of the arguments is relatively free, and thus support the analysis in which they are adjoined to VP and are freely ordered depending on their information status. More generally, we might assume the domain of VP-adjunction sites is the domain for the elements that can be either scrambled or topicalized.

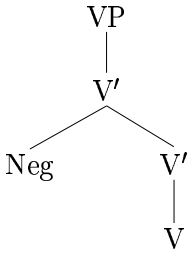
3.4 Structure of Negation

Negation in German is generally taken to be an element closest to the verb. The earlier examples in (4) and (27) (and the structure in (28)) as well as the example given below in (32) all seem to show rather clearly that the more precise generalization is that negation in German falls under the domain of VP, regardless of the actual position of the verb. In (32), sentential negation follows the direct object *den Wecker* but precedes the verb *gehört*. Adopting the idea that there are syntactic words (X^0) that do not project a phrase (e.g. Sells 1994, 1999 Abeille and Gadard 1998, Toivonen 2001), I assume that the German negative particle *nicht* is a category Neg^0 that is non-projective.

(32) Heute morgen habe ich [$_{VP}$ den Wecker nicht gehört].
Today morning have I [$_{VP}$ the alarm(clock) not heard]
'This morning I didn't hear the alarm-clock.'

Within the system of phrase structure adopted in the present work, there are a number of possible sites for the attachment of sentential negation: VP-adjoined, SpecVP, V′-adjoined, sister to V or head-adjoined to V. As I illustrate below, three of these positions—VP-adjoined, sister-to-V, head-adjoined—can be eliminated on empirical grounds. As far as I am aware, there is no reliable evidence for SpecVP vs. V′-adjoined positions, and as it is unclear SpecLP can be empirically motivated for German, I take the structure of negation to be V′-adjoined, as schematically shown in (33).

(33) Structure of negation in German

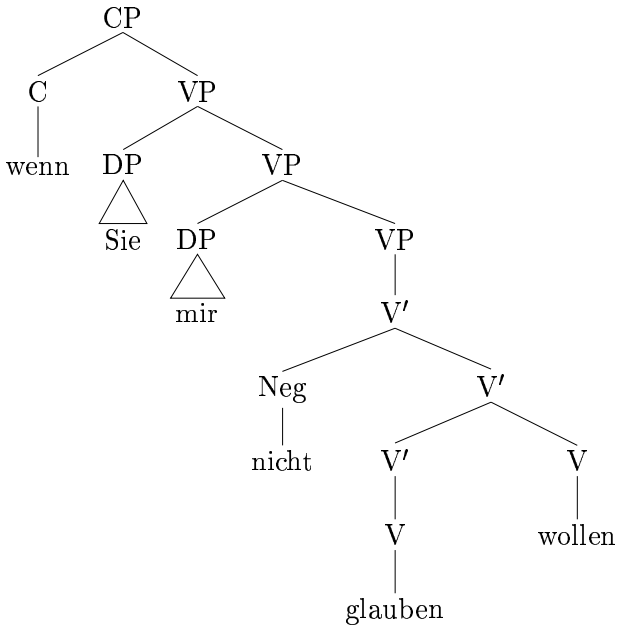


As for the other positions, first, given that *nicht* stays behind when the verb is in second position in matrix clauses as in (4), we can eliminate the possibility that negation is head-adjoined to the verb.[12]

Second, the possibility that negation is sister to V can be eliminated by examples like that in (34a), where there is a verbal complex inside VP and negation scopes over both verbs. This suggests that *nicht* could not be sister to V^0 but adjoined to V′, as shown in (34b).

(34) a. Wie können Sie mir helfen, [**wenn Sie mir nicht glauben wollen**?]
'How can you help me if you don't (want to) believe me?' SS

b.



Note in passing that the structure below the sentential negation is always V′: the non-finite verb *glauben* in (34) is therefore taken to be a V′ forming a V′ complex with the modal *wollen*. In a negative sentence, a core argument must precedes the negation. Only non-core arguments (e.g. PP) can be under V′ following the negation, as illustrated in (35).[13]

[12]The only particle I am aware of that seems to be head-adjoined is the negative intensifier *gar*, as exemplified in (i). As shown, no element intervenes between *gar* and the negation, and it also appears before the negative determiner *kein-*.

(i) a. gar nicht 'not at all'

b. $[_{NP}\ [_{D'}\ [_{D}$ gar keine $[_{N'}$ gläser]]]] drin 'no lenses at all in them' (SS)

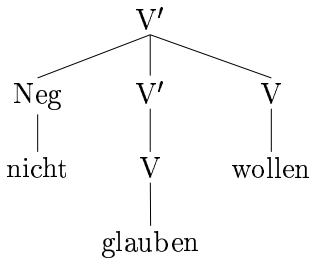
[13]Thanks to Dieter Wunderlich for bringing this point to my attention.

(35) a. Erinnern Sie sich nicht an Ihre Patienten?
remember you REFL not at your patients
'Don't you remember your own patients? SS

b. Beim freien, assoziativen Schreiben nimmst du einen Stift in die Hand, und dann setzt du ihn auf ein Blatt Papier und fängst einfach an zu schreiben. Du liest nicht, was du schreibst, **du denkst auch nicht darüber nach**.
'By free associative writing, (it means) you take a pen in your hand, and then you put it on a piece of paper, and just start writing. You don't read what you're writing, **you don't think about it either**. SS

Now there is another slightly non-standard but possible structure under a parallel-structure approach like LFG—namely, the V′ structure that is non-binary, and where the negative particle is directly under V′, as shown in (36). A flat VP structure similar to that in (36) is also proposed in HPSG approaches to German (e.g. Hinrichs and Nakazawa 1994, De Kuthy and Meurers 2001).

(36)



However, this analysis is suspicious when we compare negation with the behavior of a modifier *ganz* "very, entirely, complete", which requires strict adjacency with X^0 that it modifies and does not scope over any other element. Some examples are given in (37). As we see X^0 *ganz* modifies may be any syntactic category.[14]

(37) N: die ganze Zeit 'all the time'; den ganzen Tag 'the whole day'; in ganz Deutschland 'entire Germany'; für die ganze Familie 'for the entire family'

A: ganz schnell 'really fast'; ganz egal, was 'whatever'; bleib ganz still 'stay really quiet'; ein ganz normaler Penny 'a very normal penny'; mit ganz viel Schokoladenkuchen 'with lots of lots of chocolate cake'

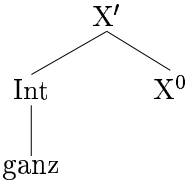
Adv: sie fuhren ganz weiter 'they drove farther and farther'; nicht ganz genau wissen 'not really exactly know'; ganz ehrlich 'very honestly'

V: Die haben das ganz übernommen 'they just/entirely took care of it'

One interesting property of this modifier that seems to suggest a tight relation with the modified head is that it modifies only the X^0 that immediately follows it. For example, *ganz gut gemacht* only means 'did really well' and not 'did everything well'; *ganz gelesen* means something like 'read it all', but *ganz schnell gelesen* means 'read really fast' but does not imply that everything is read. Even when there are two adjectives (or adverbs) that can be modified by *ganz*, such as *deutlich gut geschrieben* 'wrote clearly, well', *ganz deutlich gut geschrieben* only means 'wrote very clearly, (and) well', not 'wrote very clearly, very well'. These data then suggest that *ganz* is right adjacent to X^0, as schematically shown in (38). *ganz* is taken to be a non-projective syntactic word and is referred to as the Int(ensifier).

[14]The examples are taken from various sources including CNN Deutschland and the German version of the DVDs, *The Sixth Sense*, *Erin Brockovich*, and *AI*.

(38)



It can be shown that *ganz* is not head-adjoined (see footnote 15), so a possible argument that *ganz* is head-adjoined to X^0 while Neg is sister to V would be untenable.[15]

The negative particle *nicht*, on the other hand, does not hold such a tight relationship with the verb. In short, the scope of negation over complex predicates and the comparison with modifiers like *ganz* that hold much tighter relationship with the verb together suggest that negation is higher up in the structure than sister to V.

Now we consider VP-adjunction as a possible site for negation. First, for obvious semantic reason, the *nicht* that denotes sentential negation does not freely scramble or topicalize, as also pointed out by Haider (1997c), and instead stays rigidly in the the domain of VP. Second, as mentioned earlier with respect to the earlier example in (4), repeated here in (39), German negation does not require adjacency with the verb.

(39) Warum gefiel unsere Lösung dem Peter **nicht**?
why pleased our solution the Peter not
'Why did our solution not please Peter?' (Haegeman 1995:168)

Not only in V2 clauses, but also in partial VP-topicalization like that in (40), the negation stays behind in the VP domain.

(40) Context: a conversation (a "mind game") between a child (A) and a psychologist (B); the psychologist tries to help the child, but is being unsuccessful.

A: Was denke ich jetzt?
'What am I thinking now?'

B: Ich weiß nicht, was du gerade denkst.
'I don't know what you're thinking now.'

A: Ich finde, Sie sind nett. Aber **helfen können Sie mir nicht.**
'I'm thinking, you're nice. But You can't help me.' SS

Compare this with English adverbs *all* and *never*, which are standardly analyzed to be adjoined to VP. As such, when there is no VP, these adverbs cannot precede the empty VP site cf. Baker 1971, Sag 1976).[16]

[15] That *ganz* cannot be head-adjoined can be shown by examining the structural distinction between *ganz* and the negative intensifer *gar*, which I assume is head-adjoined (cf. footnote 12), even though they are both immediately adjacent to what they modify. The difference is that *ganz* can be reiterated while *gar* cannot. This is explained if *gar*, but not *ganz*, is head-adjoined.

(i) a. Wenn du etwas **ganz, ganz, ganz Besonderes** für mich machst, eine Spezialmission, dann geh ich loss und sage Mami, dass ich dich lieb habe. Dann wird sie dich auch lieb haben.
'If you do something very very very special for me, a special mission, then I'll go and tell Mommy I love you. Then she'll also love you.' AI

b. *gar gar gar nicht

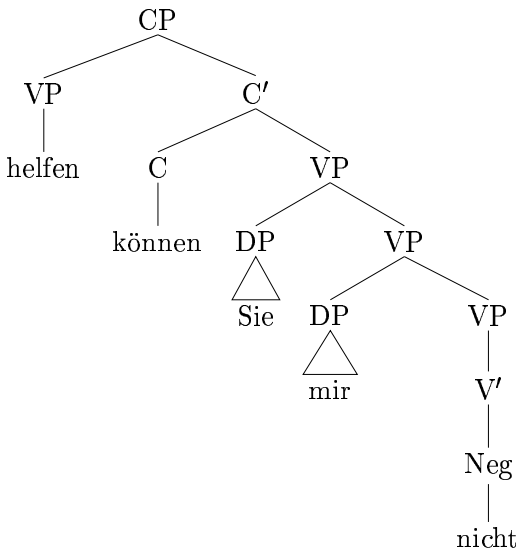
[16] As discussed in the next section, Sells (2001b) uses this diagnostics to argue that Swedish negation must be outside VP rather than VP-adjoined.

(41) a. How happy are they (*all)?

b. Max has been to France several times, but Kim never has/*has never.

The example of partial VP-topicalization in (40) thus shows that negation cannot be adjoined to VP. And clearly in German, it could not be above VP (see footnote 16). The structure for the relevant part of the utterance (boldfaced) is shown in (42).

(42)



In contrast to sentential negation, constituent negation seems to be VP-adjoined. In constituent negation, *nicht* is placed immediately before the negated constituent in the Mittelfeld:

(43) a. Ich wollte mich bei Ihnen bedanken. [**Nicht** nur dafür, dass Sie mich wieder heraufgezogen haben], sondern auch für Ihre Diskretion.
'I wanted to thank you for what you did. Not just for pulling me back, but also for your discretion.' Titanic

b. Ich kann [**nicht** einfach] gehen.
'I can't just go.' Titanic

c. Und [**nicht** wie bei Versicherungen], die höchstens einen Teil zahlen.
'And not like with insurance (companies), where they pay part of it at the most.' EB

Thus we might generalize that sentential negation appears in the smaller domain of VP, in V′-adjoined position, while constituent negation is in adjoined position immediately preceeding the negated constituent.

