

# Interrogative Investigations

Jonathan Ginzburg and Ivan A. Sag

ISBN: 1-57586-278-6

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# *Interrogative* Investigations

The  
Form,  
Meaning, and  
Use of English Interrogatives

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CSLI Publications  
Center for the Study of Language and Information  
Leland Stanford Junior University  
Printed in the United States  
04 03 02 01 00 1 2 3 4 5

Library of Congress Cataloging-in-Publication Data

Ginzburg, Jonathan, 1964–

Interrogative investigations : the form, meaning, and use of English interrogatives / Jonathan Ginzburg,  
Ivan A. Sag.

p. cm. -- (CSLI lecture notes ; no. 123)

Includes bibliographical references (p. ) and index.

ISBN 1-57586-277-8 (cloth : alk. paper) -- ISBN 1-57586-278-6 (pbk. : alk. paper)

1. English language--Interrogative. I. Sag, Ivan A., 1949– II. Title. III. Series.

PE1395 .G56 2001  
425--dc21

2001017172

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American National Standard for Information Sciences—Permanence of Paper for  
Printed Library Materials, ANSI Z39.48-1984.

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## Preface

This book began as conversations that took place as the alphabetically prior author was writing his doctoral dissertation at Stanford University. Geography and complex personal and professional circumstances are responsible for the considerable time it has taken to bring the work to completion. Along the way, there were fleeting but crucial conversations in Columbus, Edinburgh, Prague, Ithaca, Brussels, Stanford and London, without which our collaboration could never have succeeded.

We would like to acknowledge our debt to a number of colleagues who have provided much feedback on the ideas presented here. Carl Pollard and Eric Potsdam (serving as CSLI reviewer) provided such useful, detailed, yet highly critical comments on an earlier version of this book, that the final year of preparation and revision amounted to a vast overhaul of our theory. We owe both of them an extraordinary debt. Our debt to Pollard goes beyond this, however, as countless interactions with him over the years about the grammar of interrogatives have left their mark throughout Chapters 5 and 6.

We want to thank Farrell Ackerman, Emily Bender, Elisabet Engdahl, Georgia Green, Shalom Lappin, Bob Levine, Rob Malouf, Adam Przepiórkowski, and Peter Sells for detailed comments on various drafts. In addition, we thank the following people for helpful discussions, useful suggestions, and/or corrections: Anne Abeillé, Ralph Albrecht, Ash Asudeh, David Beaver, John Beavers, Emily Bender, Francis Bond, Bob Borsley, Chris Callison-Burch, Luis Casillas, Brady Clark, Robin Cooper, Ann Copestake, Elisabet Engdahl, Anke Feldhaus, Tim Fernando, Charles Fillmore, Edward Flemming, Dan Flickinger, Itamar Francez, Danièle Godard, Georgia Green, Howard Gregory, Jim Higginbotham, Erhard Hinrichs, David Johnson, Andreas Kathol, Paul Kay, Ruth Kempson, Jongbok Kim, Tibor Kiss, Dimitra Kolliakou, Manfred Krifka, Shalom Lappin, Alex Lascarides, Bob Levine, Jean-Philippe Marcotte, Rob Malouf, Detmar Meurers, Larry Moss, Doris Penker, David Pesetsky, Stanley Peters, Ellen Prince, Frank Richter, Mark Steedman, Shiao-Wei Tham, Rich Thomason, Enric Vallduví, Carl Vogel, Tom Wasow, Gert Webelhuth, Yael Ziv, and Arnold Zwicky. Thanks also to Carl Vogel for his bibtex macros, to Kim Lewis Brown, Brady Clark, Max Etchemendy, and Chris Sosa for their hard work during the copyediting process, and to Jerry Torres for fleshing out a woefully incomplete bibliography. Special thanks in addition to both Dikran Karagueuzian and Lauri Kanerva for their sage advice and special assistance with just about everything having to do with the production of this book.

Finally, the research reported here was conducted in part under the auspices of CSLI's LINGuistic Grammars Online (LINGO) project. In that connection, we gratefully acknowledge

support from Germany's Bundesministerium für Bildung, Wissenschaft, Forschung, und Technologie (BMBF), who supported LINGO's participation in the Verbmobil project under Grant FKZ:01IV7024. This material is also based in part on work supported by the National Science Foundation under grant number IRI-9612682. We further acknowledge the support of the UK Economic and Social Research Council (grant number R000222969 *Phrasal Utterance Resolution in Dialogue*). Ginzburg was supported by an Alon Young Researcher Fellowship from the Israeli Inter-University Planning and Budget Committee and a series of visits at the Department of Linguistics at Göteborg University was supported by INDI (Information Exchange in Dialogue), Riksbankens Jubileumsfond 1997-0134.

