Linguistic Inquiry
Monograph Forty-Six

Asymmetry in Morphology

Anna Maria Di Sciullo

Asymmetry in Morphology

Linguistic Inquiry Monographs
Samuel Jay Keyser, general editor

6. *Some Concepts and Consequences of the Theory of Government and Binding*, Noam Chomsky
10. *On the Nature of Grammatical Relations*, Alec Marantz
12. *Logical Form: Its Structure and Derivation*, Robert May
13. *Barriers*, Noam Chomsky
15. *Japanese Tone Structure*, Janet Pierrehumbert and Mary Beckman
16. *Relativized Minimality*, Luigi Rizzi
18. *Argument Structure*, Jane Grimshaw
19. *Locality: A Theory and Some of Its Empirical Consequences*, Maria Rita Manzini
20. *Indefinites*, Molly Diesing
21. *Syntax of Scope*, Joseph Aoun and Yen-hui Audrey Li
22. *Morphology by Itself: Stems and Inflectional Classes*, Mark Aronoff
23. *Thematic Structure in Syntax*, Edwin Williams
24. *Indices and Identity*, Robert Fiengo and Robert May
25. *The Antisymmetry of Syntax*, Richard S. Kayne
26. *Unaccusativity: At the Syntax–Lexical Semantics Interface*, Beth Levin and Malka Rappaport Hovav
27. *Lexico-Logical Form: A Radically Minimalist Theory*, Michael Brody
28. *The Architecture of the Language Faculty*, Ray Jackendoff
29. *Local Economy*, Chris Collins
30. *Surface Structure and Interpretation,* Mark Steedman
31. *Elementary Operations and Optimal Derivations*, Hisatsugu Kitahara
32. *The Syntax of Nonfinite Complementation: An Economy Approach*, Željko Bošković
33. *Prosody, Focus, and Word Order*, Maria Luisa Zubizarreta
34. *The Dependencies of Objects*, Esther Torrego
35. *Economy and Semantic Interpretation*, Danny Fox
36. *What Counts: Focus and Quantification*, Elena Herburger
37. *Phrasal Movement and Its Kin*, David Pesetsky
38. *Dynamic Antisymmetry*, Andrea Moro
39. *Prolegomenon to a Theory of Argument Structure*, Ken Hale and Samuel Jay Keyser
40. *Essays on the Representational and Derivational Nature of Grammar: The Diversity of Wh-Constructions*, Joseph Aoun and Yen-hui Audrey Li
41. *Japanese Morphophononemics: Markedness and Word Structure*, Junko Ito and Armin Mester
42. *Restriction and Saturation*, Sandra Chung and William A. Ladusaw
43. *The Linearization of Chains and Sideward Movement*, Jairo Nunes
44. *The Syntax of (In)Dependence*, Ken Safir
45. *Interface Strategies*, Tanya Reinhart
46. *Asymmetry in Morphology*, Anna Maria Di Sciullo

Asymmetry in Morphology

Anna Maria Di Sciullo

The MIT Press
Cambridge, Massachusetts
London, England

MIT Press books may be purchased at special quantity discounts for business or sales promotional use. For information, please e-mail special_sales@mitpress.mit.edu or write to Special Sales Department, The MIT Press, 55 Hayward St., Cambridge, MA 02142.

This book was set in Times New Roman on 3B2 by Asco Typesetters, Hong Kong.
Printed and bound in the United States of America.

Library of Congress Cataloging-in-Publication Data

Di Sciullo, Anna Maria.
Asymmetry in morphology / Anna Maria Di Sciullo.
p. cm. — (Linguistic inquiry monographs ; 46)
Includes bibliographical references and index.
ISBN 0-262-04229-0 (alk. paper) — ISBN 0-262-54184-X (pbk. : alk. paper)
1. Grammar, Comparative and general—Morphology. 2. Asymmetry (Linguistics) I. Title. II. Series.
P241.D52 2005
415′.9—dc22 2005047873

10 9 8 7 6 5 4 3 2 1

A Vincent e Piera
"Gradite questi pensieri che, con
tutto l'affetto, vi mando."

Contents

Series Foreword

We are pleased to present the forty-sixth in the series *Linguistic Inquiry Monographs*. These monographs present new and original research beyond the scope of the article. We hope they will benefit our field by bringing to it perspectives that will stimulate further research and insight.

Originally published in a limited edition, the *Linguistic Inquiry Monographs* are now more widely available. This change is due to the great interest engendered by the series and by the needs of a growing readership. The editors thank the readers for their support and welcome suggestions about future directions for the series.

Samuel Jay Keyser
for the Editorial Board

Acknowledgments

Asymmetry Theory is a theory of grammatical relations and their interpretation by the external systems. It targets a central property of the symbolic representations of the language faculty: asymmetry. I investigate the pervasiveness of this property in morphological objects.

The radical hypothesis presented here, the Asymmetry Hypothesis, and its explanatory power in morphology could not have existed without the current work in the Minimalist Program (Chomsky 1995; Uriagereka 1999) and in the Antisymmetry framework (Kayne 1994; Moro 2000), as well as the ongoing controversy on the relative autonomy of morphological and syntactic objects (Williams 1981a, 1981b; Selkirk 1982; Di Sciullo and Williams 1987; Baker 1988; Chomsky 1970, 1995, 2001; Halle and Marantz 1993; Bach 1996; Brody 2000; Koopman and Szabolcsi 2000; Hale and Keyser 2002).

I first presented the Asymmetry Hypothesis in 1998 at the 24th GLOW Colloquium at the University of Athens, in 1999 at MIT at the Penn/MIT Round Table on the Lexicon, as well as in courses I taught at the 1999 GLOW International Summer School in Thermi. Parts of the ideas formulated in the work were presented at the Cognitive Syntax and Semantics Conference in Dubrovnik in August 2000, at the Twelfth European Summer School in Logic, Language and Information at the University of Birmingham in July 2000, at the University of Paris V in April 2000, at the University of Massachusetts at Amherst in February 2000, at the 20th Incontro di Grammatica Generativa in Trieste in March 2001, at the Asymmetry Conference at UQAM in May 2001, at the Third International Conference of Morphology at the University of Barcelona in September 2001, at the Language, Brain, and Computation Conference at the University of Venice in October 2002, and at the Asymmetry at the Interfaces Conference at UQAM in October 2003. I thank these audiences for their comments.

Special thanks to Calixto Aguero, Manuela Ambar, Emmon Bach, Greg Carlson, Gennaro Chierchia, Noam Chomsky, Guglielmo Cinque, Roberto De Almeida, Manuel Español-Echevarría, Abdelkader Fassi Fehri, Sandiway Fong, Alessandra Giorgi, Jacqueline Guéron, Ken Hale, Henk Harkema, Irene Heim, Jim Higginbotham, Richie Kayne, Jay Keyser, David Lebeau, David Lightfoot, Giuseppe Longobardi, Alec Marantz, Andrea Moro, Marcin Morzycki, Marina Nespor, David Pesetsky, Jean-Yves Pollock, James Pustejovsky, Angela Ralli, Eric Reuland, Gemma Rigau, Tom Roeper, Sergio Scalise, Peggy Speas, Carol Tenny, Harry van Der Hulst, and Edwin Williams.

I also thank the coresearchers of the Asymmetry Project—Réjean Canac-Marquis, Rose-Marie Déchaine, Manuel Español-Echeverria, Philippe Gabrini, Mohamed Guerssel, Mark Hale, Virginia Hill, Charles Reiss, Yves Roberge, and Mireille Tremblay—for their contributions to this project.

Many thanks to Olga Zavitnevich-Beaulac for the data in Russian, to Edit Jakab for the data in Hungarian, to Grace Masagbor for the data in Yekhee, to Dana Isac and Stanca Somesfalean for the data in Romanian, and to Marcin Morzycki for the data in Polish. I also thank Francine Tessier and Marcin Morzycki for proofreading the manuscript. Finally, I thank Tom Stone, Elizabeth Judd, and Sandra Minkkinen from the MIT Press for their perseverance through the process of turning my manuscript into a book.

This work is supported in part by funding from the Social Sciences and Humanities Research Council of Canada to the Major Collaborative Research Project on Asymmetries in Natural Languages and Their Treatment by the Performance Systems (Grant no. 412-97-0016).

Introduction

In this book, I focus on a property of structural relations that has been shown to be essential for the understanding of linguistic phenomena. This property is asymmetry—that is, the irreversibility of two elements in a structured set. My contention is that asymmetry is a hardwired property of morphological relations. I raise the question of whether asymmetry is the only basic property of grammatical relations, and take symmetry as well as antisymmetry also to be available properties of relations in grammar. Typically, asymmetric relations yield restrictions in acceptability/grammaticality and interface legibility (interpretation). In contrast, symmetric relations do not give rise to the same restrictions. While it has been shown that asymmetry is basic in the description and the explanation of syntactic and phonological phenomena, its centrality in derivational morphology, or morphosyntax, if correct, would make morphological objects regular objects of the grammar.

My view contrasts with the traditional assumption that morphology, in particular derivational morphology, is irregular and thus immune to basic hardwired regularities of form and interpretation. According to Jackendoff (1975), all words of a language are listed in the lexicon. The rules of morphology are conceived as redundancy rules, by means of which the "cost" of a lexical item is computed. Those that are totally predictable will have no cost. Derivational morphology, as opposed to inflectional morphology and syntax, is traditionally considered the domain of exceptions (Fabb 1984, 38). In many languages, including English and the Romance languages, gaps have been observed in the merger of affixes and roots, such that some affixation processes have been identified as less productive than others (Aronoff 1976, 1983; Scalise 1984, 1994). Selkirk (1982) proposes that productive compounds are derived in syntax and that unproductive or idiosyncratic ones are listed in the lexicon. Semantics is generally assumed to be noncompositional or not entirely compositional in word structure, unlike the semantics of phrase structure (Chierchia and McConnell-Ginet 1990). Derivational morphology has often been contrasted with inflectional morphology. The lexicon (the locus of exceptions) has been proposed as the location of the former, while the syntax (the locus of regularity) has been proposed as the location of the latter (Chomsky 1970).

I focus here on morphological regularities, and take the asymmetric property of morphological relations to be a specific instance of the basic property of the relations of the language faculty. To illustrate this point, I formulate a theory of grammar where generic operations have specific instantiations in parallel derivations of the computational space. I call this theory *Asymmetry Theory*. I define the main features of this fully parallel model, in which the derivations proceed in separate planes of the computational space, with limited interactions between the derivations. The dynamic parallelism of the model allows for the expression of typical similarities between the derivations, as well as typical differences. I posit that morphological and syntactic relations share a property, asymmetry, while they diverge with respect to other properties of their primitives, operations and interface conditions. Asymmetry Theory holds that morphology combines and manipulates asymmetric relations only; symmetry and antisymmetry give rise to morphological gibberish.

Current theories of morphology do not approach the properties of morphological relations in these terms. Instead, they focus on the similarities and the differences between morphological and syntactic objects in terms of notions such as "morphological relatedness" and "derivational autonomy." For example, in Distributed Morphology (Halle and Marantz 1993; Marantz 1997, 2003), the derivation of morphological objects is performed in the syntactic and the phonological components. This is not the case in A-Morphous Morphology (Anderson 1992), where morphological derivations are independent from syntactic derivations. These theories also differ with respect to the nature of the operations deriving morphological objects. Morphological operations are assumed to be different from syntactic operations in A-Morphous Morphology, while they coincide with syntactic operations in Distributed Morphology. Furthermore, in Distributed Morphology, the notion of root is central and is the key to morphological relatedness; however, in A-Morphous Morphology, roots—and more generally morphemes—are not basic. Morphological theories also differ with respect to the role attributed to the lexicon. The lexicon is in play in Lexeme-based morphology (Anderson 1992; Aronoff 1994; Beard 1988, 1995), whereas it does not have any role in Distributed

Morphology. Moreover, linear and nonlinear models have been proposed regarding the articulation of the morphological component in the grammar. In most theories, there is a linear ordering of the morphological module with respect to the other modules of the grammar, whether the morphology precedes syntax or follows it, and whether it precedes the lexicon or follows it (Jackendoff 1975; Kiparsky 1982; Di Sciullo and Williams 1987; Anderson 1992; Aronoff 1994).

I take a different approach to the understanding of the parallelism and the differences between morphological and syntactic objects. In effect, by focusing on consistent crosslinguistic evidence of the regularity of form and interpretation of morphological objects, new knowledge can be found on the properties of morphological relations. Under this view, the questions of determining the autonomy or nonautonomy of morphology, and the question of identifying the key to morphological relatedness, are subsumed under the more basic question of determining how the properties of morphological relations are instances of the basic properties of the grammar.

Asymmetry Theory holds that the structural relations generated by the grammar are asymmetric as early as possible in the derivations and that morphological derivations start with asymmetric relations. The fact that mirror structures in the sense of Moro (2000) are not observed in morphological objects constitutes an argument for the strict asymmetry of morphological relations. A further argument pointing to the same direction is that inverse scope is not found in morphological objects. These facts also lead to the conclusion that the properties of morphological relations do not coincide with the properties of syntactic relations. My proposal brings additional evidence supporting and further articulating the relative autonomy of syntax and morphology, argued for in Di Sciullo and Williams 1987.

I show that the form of morphological objects is more restricted than the form of syntactic objects. I bring evidence from a variety of languages to show that the minimal morphological domain—what I call the *M-Shell*—is a formal object including two layers of asymmetric relations. This excludes nonbranching projections, as well as *n*-ary branching projections, from the set of possible morphological proper forms. I show that the M-Shell imposes severe restrictions on the form and interpretation of morphological objects.