Finally, I note two additional observations that relate to negation and VP-adjoined position. First, unlike *nicht*, the negative particle *nie* 'never' has the distribution of an adverb: for example, like an adverb, it can be placed sentence-initially, while *nicht* cannot (44a); it can also occur before a core argument in the Mittelfeld (44b).

(44) a. Nie habe ich das gesagt.
Never have I that said
cf. *Nicht habe ich das gesagt.

b. weil ich nie/??nicht den Wecker aufgezogen habe
because I never/??not the alarm.clock wind have ...
'because I never wound the alarm clock ...'
cf. Wei ich den Wecker nicht aufgezogen habe ...

The contrast in the distribution of *nie* vs. *nicht* supports the idea adverbs are VP-adjoined while the negative particle *nicht* is lower.

Secondly, research on acquisition of negation in German suggests that in first language aquisition *nicht* starts out in a higher position, arguably in VP-adjoined position along with other adverbs. Clahsen, Eisenbeiss, and Penke (1996) and Penke (2001) report that children at stage II (in the classification of stages I–III) whose word-base mean length of utterance (MLU) is around 2.5 misplace the negative particle as examplified in (45), from Penke (2001:357, ex.5). Penke (2001:355, table 2) reports that all utterances with negation (3 instances) found in children at stage I (MLU < 1.75) had the order Neg-subject as in (45); at stage II, the correct order is produced still only 16.7% of the time. (2 out of 12 instances).

(45) a. schmeckt **gar nich** die wurst — Simone, stage II
tastes at.all not the sausage
cf. Mir schmeckt die wurst **gar nicht**. (adult utterance)

b. da is **nich** papa pauf — Annelie, stage II
there is not papa on.it
cf. da ist papa **nicht** rauf. (adult utterance)

These data suggest that in early stages of acquisition, children acquirig German generalize the distribution of all forms of negation and other adverbs to be a single category (adverbs). Penke's (p.c. 8/14/02) data further suggest that during stages I and II, children do not differentiate constituent negation and sentential negation in terms of the structural position. As illustrated in (43), constituent negation is expressed by placing the negative particle immediately before the negated constituent. We find the same distribution of *nicht* in children's (intended) sentential negation:[17]

(46) a. baby nich nuckel habe
baby not "pacifier" have
cf. Das Baby hat keinen Schnuller. (adult form)

b. brauche nich lala.
need not "pacifier"
cf. Ich brauche keinen schnuller. (adult form)

If most adverbs including *nie* 'never' are indeed in VP-adjoined position as I suggest here, and if in fact constituent negation in German is also VP-adjoined while sentential negation is expressed lower (closer to V) in the structure then the apparent overgeneralization of *nicht* to treat it as one of the adverbs seems like a natural step in acquisition, as the sentential negation *nicht* would then have a unique syntactic distribution and is the odd one out.

Another aspect of German negation is that the negative particle *nicht* cannot be used to negate indefinite NPs, as illustrated in (47). The existence of the negative indefinite article *kein-*

[17]Thanks to Martina Penke for sharing her acquisition data and discussion of the relevant data.

apparently blocks the use of the negative particle.

(47) a. Ich brauche keine neue Kette.
I need no new necklace

b. *Ich brauche eine neue Kette nicht.

The apparent blocking effect becomes more obvious when we compare the sentential negation using *nicht* vs. *nie* 'never'. In the latter, this negative particle is used to negate indefinite NPs. This is illustrated in (48), and also in the earlier example in (44b).[18]

(48) Sie haben alles bezahlt. Einfach so. Wir haben **nie eine Rechnung** gesehen.
They payed everything. Just like that. We never saw a bill. EB

cf. Wir haben **keine Rechnung** gesehen.
'We didn't see any bill.'

To summarize, the aim of this section has been to motivate the elements of clause structure and their positions in German in relation to the structure of sentential negation. I hope to have provided empirical motivations for the following claims about German phrase structure:

- The root node is always CP. In a matrix clause, the inflected verb occupies C; in a subordinate clause, the complementizer occupies C, and the verb is under VP.
- The Mittelfeld under CP constitutes VP, and arguments and adverbs are generally VP-adjoined. Objects can also be generated under V′.
- Sentential negation is adjoined to V′, while constituent negation is adjoined to VP.

The structure motivated in this section will be the basis for my OT analysis of negation in section 6.

4 Cross-Linguistic Variation in the Positions of Negation

This section illustrates cross-linguistic variation in the position of negation, drawing on two language types, Korean and Swedish.

4.1 Korean

In a study of the syntax of Korean negation, Sells (2001c) argues that, despite the morphophonological similarities between the two forms, the preverbal negative particle *an* (commonly referred to as 'Short-Form Negation') we saw in (10) and the postverbal negative verb *anh-* ('Long-Form Negation') in (7) involve different syntactic constructions. Short-Form Negation (SFN) is analyzed a non-projective syntactic element Neg (see also Sells 1999) which combines with V to form another V, whereas Long-Form Negation (LFN) is analyzed as V^0 which takes a V (or VP) complement. The structures are shown in (49) (Sells 2001c)

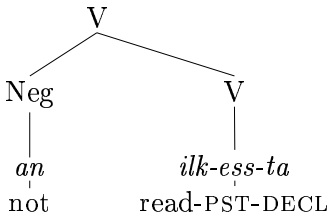
[18]There are instances where a definite NP can be negated by *kein-* (i):

(i) A: Du wirst dich nicht noch einmal so aufführen, Rose. Hast du verstanden?
'You will never behave like that again, Rose. Do you understand?

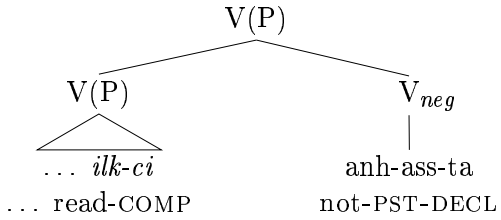
B: Ich bin keiner deiner Vorarbeiter, die du herumcommandieren kannst. Ich bin deine Verlobte, Caldon.
'I am not your foreman that you can command. I'm your fiansé, Caldon.' Titanic

Native speakers seem to get the emphatic interpretation in the use of *kein-* with a definite NP, as we can also tell from the context.

(49) a. Short-Form Negation



b. Long-Form Negation



Sells provides evidence for the structure of SFN in (49a) from complex predicates in Korean. In examples like those in (50), SFN *an* always precedes V_1 ('read'), and cannot be placed between V_1 and V_2 (Sells 2001c:4).

(50) a. an ilk-e (*an) po-ta
NEG read-COMP try-DECL
'not try to read'

b. an ilk-e (*an) cwu-ta
NEG read-COMP give-DECL
'not give the favor of reading'

c. an ilk-e (*an) siph-ta
NEG read-COMP want-DECL
'not want to read'

The sentences in (50) are therefore ambiguous: (50a), for example, could mean either 'not try to read' as in the translation where *an* scopes over the entire V_1-V_2 complex, or 'try not to read' where *an* negates just V_1. The scopal ambiguity with these complex predicates can be captured structurally as in (51) (Sells, p.6). The first interpretation, 'not try to read' is represented by a non-binary structure in which *an* scopes over both verbs. In the second interpretation 'try not to read', *an* is head-adjoined to V_1, and V_2 is outside its scope.[19]

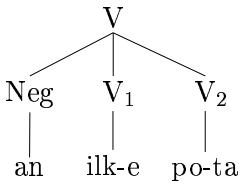
[19]Sells additionally provides examples with a nice contrast showing that it is possible to negate just V_2. The example in (19a) shows that negation unambiguously scopes over just 'want'; in the example in (19b), in contrast, only V_1 is negated:

(i) a. na-nun Swuna-lul po-ko siph-un mankhum-ina Mira-lul an po-ko siph-ta
I-TOP Swuna-ACC see-COMP want-NMLZ extent-as Mira-ACC NEG see-COMP want-DECL
'I don't want to see Mira as much as I want to see Swuna.'

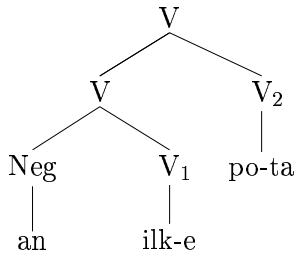
b. na-nun ku namca-lul kyelkho tasi an manna-ko siph-ta
I-TOP that man-ACC ever again not meet-COMP want-DECL
'I want to never meet that man again.'

The scopal contrast illustrated in (i) further support the structures associated with the two interpretations in (51).

(51) a. Negating V_2 ('not try to read')



b. Negating V_1 ('try to not read')



In short, in Korean both SFN and LFN fall within the VP domain: SFN *an* is a non-projective syntactic word Neg which forms V^0 with a verb. LFN *anh-*, on the other hand, is a negative verb that takes a V(P) complement. The analysis of these negative elements is consistent with the observation that Korean (also Japanese) lacks any independent evidence for functional categories (cf. Cho and Sells 1995, Sells 1995).

4.2 Swedish

Swedish exhibits main clause V2, and negation is argued to fall within the IP domain. Sells (2000) specifically argues that the constraint on the position of negation must be negative—that Swedish negation cannot be inside VP. For example, in a subordinate clause in which there is no V2 requirement, *not* can be placed in the position before the subject, or before the main verb, but not before the direct object, as illustrated in (52)[20] (adapted from Holmberg (1993), cited in Sells 2000).

(52) att (inte) Johan (inte) [$_{VP}$ gillar (*inte) mig] ...
that (not) Johan (not) [$_{VP}$ likes (*not) me] ...
'That Johan does not like me' (bothers me)

Additionally, in a V2 clause, negation (and any adverb) can be placed sentence initially, in SpecCP (Sells 2000, ex.7):

(53) Inte var et Selma
not was it Selma
'It was NOT Selma.'

Data that involves 'object shift' further suggests that negation is under I′. In Swedish, a pronoun can 'shift' forward, outside the canonical VP-internal position, as exemplified in (54). Example (54a) involves no object shift, and in (54b), the pronominal object *den* is shifted outside VP (based on Sells 2001b:62, ex.97).

(54) a. Han gav inte [$_{VP}$ **den** till henne]
he gave not [$_{VP}$ it to her]

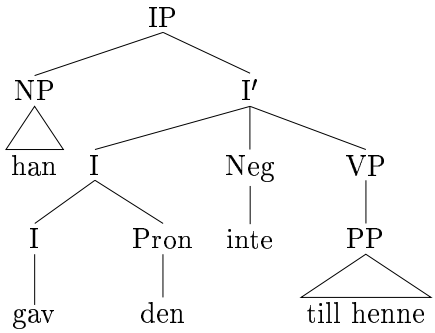
b. Han gav **den**$_{DO}$ inte [$_{VP}$ __$_{DO}$ till hanne]
he gave it not to her
'He did not give it to her'

In examples like that in (54), the shifted pronominal is analyzed to be head-adjoined to I,

[20]The canonical position for sentential negation is the position after the subject. Thanks to Sofia Lindgren for confirming the (un)grammaticality of each position of negation in example (52).

as in (56).[21]

(56)



Sells (2001b) also entertains the possibility that *inte* is adjoined to VP, thereby conforming to the standard assumption that functional projections have binary branching. However, based on the standard diagnostics for VP-adjunction illustrated earlier from English (41), he shows that negation in Swedish could not be adjoined to VP: while the English negative adverbs *never* cannot be left behind in the empty VP-site, Swedish negative particle *aldrig* 'never' can (Sells, p.61, ex.116). As shown in (57), taken from Sells (p.29, originally provided by Holmberg 1999), unlike German, Swedish negation *aldrig* 'never' and *inte* 'not' have the same syntactic distribution of adverbs.

(57) a. Tillsammans leker dom nästan **aldrig**.
together play they hardly never
'They hardly ever play together.'

b. Kysst har jag henne **inte**.
kissed have I her not
'I have not KISSED her.'

c. Skriver gör han **sällan**.
writes does he seldom
'He seldom WRITES.'

In short, Sells' (2000, 2001b) work shows conclusively that Swedish negation is in the IP domain, and specifically it occupies a position under I′ along with other adverbs.