# Introduction

## 1.1 Prolegomena

Interrogative constructions have played a central role in the development of modern syntactic theory. Characterizing the constraints on the ‘dislocation’ of *wh*-phrases in interrogatives, for example, has been at the heart of work in generative grammar since the mid 1960s. Indeed, within the paradigms known as *government and binding* (GB) or *principles and parameters*, phenomena pertaining to interrogatives have long been considered among the most compelling for postulating a syntactic level of ‘logical form’ (LF), a level that has survived and continues to play an influential role in the paradigm of the *minimalist program*.

Most work within these paradigms has been driven by concerns largely internal to the respective frameworks, drawing little motivation from formally oriented semantic and pragmatic work on interrogatives. Although there has been a significant amount of work on interrogatives across a variety of languages, there are few comprehensive syntactic and semantic treatments of a wide range of interrogative constructions and uses in a single language. In this book, our aim is to provide an account that rigorously integrates syntax and semantics and at the same time covers a wide range of English constructions.

The development of large-scale descriptions is a crucial step to take. Only when comprehensive grammar fragments are commonplace will it become possible to meaningfully compare available frameworks for grammatical description. More than forty years of applying mathematical tools to the study of syntax, for example, has failed to produce a consistent, large-scale generative-transformational description of any single human language. In linguistics today, one is not required to demonstrate that all assumptions being made in a given treatment are consistent with one another, let alone capable of providing a more systematic account than other known treatments. Theoretical linguists are free to pick and choose whatever subset of the phenomena in one or many languages they want to discuss and to selectively draw from a combination of ideas from fragmentary proposals in the literature. The analytic proposals one encounters, often formulated in terms that appear formally rigorous to an outsider, are often simply untestable. Most current theoretical discussions about the formal or architectural properties of vaguely articulated models are not grounded in any systematic, comprehensive empirical descriptions. Hence the debates about metatheory in these discussions are, at best, premature.

By constructing a consistent large-scale description of an interesting and complex domain, we hope to provide a basis for more meaningful theoretical discussion and cross-framework comparison. The tools we have selected for this task are the grammatical framework of Head-Driven

Phrase Structure Grammar (HPSG) and the semantic framework of Situation Semantics. Building on the grammatical constructions developed in Sag 1997 and the comprehensive semantics for interrogatives developed in Ginzburg 1992, 1995a,b, we develop a treatment of the syntactic and semantic properties of English interrogative constructions. Although we confine our attention here to English, we believe our general approach can be extended both to *wh*-stacking languages, such as Polish, and to *wh*-in-situ languages, such as Hindi and Japanese.

## 1.2 Syntactic Preview

In this section, we place our work in a broader syntactic context and outline some of the leading ideas of our syntactic analysis.

### 1.2.1 Generative Grammar

Our work falls squarely within the domain of the enterprise of generative grammar, which we define, following Chomsky (1966: 12) as follows:

A *generative grammar* (that is, an explicit grammar that makes no appeal to the reader's 'faculté de langage' but rather attempts to incorporate the mechanisms of this faculty) is a system of rules that relate signals to semantic interpretations of these signals.

Note also the following quotation from the preface to Chomsky 1975:

A grammar constructed in accord with the principles postulated in such a theory [of generative grammar] gives an explicit characterization of a language and its structure—and within the broader semiotic theory envisioned but not developed here, an explicit characterization as well of the meaning and reference of expressions and conditions of appropriate use.

We hope that it will soon become clear that our work, like related work in the tradition of HPSG, has as its goal the development of “explicit characterization[s]” that deal with “language and its structure” and their relation to ‘semantic interpretations’, and even to a ‘broader semiotic theory’.<sup>1</sup>

Although few well-informed readers will doubt that the analyses presented qualify as generative grammar, there are significant differences between our approach and that of investigators working within the framework of Government and Binding or the Minimalist Program. These latter two frameworks, implicitly or explicitly, reject the following two theses:

1. **Constraint-Based Architecture:** Grammar is a system of constraints that govern the relation between form and meaning. There are no operations within grammar other than constraints. This precludes, for instance, transformational operations.
2. **Constructionism:** Grammatical constructions play a fundamental role in the theory of grammar.