While the Linear Correspondence Axiom (Kayne 1994) brings together the precedence and the dominance relations, Asymmetry Theory establishes a connection between the structural relations and the operations of the grammar. In current theoretical frameworks, the operations of grammar have independent justifications. Thus, the merger of syntactic objects is subject to formal requirements (Hale and Keyser 1998, 2002; Chomsky 1995, 2000a, 2000b, 2001) and movement is triggered by uninterpretable feature checking (Chomsky 1995, 2000a, 2000b, 2001). I suggest that structural relations and operations are related. More specifically, I propose that the operations of the grammar are triggered by the necessity of obtaining asymmetric relations as soon as possible in the derivations. In the case of morphology, the derivations start with asymmetric relations; syntax does not see the full asymmetry of morphological relations, and must generate its own, destroying points of symmetry as soon as they arise. There is a basic justification to such grammatical computation. The operations of the grammar must derive asymmetric relations to ensure linearization of the constituents for phonetic legibility, on the one hand, and semantic legibility of argument structure, aspect, and operator-variable relations, on the other hand. Linear order, scope, and the other semantic relations are optimally legible in asymmetric relations at the interfaces.

I base the architecture of Asymmetry Theory on my previous work on the modularity of the grammar (Di Sciullo 1996c), and on the Derivation by Phase Model (Chomsky 2001). To illustrate the empirical coverage of the theory, I extend my previous works on the morphology of the Romance, Slavic, modern Greek, and English languages. Furthermore, I add new empirical evidence from these languages, and from Russian, Hungarian, Turkish, and Yekhee, a poorly studied north-central Edoid language from the Niger-Congo family.

This book is organized as follows. Chapter 1 points out the central role of asymmetry as a property of the relations in grammar and its manifestations in morphological objects. Chapter 2 defines Asymmetry Theory. Chapter 3 details the properties of morphological domains in terms of the M-Shell, and shows that the M-Shell is close to Chomsky's notion of phase. Chapters 4 to 6 consider some empirical predictions of the M-Shell Hypothesis. Chapter 7 discusses the interaction of asymmetric relations and the legibility conditions imposed by the external systems. I show that severe restrictions on scope hold in morphological objects, which are not observed in syntactic objects, and suggest a way to account for this semantic interface (LF) difference between the two sorts of objects. I justify the existence of a phonetic interface (PF) operation that is required by tractability considerations. This operation affects specific layers of the M-Shell, bringing additional support to the M-Shell Hypothesis and to the Strict Asymmetry of Morphology. Chapter 8 discusses linguistic variation with respect to the linear order and the PF legibility of the parts of morphological objects and provides evidence that, given independent properties of individual languages, asymmetric relations are preserved under variation. In the concluding remarks, I relate asymmetry to the Global Economy of the grammar.

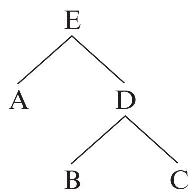
Chapter 1
Asymmetric Relations

The notion of asymmetry has more than one use in linguistic theory.[1] I use *asymmetry* to refer to a property of a relation between two elements in a set.

In a tree a relation is asymmetric if for any two nodes A and B, it holds from A to B and not from B to A. The relations of precedence, dominance, and sister-containment (asymmetric c-command) are the only basic relations in a tree that are asymmetric (see (1)).

(1) a. [A B]

b. 

c. 

In a set of ordered pairs, a relation is asymmetric if the set contains no pairs the coordinates of which are inverted (see (2)). A relation is symmetric if the set includes pairs such as ⟨A, B⟩ and ⟨A, B⟩. An antisymmetric relation is an asymmetric relation that may also include reflexive pairs such as ⟨A, A⟩ and ⟨B, B⟩.[2]

(2) a. {A, B, C}
b. {⟨A, B⟩, ⟨B, C⟩, ⟨A, C⟩}

I focus on configurational asymmetry, and in particular, on the sister-contain relation in the derivation of morphological objects—that is, the objects generated by the morphological components of the grammar. I will generally use trees or bracketed structures to represent morphological relations and, in some cases, I will use the set theoretical notation.

I begin with the Asymmetry Hypothesis, which I substantiate on linguistic and experimental grounds. I then consider current proposals related to the idea that asymmetry plays a role in grammar with respect to linearization (Kayne 1994) and movement (Moro 2000), and I raise some issues related to the derivation and the linearization of morphological objects. I propose that asymmetry is the characteristic property of morphological relations.

1.1 The Asymmetry Hypothesis

In the Minimalist Program (Chomsky 2000b), the language design is the best solution to the interface legibility conditions. The Asymmetry Hypothesis (see (3)) further explores the idea that grammar is perfect.[3]

(3) *The Asymmetry Hypothesis*
Asymmetric relations are core relations of the language faculty.

Language is a perfect solution to interface legibility conditions because it makes maximal use of asymmetric relations in the derivations and at the interfaces. Under standard assumptions, the lack of asymmetry would make linguistic expressions impossible to linearize at PF, assuming that if they are not asymmetrically related, two elements fail to linearize (Kayne 1994 and related works). The absence of asymmetry would also make linguistic expressions impossible to interpret at LF, because scope relations are legible under asymmetry (Fox 2000, among other works).[4] The asymmetric property of syntactic relations can be illustrated as follows.

Given the set theoretical definition of asymmetry, if an ordered pair $\langle A, B \rangle$ is part of an asymmetric relation, say a set S_1, then the ordered pair $\langle B, A \rangle$ is not part of S_1. An asymmetric relation is noncommutative. In other words, the members of the ordered pairs that constitute the relation cannot be inverted without destroying the property of the relation—that is, asymmetry. My contention is that this property helps make grammar perfect. Now consider what would be the case if symmetry were the core property of grammatical relations. By definition, a symmetric relation is commutative. If $\langle A, B \rangle$ is part of a symmetric relation, say the set S_2, then $\langle B, A \rangle$ would be also in S_2. Such relations are clearly not characteristic of natural language. In a linguistic expression, if an element A both precedes and follows an element B, the two instances of A cannot be identical. Consider the examples in (4), where the sentences are described in terms of relations—that is, sets of ordered pairs, the members of the ordered pairs being "minimally" the terminal elements of the sentences.

(4) a. John saw John. {⟨John, saw⟩, ⟨saw, John⟩, ⟨John, John⟩}
b. John saw JOHN. {⟨John, saw⟩, ⟨saw, JOHN⟩, ⟨John, JOHN⟩}
c. John saw himself. {⟨John, saw⟩, ⟨saw, himself⟩, ⟨John, himself⟩}
d. John arrived ~~John~~ {⟨John, arrived⟩, ⟨arrived, ~~John~~⟩, ⟨John, ~~John~~⟩}

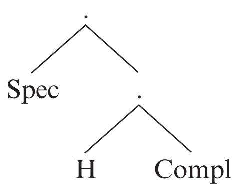
In (4a), the first and second occurrences of *John* cannot refer to the same individual. In (4b), *John* and *JOHN* do not denote the same individual at LF since one occurrence of *John* is focused and the other is not; they are not identical objects at PF. In (4c), *John* and *himself* denote the same individual; however, they are not identical grammatical objects, because *himself* is an anaphor and *John* is not. In (4d), assuming the copy theory of movement, the copy of *John* is not identical to *John* at PF, since unlike the latter, the former has no PF legible features.[5] The examples in (4) illustrate that the terminal elements of syntactic expressions are part of asymmetric relations. Thus, the same element cannot both precede and follow another element in a sentence. However, scope ambiguity is observed in syntactic expressions (see (5)). With the narrow-scope interpretation of *someone* (see (5b)), the asymmetric c-command relations of (5a) are preserved, whereas with the wide-scope interpretation of *someone* (see (5c)), they are not.[6] Thus, differences in asymmetric relations give rise to differences in semantic interpretation.

(5) a. Everyone saw someone.
b. Everyone saw a potentially different person. $\forall y \mid \exists x$ y saw x
c. There is someone that everyone saw. $\exists x \mid \forall y$ y saw x

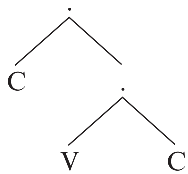
Typically, in syntactic expressions, asymmetric relations are attested on the basis of the restrictions they bring about on the distribution of constituents and their interpretation. If two constituents A and B are in an asymmetric relation, they cannot be inverted without giving rise to a difference in interpretation (see (5)) or, in some cases, to syntactic gibberish (see note 1 on extraction asymmetries).

Asymmetry is a core notion in generative grammar. It is part of the Standard Theory in the discussion on constraints on movement (Chomsky 1965, 1975; Ross 1967). In the Government and Binding Theory (Chomsky 1981, 1982, 1986; Higginbotham 1985; Reinhart 1983), asymmetry is part of the definition of the Binding Theory. As a property of linguistic relations, asymmetry has been shown to be determinant in the analysis of a variety of phenomena, including constituency, displacements, binding, linear order, and scope. In the minimalist framework (Chomsky 1995, 2000a, 2000b, 2001; Uriagereka 1999), it is part of the definition of the operations of the grammar and of the units of the computation. That asymmetry is determinant in syntactic relations has been shown in various recent works in generative syntax (see Boeckx 2003, on resumption), as well as in generative phonology (see Raimy 2000a, 2000b, 2003, on backcopying and reduplication; see also Dresher 2003; Hulst 2002; Hulst and Ritter 2003; Piggott 2003), generative morphology (see Roeper and Keyser 1992; Keyser and Roeper 1997, on compounds) and L-syntax (see Hale and Keyser 2002). Given the Asymmetry Hypothesis (see (1)), the fact that asymmetric relations are in play across the board in grammar does not come as a surprise. The pervasiveness of this property of relations suggests that asymmetry is hardwired in grammar. The idea that the operations of the grammar are defined in terms of asymmetric and symmetric relations emerges with the Minimalist Program (Chomsky 2000b, 2001) where Merge can be symmetric (i.e., set-Merge) or asymmetric (i.e., pair-Merge). The Agree Operation requires that the agreeing terms be in an asymmetric c-command relation. The Defective Intervention Constraint (Chomsky 2000b) is also based on asymmetric relations. In a broader perspective, Chomsky (personal communication and 2001, 8) notes that the principle determining that the Specifier precedes the head in a syntactic constituent might be a reflection of a more general property that holds at other levels too. Syllable structure—C-VC, rather than CV-C (see (7))—may reduce to more general cognitive principles.[7]

(6)



(7)



The fact that syntactic as well as morphological and phonological asymmetries are widely attested in natural languages suggests that this property of relations is basic in grammar. According to the Asymmetry Hypothesis, asymmetry is a core property of the relations of the language faculty. Recent results from psycholinguistics provide experimental evidence for the view that asymmetric relations contribute to the optimality of human perception and processing of linguistic expressions.

Experimental results from De Almeida and Tesolin (2004) on the processing of verb-argument (noun) relations show no difference in priming effects when verb primes are followed by purely syntactic (i.e., nonsemantic) targets (e.g., close-MOON) and when verbs are followed by semanctically related targets (e.g., close-DOOR) at short presentation times (e.g., 40 milliseconds). Differences between these prime-target pairs appear only at longer prime presentation times (e.g., 120 milliseconds). These results suggest that humans are predisposed to perceive the pure syntactic properties of argument structure independently of the semantics of that relation. Furthermore, the processing of prefixed verbal structures provides evidence that the external systems are sensitive to the asymmetry of morphological expressions. Experimental data from Tsapkini, Jarema, and Di Sciullo (2004) on the processing of French prefixed verbs, such as *refermer* 'to close again', *enfermer* 'to enclose', and *réenfermer* 'to enclose again', show a difference in the priming of sequential prefixes, like the iterative prefix *re-* versus spatial prefixes—for example, the locative prefix *en-* 'in'. These results are expected if there is structural asymmetry between the two sorts of affixal relations expressing in one case the sequential relations and in the other case the spatial relations. Moreover, experiments motivated by the asymmetric structure of syllables consisting of an onset (initial consonant or cluster) and a rime (vowel and any following consonants) can be found in Rebecca Treiman's work. Treiman (1985) reports experiments providing behavioral support for this syllable structure, showing that 8-year-olds more easily learned word games that treated onsets and rimes as units than games that did not. Other experiments support the cohesiveness of the onset: 4- and 5-year-olds less easily recognized a spoken or printed consonant target when it was the first phoneme of a cluster than when it was a singleton. Yet another experiment on the reading of printed words shows that a consonant-consonant-vowel nonsense syllable is more difficult for beginning readers to decode than consonant-vowel-consonant syllables.

Jointly, these theoretical hypotheses and the corroboration of these hypotheses by experimental data suggest that asymmetry is basic in grammar. It might be the case that asymmetry is a part of the biological endowment enabling humans to develop the grammar of the language to which they are exposed, so that they can quickly generate and interpret the expressions of their language in a relatively short period.

1.2 Morphological Relations

I posit that asymmetry is the characteristic property of morphological relations that contributes to their legibility by the external systems. The asymmetry of morphological relations follows from the basic asymmetry of relations in grammar.

It has been shown on the basis of English and other languages that asymmetric relations give rise to restrictions on the merger, agreement, and linking of syntactic constituents. If morphological relations are asymmetric, similar restrictions are predicted to be observed for morphological constituents. Actually, stronger restrictions are predicted in morphological objects than in syntactic objects, if asymmetry is the characteristic property of morphological relations, as opposed to being one of the properties of syntactic relations. Consider the following.

If A and B are two elements of a morphological object, they cannot be inverted without giving rise to morphological gibberish, indicated as (#) (see (8a, b)). Furthermore, a given element A cannot both precede and follow another element B, (8c). In (8d), the first occurrence of the affix *en-* (*en*$_1$) has directional features and the second occurrence of the affix (*en*$_2$) has event (verbal) features. Moreover, (8e) is not possible, with the second occurrence of A as a copy of the first, as if movement had taken place within the morphological object. If the second occurrence of *-en* (*-en*$_2$) had verbal event features, as is the case in (8d), tense would wrongly be predicted to occur to the left of the root in English.