4.3 Summary

The typological generalizations about forms of negation reported in previous typological work and the syntax of negation in German, Korean, and Swedish discussed in the previous two

[21] Head-adjunction to I is not the only possibility for these shifted pronominals. Sells presents data on what he calls 'adverbial intermingling', in which for some speakers the shifted object can be intermingled with a cluster of adverbs including negation. The % sign indicates the acceptability of the example is subject to speaker variation (Sells 2001b:63, ex.121; original sources cited therein):

(55) a. Igår läste han **dem** ju allstå troligen inte
yesterday read he them as.you.know thus probably not
'Yesterday as you know he probably did not read them thus.'

b. Igår läste han ju **dem** allstå troligen inte

c. Igår läste han ju allstå **dem** troligen inte

d. Igår läste han ju allstå troligen **dem** inte

e. Igår läste han ju allstå troligen inte **dem** (no object shift)

Here the shifted pronominal *dem* is taken to be under I′ along with all the adverbs.

sections together suggest that there are systematic correlations in the forms of negation, head-directionality, presence/absence of functional categories, and structural position of sentential negation, as summarized in (58). The table presents a sample of languages that represent VO and OV word order types, as well as the verb-initial language Malagasy (VOS). For each language (type), the table indicates the form of negation (Neg form), syntactic (or morphological) position of negation (Neg pos), position of the verb (V pos), and the presence/absence of functional categories (F).

(58)

	Languages	Neg form	Neg pos.	V pos.	F
I.	German (OV)	particle	V′-adjoined	V2	C
II.	Swedish (VO)	particle	under I′	V2	I,C
III.	Korean *an/anh-ta* (OV)	part./V_{neg}	Neg^0-V/V_{neg}-V(P)	V	–
IV.	Japanese (OV)	suffix	V-NEG	V	–
V.	Bantu (VO)	prefix	NEG-V	V	C
VI.	Malagasy (VOS)	particle	VP domain	V	–

The table in (58) highlights the following generalizations: first negation takes the form of a non-projective X^0 element such as German *nicht*, Swedish *inte*, Korean *an*, or Malagasy *tsy*, a negative verb like the Korean long form negation *anh-* that takes a lexical V(P) complement, or a morphological affix as in Japanese and Bantu. Second, OV languages uniformly lack empirical evidence for lexically filled *head-final* I or C. The existence of a class of complementizers in German justifies the postulation of *head-initial* C, where an inflected verb can also appear to satisfy the V2 requirement. Third, negation is generally taken to be inherently associated with a functional category like Infl (cf. Pollock 1989, Haegeman 1995:107, Hornstein 1995). As such, in languages like Swedish which show evidence for IP, negation is attracted to the head of that functional projection rather than the LP (e.g. VP) domain. English also has an inventory of Infl elements, and like Swedish, negation falls within the IP domain (Bresnan 2001a).

While the typological work on negation provides an interesting set of generalizations regarding the forms of negation and the potential relation between that and word order (in particular with respect to the position of the verb), it generally lacks a precise characterization of the positional variation of negative elements across languages. And while much of the generative research on sentential negation has focused on the structural properties of negative elements (e.g. whether they are functional heads that project NegP, whether they are in the domain of IP or VP, etc.), it generally does not articulate the potential relations between the positional variation and the form of negation and other functional categories that may or may not exist in the language. The present work therefore attempts to bring together the findings in these two domains of research, and to provide a coherent analysis of these correlating facts. In the remainder of this paper, I present an OT analysis of the typology of sentential negation summarized in (58), taking into consideration further details of German negation discussed in section 3. I first introduce a set of universal constraints that derives a word order typology and constraints on positioning of the verb and negation (largely ignoring argument and adjunct positioning) in section 5, and then turn to the illustration of constraint interaction with respect to the typology of sentential negation (section 6).

5 Asymmetry and Head-Directionality in OT

In the last five years or so starting with the pioneering work by Grimshaw (1997), the predominant approach to clausal syntax in OT has moved away from the notion of precedence and relative order, and has attempted to develop a system of constituent ordering based on the notion of alignment. The idea of Generalized Alignment, first proposed by McCarthy and Prince (1993) to account for various morphophonological phenomena, has been reinterpreted in

the domain of syntax, and alignment has been restricted only to left edges in order to capture the universal "leftness" tendency (as outlined at the beginning of this paper) and preference for right-branching structure (e.g. Grimshaw 2001, Sells 2001b, Morimoto 2001a). Sells' work, in particular, aims at recasting Kayne's theory of antisymmetry within OT, and the set of constraints proposed in his work predicts a number of important typological generalizations. Morimoto (2001a,b, 2002a) builds on the work by Sells and proposes an additional formal machinery within the general concept of alignment which enables us to provide a unified account of adjacency and directionality parameter (e.g. in head-complement, modifier-head structures). In the present work, following a lead by a recent proposal by Broadwell (2001, 2002) within OT, I motivate a further modification to the constraint system developed in OT-LFG, which I believe better represents the intuitions about the branching preference across languages.

5.1 Clausal Skeleton

Interaction of the three constraints given in (59) derives a typology of basic branching patterns.

(59) a. Head-L(eft): Every projecting X^0 is left in its immediate constituent.

b. Spec-L(eft): Specifier of XP is leftmost in XP.

c. Branching Uniformity (BrU): Directionality of X^0 and all of its extended heads and their projections (= 'co-heads') must be uniform.

Head-Left, originally proposed by Grimshaw (1997) and widely adopted in subsequent work, prefers every X^0 to be leftmost in its local structure. It therefore prefers head-initial structure. Given that the existence and unique syntactic distribution of non-projecting X^0 elements is well-motivated in recent work by Toivonen (2001), in the present work, I restrict the X^0 in Head-L to be a projecting X^0.

Spec-Left, also due to Grimshaw's work, prefers specifier to be left in the the smallest maximal projection containing it: SpecIP must be the leftmost element in IP, SpecCP must be the leftmost element in CP, and so forth. Thus, while Head-L is restricted to the local structure, Spec-L applies in a larger domain (XP).

Branching Uniformity (BrU), inspired by Broadwell's (2001, 2002) recent proposal, replaces Sells' (2001b) proposal Spine-R(ight), which is essentially a reformulation and refinement of Haider's Branching Condition (references cited above) that requires fully right-branching structure. A "spine" can be reinterpreted as Haider's 'projection line', which includes X^0 and its (extended) projections. Based on an intriguing set of data on pied-piping with inversion inside specifier-head (e.g. possessor-possessum) and head-complement structures in San Dionicio Zapotec, Broadwell (2001) proposes a constraint called 'consistency'. This constraint is an OT version (i.e. violable) of Giorgi and Longobardi's (1991, chapter 2) 'Consistency Principle' stated in (60).[22]

(60) Consistency Principle (Giorgi and Longobardi 1991:98):
An XP immediately expanding a lexical category on the non-recursive side is directionally consistent in every projection.

A 'non-recursive' XP is the direct extension of a complement-taking head. The 'recursive' side is the side on which complements or specifiers appear. The principle thus requires that the directionality of X^0 and its (extended) projections in the non-recursive side (e.g. V, VP, I, IP, C, CP) must be uniform. This particular concept of "heads and their extension" is equivalent to 'co-heads' in LFG (= syntactic nodes that map to the same functional structure), or 'extended

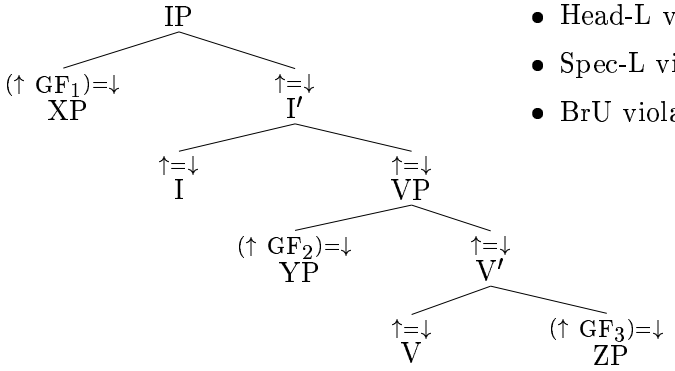
[22] In the most recent work, Broadwell (2002) reformulates Giorgi and Longobardi's (1991) Consistency Principle in (60) to account for a broader range of data.

heads' in Grimshaw (2000) and Bresnan (2001a). Co-heads are what constitute a 'clausal spine' in Sells (2001b). The 'projection line' in Haider's work expresses essentially the same concept.

Branching Uniformity (BrU) has the same effect as Spine-R without making reference to "rightness" that we ideally want to avoid in order to capture the asymmetry and preference for leftness in syntax. Unlike Sells' Spine-R or Haider's Branching Condition, however, BrU does not exclusively prefer right-branching structure. It only prefers uniform branching. Thus, head-final languages are optimally fully right-branching; head-initial languages are optimally fully left-branching. What prefers right-branching in head-initial languages is the interaction of BrU and Spec-Left. Importantly, there are no Spec-Right (or Head-Right). And the specifier's sister node is X′, an extended head. Intuitively, this means that the overall branching preference across languages will be right-branching. To illustrate how these constraints figure in OT-LFG grammar, let us consider a schematic SIVO structure in (61).[23]

Head-L evaluates the position of V and I, and they are both leftmost in their immediate constituent (V′ and I′ respectively) in (61). We have two specifiers, SpecIP and SpecVP, and they both respect Spec-L (violation = 0). For the present purposes, it is sufficient to note that all the nodes that are annotated ↑ = ↓ are 'verbal heads' (co-heads), as they all map to the same functional structure, and hence constitutes a single domain in which BrU is evaluated. Given the ranking in (61b), BrU prefers right-branching. As with Spine-R, each co-head (annotated ↑ = ↓) will be evaluated with respect to BrU.

(61) a. SIVO structure



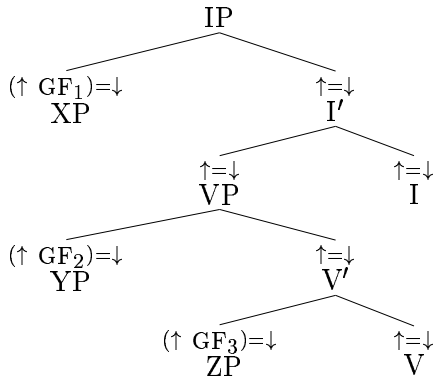
- Head-L violation: 0.
- Spec-L violation: 0.
- BrU violations: 2 (I and V).

b. Ranking: Head-L, Spec-L ≫ BrU

Now compare the head-initial SOVI structure in (61) with the head-final SOVI structure (62), where the functional category I is also head-final:

[23]The structure in (61) and the subsequent trees representing different word order types are originally discussed in Sells (2001b).

(62) a. SOVI structure



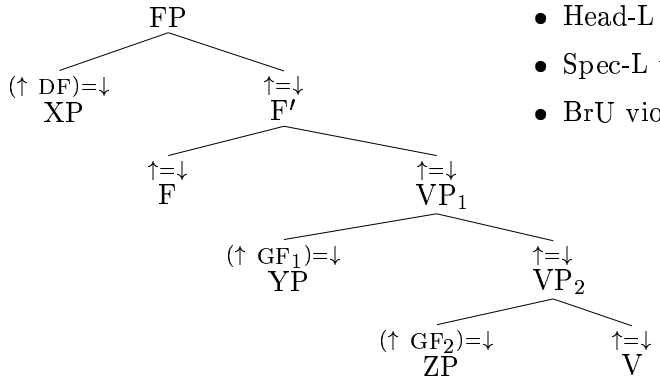
- Head-L violations: 2 (I and V).
- Spec-L violation: 0.
- BrU violation: 1 (VP).

b. Ranking: Spec-L ≫ BrU ≫ Head-L

Here, as with the head-initial structure in (61), the high-ranking Spec-L constraint prefers left-specifiers (XP and YP). Given the ranking of Spec-L relative to the other two, BrU will again prefer right-branching structure. In head-final languages, BrU must crucially outrank Head-L. If the X^0 heads are head-final, Head-L is obviously more severely violated, but the violation of BrU will be fewer than if the X^0s align left (= head-initial). Thus given the top-ranked constraint Spec-L, the ranking BrU ≫ Head-L prefers head-finality.