(8) a. write-er-s {⟨write, -er⟩, ⟨-er, -s⟩, ⟨write, -s⟩}
b. #er-write-s {⟨-er, write ⟩, ⟨-write, -s⟩, ⟨er-, -s⟩}
c. #er-write-er {⟨-er, write⟩, ⟨write, -er⟩, ⟨-er, -er⟩}
d. en-light-en {⟨en$_1$-, light⟩, ⟨light, -en$_2$⟩, ⟨-en$_1$, -en$_2$⟩}
e. #en-light-~~en~~ {⟨en-, light⟩, ⟨light, -~~en~~⟩, ⟨-en, -~~en~~⟩}

These facts suggest that morphological relations are asymmetric. In a morphological object, the same element, (say, an affix), cannot both follow and precede another element, (say, a root). Consider now the following examples with compounds, which also point in the same direction.

(9) a. the taxi driver / #the driver taxi
b. the taxi'*s* driver / the driver of the taxi

c. the dollhouse / #the house-doll
d. the doll*'s* house / the house of the doll

(10) a. the expert-tested software. / #the tested-expert software
b. Expert*s have* tested the software. / The software was tested by experts.
c. wind-blown hair / #the blown-wind hair
d. The wind *has* blown her hair. / Her hair was blown by the wind.

In English deverbal compounds, the nonhead precedes the head, even though in cases such as (9a, c) it is related to the complement position. Its position cannot be the result of a movement operation, because the bare nonhead may not occupy the complement position.[8] In the absence of an active functional element, such as the possessive, a complement does not typically precede a noun in a syntactic expression (see (9b, d)). Similarly, with compounds including subjects (see (10)), the precedence relations are not identical to the ones obtained in related syntactic expressions. An intervening functional element must be present in the syntactic expressions, but not in the compounds. These facts also indicate that the properties of morphological relations cannot be equated with the properties of syntactic relations.[9]

Moreover, there is no scope ambiguity in morphological objects, as there can be in syntactic objects (see (5)). Suppose that the affix *un-* can be the spell-out of negation and that the affix *-able* is the spell-out of modality (in this case possibility) in morphological objects. The interaction of negation and modality is strict in morphology. For example in (11a), the negation scopes over the modal, as does the likely paraphrase in (11b); the modal does not scope over the negation, since (11c) is not a likely paraphrase (≠) of (11a). The absence of scope ambiguity in morphological objects also points to the conclusion that morphological relations are asymmetric only.

(11)	a.	This is unpredictable.	NEG > MOD
	b.	It is not possible to predict this.	NEG > MOD
	c.	≠It is possible not to predict this.	MOD > NEG

Asymmetry is hardwired in morphological relations. I use the term *asymmetry* to refer to the property of morphological relations, to the exclusion of symmetry and antisymmetry. *Antisymmetry* is used in Kayne 1994 to express the property of syntactic relations with respect to linearization.[10] Symmetry and asymmetry are used in Moro 2000 to express the properties of syntactic relations with respect to movement. The following paragraphs consider Kayne's and Moro's hypotheses and their consequences for the derivation of morphological expressions.

1.3 Asymmetry and Linearization

According to Kayne's (1994) Linear Correspondence Axiom, the linear ordering of terminals is a function of the asymmetric c-command relation between all the ordered pairs of preterminals (see (12), (13)).[11] Because the precedence relation is asymmetric, transitive, and total, the LCA is calculated over all the ordered pairs of the preterminals in a tree. The precedence relation is asymmetric and irreflexive since an element can never precede itself. A well-formed tree cannot contain two nonterminal nodes symmetrically c-commanding each other, unless at most one of the two nonterminal nodes contains at least one other nonterminal node. If this requirement is not met, the terminal nodes will fail to linearize.[12]

(12) *Linear Correspondence Axiom*
d(A) in a linear ordering of T. (Kayne 1994, 6)

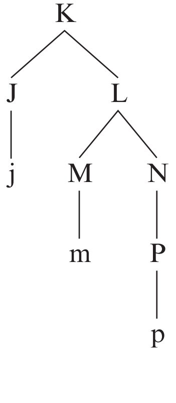
(13) Let X, Y be nonterminals and x, y terminals such that X dominates x and Y dominates y. Then, if X asymmetrically c-commands Y, x precedes y. (Kayne 1994, 33)

(14) *C-command*
X c-commands Y iff *X and Y are categories* and X excludes Y, and every category that dominates X dominates Y. (Kayne 1994, 16)

(15) *Asymmetric c-command*
X asymmetrically c-commands Y, if X c-commands Y and Y does not c-command X. (Kayne 1994, 4)

Consider the phrase marker in (16).

(16)



The set of all the pairs of nonterminal nodes such that the first asymmetrically c-commands the other is the set A in (17), and d(A) in (18). The three ordered elements in (19) constitute a linear ordering of the set in (16). Assuming that transitivity holds, antisymmetry is respected and the ordering is total.

(17) A = {⟨J, M⟩, ⟨J, N⟩, ⟨J, P⟩, ⟨M, P⟩}

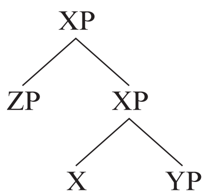
(18) d(A) = {⟨j, m⟩, ⟨j, p⟩, ⟨m, p⟩}

(19) {j, m, p}

According to Kayne, the LCA applies at all levels of representation. It applies to internal levels of representation, including D-structure and S-structure, and it applies also to the PF interface for linearization. It derives the basic properties of X-bar structure, see (20). It allows only a single type of constituent, the one represented in (21), in which a head projects only one level of complement, with only one more level of expansion, because in the antisymmetry framework, subjects and adjuncts are formally nondistinct.[13]

(20) a. A constituent must have a head.
b. A constituent has one and only one head.
c. A head has only one complement.
d. A head cannot take another head as its complement.

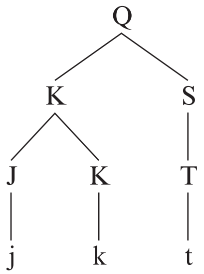
(21)



The LCA imposes strict ordering relations. Given the Universal Base Hypothesis, the order of the base constituents is universally specifier-head-complement, crosslinguistic variation in word order being a consequence of movement.

Kayne (1994, 38–41) suggests, on the basis of the properties of English and Romance compounds such as *overturn* and *ouvre-boîte* 'can opener', that the LCA extends under the word level. In doing so, he assumes that the structure of compounds is more complex than what appears prima facie, because the LCA must apply to structural descriptions where there is asymmetric c-command between all pairs of preterminals. This is the case for the head-adjunction structure in (22), where J adjoins to K.

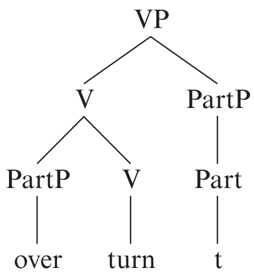
(22)



(Kayne 1994, 40 (10))

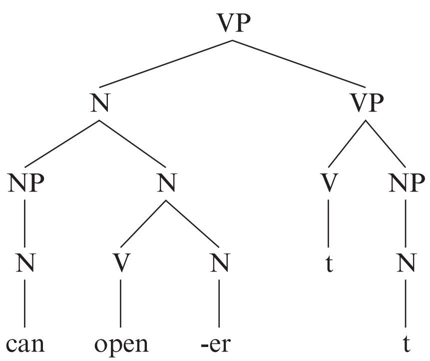
Kayne (1994, 40) proposes that the complex verb *overturn* is derived by head movement (see Baker 1988; Travis 1984), *over* adjoining to *turn* (see (23)).

(23)



Head movement is part of the derivation of Part-V compounds, and XP movement is also part of the derivation of deverbal compounds. Kayne (1994, 41) suggests that a possible analysis of *can opener* might be "'er [open [$_{NP}$ [$_{N}$ can]]]', *open* adjoining to -*er* and the NP [$_{NP}$ [$_{N}$ can]] moving to the specifier of the -*er* projection" (see (24)).

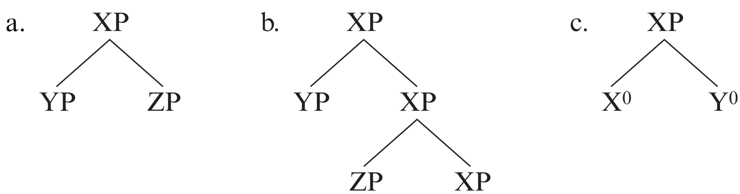
(24)



Even though linearization may technically be achieved by head movement, this rule, and more generally sister adjunction, introduces symmetry in the derivation and it may alter scope relations, which may in some cases alter the semantic interpretation (see chapter 7). The asymmetric relations can be kept constant in a model where the morphological derivation takes place in a separate plane from the syntactic derivation. In such a model, nothing requires linearization in morphology to be obtained by head movement or XP movement. The linearization of the morphological constituents may be achieved by an operation that applies only in the phonology and that does not introduce symmetry in the derivation, as discussed in chapters 2 and 7.

1.4 Movement as Symmetry Breaking

Moro (2000) developed a weak version of Kayne's (1994) Antisymmetry Theory and argued that movement is asymmetry breaking. Points of symmetry are derived when the LCA is violated, as in (25a) for small clauses, (25b) for multiple-specifier constructions, and (25c) for clitic structures, from Moro (2000, 32).

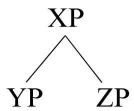
(25)


According to Moro (2000), movement is forced by the requirement of eliminating symmetric relations or "points of symmetry" generated in the course of the derivation. Points of symmetry are postulated on the basis of "mirror structures" found in syntax across categories (among others, see Den Dikken 1997; Kayne 1994; Moro 1997; Zamparelli 1995). The examples in (26) illustrate this phenomenon in the IP, the DP, and the AP domains.

(26) a. a picture of the wall is [t the cause of the riot] / the cause of the riot is [a picture of the wall t]
b. John bought [books of [t this type]] / John bought [this type of [books t]]
c. you are [t kind] / it's [kind of [you t]]

In each case, two phrases can alternatively move to derive the correct output given that there are two distinct ways to neutralize a point of symmetry. According to Moro, if movement were considered a way to delete the uninterpretable features of one element, the existence of such "mirror structures" would be hard to understand. In each pair, the two displaced elements are linked by one and the same relation, namely predication;

Moro (2000), following Williams (1980), analyzes predication as a symmetric structure. According to Williams (1980), predication is a mutual m-command between two maximal projections, a subject YP and the predicate ZP (see (27)).[14]

(27)


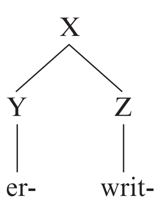
If points of symmetry consist of two elements X and Y and movement is a way to neutralize points of symmetry, then potentially, whenever it is observed that X moves, it should also be possible to observe an associated structure where Y moves. This prediction appears to be borne out in XP structure with cases of canonical versus inverse copular structures discussed in (26).

In morphology, such an alternation is not observed, which indicates that points of symmetry are not derived in morphology, and thus that movement does not take place to eliminate them. If the derivation of morphological objects gave rise to mirror structures, alternations such as the ones in (28) in derivation and in (29) in compounding would be expected to occur, contrary to fact.

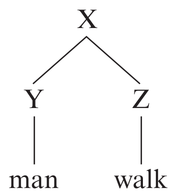
(28) a. [write -er]
b. [write [-er t]]
c. #[-er [write [t t]]]

(29) a. [man walk]
b. [walk [man t]]
c. #[man [walk [t t]]]

The example in (28) shows that the relation between an affix and a root is not symmetric; the affix and the root are not sisters. If this were the case, mirror structures could be created by the displacement of either the affix or the root, thus destroying the point of symmetry. This is not the case, notwithstanding the fact that a predication relation could be assumed to hold between the "agentive" nominal affix -*er* and the predicative root *writ*- before movement would take place (see (30)).

(30)


Compounds such as *walk-man*, with a predication (subject-verb) relation, even though less common than compounds with a verb-object relation, are found in a variety of languages, including Romance (e.g., *scorri-mano*, run hand, 'stairway'), and German (e.g., *Vogel sprech*, speak bird, 'talking-bird'). Here again, the constituents cannot be sisters before movement takes place (see (31)), because mirror structures cannot be created without giving rise to morphological gibberish (see (29c)). Thus, there is no evidence that points of symmetry are introduced in the derivation of deverbal compounds based on predication.

(31)


The facts in (28) and (29) suggest that points of symmetry are not found in morphology. I posit that points of symmetry are never created in the morphological derivations precisely because morphology combines and manipulates asymmetric relations only; symmetric relations are irrelevant in morphology. This is apparently not the case for syntax, under the assumption that points of symmetry can be derived in syntactic derivations.[15]

1.5 The Strict Asymmetry of Morphology

Morphology and syntax differ with respect to the choice of properties of relations made available by the grammar. Morphology picks asymmetry only. This is why morphology is more restricted than syntax. I state my proposal as follows:

(32) *The Strict Asymmetry of Morphology*
Morphology combines and manipulates asymmetric relations only.

The severe restrictions on the linear ordering and the scope of the constituents in morphological objects provide evidence that morphology manipulates asymmetric relations only. The hypothesis in (32) makes the following predictions for English:

- Affixes and roots cannot be inverted:

(33) a. writ- er / #er- write
b. re-writ-ing / #ing-write-re
c. en-trap-ment / #ment-trap-en

- Inversion is impossible among affixes:

(34) a. compute, comput-able, comput-er, comput-er-ize, comput-er-iz-able / #comput-ize-er, #comput-er-able, #comput-able-ize
b. re-en-trap / #en-retrap, re-en-capsul-ate / #en-re-capsul-ate
re-dis-connect / #dis-re-connect

- The constituents of compounds cannot be inverted either. The nonhead precedes the head in deverbal compounds (35a), in root compounds (35c), as well as in compounds including modifier-head relations (35e, g):

(35) a. paper cutter / #cutter-paper
b. teacup / #cup-tea
c. Sunday driver / #driver-Sunday
d. elephant man / #man-elephant

- Recursivity does not affect the precedence relations. In English compounds, recursivity is to the left, expanding the nonhead constituent (see (36)):

(36) a. paper cutter / tick-paper-cutter / #paper-tick-cutter
b. teacup / English-teacup / #tea-English-cup
c. Sunday driver / Easter-Sunday-driver / #Sunday-Easter-driver

It is generally the case that affixes cannot be reordered in word structure. However, there are two cases where reordering is possible: (1) diminutive clusters in Italian and (2) causative-reflexive affixation in Ecuadorian Quechua, reported in Muysken 1981. As predicted, different orderings of the affixes yield systematic differences in interpretation.

(37) dim1 > dim2; dim2 > dim1
-*ino*: descriptive; -*etto*: evaluative
a. tavolo, tavolino, tavoletto (It)
'table', 'small table', 'funny small table'
b. tavolinetto, tavolettino
'small funny table', 'funny small table'

(38) CAUSE > REC; REC > CAUSE
a. verb CAUSE -*chi* REC -*naku* (EQ)
maqa- chi naku- rka- n
beat CAUSE REC pl. 3
'They let each other be beaten.'
b. verb REC -*naku* CAUSE -*chi* (Qu)
maqa- naku- ya- chi- n
beat REC DUR CAUSE 3
'He is causing them to beat each other.' (Muysken 1981)

The inversion of affixes in morphological expressions give rise to a difference in semantic interpretation, whereas the inversion of two constituents in syntactic expressions may also give rise to a difference in information structure, including focus—as illustrated in (39) with locative inversion, and in (40) with quotative inversion—as well as to a difference in inference structure—as illustrated in (41) with passives and in (42) with middles.

(39) a. John rolled down the hill.
  b. Down the hill rolled John.

(40) a. "I am so happy" Mary thought.
  b. "I am so happy" thought Mary.

(41) a. Beavers build dams.
  (One property of beavers is that they build dams.)
  b. Dams are built by beavers.
  (It is a property of dams to be built by beavers.)

(42) a. It is easy (for John) to wash this shirt.
  b. This shirt washes easily (for anybody).

The Strict Asymmetry of Morphology also predicts that inverse scope is not possible, as illustrated in (11) above with NEG and MOD affixes, other than with a difference interpretation for the affixes. This can be seen with the affix *un*-, which may be the spell-out of negative or inverse semantic features.

With a root that does not denote an activity, *un*- may only be the spell-out of the negative feature (see (43)). With a root that does denote an activity, both options (negative and inverse) are available (see (44b, c)). Notwithstanding the two interpretations for -*un*, inverse scope does not arise, since (44d) is not a likely paraphrase of (44a).

(43) a. This situation is unbearable.
  b. It is not possible to bear this situation.
  c. #It is possible not to bear this situation.

(44) a. This shoe is untieable.
  b. It is not possible to tie this shoe. (negative *un*-)
  c. It is possible to untie this shoe. (inverse *un*-)
  d. #It is possible not to tie this shoe.

Thus, parts of morphological expressions cannot be inverted without giving rise to gibberish or a difference in interpretation, which is not a difference in information structure, as is the case when inversion occurs in narrow syntax (see (39)–(42)).

If asymmetry is a core property of grammatical relations, the asymmetry of morphology is an instance of a core property of relations of the grammar; it is not an instance of a property of syntactic relations. There is crosslinguistic evidence that morphology manipulates asymmetric relations, whereas it might be the case that symmetric and antisymmetric relations are also derived by syntax. Findings reported in Moro et al. 2001 in functional imaging on the neurological correlates of the syntactic and morphological components of the language faculty reveal the relative autonomy of these components. This provides neurophysiological evidence for my argument that while asymmetry is a basic property of relations in grammar and thus part of syntax and morphology, morphological relations cannot be equated with syntactic relations. However, parallelisms are observed between morphology and syntax—for example with respect to the "head of" relation, and with respect to Agree, as discussed in chapter 3.

If syntax cannot be equated with morphology, how can the operations of the grammar ensure that both syntactic and morphological derivations generate asymmetric relations? I consider this question in the next chapter from the perspective of Minimalism and formulate the Asymmetry Theory.

Appendix: Sets, Pairs, and Relations

Current generative grammar, in particular the Minimalist Program, operates a number of theoretical notions such as *set*, *pair*, *ordered pair*, *relation*, *symmetry*, and *asymmetry*. These notions are extensively used by linguistic theories (e.g., the Antisymmetry framework and the Dynamic Antisymmetry framework). In the following paragraphs I will briefly define these set theoretical notions (for further details see Partee, Ter Meulen, and Wall 1990).

A *set* is an aggregation of discrete individuals regarded as a whole. The individuals that are part of a set constitute its members. A finite set consisting of the positive integers 1, 2 can be denoted by listing the names of its members, as in {1, 2}. This so-called list notation of a set specification differs from the predicate notation that specifies some property typical/characteristic of all and only its members—for example, {x | x is a positive integer less than 3} reads "the set of all x such that x is positive integer less than 3." The list notation is widely applied in current syntactic theory. For instance, Chomsky (2001, 10) uses it to define the set of expressions Exp derived by the computational procedure. Thus, Exp is the set of interface representations $\langle PF, LF \rangle$, where PF is the phonetic interface and LF is the semantic interface.

The members of a set can either be in unordered or in ordered relation. In the former case, given two sets, the order of the members of the sets does not affect their equivalence. Thus, the set $\{1, 2\}$ could be equivalently denoted as $\{2, 1\}$, because there is no order or precedence relation specified for the members. More complex mathematical structures can be built if the notion of order is defined over the members of a set.

An *ordered pair* with a as the first coordinate and b as the second coordinate is denoted $\langle a, b \rangle$, where the elements of the set are in angle brackets. Given the two sets A and B, the set, whose members are all the possible ordered pairs with the first coordinate from A and the second coordinate from B, is called the Cartesian product of A and B and is represented as $A \times B$. For example, if $A = \{a, b\}$ and $B = \{1, 2\}$, then the configurations $A \times B = \{\langle a, 1 \rangle, \langle a, 2 \rangle, \langle b, 1 \rangle, \langle b, 2 \rangle\}$ and $B \times A = \{\langle 1, a \rangle, \langle 1, b \rangle, \langle 2, a \rangle, \langle 2, b \rangle\}$ are obtained.

Ordered pairs are used to express asymmetric relations between all the pairs of nonterminal symbols in a phrase marker in Kayne 1994. Chomsky (2000b, 133) uses the difference between sets and pairs to define the operations of the grammar—in particular in the definition of Pair-Merge, or the adjunction operation, as opposed to Set-Merge, or the substitution operation.

A *relation* is a set of ordered pairs in a given domain. For example, given a domain of discourse I, containing all human beings, the Cartesian product $I \times I$ is formed. The predicate "x is the mother of y" is true for certain ordered pairs in $I \times I$, and false for the others. If the set of ordered pairs for which "x is the mother of y" is true, the extension of the predicate can be called the relation of motherhood. Thus, any subset of a Cartesian product is a relation holding between the first and the second coordinates of each ordered pair. If R is a relation and $\langle a, b \rangle$ is an ordered pair in R, a stands in a relation R to b, which can be written aRb.

Given the two sets A and B, if all the members of A are also the members of B, then A forms a *subset* of B. The subset relation is expressed by $\subseteq$ or $\supseteq$, the open side of the symbol pointing away from the subset, as in $\{1, 2\} \subseteq \{1, 2, 3\}$, $\{1, 2, 3\} \supseteq \{1, 2\}$. To avoid the possibility of identical sets, the term *proper subset* is used. A is a proper subset of B or is properly included in B whenever A is a subset of B but not equal to B. Proper inclusion is denoted by $\subset$ and $\supset$—for example, $\{1, 2, 3\} \subseteq \{1, 2, 3\}$ and $\{1, 2\} \subset \{1, 2, 3\}$. A (binary) relation R that is a subset of $A \times B$ is said to be a relation "from A to B." Relations between sets are crucial in the definition of the building blocks of grammar, as discussed in section 1.5.

The relations in a set are characterized by a number of properties such as symmetry, asymmetry, and antisymmetry.

(1) If $R \subseteq A \times A$, then R is symmetric iff
$(\forall x\ y)\ (\langle x, y\rangle \in R \rightarrow \langle y, x\rangle \in R)$.

A relation R in a set A is *asymmetric* if and only if for any $\langle x, y\rangle$ in R, it is never the case that $\langle y, x\rangle$ is also in R.

(2) If $R \subseteq A \times A$, then R is asymmetric iff
$(\forall x\ y)\ (\langle x, y\rangle \in R \rightarrow \langle y, x\rangle \notin R)$.

Here are some examples of asymmetric relations in the set $A = \{a, b, c, d\}$: $\{\langle a, b\rangle, \langle d, c\rangle\}$, $\{\langle b, a\rangle, \langle e, c\rangle, \langle k, f\rangle\}$.

A relation that is otherwise asymmetric but may include pairs of the form $\langle x, x\rangle$ is antisymmetric. An *antisymmetric* relation is an asymmetric relation with the additional property that the set may include reflexive relations:

(3) If $R \subseteq A \times A$, then R is antisymmetric iff
$(\forall x, y)\ (\langle x, y\rangle \in R \wedge \langle y, x\rangle \in R \rightarrow x = y)$.

Examples of antisymmetric relations in $A = \{a, b, c, d\}$ are: $\{\langle b, a\rangle, \langle a, a\rangle\}$, $\{\langle b, b\rangle, \langle a, b\rangle, \langle d, c\rangle\}$, $\{\langle b, a\rangle, \langle e, c\rangle, \langle k, f\rangle\}$.

Consequently, every asymmetric relation is also antisymmetric, but not the converse.

Symmetry is the property of relations in a set such that for every pair $\langle x, y\rangle$ in the set, the pair $\langle y, x\rangle$ is also part of that set.

An asymmetric relation is irreflexive. A relation R in a set A is reflexive if and only if all the ordered pairs of the form $\langle x, x\rangle$ are in R for every x in A.

(4) If $R \subseteq A \times A$, then R is reflexive iff
$(\forall x \in A)\ \langle x, x\rangle \in R$.

(5) If $R \subseteq A \times A$, then R is irreflexive iff
$(\forall x \in A)\ \langle x, x\rangle \notin R$.

For example, given the set $B = \{a, b, c\}$, the relation $R_1 = \{\langle a, a\rangle, \langle a, b\rangle, \langle b, b\rangle, \langle b, c\rangle, \langle c, c\rangle\}$ is reflexive because it contains the ordered pairs $\langle a, a\rangle$, $\langle b, b\rangle$, $\langle c, c\rangle$, whereas the relation $R_2 = \{\langle a, a\rangle, \langle a, b\rangle, \langle b, b\rangle, \langle b, c\rangle\}$ is nonreflexive because the ordered pair $\langle c, c\rangle$ is lacking. The relation $R_3 = \{\langle a, b\rangle, \langle b, c\rangle, \langle a, c\rangle\}$ is irreflexive because it contains neither $\langle a, a\rangle$ nor $\langle b, b\rangle$ nor $\langle c, c\rangle$, whereas the relation

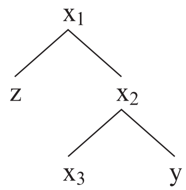
$R_4 = \{\langle a, b\rangle, \langle b, c\rangle, \langle a, a\rangle\}$ is not irreflexive because the pair $\langle a, a\rangle$ is present.

Thus, in set theory, asymmetry is the property of sets of ordered pairs such that for any pair $\langle x, y\rangle$, there cannot be a pair $\langle y, x\rangle$ or $\langle y, y\rangle$ or $\langle x, x\rangle$ in that set. The members of the pairs are ordered unidirectionally. Asymmetry and antisymmetry differ with respect to ordering relations. Asymmetry manipulates only strict ordering relations; in contrast, the antisymmetry theory permits weak ordering relations. In a strict ordering relation, no element precedes itself; whereas in nonstrict orderings, every element precedes itself. Partial orders are transitive relations that are either antisymmetric and reflexive, or asymmetric and irreflexive. Total orders are partial orders that in addition are said to be connected.

The set theoretical properties of relations apply to mathematical configurations—that is, to structures composed of one or more sets together with one or more relations in these sets. A tree diagram is an oriented mathematical configuration, the properties of which can be defined in terms of ordered pairs of nodes connecting branches.

The relations of dominance, precedence, sister, and c-command between pairs of nodes in a tree such as (6) can be formulated as follows: node x_1 *dominates* node x_2 if there is a connected sequence of branches extending downward from x_1 to x_2 in the tree. In (6) x_1 dominates x_2, and that x_2 dominates x_3.

(6)



Given a tree, and assuming that x dominates y ($\langle x, y\rangle$), the set of all ordered pairs $\langle x, y\rangle$ for that tree constitutes the dominance relation for the tree. Dominance is asymmetric. It defines a strict ordering of the nodes in a tree. Two nodes are ordered in a "left-to-right" direction just in case they are not ordered by dominance. Given a tree, the set of all the ordered pairs $\langle x, y\rangle$ such that x precedes y (x is to the left of y) is said to define the precedence relation of that tree. Precedence is irreflexive. If x precedes y, then y cannot precede x, and thus this relation is asymmetric. Precedence determines the strict partial order over the nodes of a tree.

Distinct nodes immediately dominated by the same node are called "sisters." The relation "sister of" is symmetric—that is, if x is the sister of y, y is also the sister of x. If x c-commands y, then x and y do not dominate each other and all the categories that dominate x dominate y. If x asymmetrically c-commands y, then x c-commands y and y does not c-command x. In the tree in (6), sisterhood holds for the pairs $\langle z, x_2 \rangle$ and $\langle x_3, y \rangle$, whereas asymmetric c-command holds for the pairs $\langle z, x_3 \rangle$ and $\langle z, y \rangle$.