However, as discussed by Sells (2001b), there are more optimal structures that these constraints can produce for head-final languages under the same ranking. Consider for example, the structure in (63), where the functional category F licenses its complement on the right, but lexical head V takes its complement on the left. This is essentially the type of structure observed in OV languages with V2 like German. Here and in the subsequent structures in (64)–(65) without functional projections, I take the head-final clause to be VP, following the proposals by Sells (1994, 1995, 2001b) for Japanese and Korean and a similar structure adopted by Kiparsky (1996) for head-final root node in Old English.

(63) a. SIOV structure (e.g. German nonsubject-initial clause)



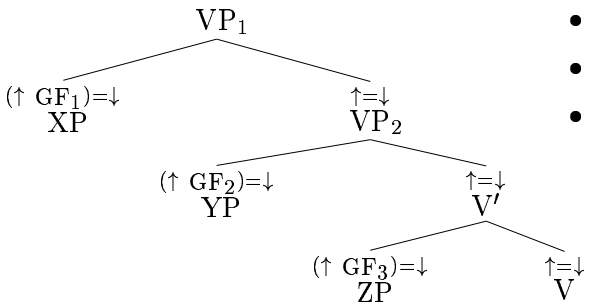
- Head-L violation: 1 (V).
- Spec-L violation: 0.
- BrU violation: 1 (F).

b. Ranking: Spec-L ≫ BrU ≫ Head-L

This structure violates Head-L only once, as F^0 is left-headed. The violations of Spec-L and BrU remain the same as those in (62). These constraints thus support the claim that functional categories are never right-headed, or that there is no rightward V-to-I or I-to-C movement and hence we find no rightward V2 languages (e.g. Kayne 1994, Kiparsky 1996).

Given the set of just three constraints considered so far, there is an even more optimal head-final structure, namely the one without any functional projection, shown in (64).

(64) a. SOV structure



- Head-L violation: 1 (V).
- Spec-L violation: 0.
- BrU violation: 0.

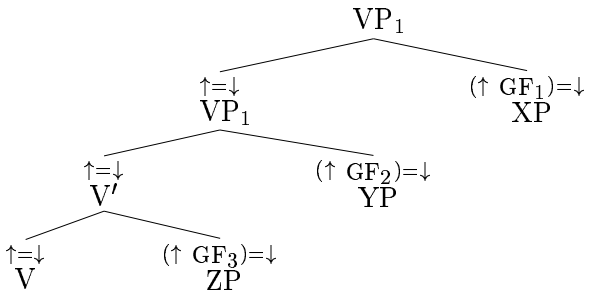
b. Ranking: Spec-L ≫ BrU ≫ Head-L

The structure in (64) is fully right-branching with a single right-headed V^0 at the bottom. This structure incurs no violation of BrU or the highest-ranked Spec-L constraint. As pointed out by Sells (2001b), this captures the observation that in head-final languages, inflectional elements such as tense and aspect and complementizers are typically affixal, and do not show evidence for lexical Infl or Comp (e.g. Cho and Sells 1995, Sells 1995 with specific reference to Japanese and Korean).[24] For the structure in (63) to be optimal then, as in German, there must be an additional constraint that forces the presence of a functional category, such as V2.

Additionally, note that the top node of the head-final structure in (63)–(64) is taken to be VP, so the subject is in adjoined position. As also predicted in Sells' system these constraints effectively prefer left-adjunction to right-adjunction: adjunction creates another layer of extended verbal heads, and the directionality of those verb heads must be uniform. For example, right-adjunction of the subject NP (GF_1) in (64) would force the sister node VP_2 to be on its left. As VP_2 is an extended projection of V^0, this would violate BrU, which, given the high-ranking Spec-L, prefers right-branching structure. Therefore no additional constraint or stipulation is necessary to force left-adjunction.

So far, the system of constraints adopted here that derives the optimal head-initial and head-final structures work identically with Sells' system that employs Spine-R. The difference with respect to the evaluation of BrU vs. Spine-R emerges in VOS languages like Malagasy. Demoting Spec-L below BrU and Head-L, and ranking BrU below Head-L means that BrU will prefer fully left-branching structure, as shown in (65).[25]

(65) a. VOS structure



- Head-L violation: 0.
- Spec-L violation: 1.
- BrU violation: 0.

b. Ranking: Head-L ≫ BrU ≫ Spec-L

[24]—although the structure in (64) deviates from the proposal by Cho and Sells (1995) and Sells (1995) in that in their work VP_1 and VP_2 are both represented V′, and all arguments are therefore adjoined to V′. That might be a more desirable structure, in which case Spec-L might need to be reformulated. The same can be said about the verb-initial structure in (65).

[25]As pointed out in footnote 24, the structure in (65) may need a slight modification for the clause structure of VOS languages like Malagasy.

In contrast to the zero violation of BrU, Spine-R would be violated three times at the nodes annotated $\uparrow = \downarrow$ (VP_2, V′, and V). Although the optimal structure for VOS languages will be the same in both systems, BrU captures the asymmetry in the uniformity of headedness in SVO vs. verb-initial languages. That is, some SVO languages show a mixture of head-finality and head-initiality across categories: English, for example, exhibits head-finality within NP, while the rest of the XPs are head-initial; verb-initial languages like Malagasy (VOS), on the other hand, exhibit completely uniform head-initiality across all syntactic categories. This suggests that languages simply prefer uniformity of headedness. The preference for right-branching is then not the result of any single constraint but rather a product of an interaction between a constraint on branching uniformity and a constraint on other leftness constraints such as Spec-L and Head-L.[26]

Importantly, a negative particle Neg^0 observed in languages like Swedish, German, and the Korean *an* is a 'co-head' in LFG terminology, which unifies with the verbal heads in the same (outermost) f-structure. Therefore, if the negative particle is sister to any verbal head (e.g. V′ in German; I^0 in Swedish, V^0 in Korean), it would incur one violation of BrU. On the other hand, these particles are not the X^0 'heads' in the X-bar theoretic sense, as they do not project a phrase. They therefore will not be subject to the Head-L constraint.

5.2 Abutment

In Morimoto (2001a), I propose an additional formal mechanism 'abutment' that enables us to provide a unified account of syntactic elements that are attracted to heads rather than to clausal edges, such as head-complement and head-modifier structures. As detailed by Morimoto (2001a), while alignment of in syntax is always to the left edge of X^0 or XP, ABUTMENT is alignment of the *opposite edges* of two elements. The general definition of abutment is given in (66).[27]

(66) General Definition of **Abutment**

Abut(C_1, $Edge_1$, C_2, $Edge_2$) = $_{def}$
C_1 abuts with C_2 if and only if $Edge_1$ of C_1 shares $Edge_2$ of C_2; where $Edge_1 \neq Edge_2$.

Abbreviated as Abut-C_1(C_2).

C_1 can be any non-head: e.g. complements like an object, modifiers like a relative clause, or a non-projective X^0 elements like a negation particle. C_2 must be a head (e.g. N-head, V-head, etc). $Edge_1$ is an edge of C_1, and $edge_2$ is an edge of C_2. Importantly, abutment does not specify particular edges to be aligned. It only requires that edges of C_1 and C_2 must be opposite. The constraint thus simply requires adjacency of two elements. Which side of the head a complement or modifier should be placed is determined not by abutment, but by the constraints on clausal skeleton given earlier in (59).

As we have seen, placement of negation relative to the verb in a given language also depends on the head-directionality of that language. Applying the general definition of abutment in (66), we can instantiate a constraint on the positioning of negation, as given in (67). (In the analysis to follow, it will be further abbreviated to 'Abt-Neg'.)

[26] A potential problem with BrU with respect to verb-initial languages might be that it predicts that verb-initial languages prefer right-adjunction to left-adjunction. As discussed in Morimoto (2000, chapter 2), discourse-related constituents like topic and focus, which are either in adjoined or specifier position, are overwhelmingly clause-initial in verb-initial languages. However, the placement of these discourse elements on the left-edge of a clause can take priority over BrU by high-ranking constraints that prefer topic and focus to align left (TOPIC-L, FOC-L), as proposed in previous OT literature.

[27] The definition of abutment, also discussed in Morimoto (2001a), is based on the definition of Generalized Alignment of McCarthy and Prince (1993). The version adopted here is simplified for present purposes.

(67) Abut-NEG(V-HD): Abut E_1 of NEG with E_2 of V-HD.

This constraint simply requires strict adjacency of Neg and verbal head (V-HD). As with all alignment constraints, abutment constraints are also gradient. The degree of violation is assessed by counting any element between the two elements specified in the constraint. For example, if there are two syntactic words (= two nodes) between Neg and the verb, then the degree of violation is 2.

5.3 Positioning of X^0 Elements

Another set of constraints concerns the category of the root clause and relative 'hight' of the verbal head and negation on phrase structure. The earlier discussion of clause structure in languages like German, Korean, and Swedish lead us to the following generalizations with respect to the category of root clauses in these language types:

1. V2 languages require the inflected verb to occupy a functional head position of a left-headed FP in main clauses: the inflected verb is in I in languages that show evidence of I^0 (e.g. Swedish), and in C in languages with no IP (e.g. German).

2. Languages that show evidence of I^0 also license subject in SpecIP regardless of V2: e.g. English, Swedish.

3. Non-V2 languages that lack lexical Infl place all arguments in the domain of VP (or exocentric category S): e.g. Bantu, Korean, Japanese.

4. As negation is associated with Infl, languages with IP always place Neg in the IP domain (e.g. English, Swedish). Languages with no IP place negation in the domain of the lexical verb (e.g. German, Bantu, Korean, Japanese).

As for the V2 requirement, it is not clear to me how it should be motivated either functionally or formally. For present purposes, I propose a place-holder constraint "V2", given in (68a), which enforces V2 only in matrix clauses. The constraint *I penalizes the presence of I^0. This reflects the observation that functional categories exist only in a subset of languages, namely some head-initial languages, while lexical categories (like V and N) are available in all languages. It can therefore be interpreted as an instance of a markedness constraint. Subj-in-IP, on the other hand, requires positional licensing of subject in SpecIP. This reflects the generalization in 2 above that in languages that are strictly endocentric, SpecIP is generally the subject position (cf. Bresnan 2001a). In non-V2 languages that lack lexical Infl such as Bantu, Korean, and Japanese, *I is relatively hight-ranked, and Subj-in-IP, relatively low-ranked. In V2 languages the constraint "V2" is the highest-ranked among the three.

(68) a. "V2": The inflected verb must be in second position in main clauses, and it occupies a functional head position.

b. *I: Avoid I.

c. Subj-in-IP: Subject is licensed in SpecIP (= positional licensing of subject).

Among the V2 languages, there are so-called 'symmetric V2' languages such as Icelandic, and 'non-symmetric V2' languages such as Swedish and German. The historical development of embedded V2 argued by Kiparsky (1996), outlined earlier in section 3.2, tells us that all symmetric V2 languages must be VO, but some VO languages show non-symmetry, where the verb is in "V3", as in the mainland Scandinavian languages. The contrast in the presence/absence of V2 in embedded clauses can be characterized by the constraint OB-HD(FP) (69), originally proposed by Grimshaw (1997), which requires that the functional head position be filled.

(69) OB-HD(FP): 'obligatory head'—functional head position must be filled by an overt element.

Let us now see how different rankings of the four constraints in (68)—(69) derive cross-linguistic variation in phrase structure categories, in particular with respect to verb positioning and category of clauses. Tableaux in (70)–(72) illustrate matrix clauses. The candidates represent a simple transitive sentence like *John plays football*. Candidate a represents a V2 language where the root clause is IP—VO languages that display V2 as in Swedish and Icelandic; b represents a VO language where the root clause is CP as in German; c represents a non-V2 head-initial language as in English, where the root node is IP.

The ranking in (70) derives an optimal matrix clause in symmetric V2 languages like Icelandic, but of course the structure of main clause V2 is identical with non-symmetric languages like Swedish. Under this ranking, candidate a is optimal since it only violates the lowest ranked constraint.