It has been proposed that c-command is not an elementary relation but can be derived from the properties of derivations (Epstein 1995; Frank, Vijay-Shanker, and Chen 1996; Reuland 1998). Asymmetric c-command falls out in a natural way from the operations of the grammar in the minimalist framework (Chomsky 2000a). This relation is subsumed under the more elementary "sister" and "contain" relations derived by the operation Merge. In Chomsky 2000b, 116, c-command is a relation that falls out from the computational process. Thus, the operation Merge takes two elements α and β and forms a more complex one K incorporating both α, β. Merge provides two relations: sisterhood, which holds for (α, β), and immediate contain, which holds for (K, α) and (K, β). By composition of relations, two new relations are derived: the relation *contain* and the relation *c-command* (sister-contain). Thus, K contains α if K immediately contains α, or K immediately contains L, which immediately contains α; conversely α is a term of K if K contains α. And α c-commands β if α is the sister of K that contains β. See Chomsky 2000a for discussion.

References

Abels, Klaus. 2001. On an alleged argument for the Proper Binding Condition. *MIT Working Papers in Linguistics* 43, 1–16.

Abney, Steven. 1987. The English noun phrase in its sentential aspect. Unpublished doctoral dissertation, MIT.

Adger, David. 2003. Stress and phasal syntax. GLOW abstract.

Aguero, Calixto. 2001. Cyclicity and the Scope of Wh-Phrases. Unpublished doctoral dissertation, MIT.

Aguero, Calixto. 2003. The DPBE and Its Exemption in Romance. Unpublished manuscript, UQAM.

Aguero, Calixto. 2004. Isolability at the Interfaces and the Notion of Binding Domain. Unpublished manuscript, UQAM.

Ambar, Manuela. 1983. Gouvernement et inversion dans les interrogatives Qu- en Portugais. *Recherches Linguistiques* (Paris) 16, 5–31.

Ambar, Manuela. 1988. *Para una sintaxe da inversao sujeto verbo en portuguès*. Doctoral dissertation. Lisbon: Colibi.

Ambar, Manuela. 2003. Wh-asymmetries. In Anna Maria Di Sciullo, ed., *Asymmetry in Grammar, Volume 1: Syntax and Semantics*, 209–251. Amsterdam: John Benjamins.

Ambar, Manuela, and Rita Veloso. 2001. On the nature of wh-phrases—word order and wh-in-situ. Evidence from Portuguese, French, Hungarian and Tetum. In Yves d'Hulst, Johan Rooryck, and Jan Schroten, eds., *Selected Papers from "Going Romance" 1999, Current Issues in Linguistic Theory* 221, 1–39.

Anderson, Steven. 1992. *A-Morphous Morphology*. Cambridge: Cambridge University Press.

Androutsopoulou, Antonia, and Manuel Español Echevarria. 2003. French definite determiners in indefinite contexts and asymmetric agreement. In Anna Maria Di Sciullo, ed., *Asymmetry in Grammar, Volume 2: Morphology, Phonology, Acquisition*, 11–27. Amsterdam: John Benjamins.

Aoun, Joseph, and Yen-Hui Audrey Li. 1993. *Syntax of Scope*. Cambridge, MA: MIT Press.

Aoun, Joseph, and Yen-Hui Audrey Li. 2003. *Essays on the Representational and Derivational Nature of Grammar*. Cambridge, MA: MIT Press.

Aronoff, Mark. 1976. *Word Formation in Generative Grammar*. Cambridge, MA: MIT Press.

Aronoff, Mark. 1983. Potential words, actual words, productivity and frequency. In Shiro Hattori, Kazuko Inoue, Tadao Shimomiya, Yoshio Nagashima, eds., *Proceedings of the 13th International Congress of Linguists, 1982, Tokyo*. Tokyo: Tokyo Press, 163–171.

Aronoff, Mark. 1994. *Morphology by Itself*. Cambridge, MA: MIT Press.

Arregi, Karlos. 2003. Nuclear stress and syntactic structure. Paper presented at the North American Syntactic Conference, Concordia University.

Bach, Emmon. 1996. On the grammar of complex words. In Anna Maria Di Sciullo, ed., *Configurations: Essays on Structure and Interpretation*. Somerville, MA: Cascadilla Press.

Baker, Mark C. 1988. *Incorporation: A Theory of Grammatical Function Changing*. Chicago: University of Chicago Press.

Bakovic, Eric. 2000. Harmony, Dominance, and Control. Unpublished doctoral dissertation, Rutgers University.

Barwise, Jon, and Robin Cooper. 1981. Generalized quantifiers in natural languages. *Linguistics and Philosophy* 4(1), 159–219.

Beard, Robert. 1988. The separation of derivation and affixation: Toward a lexeme-morpheme based morphology. *Quarderni di semantica* 5, 277–287.

Beard, Robert. 1995. *Lexeme-Morpheme Based Morphology*. Albany, NY: SUNY Press.

Bendor-Samuel, David. 1988. The ongoing use of vernacular literature. *Notes on Scripture in Use and Language Programs* 18, 3–20.

Bendor-Samuel, John T., and Rhonda L. Hartell, eds. 1989. *The Niger-Congo Languages: A Classification and Description of Africa's Largest Language Family*. Lanham, MD: University Press of America.

Binnick, Robert. 1998. *Time and the Verb*. Oxford: Oxford University Press.

Boeckx, Cedric. 2003. Symmetries and asymmetries in multiple checking. In Cedric Boeckx and Kleanthes K. Grohmann, eds., *Multiple Wh-Fronting*, 17–26. Amsterdam: John Benjamins.

Boeckx, Cedric, and Kleanthes K. Grohmann. 2003. *Multiple Wh-Fronting*. Amsterdam: John Benjamins.

Boeckx, Cedric, and Sandra Stjepanović. 2001. Heading toward PF. *Linguistic Inquiry* 32, 345–355.

Booij, Geert. 1989. On the representation of diphthongs in Frisian. *Journal of Linguistics* 25, 319–332.

Borer, Hagit. 1986. I-subjects. *Linguistic Inquiry* 17(3), 375–416.

Borer, Hagit. 1988. On the parallelism between compounds and constructs. *Yearbook of Morphology* 1, 45–66.

Borer, Hagit. 1991. The causative-inchoative alternation: A case study in parallel morphology. *Linguistic Review* 8, 119–158.

Borer, Hagit. 1994. The projection of arguments. In E. Benedicto and J. Runner, eds., *Functional Projections*, 19–47. Amherst: GLSA, University of Massachusetts.

Borer, Hagit. 1998. Morphology and syntax. In Andrew Spencer and Arnold Zwicky, eds., *The Handbook of Morphology*, 151–190. Oxford: Blackwell.

Bošković, Želiko. 1997. *The Syntax of Nonfinite Complementation: An Economy Approach*. Cambridge, MA: MIT Press.

Brody, Michael. 2000. Mirror theory: Syntactic representations in perfect syntax. *Linguistic Inquiry* 31, 29–56.

Browning, Marguerite. 1987. Null operator constructions. Unpublished doctoral dissertation, MIT.

Burzio, Luigi. 1986. *Italian Syntax: A Government-Binding Approach*. Dordrecht: Reidel.

Bybee, Joan, Revere Perkins, and William Pagliuca. 1994. *The Evolution of Grammar: Tense, Aspect, and Modality in the Languages of the World*. Chicago: University of Chicago Press.

Carlson, Greg. 1977. Reference to Kinds in English. Unpublished doctoral dissertation, University of Massachusetts, Amherst.

Carlson, Greg. 1999. Event semantics and propositional semantics. Paper presented at the Thermi Conference on Tense, Aspect and Mood, Thermi International Summer School of Linguistics (TISSL).

Carlson, Greg. 2002. Weak indefinites. In Martine Coene and Yves d'Hulst, eds., *From NP to DP, Volume 1: The Syntax and Semantics of Noun Phrases*, 195–210. Amsterdam: John Benjamins.

Carlson, Greg. 2003. Interpretive asymmetries in major phrases. In Anna Maria Di Sciullo, ed., *Asymmetry in Grammar, Volume 2: Morphology, Phonology and Acquisition*, 301–315. Amsterdam: John Benjamins.

Chierchia, Gennaro. 1998. Reference to kinds across languages. *Natural Language Semantics* 6, 339–405.

Chierchia, Gennaro. 2001. A puzzle about indefinites. In Carlo Cecchetto, Gennaro Chierchia, and Maria Teresa Guasti, eds., *Semantic Interfaces: Reference, Anaphor and Aspect*, 51–89. Stanford, CA: Center for the Study of Language and Information.

Chierchia, Gennaro, and Sally McConnell-Ginet. 1990. *Meaning and Grammar: An Introduction to Semantics*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1970. Remarks on nominalizations. In R. Jacobs and P. Rosenbaum, eds., *Readings in Transformational Grammar*, 184–221. Boston: Ginn.

Chomsky, Noam. 1975. *Reflections on Language*. New York: Pantheon.

Chomsky, Noam. 1977. On wh-movement. In Peter Culicover, Thomas Wasow, and Adrian Akmajian, eds., *Formal Syntax*, 71–132. New York: Academic Press.

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

Chomsky, Noam. 1982. *Some Concepts and Consequences of the Theory of Government and Binding*. Cambridge, MA: MIT Press.

Chomsky, Noam. 1986. *Knowledge of Language*. New York: Praeger.

Chomsky, Noam. 1993. A minimalist program for linguistic theory. In Kenneth Hale and Samuel Jay Keyser, eds., *The View from Building 20*. Cambridge, MA: MIT Press.

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

Chomsky, Noam. 1998. Minimalist inquiries: The framework. *MIT Occasional Papers in Linguistics* 15. (Revised version published as Chomsky 2000b.)

Chomsky, Noam. 1999. Derivation by phase. *MIT Occasional Papers in Linguistics* 18. (Revised version published as Chomsky 2001.)

Chomsky, Noam. 2000a. Beyond Explanatory Adequacy. Unpublished manuscript, MIT.

Chomsky, Noam. 2000b. Minimalist inquiries: The framework. In R. Martin, D. Michaels, and J. Uriagereka, eds., *Step by Step: Essays on Minimalist Syntax in Honor of Howard Lasnik*, 89–155. Cambridge, MA: MIT Press.

Chomsky, Noam. 2001. Derivation by phase. In Michael Kenstowicz, ed., *Ken Hale: A Life in Language*, 1–52. Cambridge, MA: MIT Press.

Chomsky, Noam, and Morris Halle. 1968. *The Sound Pattern of English*. New York: Harper & Row.

Chung, Sandra. 1998. *The Design of Agreement: Evidence from Chamorro*. Chicago: University of Chicago Press.

Cinque, Guglielmo. 1990. *Types of Ā-dependencies*. Cambridge, MA: MIT Press.

Cinque, Guglielmo. 1993. A null theory of phrase and compound stress. *Linguistic Inquiry* 24, 239–297.

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

Collins, Christopher. 1997. *Local Economy*. Cambridge, MA: MIT Press.

Collins, Christopher. 2002. Eliminating labels. In S. D. Epstein and T. D. Seely, eds., *Derivation and Explanation in the Minimalist Program*, 42–64. Oxford: Blackwell.

Comrie, Bernard. 1976. *Aspect: An Introduction to the Study of Verbal Aspect and Related Problems*. Cambridge Textbooks in Linguistics. Cambridge: Cambridge University Press.

Corver, Norbert. 1997. The internal syntax of the Dutch extended adjectival projection. *Natural Language and Linguistic Theory* 15, 289–368.

Dayal, Veneeta. 1997. Free relatives and ever: Identity and free choice readings. *Proceedings of SALT VII*, 99–116. Ithaca, NY: CLC Publications.

De Almeida, Roberto G., and S. Tesolin. 2004. Priming Arguments and Conceptual Fillers of Verbs. Unpublished manuscript, Concordia University.

Demirdache, Hamida, and Myriam Uribe-Etxebarria. 2000. The primitives of temporal relations. In R. Martin, D. Michaels, and J. Uriagereka, eds., *Step by Step: Minimalist Essays in Honor of Howard Lasnik*, 157–187. Cambridge, MA: MIT Press.

den Dikken, Marcel. 1995. *Particles—On the Syntax of Verb-Particle, Triadic and Causative Constructions*. Oxford: Oxford University Press.

den Dikken, Marcel. 1997. The syntax of possession and the verb "have." *Lingua* 101, 129–150.

den Dikken, Marcel. 2003. On the morphosyntax of *wh*-movement. In C. Boeckx and K. Grohmann, eds., *Multiple Wh-Fronting*, 77–98. Amsterdam: John Benjamins.

den Dikken, Marcel, and Anastasia Giannakidou. 2002. From *hell* to polarity: "Aggressively non-D-linked" wh-phrases as polarity items. *Linguistic Inquiry* 33, 31–61.

Diesing, Molly. 1992. *Indefinites*. Cambridge, MA: MIT Press.

Di Sciullo, Anna Maria. 1992. Deverbal compounds and the external argument. In I. M. Roca, ed., *Thematic Structure: Its Role in Grammar*, 65–78. Berlin: Foris.

Di Sciullo, Anna Maria. 1993. The complement domain of a head at morphological form. *Probus* 5, 257–290.

Di Sciullo, Anna Maria. 1994. Prefixes and suffixes. In Claudia Parodi, Carlos Quicoli, Mario Saltarelli, and Maria-Luisa Zubizarreta, eds., *Romance Linguistics in Los Angeles: Selected Papers from the 24th Linguistic Symposium on Romance Languages*. Washington, DC: Georgetown University Press.

Di Sciullo, Anna Maria. 1996a. Atomicity and relatedness in configurational morphology. In Anna Maria Di Sciullo, ed., *Configurations. Essays on Structure and Interpretation*, 17–40. Somerville, MA: Cascadilla Press.

Di Sciullo, Anna Maria. 1996b. X-bar selection. In J. Rooryck and Laurie Zaring, eds., *Phrase Structure and the Lexicon*, 77–108. Dordrecht: Kluwer.

Di Sciullo, Anna Maria. 1996c. X^0/XP Asymmetries. *Linguistic Analysis* 26, 1–26.

Di Sciullo, Anna Maria. 1997. Prefixed-verbs and adjunct identification. In Anna Maria Di Sciullo, ed., *Projections and Interface Conditions: Essays in Modularity*, 52–74. New York: Oxford University Press.

Di Sciullo, Anna Maria. 1999a. The local asymmetry connection. *MIT Working Papers in Linguistics* 35, 25–49.

Di Sciullo, Anna Maria. 1999b. Verbal structures and variation. In Esthela Treviño and José Lema, eds., *Semantic Issues in Romance Syntax*, 39–57. Amsterdam: John Benjamins.

Di Sciullo, Anna Maria. 2002. The asymmetry of morphology. In P. Boucher, ed., *Many Morphologies*, 1–28. Somerville, MA: Cascadilla Press.

Di Sciullo, Anna Maria. 2003a. Asymmetry in morphological objects and derivational complexity. In N. Callaos, A. M. Di Sciullo, T. Ohta, and T. K. Liu, eds., *SCI 2003 Proceedings*, 13–18. Orlando, FL: International Institute of Informatics and Systemics.

Di Sciullo, Anna Maria. 2003b. Morphological relations in asymmetry theory. In Anna Maria Di Sciullo, ed., *Asymmetry in Grammar, Volume 2: Morphology, Phonology and Acquisition*, 9–36. Amsterdam: John Benjamins.

Di Sciullo, Anna Maria. 2003c. Spatial relations in morphological objects. In Geert Booij, Janet DeCesaris, Angela Rali, and Sergio Scalise, eds., *Topics in Morphology: Selected Papers from the Third Mediterranean Morphology Meeting*, 29–50. Barcelona: Universitat Pompeu Fabra.

Di Sciullo, Anna Maria. 2004. Deriving Compounds. Unpublished manuscript, UQAM.

Di Sciullo, Anna Maria. 2005. Affixes at the edge. LSA handout. Oakland, CA.

Di Sciullo, Anna Maria. Forthcoming. On the asymmetrical nature of elementary operations: Evidence from codeswitching. In Jeff McSwam, ed., *Grammatical Theory and Bilingual Codeswitching*. Cambridge, MA: MIT Press.

Di Sciullo, Anna Maria, and Sandiway Fong. 2001a. Asymmetry, zero morphology and tractability. In *Proceedings of the 15th Pacific Asia Conference on Language, Information and Computation*, 61–72. Hong Kong: City University of Hong Kong.

Di Sciullo, Anna Maria, and Sandiway Fong. 2001b. Efficient parsing for word structure. In *NLPRS 2001, Proceedings of the 16th Natural Language Processing Pacific Rim Symposium*, 741–748. Tokyo: National Center of Sciences.

Di Sciullo, Anna Maria, and Dana Isac. 2003. Ways of agreeing, phases, and interfaces. Paper presented at the Workshop on Agreement, Universidade Nova de Lisboa.

Di Sciullo, Anna Maria, and Dana Isac. 2004. Possible extraction domains and AGREE as an asymmetric relation. Paper presented at the Interfaces Conference, Pescara, Italy.

Di Sciullo, Anna Maria, and Elisabeth Klipple. 1994. Modifying affixes. *WECOL* 6.

Di Sciullo, Anna Maria, and Roumyana Slabakova. Forthcoming. Quantification and aspect. In A. van Hout, H. de Swart, and H. Verkuyl, eds., *Aspect*. Dordrecht: Kluwer.

Di Sciullo, Anna Maria, and Edwin Williams. 1987. *On the Definition of Word*. Cambridge, MA: MIT Press.

Di Sciullo, Anna Maria, Dana Isac, Anne Bricaud, Marguerite Champagne-Desbiens, Laura Darche, Roseline Hebert, and Mara Simon. 2003a. Asymmetry-based lexicon. In N. Callaos, A. M. Di Sciullo, T. Ohta, and T. K. Liu, eds., *SCI 2003 Proceedings*, 7–12. Orlando, FL: International Institute of Informatics and Systemics.

Di Sciullo, Anna Maria, Ileana Paul, and Stanca Somesfalean. 2003b. The clause structure of extraction asymmetries. In A. M. Di Sciullo, ed., *Asymmetry in Grammar, Volume 1: Syntax and Semantics*, 279–300. Amsterdam: John Benjamins.

Dowty, David. 1979. Word meaning and Montague grammar: The semantics of verbs and times in generative semantics and in Montague's PTQ. In Jakko Hintikka and Stanley Peters, eds., *Synthese Language Library*. Dordrecht: Reidel.

Dresher, B. Elan. 2003. Contrast and asymmetries in inventories. In Anna Maria Di Sciullo, ed., *Asymmetry in Grammar, Volume 2: Morphology, Phonology, Acquisition*, 239–257. Amsterdam: John Benjamins.

Dressler, Wolfgang. 1986. Forma y funcion de los interfijos. *Revista Espanola de Linguistica* 16, 381–395.

Elugbe, Ben Ohi. 1989. Edoid. In John Bendor-Samuel and Rhonda L. Hartell, eds., *The Niger-Congo Languages: A Classification and Description of Africa's Largest Language Family*, 291–304. Lanham, MD: University Press of America.

Embick, David. 2000. Syntax and categories: Verbs and participles in the Latin perfect. *Linguistic Inquiry* 31, 185–230.

Embick, David. 2004. On the structure of resultative particles in English. *Linguistic Inquiry* 35(3), 355–393.

Embick, David, and Rolf Noyer. 2001. Movement operations after syntax. *Linguistic Inquiry* 32, 555–595.

Engdahl, Elisabet. 1983. Parasitic gaps. *Linguistics and Philosophy* 6, 5–34.

Engdahl, Elisabet. 1985. Parasitic gaps, resumptive pronouns, and subject extractions. *Linguistics* 23, 3–44.

Epstein, Samuel David. 1995. Un-principled syntax: The derivation of syntactic relations. In S. D. Epstein and N. Hornstein, eds., *Working Minimalism*, 317–347. Cambridge, MA: MIT Press.

Everaert, Martin, Arnold Evers, Riny Huybregts, and Mieke Trommelen, eds. 1988. *Morphology and Modularity*. Dordrecht: Foris.

Fabb, Nigel. 1984. Syntactic Affixation. Unpublished doctoral dissertation, MIT.

Filip, Hana. 2001. Prefixes and the delimitation of events. In Wayles Browne and Barbara Partee, eds., special issue of *Journal of Slavic Linguistics*, 55–101.

Fillmore, Charles, Paul Kay, Laura A. Michaelis, and Ivan A. Sag. 2003. *Construction Grammar*. Chicago: University of Chicago Press.

Fodor, Jerry. 1979. *The Language of Thought*. Cambridge: Harvard University Press.

Fox, Danny. 2000. *Economy and Semantic Interpretation*. Cambridge, MA: MIT Press.

Fox, Danny. 2002. Antecedent-contained deletion and the copy theory of movement. *Linguistic Inquiry* 33, 63–96.

Frank, Robert. 2002. *Phrase Structure Composition and Syntactic Dependencies*. Cambridge, MA: MIT Press.

Frank, Robert. 2004. Restricting grammatical complexity. *Cognitive Science* 28(5), 669–698.

Frank, Robert, K. Vijay-Shanker, and John Chen. 1996. Dominance, precedence and c-command in description-based parsing. In Carlos Martin-Vide, ed., *Proceedings of the 12th Congreso de Lenguajes Naturales y Lenguajes Formales*, 61–74. Barcelona: PPU.

Frege, Gottlob. [1891] 1952. On sense and reference. In P. Geach and M. Black, eds., *Translations from the Philosophical Writings of Gottlob Frege*, 56–78. Oxford: Blackwell.

Giannakidou, Anastasia. 2000. Negative concord and the scope of universals. In Paul Rowlet, ed., *Transactions of the Philological Society* 98(1), 87–120.

Gil, David. 2001. Quantifiers. In M. Haspelmath, E. Köning, W. Oesterreicher, and W. Raible, eds., *Language Typology and Language Universals*, vol. 2, 1257–1294. Berlin: Walter de Gruyter.

Gillon, Brendan. 1998. The autonomy of word formation: Evidence from classical Sanskrit. *Indian Linguistics* 56, 15–52.

Giorgi, Alessandra, and Giuseppe Longobardi. 1991. *The Syntax of Noun Phrases: Configuration, Parameters, and Empty Categories*. Cambridge: Cambridge University Press.

Giusti, Giuliana. 1991. The categorial status of quantified nominals. *Linguistische Berichte* 136, 438–454.

Greenberg, Joseph. 1963. Some universals of grammar with particular reference to the order of meaningful elements. In Joseph Greenberg, ed., *Universals of Language*, 73–113. Cambridge, MA: MIT Press.

Grevisse, Maurice. [1936] 1986. *Le bon usage*. Gembloux: Duculot.

Grimshaw, Jane. 1990. *Argument Structure*. Cambridge, MA: MIT Press.

Grimshaw, Jane. 1991. Extended Projections. Unpublished manuscript, Brandeis University.

Grimshaw, Jane. 1994. Minimal projection and clause structure. In B. Lust, M. Suner, and J. Whitman, eds., *Syntactic Theory and First Language Acquisition*, 75–83. Hillsdale, NJ: Erlbaum.

Gruber, Jeffrey. 1965. Studies in Lexical Relations. Unpublished doctoral dissertation, MIT.

Gruber, Jeffrey. 1997. Modularity in a configurational theta theory. In Anna Maria Di Sciullo, ed., *Projections and Interface Conditions. Essays in Modularity*, 155–200. New York: Oxford University Press.

Guasti, Teresa, and Luigi Rizzi. 1999. Agreement and Tense as Distinct Syntactic Positions: Evidence from Acquisition. Unpublished manuscript, University of Siena.

Guéron, Jacqueline. 1992. Types syntaxiques et types sémantiques: la phrase copulative comme palimpseste. *Revue Québécoise de linguistique* 1, 7–115.

Guéron, Jacqueline. 1994. Beyond predication. In Guglielmo Cinque, Jan Koster, Jean-Yves Pollock, and Raffaella Zanuttini, eds., *Paths Towards Universal Gram-*

mar: Studies in Honor of Richard Kayne. Washington, DC: Georgetown University Press.

Guéron, Jacqueline. 2001. On the aspectual functions of the verb BE. Paper presented at The Syntax of Aspect, Research Workshop of the Israel Science Foundation, Ben-Gurion University of the Negev.

Hagstrom, Paul. 1998. Decomposing Questions. Unpublished doctoral dissertation, MIT.

Hagstrom, Paul. 2002. Implications of child errors for the syntax of negation in Korean. *Journal of East Asian Linguistics* 11(3), 211–242.

Hale, Kenneth. 1986. Notes on world view and semantic categories: Some Warlpiri examples. In Peter Muysken and Henk van Reimsdijk, eds., *Features and Projections*, 233–245. Dordrecht: Foris.

Hale, Kenneth, and Samuel J. Keyser. 1993. On argument structure and the lexical expression of syntactic relations. In Kenneth Hale and Samuel J. Keyser, eds., *The View from Building* 20, 53–109. Cambridge, MA: MIT Press.

Hale, Kenneth, and Samuel J. Keyser. 1998. The basic elements of argument structure. In Heidi Harley, ed., *Papers from the Penn/MIT Roundtable on Argument Structure and Aspect, MIT Working Papers in Linguistics* 32, 73–118.

Hale, Kenneth, and Samuel J. Keyser. 2002. *Prolegomena to a Theory of Argument Structure*. Cambridge, MA: MIT Press.

Halle, Morris, and Alec Marantz. 1993. Distributed morphology and the pieces of inflection. In Kenneth Hale and Samuel J. Keyser, eds., *The View from Building* 20, 111–176. Cambridge, MA: MIT Press.

Hamblin, C. L. 1958. Questions. *Australian Journal of Philosophy* 36(3), 159–168.

Harley, Heidi. 2003. Merge, conflation, and head movement: The First Sister Principle revisited. Paper presented at NELS 34, Stony Brook, NY.

Harley, Heidi, and Rolf Noyer. 2000. State-of-the-article: Distributed morphology. *Glot International* 4(4), 3–9.

Haspelmath, M. 1997. *Indefinite Pronouns*. Oxford: Clarendon Press.

Hazout, Ilan. 1991. Verbal Nouns: Theta Theoretic Studies in Hebrew and Arabic. Unpublished doctoral dissertation, University of Massachusetts, Amherst.

Hazout, Ilan. 2000. Adjectival genitive constructions in Modern Hebrew: A case study in coanalysis. *Linguistic Review* 17, 29–52.

Heim, Irene, and Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Oxford: Blackwell.

Higginbotham, James. 1985. On semantics. *Linguistic Inquiry* 16, 547–593.

Higginbotham, James. 1996. On events in linguistic semantics. In Fabio Pianesi, Achille Varzi, and James Higginbotham, eds., *Speaking of Events*. New York: Oxford University Press.

Higginbotham, James. 1999. Headedness and telicity. Paper presented at the University of Siena. Unpublished manuscript, University of Oxford.

Higginbotham, James, and Gillian Ramchand. 1997. The stage-level/individual-level distinction and the mapping hypothesis. *Oxford University Working Papers in Linguistics, Philology & Phonetics* 2, 53–83.

Hintikka, Jaakko. 1986. The semantics of "a certain." *Linguistic Inquiry* 17, 331–336.

Hiraiwa, Ken. 2001. Multiple agree and the defective intervention constraint in Japanese. *MIT Working Papers in Linguistics* 40, 67–80.

Hoeksema, Jack. 1985. *Categorial Morphology*. New York: Garland.

Hoekstra, Teun. 1988. Small clause results. *Lingua* 74, 101–139.

Holmberg, Anders. 2001. Expletives and agreement in Scandinavian passives. *Journal of Comparative Germanic Syntax* 4, 85–128.

Huang, C.-T. James. 1982. Logical Relations in Chinese and the Theory of Grammar. Unpublished doctoral dissertation, MIT.

Hulst, Harry van der. 2002. *Word Prosodic Systems in the Languages of Europe*. Berlin: Mouton de Gruyter.

Hulst, Harry van der, and Nancy Ritter. 2003. Levels, constraints and heads. In Anna Maria Di Sciullo, ed., *Asymmetry in Grammar, Volume 2: Morphology, Phonology, Acquisition*, 147–188. Amsterdam: John Benjamins.