(70) Main clause V2: VO languages

e.g. Swedish, Icelandic		"V2"	SubjIP	OB-HD(FP)	*I
a. ☞	$[_{IP}$ Subj $[_{I'}$ V_{fin} $[_{VP}$ Obj]]]				*
b.	$[_{CP}$ Subj $[_{C'}$ V_{fin} $[_{VP}$ Obj]]]		*		
c.	$[_{IP}$ Subj $[_{I'}[_{VP}$ V O]]]	*			

The tableau in (71) represents the main clause structure for German. The CP matrix clause in c can be derived by demoting Subj-in-IP above *I. The high-ranked V2 cosntraint forces the finite verb to be in a functional head position. So the optimal choice is to place the verb in C (relative ranking of *I and V2 does not matter).

(71) Main clause V2: OV languages

e.g. German		"V2"	*I	OB-HD(FP)	SubjIP
a.	$[_{IP}$ Subj $[_{I'}$ V_{fin} $[_{VP}$ Obj]]]		*		
b. ☞	$[_{CP}$ Subj $[_{C'}$ V_{fin} $[_{VP}$ Obj]]]				*
c.	$[_{IP}$ Subj $[_{I'}[_{VP}$ V O]]]	*			

The tableau in (72) illustrates an English root clause IP. Here, by demoting the V2 constraint and promoting Subj-in-IP we ensure positional licensing of subject in SpecIP. Ranking *I above OB-HD(FP) ensures that the finite verb will be in VP, and IP is headless.

(72) Main clause non-V2 (IP)

	e.g. English	SubjIP	*I	OB-HD(FP)	"V2"
a.	$[_{IP}$ Subj $[_{I'}$ V_{fin} $[_{VP}$ Obj]]]		*		
b.	$[_{CP}$ Subj $[_{C'}$ V_{fin} $[_{VP}$ Obj]]]	*			
c. ☞	$[_{IP}$ Subj $[_{I'}[_{VP}$ V O]]]				*

In embedded clauses, rerankings of Subj-in-IP, OB-HD(FP), and *I yield three different patterns for V2 languages: (a) symmetric V2, (b) non-symmetric V2 with head-initial VP in embedded clauses, and (c) non-symmetric V2 with head-final VP in embedded clauses. Let us consider a sentence like *Everyone thinks that John plays football*. The tableau in (73) represents symmetric V2. The ranking OB-HD(FP) ≫ *I requires the inflected verb to be in I in embedded clauses, effectively placing the verb in second position.

(73) Embedded clause symmetric V2

	e.g. Icelandic	"V2"	SubjIP	OB-HD(FP)	*I
a. ☞	$[_{C'}$ comp $[_{IP}$ Subj $[_{I'}$ V_{fin} $[_{VP}$ Obj]]]]				*
b.	$[_{C'}$ comp $[_{IP}$ Subj $[_{VP}$ V_{fin} Obj]]]			*	
c.	$[_{C'}$ comp $[_{VP}$ Subj $[_{VP}$ Obj V_{fin}]]]		*		

By reranking OB-HD(FP) and *I, we get non-symmetric with head-initial VP, where the finite verb in the embedded clause occupies V. If there is any adverb, the ranking OB-HD(FP) ≫ *I effectively produces "V3", in which the verb is in V, following negation in the IP domain.

(74) Embedded clause non-symmetric V2: VO languages

	e.g. Swedish	"V2"	SubjIP	*I	OB-HD(FP)
a.	$[_{C'}$ comp $[_{IP}$ Subj $[_{I'}$ V_{fin} $[_{VP}$ Obj]]]]			*	
b. ☞	$[_{C'}$ comp $[_{IP}$ Subj $[_{VP}$ V_{fin} Obj]]]				*
c.	$[_{C'}$ comp $[_{VP}$ Subj $[_{VP}$ Obj V_{fin}]]]		*		

For non-symmetric V2 with head-final VP, the structure below C is taken to be VP. This is derived by the ranking of *I and OB-HD(FP) above Subj-in-IP. Thus, the different rankings of Subj-in-IP relative to *I and OB-HD(FP) yield the difference in the category of the embedded clause in Swedish and German. The constraints on clausal skeleton are responsible for optimally producing verb-final VP rather than verb-initial VP ("V3").

(75) Embedded clause non-symmetric V2: OV languages

	e.g. German	"V2"	*I	OB-HD(FP)	SubjIP
a.	$[_{C'}$ comp $[_{IP}$ Subj $[_{I'}$ V_{fin} $[_{VP}$ Obj]]]]		*		
b.	$[_{C'}$ comp $[_{IP}$ Subj $[_{VP}$ V_{fin} Obj]]]			*	
c. ☞	$[_{C'}$ comp $[_{VP}$ Subj $[_{VP}$ Obj V_{fin}]]]				*

The interaction of the four constraints schematically illustrated above thus enables us to relate the presence/absence of V2, presence/absence of lexical Infl, presence/absence of symmetric V2, and the category for root clauses. Directionality of head—VO vs. OV—is determined by the constraints on clausal skeleton introduced earlier in (59).

Turning now to the placement of negation, three constraints are necessary to model the observed cross-linguistic variation. The Abut-Neg constraint is repeated in (76a). Effects of Abut-Neg are most readily observed languages with affixal negation such as Turkish and Japanese, exemplified earlier in (1) and (2) respectively, and languages such as Korean with the postverbal negative verb *anh-* shown earlier in (7) and the preverbal particle *an* in (10). In languages like German, we observe violation of Abut-Neg in a V2 example like that in (39) and partial VP topicalization like that in (40), but as noted in previous work (e.g. Haider 1997c), negation in German is generally close to the verb and Abut-Neg is thus highly effective.

neg-in-fp in (76b) reflects the generalization noted earlier that negation is generally taken to be inherently associated with Infl. The effect of Neg-in-FP is observed in languages like Swedish and English in which negation is in the domain of IP as discussed earlier in section 4.2.

*Neg_{aff} in (76c) is interpreted as an instance of an 'iconicity' constraint, and is satisfied by languages with any non-affixal negation forms.

(76) Constraints on Neg

a. Abut-NEG(V-HD): "NEG and (lexical) V-head must be adjacent."

b. neg-in-fp: Neg must be in the IP domain.

c. *Neg_{aff}: Avoid affixal negation.

The notion of iconicity (that motivates *Neg_{aff}) and its relevance in morphosyntax has been extensively discussed by Haiman (1985). For example, Haiman argues that reduced (= null and morphologically bound) pronominals are syntactically marked in that they violate a syntax-semantics iconicity constraint. They yield a non-isomorphic mapping between syntactic constituents and semantic referents, because they both have semantic content expressing a grammatical relation and referential role, but a null pronoun has no syntactic content, and a bound pronominal is part of another syntactic constituent (see Bresnan 2001b for further discussion). In the case of negation, the situation is similar. A negative particle is unmarked in the sense that there is a perfect syntax-semantic mapping: it is a syntactic unit (X^0) that expresses the notion of negation. A negative affix, on the other hand, expresses the same semantic content, but it is morphologically part of another constituent, usually a verb. Iconicity constraints have been motivated in other domains of syntax in OT, such as a typology of pronominal systems (Bresnan 2001b) and differential object marking (Aissen 2000, Morimoto 2002b).

The constraints discussed in this section are summarized in (77). Those in the first row (77)1–3 are the constraints on clausal skeleton. As discussed in section 5.1, the ranking 2 ≫ 1 ≫ 3 gives us a VO language, 2 ≫ 3 ≫ 1, an OV language, and 1 ≫ 3 ≫ 2, a verb-initial

language. Those in the second raw are the constraints on head positioning, as illustrated with V2 languages in (73)—(75). Those in the third row are the constraints relating to the form and position of negation.

(77) Summary of constraints

1. Head-L (59a)	2. Spec-L (59b)	3. BrU (59c)	
4. V2 (68a)	5. *I (68b)	6. Subj-in-IP (68c)	7. OB-HD(FP) (69)
8. Abut-Neg (76a)	9. neg-in-fp (76b)	10. *Neg_{aff} (76c)	

6 Deriving a Positional Typology of Negation

Having identified the set of constraints necessary to derive a word order typology and the variation in the forms and positions of negation, I now turn to the OT analysis and illustrate how the set of proposed constraints derive the observed facts. For a detailed illustration, I focus on the languages discussed in sections 3–4. A general discussion of the typology of sentential negation summarized in (58) will follow.

6.1 German and Swedish

In this section I provide a comparative illustration of constraint interaction that derives German and Swedish negation. I first consider sentential negation of a triadic predicate *give*. A simplified input is given in (78).[28]

(78)
$$\begin{bmatrix} \neg \text{ (give (x, y, z))} \\ \text{x: 1sg Pro} \\ \text{y: 3sg Pro}_{fem} \\ \text{z: book} \\ \text{TENSE: PAST} \\ \text{ASP: PERF} \end{bmatrix}$$

In German, the optimal output would be the sentence in (79), in which the negative particle *nicht* appears in the VP domain, adjoined to V′ as discussed earlier. The tableau that shows the ranking and evaluation of the relevant constraints is given in (80).

(79) Ich [$_{C'}$ habe [$_{VP}$ ihr das Buch nicht gegeben]] German
I [$_{C'}$ have [$_{VP}$ her the book not given]]

Notes on the constraints: In order to keep the focus of the discussion on the positional variation in negation, I limit the set of candidates in each tableau to the most relevant set of candidates with respect to the position of negation and head-directionality. For this reason, two constraints are omitted from the the tableaux. Spec-L is omitted for the discussion of SVO/SOV languages and consider only those candidate that respect Spec-L, so the subject will be leftmost. OB-HD(FP) was introduced earlier in part to illustrate variation among V2 languages, in particular the symmetric V2 language Icelandic vs. non-symmetric V2 languages. Since I will not be discussing negation in Icelandic (which parallels Swedish) OB-HD(FP) will be omitted from the rest of the discussion in this section.

Notes on the candidate set: Candidates 1, 2 are different only in the category of the root node. All of the candidates labeled 1 are CPs; those labeled 2 are IPs. The rest of the structure

[28] As standardly assumed in OT-LFG work to date, the INPUT taken is taken to be a skeletal f-structure For a detailed discussion of the INPUT and GEN, see, for example, Kuhn (2001) and Sells (2001a,b).

is the same in candidates that share the same alphabetical label: e.g. a1, a2; b1, b2, and so forth. Depending on the language the tableau illustrates, I omit some unimportant candidates for the purposes of our discussion.

In (80), the optimal candidate a1 represents the sentence in (79) with CP . a1 and a2 both violate BrU twice at C and Neg, and Head-L once, at C. a2 is IP with the finite verb in I, and it is therefore eliminated at the point it violates *I. In candidate b1,2, Neg is in SpecVP, and the internal arguments are in V′. This incurs a violation of Abut-Neg.[29] b2 is eliminated at the point it violates *I. In candidates 1, 2, Neg is under F′ preceding the VP. This again violates the abutment constraint, since the lexical verb is final. In candidate d, Neg is under F′, and the lexical verb is head-initial. This incurs one extra mark for BrU. In candidate e, Neg is under V′, and the VP is head-initial. This violates BrU three times again, at F, V and Neg. Finally, candidate f is a uniformly head-final structure with the functional category on the right: Neg is under I′ in the head-final VP, and F is also head-final. There are many other candidates we can consider, but I presume that others will more severely violate high-ranking constraints.

(80) German main clause with V_{fin} + V (79)

	Input: (78)	"V2"	BrU	Head-L	*I	*Neg$_{aff}$	Abt-neg	SubjIP	NegFP
a1. ☞	S [$_{C'}$ V_{fin} [$_{VP}$ O_1 [$_{VP}$ O_2 [$_{V'}$ Neg V]]]] Ich habe ihr das Buch **nicht** gegeben		**	*				*	*
a2.	S [$_{I'}$ V_{fin} [$_{VP}$ O_1 [$_{VP}$ O_2 [$_{V'}$ Neg V]]]]		**	*	*!				*
b1.	S [$_{C'}$ V_{fin} [$_{VP}$ Neg [$_{V'}$ O_1 O_2 V]]]		**	*			*!	*	*
b2.	S [$_{I'}$ V_{fin} [$_{VP}$ Neg [$_{V'}$ O_1 O_2 V]]]		**	*	*!		*		*
c1.	S [$_{C'}$ V_{fin} Neg [$_{VP}$[$_{V'}$ O_1 O_2 V]]]		**	*			*!	*	
d1.	S [$_{C'}$ V_{fin} Neg [$_{VP}$[$_{V'}$ V O_1 O_2]]]		***!					*	
e1.	S [$_{C'}$ V_{fin} [$_{VP}$[$_{V'}$ V Neg O_1 O_2]]]		***!					*	*
f1.	S [$_{C'}$[$_{VP}$[$_{V'}$ O_1 O_2 V]] Neg V_{fin}]	*!	**	*				*	*

Looking at the competition between a1 and c1 in particular, we see that what is important in German is that Abut-Neg outranks Neg-in-FP.