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

Jackendoff, Ray. 1975. Morphological and semantic regularities in the lexicon. *Language* 51, 639–671.

Jackendoff, Ray. 1983. *Semantics and Cognition*. Cambridge, MA: MIT Press.

Jackendoff, Ray. 1990. *Semantic Structures*. Cambridge, MA: MIT Press.

Jackendoff, Ray. 1997. *The Architecture of the Language Faculty*. Cambridge, MA: MIT Press.

Jacobson, Pauline. 1995. On the quantificational force of free relatives. In Emmon Bach, Eloise Helinek, Angelika Kratzer, and Barbara Partee, eds., *Quantification in Natural Languages*, 451–486. Dordrecht: Kluwer.

Johnson, Kyle. 1991. Object positions. *Natural Language and Linguistic Theory* 9, 577–636.

Joshi, Aravind K. 1985. Tree-adjoining grammars: How much context sensitivity is required to provide reasonable structural descriptions? In D. Dowty, L. Karttunen, and A. Zwicky, eds., *Natural Language Parsing*, 206–250. Cambridge: Cambridge University Press.

Joshi, Aravind K., Leon S. Levi, and Masako Takahashi. 1975. Tree adjunct grammars. *Journal of Computer and System Sciences* 10(1), 136–163.

Julien, Marit. 1996. *Syntactic Word Formation in Northern Sámi*. Oslo: Novus Press.

Kalluli, Dalilna. 1995. Clitics in Albanian. Unpublished master's thesis, University of Durham.

Karttunen, Lauri. 1977. Syntax and semantics of questions. *Linguistics and Philosophy* 1, 3–44.

Kayne, Richard. 1985. Principles of particle constructions. In Jacqueline Guéron, Hans-Georg Obenauer, and Jean-Yves Pollock, eds., *Grammatical Representation*, 101–140. Dordrecht: Foris.

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

Kayne, Richard. 1998. Person Morphemes and Reflexives. Unpublished manuscript, New York University.

Kayne, Richard. 2000. *Parameters and Universals*. Oxford: Oxford University Press.

Kayne, Richard. 2001. Prepositions as Probes. Unpublished manuscript, New York University.

Kayne, Richard. 2003. Antisymmetry, adpositions and remnant movement. Paper presented at the Approaching Asymmetry at the Interfaces Conference, UQAM.

Keyser, Samuel J. 1968. Review of Sven Jacobson, *Adverbial Positions in English*. *Language* 44, 357–375.

Keyser, Samuel J. and Tom Roeper. 1997. Anti-symmetry and leftward movement in morphology. Unpublished manuscript, MIT and University of Massachusetts.

Kiefer, Ferenc. 1992. Compounding in Hungarian. *Rivista di Linguistica* 4(1), 61–78.

Kiparsky, Paul. 1982. Lexical morphology and phonology. In In-Seok Yang, ed., *Linguistics in the Morning Calm*, 1–91. Seoul: Hanshin Publishing Co.

Kiss, Katalin. 1991. Logical structure in linguistic structure: The case of Hungarian. In C.-T. James Huang and Robert May, eds., *Logical Structure and Linguistic Structure*, 111–147. Dordrecht: Kluwer.

Klipple, Elisabeth. 1997. Prepositions and variation. In Anna Maria Di Sciullo, ed., *Projections and Interface Conditions: Essays on Modularity*, 74–108. New York: Oxford University Press.

Koopman, Hilda. 1984. *The Syntax of Verbs: From Verb Movement Rules in the Kru Languages to Universal Grammar*. Dordrecht: Foris.

Koopman, Hilda, and Dominique Sportiche. 1982. Variables and the bijection principle. *Linguistic Review* 2(3), 139–160.

Koopman, Hilda, and Dominique Sportiche. 1991. The position of subjects. *Lingua* 85(1), 211–258.

Koopman, Hilda, and Anna Szabolcsi. 2000. *Verbal Complexes*. Cambridge, MA: MIT Press.

Kornfilt, Jaklin. 2004. *Turkish*. London: Routledge.

Kratzer, Angelika. 1996. Severing the external argument from its verb. In Johan Rooryck and Laurie Zaring, eds., *Phrase Structure and the Lexicon*. Dordrecht: Kluwer.

Kratzer, Angelika. 1998. Scope or pseudoscope? Are there wide scope indefinites? In S. Rothstein, ed., *Events in Grammar*, 163–196. Dordrecht: Kluwer.

Krifka, Manfred. 1990. Boolean and non-boolean "and." In Lászlo Kálman and Lászlo Polos, eds., *Papers from the Second Symposium on Logic and Language*, 161–188. Budapest: Akadémiai Kiadó.

Kroch, Anthony, and Aravind Krishna Joshi. 1985. *The Linguistic Relevance of Tree Adjoining Grammar*. Report MS-CIS-85-16. Department of Computer and Information Science, Moore School, University of Pennsylvania, Philadelphia.

Ladusaw, William. 1992. Expressing negation. In Chris Barker and David Dowty, eds., *SALT II*, 237–259. Ithaca, NY: CLC Publications.

Ladusaw, William. 1994. Thetic and categorical, stage and individual, weak and strong. In Mandy Harvey and Lynn Santelmann, eds., *Proceedings from SALT IV*, 220–229. Ithaca, NY: CLC Publications.

Lapointe, Steven. 1979. A theory of Grammatical Agreement. Unpublished doctoral dissertation, MIT.

Larson, Richard. 1987. Missing prepositions and the analysis of English free relative clauses. *Linguistic Inquiry* 18(2), 239–266.

Larson, Richard. 1988. On the double object construction. *Linguistic Inquiry* 19, 335–391.

Larson, Richard. 1990. Double objects revisited: Reply to Jackendoff. *Linguistic Inquiry* 21, 589–632.

Lasnik, Howard. 1999. *Minimalist Analysis*. Malden, MA: Blackwell.

Lasnik, Howard. 2002. Feature movement or agreement at a distance? In Artemis Alexiadou, Elena Anagnostopoulou, Sjef Barbiers, and Hans-Martin Gärtner, eds., *Dimensions of Movement*, 189–208. Amsterdam: John Benjamins.

Lebeaux, David. 2003. A subgrammar of contructions with reflexive clitics in Polish. In Anna Maria Di Sciullo, ed., *Asymmetry in Grammar, Volume 2: Morphology, Phonology and Acquisition*, 285–301. Amsterdam: John Benjamins.

Legate, Julie. 2003. Some interface properties of the phase. *Linguistic Inquiry* 34, 506–516.

Levi, Susannah. 2001. Glides, laterals, and Turkish vowel harmony. *CLS* 37, 379–393.

Levin, Beth, and Malka Rappaport Hovav. 1995. *Unaccusativity: At the Syntax–Lexical Semantics Interface*. Cambridge, MA: MIT Press.

Lewis, G. L. 1967. *Turkish Grammar*. Oxford: Oxford University Press.

Liberman, Mark, and Allan S. Prince. 1977. On stress and linguistic rhythm. *Linguistic Inquiry* 8, 249–336.

Lieber, Rochelle. 1980. On the Organization of the Lexicon. Unpublished doctoral dissertation, MIT.

Lieber, Rochelle. 1992. *Deconstructing Morphology: Word Formation in Syntactic Theory*. Chicago: University of Chicago Press.

Lieber, Rochelle, and R. Harald Baayen. 1993. Prefixes in Dutch: A study in lexical conceptual structure. In Geert Booij and Jaap van Marle, eds., *Yearbook of Morphology*, 51–78. Dordrecht: Kluwer.

Mahajan, Anoop. 1990. The A/A-bar Distinction and Movement Theory. Unpublished doctoral dissertation, MIT.

Mahajan, Anoop. 2000. Eliminating head movement. *GLOW Newsletter* 44, 44–45.

Manzini, Maria Rita, and Leonardo M. Savoia. 1999. The syntax of middle-reflexive and object clitics: A case of parametrization in Arberesh dialects. In M. Mandalà, ed., *Studi in onore di Luigi Marlekaj*, 283–328. Bari: Adriatica.

Marantz, Alec. 1984. *On the Nature of Grammatical Relations*. Cambridge, MA: MIT Press.

Marantz, Alec. 1997. No escape from syntax: Don't try to do morphological analysis in the privacy of your own lexicon. In A. Dimitriadis, I. Siegel, C. Surek-Clark, and A. Williams, eds., *Proceedings of the 21st Annual Penn Linguistics Colloquium 201–225, Pennsylvania Working Papers in Linguistics* 4(2). Philadelphia: University of Pennsylvania.

Marantz, Alec. 2003. Pulling words up by the root. Handout for presentation at McGill University.

Mateu, Jaume. 2000a. Paths and telicity in idiomatic constructions: A lexical syntactic approach to the *way* construction. Paper presented at the 2000 ESSLLI Workshop on Paths and Telicity in Event Structure, University of Birmingham.

Mateu, Jaume. 2000b. Syntactically-based lexical decomposition. Paper presented at the 26th Annual Meeting of the Berkeley Linguistics Society (BLS 26), University of California, Berkeley.

Matushansky, Ora. Forthcoming. Going through a phase. In Martha McGinnis and Norvin Richards, eds., *Proceedings of the MIT Workshop on EPP and Phases*. Cambridge, MA: MITWPL.

May, Robert. 1977. The Grammar of Quantification. Unpublished doctoral dissertation, MIT.

May, Robert. 1985. Syntactic rules and semantic rules: Their relation in *wh*-constructions. In J. Guéron, H.-G. Obenauer, and J.-Y. Pollock, eds., *Grammatical Representation*, 187–201. Dordrecht: Foris.

May, Robert, and James Higginbotham. 1981. Crossing, pragmatics, markedness. In A. Belletti, L. Brandi, and L. Rizzi, eds., *Theory of Markedness in Generative Grammar: Proceedings of the Third GLOW Colloquium*, 423–444. Pisa: Annali della Scuola Normale Superiore, Classe de Lettere e Filosofia.

McCarthy, John. 1982. Prosodic structure and expletive infixation. *Language* 58, 574–590.

McCloskey, James. 1991. There, it, and agreement. *Linguistic Inquiry* 22, 563–567.

McGinnis, Martha. 2001. Variation in the phase structure of applicatives. In J. Rooryck and P. Pica, eds., *Linguistic Variation Yearbook*. Amsterdam: John Benjamins.

Merlo, Christian and Pierre Vidaud. 1967. *Unité des langues négro-africaines*. Paris: G.-P. Maisonneuve et Larose.

Montague, Richard. 1970. Universal grammar. *Theoria* 36, 373–398.

Montague, Richard. 1973. The proper treatment of quantification on ordinary English. In J. Hintikka, J. Moravcsik, and P. Suppes, eds., *Approaches to Natural Language*. Dordrecht: D. Reidel. (Reprinted in Montague 1974.)

Montague, Richard. 1974. *Formal Philosophy: Selected Papers of Richard Montague*. Ed. Richmond H. Thomason. New Haven, CT: Yale University Press.

Montague, Richard, and Donald Kalish. 1959. That. *Philosophical Studies* 10, 54–61.

Moro, Andrea. 1997. *The Raising of Predicates*. Cambridge: Cambridge University Press.

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

Moro, Andrea, Marco Tettamanti, Daniela Perani, Catarina Donati, Stefano F. Cappa, and Ferruccio Fazio. 2001. Syntax and the brain: Disentangling grammar by selective anomalies. *Neuroimage* 13(1), 110–118.

Muysken, Pieter. 1981. Quechua word structure. In F. Heny, ed., *Binding and Filtering*. London: Croom Helm.

Muysken, Pieter. 1988. Affix order and interpretation: Quechua. In M. Everaert, A. Evers, R. Huybregts, and M. Trommelen, eds., *Morphology and Modularity*. Dordrecht: Foris.

Neeleman, Ad, and Joleen Schipper. 1992. Verbal prefixation in Dutch: Thematic evidence for conversion. In G. Booij and J. Van Marle, eds., *Yearbook of Morphology*, 57–92. Dordrecht: Kluwer.

Nissenbaum, Jon. 2000. Covert movement and parasitic gaps. In M. Hirotani, A. Coetzee, N. Hall, and J.-Y. Kim, eds., *Proceedings of the 30th Annual Meeting, North East Linguistics Society* 30. Amherst, MA: GLSA, University of Massachusetts.

Obenhauer, Hans. 1994. Aspects de la syntaxe A-barre. Thèse de doctorat d'Etat, Université de Paris VIII.

O'Keefe, John. 1995. The spatial prepositions in English, vector grammar, and the cognitive map theory. In Paul Bloom, Mary A. Peterson, Lynn Nadel, and Merrill F. Garrett, eds., *Language and Space*. Cambridge, MA: MIT Press.

Olsen, Mari Broman. 1997. *A Semantic and Pragmatic Model of Lexical and Grammatical Aspect.* New York: Garland.

Partee, Barbara H., Alice Ter Meulen, and Robert Wall. 1990. *Mathematical Methods in Linguistics*. Dordrecht: Kluwer.

Perlmutter, David M. 1987. Impersonal passives and the unaccusative hypothesis. In J. Jaeger et al., eds., *Proceedings of the Fourth Annual Meeting of the Berkeley Linguistic Society*, 159–189. Berkeley: University of California at Berkeley.

Pesetsky, David. 1985. Morphology and logical form. *Linguistic Inquiry* 16, 193–245.

Pesetsky, David. 1989. The earliness principle. Paper presented at *GLOW* 1989.

Pesetsky, David. 1995. *Zero Syntax*. Cambridge, MA: MIT Press.

Pesetsky, David, and Esther Torego. 2001. T-to-C movement: Causes and consequences. In Michael Kenstowicz, ed., *Ken Hale: A Life in Language*. Cambridge, MA: MIT Press.

Philips, Colin. 2003. Linear order and constituency. *Linguistic Inquiry* 34(1), 37–90.