Compare this with a comparable sentence in Swedish, given in (82), and the tableau that represents it in (81). The ranking differences between German and Swedish are the following: first, in Swedish Head-L outranks BrU to yield uniformly head-initial structure. Second, Subj-in-IP ranks above *I, so the optimal root clause is IP, one of the 2s. *I must be demoted below neg-in-fp so that candidate d2 is preferred to candidate e2: both are IPs and license subject in SpecIP. But d2 has Neg under I′, and e2 in the VP domain. Note that in this tableau candidate e2 is harmonically bound, so the ranking of the last three constraints shown in the tableau is not crucial. The ranking of Neg-in-FP and Abut-Neg would become crucial if there are any other adverbs under I′: d2 would violate Abut-Neg and e2 would not. But the proposed ranking would still prefer d2 over e2.

[29] As discussed earlier, because all alignment constraints are gradient, technically the violation of Abut-Neg by candidate c should be 2, since there are two syntactic elements, O_1 and O_2, between Neg and V-HD. Nonetheless for a simpler exposition, abutment is taken as non-gradient in the present discussion.

(81) Swedish main clause with V_{fin} + V (82)

	Input: (78)	"V2"	Head-L	BrU	SubjIP	*Neg_{aff}	NegFP	*I	Abt-neg
a2.	S [$_{I'}$ V_{fin} [$_{VP}$ O_1 [$_{VP}$ O_2 [$_{V'}$ Neg V]]]]		*!	**			*	*	
b2.	S [$_{I'}$ V_{fin} [$_{VP}$ Neg [$_{V'}$ O_1 O_2 V]]]		*!	**			*	*	
c2.	S [$_{I'}$ V_{fin} Neg [$_{VP}$[$_{V'}$ O_1 O_2 V]]]		*!	**				*	
d1.	S [$_{C'}$ V_{fin} Neg [$_{VP}$[$_{V'}$ V O_1 O_2]]]			***	*!	*			
d2. ☞	S [$_{I'}$ V_{fin} Neg [$_{VP}$[$_{V'}$ V O_1 O_2]]] jag har **inte** gett boken till henne			***				*	
e1.	S [$_{C'}$ V_{fin} [$_{VP}$[$_{V'}$ V Neg O_1 O_2]]]			***	*!		*		
e2.	S [$_{I'}$ V_{fin} [$_{VP}$[$_{V'}$ V Neg O_1 O_2]]]			***			*!	*	
f2.	S [$_{I'}$[$_{VP}$[$_{V'}$ O_1 O_2 Neg V]] V_{fin}]	*!	*	**	*		*	*	

(82) jag [$_{I'}$ har **inte** [$_{VP}$ gett boken till henne]] Swedish (= (81)d2)
I have [$_{I'}$ not [$_{VP}$ given the.book to her]]

Let us now consider the earlier example of an embedded clause in German in (34a).

(34a) Wiel können Sie mir helfen, [**wenn Sie mir nicht glauben wollen**?]
'How can you help me if you don't (want to) believe me?' SS

In order to derive the sentence in (34), we consider the input in (83). The input shows that the relevant part *if you don't want to believe me*, is a sentential adjunct (ADJ) that is in irrealis. The negation scopes over the entire clause (¬ (want (x, s))). In order to ensure the verb *glauben* 'believe' to agree with the 2nd person formal subject in the optimal output, I simply indicate the subject as 'Sie'. The input also shows that the subject of 'want' and that of the lower verb 'believe' is identical.

(83)
$$\left[\begin{array}{l} \ldots \\ \\ \\ \text{ADJ} \left[\begin{array}{ll} & \neg\ (\text{want}\ (\text{x, s})) \\ \text{x:} & \left[\text{2sg 'Sie'}\right]_i \\ \text{s:} & \left[\begin{array}{l}(\text{believe}\ (\text{x, y})) \\ \text{x: } \left[\ \right]_i \\ \text{y: } \left[\text{1sg Pro}\right]\end{array}\right] \\ & \text{MOOD: IRREALIS}\end{array}\right] \\ \\ \end{array}\right]$$

In the tableau in (84), candidate a has the structure for a German subordinate clause: under the clause under C is VP, and the subject is in adjoined position. Neg here is assumed to be adjoined to V′ (though not clearly shown in the tableau). Candidate b has IP; Neg is under I′, and I is empty. The finite and non-finite verbs are inside head-final VP. Since Neg is in the IP domain and VP is head-final, this candidate fatally violates Abut-Neg. Because BrU ranks above Head-L in German, the rest of the candidates (c–f) are rendered suboptimal at the point they incur more violations of BrU than a–b. So this again, shows that Abut-Neg must crucially outrank neg-in-fp or Subj-in-IP in German.

(84) German subordinate clause with V_{fin} + V (82)

Input: (83)	"V2"	BrU	Head-L	*I	*Neg_{aff}	Abt-neg	SubjIP	NegFP
a. ☞ [$_{C'}$ C [$_{VP}$ S [$_{VP}$ O Neg [$_{VP}$ V] V_{fin}]]] wenn Sie mir **nicht** glauben wollen		**	**				*	*
b. [$_{C'}$ C [$_{IP}$ S Neg [$_{VP}$ [$_{VP}$ O V] V_{fin}]]]		**	**			*!		
c. [$_{C'}$ C [$_{VP}$ S [$_{VP}$ V_{fin} [$_{VP}$[$_{V'}$ O Neg V]]]]]		***!	**					*
d. [$_{C'}$ C [$_{IP}$ S V_{fin} Neg [$_{VP}$[$_{V'}$ V O]]]]		***!	**	*				
e. [$_{C'}$ C [$_{IP}$ S Neg [$_{VP}$ V_{fin} [$_{VP}$ V O]]]]		***!*						
f. [$_{C'}$ C [$_{IP}$ S V_{fin} [$_{VP}$ Neg [$_{VP}$[$_{V'}$ V O]]]]]		***!*		*				*

Although I do not have an equivalent sentence in Swedish, a sentential complement like that (85) is comparable in terms of the structure, as both *if*-clauses and sentential complements in German have the parallel structure.

(85) ... att jag **inte** [$_{VP}$ har gett boken till henne]
... that I not [$_{VP}$ have given the.book to her]

In order to derive the Swedish sentence in (85), we consider a slightly different input given in (86). COMP indicates that the clause in question is a sentential complement headed by 'that'. The rest is the same as the input for the main clause in (78).

(86)
$$\begin{bmatrix} \ldots \\ \text{COMP} & \begin{bmatrix} \neg\ (\text{give (x, y, z)}) \\ \text{x: 1sg Pro} \\ \text{y: 3sg Pro}_{fem} \\ \text{z: book} \\ \text{TENSE: PAST} \\ \text{ASP: PERF} \end{bmatrix} \end{bmatrix}$$

In the tableau in (87), the first four candidates violate Head-L, which ranks above BrU in Swedish. Among the two remaining candidates, candidate e has the CP-IP structure with the subject in SpecIP, and Neg under I′. The verb is within the head-initial VP, following Neg. This structure incurs a violation of Abut-Neg, since Neg is not adjacent to the lexical verb. In candidate f, the finite verb occupies I, and Neg follows it. Neg is inside VP, and therefore fatally violates Neg-in-FP. Note that an alternative structure similar to candidate f, call it 'candidate f", could place Neg under I′ following the verb (as in the main clause). This would escape the violation Neg-in-FP. However, it would violate the next lower constraint *I, which still outranks Abut-Neg that the optimal candidate violates. So again, we see that in Swedish, Neg-in-FP and *I must be ranked higher than Abut-Neg.

(87) Swedish subordinate clause with V_{fin} + V

	Input: (86)	"V2"	Head-L	BrU	SubjIP	*Neg_{aff}	NegFP	*I	Abt-neg
a.	[$_{C'}$ C [$_{VP}$ S [$_{VP}$ O Neg [$_{VP}$ V] V_{fin}]]]		*!**	**	*		*		
b.	[$_{C'}$ C [$_{IP}$ S Neg [$_{VP}$ [$_{VP}$ O V] V_{fin}]]]		*!**	**					*
c.	[$_{C'}$ C [$_{VP}$ S [$_{VP}$ V_{fin} [$_{VP}$[$_{V'}$ O Neg V]]]]]		*!*	***	*	*			
d.	[$_{C'}$ C [$_{IP}$ S V_{fin} Neg [$_{VP}$[$_{V'}$ V O]]]]		*!	***				*	
e. ☞	[$_{C'}$ C [$_{IP}$ S Neg [$_{VP}$ V_{fin} [$_{VP}$ V O]]]] att jag **inte** har gett boken till henne			****				*	*
f.	[$_{C'}$ C [$_{IP}$ S V_{fin} [$_{VP}$ Neg [$_{VP}$[$_{V'}$ V O]]]]]			****			*!		

Note also that if we additionally consider OB-HD(FP) introduced earlier in (69), and place it above *I in (87), we derive a symmetric V2 language like Icelandic: f—or f' just discussed above—instead of e would be optimal.

6.2 Korean and Japanese

Korean and Japanese are typologically quite similar, and intuitions and linguistic generalizations about one language often carry over to the other. However with respect to the syntactic expression and distribution of sentential negation the two languages exhibit quite different structures. Japanese expresses negation as a negative suffix on the verb, as exemplified earlier in (2), repeated below.

(2) Japanese (SOV): suffix

Taroo-wa asagohan-o tabe-**na**-katta.
Taroo-TOP breakfast-ACC eat-NEG-PAST
'Taro didn't eat breakfast.'

Korean, on the other hand, has two forms. One form is the preverbal particle *an* shown earlier in (10). It left-adjoins to the verb to form a V^0 (49a). The second form is the postverbal negative auxiliary (7); this V_{neg} selects a V(P), the (projection of) V_{lex} (49b).

(10) Korean (SOV) preverbal negation

John-un ppang-ul **an** mek-ess-ta.
John-TOP bread-ACC NEG eat-PAST-DECL
'John didn't eat the bread.' (Kim 2000:1)

(7) Korean (SOV): negative auxiliary

Na-nun phyenci-lul ssu-ci **anh-ass-ta**.
I-TOP letter-ACC write-COMP NEG-PAST-DECL
'I didn't write a letter.' (Kim 2000:2)

I consider the input that represents the Korean example in (10), but all three examples from Japanese and Korean are transitive sentence with the overt arguments, so the following illustration covers all of them.

(88) $\begin{bmatrix} \neg\ (\text{eat}\ (\text{x},\ \text{y})) \\ \text{x: } \left[\text{1sg Pro}\right] \\ \text{y: } \left[\text{'bread'}\right] \\ \text{TENSE: PAST} \end{bmatrix}$

The tableau in (89) considers some relevant candidates for the evaluation of the input for Korean and Japanese. For these languages, V2 is not relevant (= very low ranked), so I will not be including this in the tableau. On the other hand, the constraint OB-HD(FP) that requires a functional head-position to be filled plays an important role here, so V2 is replaced by OB-HD for the present illustration.

(89) Korean main clause short form negation (*an*) (10)

	Input: (88)	*I	*Neg_{aff}	BrU	Head-L	Abt-neg	OB-HD(FP)	SubjIP	NegFP
a.	[$_{VP}$ S [$_{VP}$ O V-Neg]]		*!		*			*	*
b. ☞	[$_{VP}$ S [$_{VP}$ O [$_{V}$ Neg V]]]			*				*	*
e.g.	John-un ppang-ul **an** mek-ess-ta								
c. ☞	[$_{VP}$ [$_{VP}$[$_{VP}$ O V] V$_{neg}$]]			*				*	*
e.g.	Na-nun phyenci-lul ssu-ci **anh-ass-ta**								
d.	[$_{IP}$ S Neg [$_{VP}$ V O]]			**!			*		
e.	[$_{IP}$ S [$_{VP}$ O V] Neg]			*			*!		*

Candidate a represents the structure for Japanese sentential negation; candidate b represents short-form negation in Korean, and candidate c, long-form negation. The crucial difference between Korean and Japanese is that in Korean, the constraint against the non-iconic form of negation—affixal—is the highest constraint. Recall that, as noted at the end of section 5.1, a negative particle Neg^0 is subject to BrU constraint as it is always a co-head, but it is not subject to the Head-L constraint because it is not a head of a projection in the X-bar theoretic sense. Having the non-iconic affixal negation is therefore better with respect to BrU. Since BrU is ranked above Head-L in both languages, the only difference must be that in Korean, *Neg_{aff} is ranked above BrU.

Among the candidates b–e, the head-initial structure d violates BrU more severely than others. Among the remaining candidates b, c, e, e violates OB-HD(FP) since the root node is IP but I is not filled by a lexical Infl. In the two remaining candidates, first, candidate b violates BrU once because Neg is left-adjoined and interrupts the branching uniformity (which is right-branching). In candidate c, on the other hand, the VP complement headed by the lexical verb violates BrU. Next, candidate b incurs no mark for Head-L, and neither does candidate c. And they both equally violate the lower ranked constraints Subj-in-IP and neg-in-fp. Thus, the same constraint ranking yields both forms of negation.

In order to derive the optimal structure for Japanese, we only need reranking of *Neg_{aff} and BrU: candidate a incurs no violation of BrU, and hence, this will be optimal at the point the rest of the candidate set violates it. The present constraint system thus shows how these typologically similar languages that seem to have almost an identical constraint ranking with respect to clausal syntax can differ just in the domain of sentential negation.

6.3 General Picture of the Typology of Negation

I conclude this section by providing a general picture of the typology of sentential negation discussed in this paper in terms of constraint ranking. The rankings in (90) highlight the differences in the ranking of the proposed constraints that prefers one form or structural position over another in the languages considered. The Word order types SOV, SVO, and VOS abbreviate the appropriate ranking of Head-L, Spec-L, and BrU as illustrated in section 5.1.[30]

(90) Constraint rankings

1. Head-L	2. Spec-L	3. BrU
4. V2	5. *I	6. Subj-in-IP 7. OB-HD(FP)
8. Abut-Neg	9. neg-in-fp	10. *Neg_{aff}

I.	German:	$4 \gg \text{SOV} \gg 5 \gg 7 \gg 10 \gg 8 \gg 6 \gg 9$
II.	Swedish:	$4 \gg \text{SVO} \gg 6 \gg 7 \gg 10 \gg 9 \gg 5 \gg 8$
III.	Korean:	$5 \gg 10 \gg \text{SOV} \gg 8 \gg 7 \gg 6 \gg 9 \gg 4$
IV.	Japanese:	$5 \gg \text{SOV} \gg 10 \gg 8 \gg 7 \gg 6 \gg 9 \gg 4$
V.	Bantu:	$5 \gg \text{SVO} \gg 10 \gg 8 \gg 7 \gg 6 \gg 9 \gg 4$
VI.	Malagasy:	$5 \gg 10 \gg \text{VOS} \gg 8 \gg 7 \gg 6 \gg 9 \gg 4$

Japanese and Bantu both have affixal negation. The ranking of the constraints on clause structure shown for Japanese and Bantu derives a similar structure without Infl or configurational subject position (SpecIP).[31] The present system of constraints suggests that affixal form of negation can be expected in languages that do not show evidence for Infl, and in which the subject is not structurally licensed in SpecIP.

Similarly, as we observed in the earlier example in (6), Malagasy sentential negation is expressed as a preverbal particle analogous to Korean short-form negation. This can be derived by a similar constraint ranking between the two languages except in the rankings of 1–3 on clausal skeleton.

As mentioned earlier in section 2, Dryer's (1988) typological survey of sentential negation indicates that while majority of SVO languages most commonly place negation preverbally, SOV languages exhibit more variation: 64 out of 117 languages in his survey place negation postverbally, but the rest of 39 languages have preverbal negation like that in Korean (and Hindi: cf. (9)). If the present analysis of Korean is correct, then it shows that given the relatively small set of constraints on negation (constraints 8–10), the interaction of those and the ranking of the general constraints on phrase structure and syntactic categories (constraints 1–7 in (90)) that yield SOV word order and correlating structural properties can derive the alternative, preverbal negation in SOV languages without any constraint reranking.

7 Conclusion

The present analysis of sentential negation illustrates that the form and position of negation in a given language are in part predictable based on the clausal properties of that language. Languages choose between the domains of IP and VP for sentential negation. As negation is generally attracted to Infl, languages for which the existence of I/IP is independently motivated always place Neg in the IP domain. Given the antisymmetry hypothesis and prediction that

[30] For languages like German, Japanese and Korean in which all arguments are adjoined to VP (or V′), the constraint SUBJ-L (e.g. Sells 2001b, among many others) is probably more appropriate.

[31] Of course Bantu languages and Japanese show many structural and morphosyntactic differences than the almost identical constraint ranking in (90) suggests. But in terms of the basic clause structure (except for the head-directionality) and negation, which is the main focus of the constraint system here, these languages share similar structural properties.

head-final languages lack empirical evidence for rightward functional categories, we predict that only a subset of verb-initial languages express sentential negation in the IP domain.

In the present approach, relative markedness of structure characterized by the antisymmetry hypothesis is captured by typologically grounded universal constraints. Parameters of head-directionality and positional variation of various syntactic elements (verb, arguments, negation, etc) are derived by ranking of those universal constraints. Within this perspective, dierctionality parameters exist as a way of optimally satisfying a set of constraints that derives the asymmetry of phrase structure: constraints on negation, for example, only demand adjacency with the verbal head (Abut-Neg), a form that expresses iconic mapping between form and meaning (*Neg_{aff}), or that Neg be in the IP domain. It is the relative ranking of the constraints on asymmetry that determines which side of the verbal head Neg will be placed.

The OT approach to antisymmetry developed here also illustrates that language-specific parameters of head-directionality can be derived without losing Kayne's insight that phrase structure is fundamentally asymmetric or recourse to unmotivated movement operations.

References

Abeillé, Anne, and Danièle Godard. 1998. A lexical approach to quantifier floating in French. In Andreas Kathol, Jean-Pierre Koenig, and Gert Webelhuth (eds.), *Lexical and Constructional Aspects of Linguistic Explanation*. Stanford, CA, CSLI Publications. To appear.

Aissen, Judith. 2000. Differential case marking: Iconicity vs. economy. MS. UC Santa Cruz, May 2000 version.

Baker, Carl L. 1971. Stress level and auxiliary behavior in English. *Linsguistic Inquiry* 2, 167–181.

Berman, Judith. 2000. *Topics in the Clausal Syntax of German*. Doctoral dissertation, Universität Stuttgart, Stuttgart.

Bianchi, Valentina. 1999. *Consequences of Antisymmetry: Headed Relative Clauses*. Berlin/New York, Mouton de Gruyter.

Bresnan, Joan (ed.). 1982. *The Mental Representation of Grammatical Relations*. Cambridge, MA, The MIT Press.

Bresnan, Joan. 2000. Optimal syntax. In Joost Dekkers, Frank van der Leeuw, and Jeroen van de Weijer (eds.), *Optimality Theory: Phonology, Syntax and Acquisition*, 334–385. Oxford University Press.

Bresnan, Joan. 2001a. *Lexical Functional Syntax*. Oxford, Blackwell.

Bresnan, Joan. 2001b. The emergence of the unmarked pronoun. In Geraldine Legendre, Sten Vikner, and Jane Grimshaw (eds.), *Optimality-Theoretic Syntax*, 113–142. Cambridge, MA, The MIT Press.

Bresnan, Joan, and Sam A. Mchombo. 1987. Topic, pronoun, and agreement in Chicheŵa. *Language* 63(4), 741–782.

Broadwell, George Aaron. 2001. Optimal order and pied-piping in San Dionicio Zapotec. In Sells (Sells 2001a), 197–223.

Broadwell, George Aaron. 2002. Constraint symmetry in Optimality Theoretic syntax. Handout of the paper presented at LFG-02, July 22-25, Athens.

Butt, Miriam. 1994. Complex predicate and scrambling in Urdu. In Miriam Butt, Tracy Holloway King, and Gillian Ramchand (eds.), *Theoretical Perspective on Word Order in South Asian Languages*, 67–90. Stanford, CA, CSLI Publications.

Cho, Young-Mee Y., and Peter Sells. 1995. A lexical account of inflectional suffixes in Korean. *Journal of East Asian Linguistics* 4 (2), 119–174.

Choi, Hye-Won. 1999. *Optimizing Structure in Context: Scrambling and Information Structure*. Stanford, CA, CSLI Publications.

Clahsen, Harald, Sonja Eisenbeiss, and Martina Penke. 1996. Lexical learning in early syntactic development. In Harald Clahsen (ed.), *Generative Perspective on Language Acquisition*, Vol. 14 of *Language Acquisition and Language Disorders*, 129–159. Amsterdam/Philadelphia, John Benjamins.

Dahl, Östen. 1979. Typology of sentence negation. *Linguistics* 17, 79–106.

Dalrymple, Mary, Ronald M. Kaplan, John T. Maxwell, and Annie Zaenen (eds.). 1995. *Formal Issues in Lexical-Functional Grammar*. Stanford, CA, CSLI Publications.

De Kuthy, Kordula, and Walt Detmar Meurers. 2001. On partial constituent fronting in German. *Journal of Comparative Germanic Linguistics* 3, 143–205.

deHaan, Germen, and Fred Weerman. 1986. Finiteness and verb fronting in Frisian. In Haider and Prinzhorn (Haider and Prinzhorn 1986), 77–110.

Diesing, Molly. 1990. Verb movement and subject position in Yiddish. *Natural Language & Linguistic Theory* 8, 41–79.

Dryer, Matthew S. 1988. Universals of negative position. In Machael Hammond, Edith A. Moravcsik, and Jessica R. Wirth (eds.), *Studies in Syntactic Typology*, 93–124. Philadelphia/Amsterdam, John Benjamins.

Faarlund, Jan Terje. 1990. *Syntactic Change: Toward a Theory of Historical Syntax*. Berlin/New York, Mouton de Gruyter.

Falk, Cecilia. 1993. *Non-referential Subjects in the History of Swedish*. Department of Scandinavian Languages, Lund.

Falk, Yahuda N. 2001. *Lexical-Functional Grammar: An Introduction to Parallel Constraint-Based Syntax*. Stanford, CA, CSLI Publications.

Fanselow, Gisbert. 1987. *Konfigurationalität: Untersuchen zur Universalgrammatik am Beispiel des Deutchen*. Tübingen, Narr.

Giorgi, Alessandra, and Giuseppe Longobardi. 1991. *The Syntax of Noun Phrases: Configuration, Parameters and Empty Categories*. Vol. 57 of *Cambridge Studies in Linguistics*. Cambridge, UK, Cambridge University Press.

Greenberg, Joseph H. 1963 [1990]. Some universals of grammar with particular reference to the order of meaningful elements. In Keith Denning and Suzanne Kemmer (eds.), *On Language: Selected Writings of Joseph H. Greenberg*, 40–70. Stanford, CA, Stanford University Press.

Greenberg, Joseph H. 1966. *Language Universals*. The Hague, Mouton.

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

Grimshaw, Jane. 2000. Locality and extended projections. In Peter Coopmans, Martin Everaet, and Jane Grimshaw (eds.), *Lexical Specification and Insertion*, 115–133. Amsterdam/Philadelphia, John Benjamins.

Grimshaw, Jane. 2001. Economy of structure in OT. MS. Rutgers University. Available on-line via `http://ruccs.rutgers.edu/roa.html`.

Haegeman, Liliane. 1992. *Theory and Description in Generative Syntax: A Case Study in West Flemish*. Oxford, UK, Cambridge University Press.

Haegeman, Liliane. 1995. *The Syntax of Negation*. Cambridge, UK, Cambridge University Press.

Haegeman, Liliane. 1998. V-positions and the Middle Field in West Flemish. *Syntax* 1, 259–299.

Haegeman, Liliane. 2001. Antisymmetry and verb-final order in West Flemish. *Journal of Comparative Germanic Lingusitics* 3, 207–232.