Piggott, Glyne. 2003. Obstruent neutrality in nasal harmony. In Anna Maria Di Sciullo, ed., *Asymmetry in Grammar, Volume 2: Morphology, Phonology and Acquisition*, 189–215. Amsterdam: John Benjamins.

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

Potsdam Eric, and Maria Polinsky. 2001. Long-distance agreement and topic in Tsez. *Natural Language and Linguistic Theory* 19, 583–646.

Przepiorkowski, Adam, and Anna Kupsc. 1997. Negative concord in Polish. *Technical Report* 828. Polish Academy of Sciences, Institute of Computer Science, Warsaw.

Pulleyblank, Douglas George. 1983. Tone in lexical phonology. Unpublished doctoral dissertation, MIT.

Pustejovsky, James. 1988. The geometry of events. In Carol Tenny, ed., *Studies in Generative Approaches to Aspect. Lexicon Project Working Papers* 24, 19–39. Cambridge, MA: MIT Press.

Pustejovsky, James. 1991. The syntax of event structure. *Cognition* 41, 47–81.

Pustejovsky, James. 1995. *The Generative Lexicon: A Theory of Computational Lexical Semantics*. Cambridge, MA: MIT Press.

Pylkkänen, Liina. 2002. Introducing Arguments. Unpublished doctoral dissertation, MIT.

Raimy, Eric. 2000a. *The Phonology and Morphology of Reduplication*. Berlin: Mouton de Gruyter.

Raimy, Eric. 2000b. Remarks on backcopying. *Linguistic Inquiry* 3, 541–552.

Raimy, Eric. 2003. Asymmetry and linearization in phonology. In Anna Maria Di Sciullo, ed., *Asymmetry in Grammar, Volume 2: Morphology, Phonology and Acquisition*, 129–146. Amsterdam: John Benjamins.

Ralli, Angela. 1992. Compounds in Modern Greek. *Rivista di Linguistica* 4(1), 143–174.

Ralli, Angela, and Maria Raftopoulou. 1999. Compounding as a diachronic phenomenon of word formation. *Studies in Greek Linguistics*, 389–403. Thessaloniki: Aristotle University of Thessaloniki.

Reichenbach, Hans. 1947. *Elements of Symbolic Logic*. New York: Free Press.

Reinhart, Tanya. 1983. *Anaphora and Semantic Interpretation*. London: Croom Helm.

Reinhart, Tanya. 1997. Interface economy and markedness. In C. Wilder, H. Gärtner, and M. Bierwisch, eds., *The Role of Economy Principles in Linguistic Theory*, 146–170. Berlin: Akademie Verlag.

Reinhart, Tanya. 2000. Strategies of anaphora resolution. In H. Bennis, M. Everaert, and E. Reuland, eds., *Interface Strategies*, 295–324. Amsterdam: Royal Academy of Arts and Sciences.

Reuland, Eric. 1998. Structural conditions on chains and binding. In *Proceedings of NELS* 28, 341–356. Amherst, MA: GLSA, University of Massachusetts.

Rice, Keren. 1998. Salve (Northern Athapaskan). In Andrew Spencer and Arnold Zwicky, eds., *The Handbook of Morphology*, 649–689. Oxford: Blackwell.

Ritter, Elisabeth. 1991. Two functional categories in noun phrases: Evidence from modern Hebrew. In S. Rothstein, ed., *Syntax and Semantics* 26, 37–62. San Diego: Academic Press.

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

Roeper, Thomas. 1998. Compound syntax and head movement. *Yearbook of Morphology* 1, 187–228. Dordrecht: Foris.

Roeper, Thomas. 1999. Leftward Movement in Morphology. Unpublished manuscript, University of Massachusetts.

Roeper, Thomas, and Samuel J. Keyser. 1992. Re: The abstract clitic hypothesis. *Linguistic Inquiry* 23, 89–125.

Roeper, Thomas, and William Snyder. 2005. Language learnability and the forms of recursion. In A. M. Di Sciullo, ed., *UG and External Systems*, 155–169. Amsterdam: John Benjamins.

Rohrbacher, Bernhard. 1994. The Germanic VO Languages and the Full Paradigm: A Theory of V to I Raising. Unpublished doctoral dissertation, University of Massachusetts, Amherst.

Ross, John R. 1967. Constrains on Variables in Syntax. Unpublished doctoral dissertation, MIT.

Rumelhart, David E., and James L. McClelland. 1986. On learning the past tense of English verbs. In J. L. McClelland, D. E. Rumelhart, and the PDP Research Group, eds., *Parallel Distributed Processing: Explorations in the Microstructure of Cognition, Volume 2: Psychological and Biological Models*, 216–271. Cambridge, MA: MIT Press.

Safir, Kenneth. 1985. *Syntactic Chains*. Cambridge: Cambridge University Press.

Scalise, Sergio. 1984. *Generative Morphology*. Dordrecht: Foris.

Scalise, Sergio. 1994. *Morfologia*. Bologna: Il Mulino.

Sebüktekin, Hikmet. 1971. *Turkish-English Contrastive Analysis*. The Hague: Mouton.

Selkirk, Elisabeth. 1982. *The Syntax of Words*. Cambridge, MA: MIT Press.

Sells, Peter. 1984. Syntax and Semantics of Resumptive Pronouns. Unpublished doctoral dissertation, University of Massachusetts.

Shibatani, Masayoshi, and Taro Kageyama. 1988. Word formation in a modular theory of grammar: A case of post-syntactic compounds in Japanese. *Language* 64, 451–484.

Smith, Carlotta. 1991. *The Parameter of Aspect*. Dordrecht: Kluwer.

Smolensky, Paul, Michael C. Mozer, and David E. Rumelhart, eds. 1996. *Mathematical Perspectives on Neural Networks*. Mahwah, NJ: Erlbaum.

Snyder, William. 1995. A neo-Davidsonian approach to resultatives, particles, and datives. In J. Beckman, ed., *Proceedings of NELS 25.* Amherst, MA: GLSA, University of Massachusetts.

Snyder, William. 2001. On the nature of syntactic variation: Evidence from complex predicates and complex word-formation. *Language* 77, 324–342.

Speas, Margaret. 1990. *Phrase Structure in Natural Language*. Dordrecht: Kluwer.

Speas, Margaret. 1994. Null arguments in a theory of economy of projection. *UMass Occasional Papers in Linguistics.*

Speas, Margaret, and Carol Tenny. 2003. Configurational properties of point of view roles. In Anna Maria Di Sciullo, ed., *Asymmetry in Grammar, Volume 1: Syntax and Semantics*, 315–345. Amsterdam: John Benjamins.

Spencer, Andrew. 1991. *Morphological Theory*. Oxford: Blackwell.

Spencer, Andrew. 1998. The redundancy of lexical categories. In *If You See What I Mean . . . Essays on Language*. Presented to Keith Brown on the Occasion of His Retirement in 1998. (ERRL special issue, May 1998.)

Spencer, Andrew, and Marina Zaretskaya. 1998. Verb prefixation in Russian as lexical subordination. *Linguistics* 36, 1–39.

Spencer, Andrew, and Arnold M. Zwicky. 1998. *The Handbook of Morphology*. Oxford: Blackwell.

Sportiche, Dominique. 2002. Movement types and triggers. *GLOW Newsletter* 48, 116–117.

Stiebels, Barbara. 1998. Complex denominal verbs in German and the morphology-semantics interface. In Geert Booij and Jaap van Marle, eds., *Yearbook of Morphology 1997*, 265–302. Dordrecht: Kluwer.

Stiebels, Barbara, and Dieter Wunderlich. 1994. Morphology feeds syntax: The case of particle verbs. *Linguistics* 32, 913–968.

Stowell, Timothy. 1995. What do the present and past tenses mean? In P. Bertinetto, V. Bianchi, J. Higginbotham, and M. Squartini, eds., *Temporal Reference, Aspect, and Actionality, Volume 1: Semantic and Syntactic Perspectives*, 381–396. Torino: Rosenberg and Sellier.

Svenonius, Peter. 1996. The Verb-Particle Alternation in the Scandinavian Languages. Unpublished manuscript, University of Tromsö.

Svenonius, Peter. 2003. Phases at the interface. Handout. IAP Workshop on EPP and Phases.

Svolacchia, Marco, Lunella Mereu, and Annarita Puglielli. 1995. Aspects of discourse configuration in Somali. In K. Kiss, ed., *Discourse Configurational Languages*, 65–98. New York: Oxford University Press.

Talmy, Leonard. 1985. Lexicalization patterns: Semantic structure in lexical forms. In Timothy Shopen, ed., *Language Typology and Syntactic Description, Volume 3: Grammatical Categories and the Lexicon*, 57–149. Cambridge: Cambridge University Press.

Talmy, Leonard. 1991. Path to realization: A typology of event integration. *Buffalo Working Papers in Linguistics* 91-01.147-87.

Talmy, Leonard. 2000. *Toward a Cognitive Semantics, Volume 1: Concept-Structuring Systems; Volume 2: Typology and Process in Concept Structuring*. Cambridge, MA: MIT Press.

Tancredi, Christopher. 2004. Wh-mo NPs in Japanese: Quantifiers, plurals, or a different beast altogether. Unpublished manuscript.

Taraldsen, Tarald. 1981. The theoretical interpretation of a class of marked extractions. In A. Belletti, L. Brandi, and L. Rizzi, eds., *Theory of Markedness in Generative Grammar*. Pisa: Scuola Normale Superiore.

Tenny, Carol. 1988. The Aspectual Interface Hypothesis. *Lexicon Project Working Papers* 31. Center for Cognitive Sciences, MIT.

Tenny, Carol. 1994. *Aspectual Roles and the Syntax-Semantics Interface*. Dordrecht: Kluwer.

Toman, Jindrich. 1998. Word-syntax. In Andrew Spencer and Arnold Zwicky, eds., *Handbook of Morphology*, 306–321. Oxford: Blackwell.

Travis, Lisa. 1984. Parameters and the Effects of Word Order Variation. Unpublished doctoral dissertation, MIT.

Treiman, Rebecca. 1985. Onsets and rimes as units of spoken syllables: Evidence from children. *Journal of Experimental Child Psychology* 39(1), 161–181.

Tsai, Dylan Wei-Tien. 1994. On nominal islands and LF extraction in Chinese. *Natural Language and Linguistic Theory* 12, 121–175.

Tsapkini, Kyrana, Gonia Jarema, and Anna Maria Di Sciullo. 2004. The role of configurational asymmetry in the lexical access of prefixed verbs: Evidence from French. *Brain and Language* 90, 143–150.

Ura, Hiroyuki. 1995. Towards a theory of "strictly derivational" economy condition. In Robert Pensalfini and Hiroyuki Ura, eds., *Papers on Minimalist Syntax*. Cambridge, MA: MIT Press.

Uriagereka, Juan. 1999. Multiple spell-out. In S. D. Epstein and M. Hornstein, eds., *Working Minimalism*, 251–283. Cambridge, MA: MIT Press.

Van Hout, Angeliek, and Tom Roeper. 1998. Event semantics and aspectual structure in derivational morphology. In Heidi Harley, ed., *Papers from the Penn/MIT Roundtable on Argument Structure and Aspect, MIT Working Papers in Linguistics* 32, 175–200.

Van Riemsdijk, Henk. 1989. Movement and regeneration. In Paola Benincà, ed., *Dialect Variation and the Theory of Grammar: Proceedings of the GLOW Workshop on Linguistic Theory and Dialect Variation*, 105–136. Dordrecht: Foris.

Vendler, Zeno. 1967. *Linguistics in Philosophy*. Ithaca, NY: Cornell University Press.

Vergnaud, Jean-Roger. 1980. Dépendances Formelles en Syntaxe. Thèse de Doctorat d'État, Université de Paris 7.

Vergnaud, Jean-Roger, and Maria Luisa Zubizarreta. 1992. The definite determiner and the inalienable construction in French and English. *Linguistic Inquiry* 23(4), 595–652.

Verkuyl, Henk. 1993. *A Theory of Aspectuality. The Interaction between Temporal and Atemporal Structure*. Cambridge Series in Linguistics 64. Cambridge University Press.

Verkuyl, Henk. 1999. *Aspectual Issues. Studies on Time and Quantity*. CSLI Publications. Center for the Study of Language and Information. Stanford, California.

Von Fintel, Kai. 2000. Whatever. In Brendan Jackson and Tanya Matthews, eds., *Proceedings of SALT 10*. Ithaca, NY: CLC Publications.

Walinska de Hackbeil, Hanna. 1986. The Roots of Phrase Structure: The Syntactic Basis of English Morphology. Unpublished doctoral dissertation, University of Washington.

Wechsler, Stephen. 1990. Accomplishments and the prefix re-. In J. Carter and R.-M. Déchaine, eds., *Proceedings of the North Eastern Linguistic Society* 19, 419–434. Amherst, MA: University of Massachusetts.

Williams, Edwin. 1980. Predication. *Linguistic Inquiry* 11, 203–238.

Williams, Edwin. 1981a. Argument structure and morphology. *Linguistic Review* 1, 81–114.

Williams, Edwin. 1981b. On the notions "lexically related" and "head of a word." *Linguistic Inquiry* 12, 245–274.

Williams, Edwin. 2003. *Representation Theory*. Cambridge, MA: MIT Press.

Wurmbrand, Susi. 2003. A-movement to the point of no return. In Makoto Kadowaki and Shigeto Kawahara, eds., *Proceedings of the North Eastern Linguistic Society Annual Meeting* (NELS 33), 463–474. Amherst, MA: University of Massachusetts, GLSA.

Zamparelli, Roberto. 1995. Layers in the Determiner Phrase. Unpublished doctoral dissertation, University of Rochester.

Zubizarreta, Maria Luisa. 1998. *Prosody, Focus, and Word Order*. Cambridge, MA: MIT Press.

Zwarts, Joost. 1992. X′-syntax–X′-semantics: On the Interpretation of Functional and Lexical Heads. Unpublished doctoral dissertation, Utrecht University.