Haider, Hubert. 1993. *Deutsche Syntax—generativ: Vorstudien zur Theorie einer projecktiven Grammatik*. Tübingen, Narr.

Haider, Hubert. 1995. Studies on phrase structure and economy. *Working Papers of the Sonderforschungsbereich 340* 70. University of Stuttgart, Tübingen, and IBM Heidelberg.

Haider, Hubert. 1997a. Extraposition. In Dorothee Beerman, David LeBlanc, and Henk van Riemsdijk (eds.), *Rightward Movement*, Vol. 17 of *Lingusitik Aktuell/Linguistics Today*, 115–151. Amsterdam/Philadelphia, John Benjamins.

Haider, Hubert. 1997b. Precedence among predicates. *Journal of Comparative Germanic Linguistics* 1, 3–41.

Haider, Hubert. 1997c. Projective economy. In Werner Ambraham and Elly van Gelderen (eds.), *German: Syntactic Problems—Problematic Syntax*, 83–103. Tübingen, Max Niemeyer Verlag.

Haider, Hubert. 1997d. Scrambling: Locality, Economy, and Directionality. In Tonoike Shigeo (ed.), *Scrambling*, Vol. 5 of *Linguistics Workshop Series*, 61–91. Tokyo, Kuroshio Publishers.

Haider, Hubert. 1997e. Typological implications of a directionality constraint on projections. In Artemis Alexiadou and T. Alan Hall (eds.), *Studies on Universal Grammar and Typological Variation*, Vol. 13 of *Linguistik Aktuell*, 17–33. Amsterdam/Philadelphia, John Benjamins.

Haider, Hubert. 2000a. Branching and discharge. In Peter P. Coopmans, Martin Everaert, and Jane Grimshaw (eds.), *Lexical Specification and Insertion*, Vol. 17 of *Current Issues in Linguistic Theory*, 135–164. Amsterdam, John Benjamins.

Haider, Hubert. 2000b. OV is more basic than VO. In Peter Svenonius (ed.), *The Derivation of VO and OV*, 45–67. Amsterdam, John Benjamins.

Haider, Hubert. 2002. V-clustering and clause union — causes and effects. MS. May 17th version. Salzburg University.

Haider, Hubert, and Martin Prinzhorn (eds.). 1986. *Verb Second Phenomena in Germanic Languages.* Dordrecht, Foris.

Haider, Hubert, and Inger Rosengren. 1998. Scrambling. *Sprache und Pragmatik.* Arbeitsberichte 49.

Haider, Hubert, and Inger Rosengren. 2002. Scrambling — untriggererd chain formation in OV-languages. MS. Salzburg University and Lund University.

Haiman, John. 1985. *Natural Syntax: Iconicity and Erosion.* Cambridge, UK, Cambridge University Press.

Hinrichs, Erhard W., and Tsuneko Nakazawa. 1994. Partial VP and split NP topicalization in German: An HPSG approach. *Sprachtheoretische Grundlagen für die Computerlinguistik*, Bericht Nr.58, 1–46. Arbeitspapiere des Sonderforschungsbereichs 340. Universität Tübingen.

Holm, John. 1988. *Pidgins and Creoles Volume I: Theory and Structure.* Cambridge, UK, Cambridge University Press.

Holmberg, Anders. 1986. Word Order and Syntactic Features in the Scandinavian Languages and English. Stockholm. Department of Linguistics, Stockholm University.

Holmberg, Anders. 1999. Remarks on Holmberg's generalization. *Studia Linguistica* 53, 1–39.

Holmberg, Anders, and Christer Platzack. 1988. On the role of inflection in Scandinavian Syntax. Working Papers in Scandinavian Syntax.

Hornstein, Norbert. 1995. *Logical Form: From GB to Minimalism.* Oxford, Blackwell.

Hyman, Larry M. n.d. On the change from SOV to SVO: Evidence from Niger-Congo. In Charles N. Li (ed.), *Word Order and Word Order Change*, 113–147. Austin and London, University of Texas Press.

Kager, René. 1999. *Optimality Theory.* Cambridge, Cambridge University Press.

Kayne, Richard. 1994. *The Antisymmetry of Syntax.* Cambridge, MA, The MIT Press.

Kim, Johng-bok. 2000. *The Grammar of Negation.* Stanford, CA, CSLI Publications.

Kimenyi, Alexandre. 1980. *A Relational Grammar of Kinyarwanda.* Berkeley, CA, University of California Press.

King, Tracy Holloway. 1995. *Configuring Topic and Focus in Russian.* Stanford, CA, CSLI Publications.

Kiparsky, Paul. 1996. The shift to head-initial VP in Germanic. In Thráinsson et al. (Thráinsson et al. 1996), 140–179.

Kiparsky, Paul. 1997. The rise of positional licensing. In Ans van Kemenade and Nigel Vincent (eds.), *Parameters of Morphosyntactic Change*, 460–494. Cambridge, UK, Cambridge University Press.

Kiss, Tibor. 2001. Configurational and relational scope determination in German. In W. Detmar Meurers and Tibor Kiss (eds.), *Constraint-Based Approaches to Germanic Syntax*, Studies in Constraint-Based Lexicalism, 141–175. Stanford, CA, CSLI Publications.

Kroeger, Paul. 1993. *Phrase Structure and Grammatical Relations in Tagalog.* Stanford, CA, CSLI Publications.

Kuhn, Jonas. 2001. *Generation and parsing in Optimality Theoretic syntax—Issues in the formalization of OT-LFG.* Doctoral dissertation, Universität Stuttgart.

McCarthy, John, and Alan S. Prince. 1993. Generalized alignment. In Geart Booji and Jaap van Marle (eds.), *Yearbook of Morphology*, 79–153. Dordrecht, Foris.

Mitchell, Erika. 1991. Evidence from Finnish for Pollock's theory of IP. *Linguistic Inquiry* 22, 373–379.

Morimoto, Yukiko. 2000. *Discourse Configurationality in Bantu Morphosyntax.* Doctoral dissertation, Stanford University, Stanford, CA. Available online at `http://www-csli.stanford.edu/~morimoto/thesis2.pdf`.

Morimoto, Yukiko. 2001a. Verb raising and phrase structure variation in OT. In Peter Sells (ed.), *Formal and Empirical Issues in Optimality-Theoretic Syntax*, 129–196. Stanford, CA, CSLI Publications.

Morimoto, Yukiko. 2001b. Deriving the directionality parameter in OT-LFG. In Miriam Butt and Tracy King (eds.), *Proceedings of LFG-01*, 224–244, Stanford, CA. CSLI Publications. Online at `http://csli-publications.stanford.edu/`.

Morimoto, Yukiko. 2002. Prominence mismatches and differential object marking in Bantu. In Miriam Butt and Tracy Holloway King (eds.), *The Proceedings of LFG-02*, Stanford, CA. CSLI Publications. To appear. Available online at `http://www-csli.stanford.edu/~morimoto/lfg02.pdf`.

Morimoto, Yukiko. 2002a. Functional categories and structural economy in Bantu. In Vida Samian (ed.), *Proceedings of Western Conference on Lingusitics 2000*, 552–566. Fresno, CA, California State University Fresno.

Moro, Andrea. 2000. *Dynamic Antisymmetry.* Cambridge, MA, MIT Press.

Müller, Gereon. 1996. *Imcomplete Category Fronting.* Habilitation thesis, Tübingen.

Müller, Gereon. 2000. *Elemente der optimalitätstheoretischen Syntax.* Tübingen, Stauffenburg.

Payne, John R. 1985. Negation. In Timothy Shopen (ed.), *Language Typology and Syntactic Description*, Vol. 1, 197–242. Cambridge, Cambridge University Press.

Penke, Martina. 2001. Controversies about CP: A comparison of language acquisition and language impairments in Broca's aphasia. *Brain and Language* 77, 351–363.

Platzack, Christer. 1986. The position of the finite verb in Swedish. In Hubert Haider and Martin Prinzhorn (eds.), *Verb Second Phenomena in Germanic Languages*, 27–47. Dordrecht, Foris.

Platzack, Christer. 1996. Null subjects, weak AGR and syntactic diffrences in Scandinavian. In Thráinsson et al. (Thráinsson et al. 1996), 180–196.

Pollock, Jean-Yves. 1989. Verb movement, universal grammar, and structure of IP. *Linguistic Inquiry* 20, 365–424.

Prince, Alan, and Paul Smolensky. 1993. *Optimality Theory: Constraint interaction in Generative Grammar.* RuCCS Technical Report No.2. Piscataway, NJ: Rutgers University Center for Cognitive Science. To appear, Cambridge, Mass: MIT Press.

Rackowski, Andrea, and Lisa Travis. 2000. V-initial languages: X or XP movement and adverbial placement. In Andrew Carnie and Eithne Guilfoyle (eds.), *The Syntax of Verb Initial Languages*, 117–142. New York, Oxford University Press.

Reuland, Eric. 1990. Head movement and the relation between morphology and syntax. In *Yearbook of Morphology*, Vol. 3, 129–161. Dordrecht, Foris.

Rögnvaldsson, Eiríkur, and Höskuldur Thráinsson. 1990. On Icelandic word order once more. In Joan Maling and Annie Zaenen (eds.), *Modern Icelandic Syntax*, Vol. 24 of *Syntax and Semantics*, 3–40. San Diego, Academic Press.

Sag, Ivan. 1976. *Deletion and Logical Form.* Doctoral dissertation, MIT.

Sells, Peter. 1994. Sub-phrasal syntax in Korean. *Language Research* 30(2), 351–386.

Sells, Peter. 1995. Korean and Japanese morphology from a lexical perspective. *Linguistic Inquiry* 26, 277–325.

Sells, Peter. 1999. Constituent ordering as alignment. In Susumu Kuno et al (ed.), *Harvard Studies in Korean Linguistics*, Vol. 8, 546–560, Seoul. Hanshin.

Sells, Peter. 2000. Negation in Swedish: Where it's not at. In Miriam Butt and Tracy Holloway King (eds.), *Proceedings of the LFG00 Conference*, Stanford, CA. CSLI Publications. On-line at `http://csli-publications.stanford.edu/`.

Sells, Peter (ed.). 2001a. *Formal and Empirical Issues in Optimality Theoretic Syntax.* Stanford, CA, CSLI Publications.

Sells, Peter. 2001b. *Structure, Alignment and Optimality in Swedish.* Stanford, CA, CSLI Publications.

Sells, Peter. 2001c. Three aspects of negation in Korean. *Journal of Linguistic Studies* 6, 1–15.

Taraldsen, Knut Tarald. 1986. On verb second and the functional content of syntactic categories. In Haider and Prinzhorn (Haider and Prinzhorn 1986), 7–25.

Thráinsson, Höskuldur. 1986. V 1, V2, V3 in Icelandic. In Haider and Prinzhorn (Haider and Prinzhorn 1986), 169–194.

Thráinsson, Höskuldur, Samuel David Epstein, and Steve Peter (eds.). 1996. *Studies in Comparative Germanic Syntax.* Vol. II. Dordrecht/Boston/London, Kluwer Academic Publishers.

Toivonen, Ida. 2001. *The Phrase Structure of Non-Projecting Words.* Doctoral dissertation, Stanford University, Stanford, CA.

van Gelderen, Elly. 1993. *The Rise of Functional Categories.* Vol. 9 of *Linguistik Aktuell/Linguistics Today.* Amsterdam/Philadelphia, John Benjamins.

Vennemann, Theo. 1973. Explanation in syntax. In James Kimball (ed.), *Syntax and Semantics*, Vol. II, 1–50. New York, Seminar Press.

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

Weerman, Fred. 1988. *The V2 Conspiracy: A Synchronic and a Diachronic Analysis of Verbal Positions in Germanic Languages.* Dordrecht, Foris.

Zwart, Jan-Wouter. 1997. The Germanic SOV languages and the universal base hypothesis. In Liliane Haegeman (ed.), *The New Comparative Syntax*, 246–267. London/New York, Longman.

Heinrich-Heine Universität Düsseldorf
Institute für Sprache und Information
`morimoto@phil-fak.uni-duesseldorf.de`
`http://www-csli.stanford.edu/~morimoto`