### 1.2.2 Constraint-Based Grammar

Our work also falls within a particular tradition of work in generative grammar, often referred to as Constraint-Based Grammar (CBG).<sup>2</sup> The fundamental idea of CBG is that grammars consist

<sup>1</sup>We emphasize this point only because, as noted by Smith (1999), there is now a second meaning of ‘generative grammar’ that renders it interchangeable with ‘generative-transformational’ grammar. This misleading usage should be rejected, in our view.

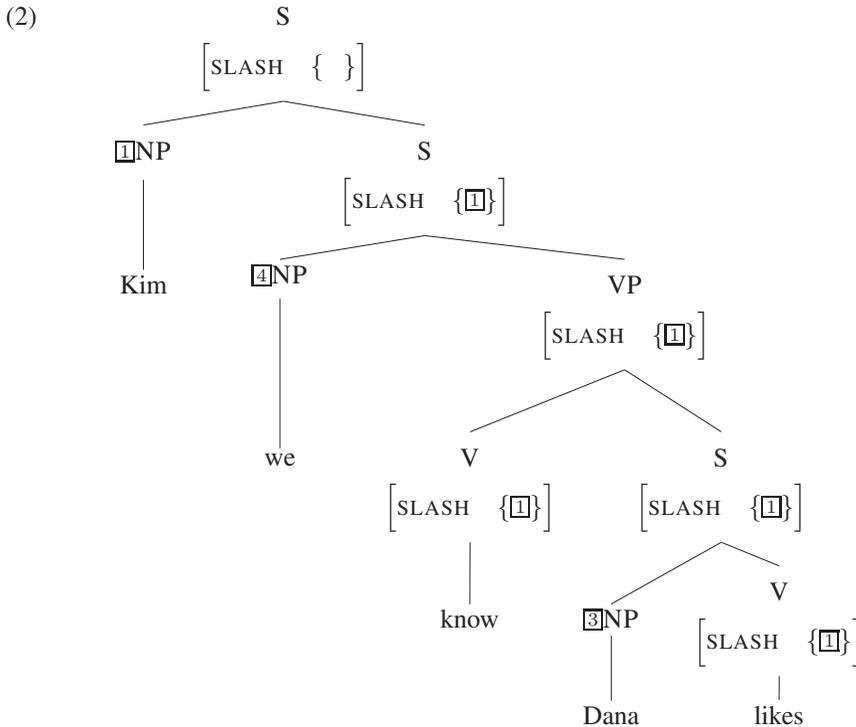
<sup>2</sup>The tradition of CBG starts with the pioneering work of Johnson and Postal (1980). Grammars of this sort are also sometimes referred to as ‘Unification-Based’ grammars. This term is misleading, however, as unification is but one of many procedures that can be used to solve systems of identity constraints.

of correlated constraints that are satisfied by modeling structures. A grammar is thus straightforwardly a theory of a language: a set of statements in an appropriate feature logic (constraints) that are satisfied by certain models, each of which is a specified correlation of sound, syntactic information, and meaning. We assume that the modeling structures in HPSG are directed graphs that specify values for features such as PHONOLOGY, (syntactic) CATEGORY, (semantic) CONTENT and CONTEXT (of use).

Following a long analytic tradition, phenomena that have been treated by transformational movement are treated exclusively in terms of constraints.<sup>3</sup> A particular construction type, for example, allows a ‘fronted’ element as its first daughter and an appropriate sentential phrase as its second (head) daughter. This head daughter is further constrained to bear an appropriate specification for the feature, named SLASH in HPSG, encoding information about elements missing within that constituent:

$$(1) \quad \begin{array}{c} \text{S} \\ \left[ \begin{array}{l} \textit{fin} \\ \text{SLASH } \{ \} \end{array} \right] \end{array} \rightarrow \boxed{1} \begin{array}{c} \text{S} \\ \left[ \text{SLASH } \{ \boxed{1} \} \right] \end{array}$$

General principles of the theory, also formulated as constraints, ensure that this head daughter’s value for the feature SLASH match the SLASH value of its own head daughter. Various constraints that we discuss in detail in Chapter 5 interact to ensure that an appropriate lexical head (the verb *likes* in (2)) appears without its object, just in case the indicated SLASH information is ‘percolated’ up through the structure and identified with the appropriate filler:



<sup>3</sup>See Brame 1978, Johnson and Postal 1980, Gazdar 1981, Ades and Steedman 1982, Kaplan and Bresnan 1982, Bresnan 1982b, Gazdar et al. 1985, Kaplan and Zaenen 1989, Pollard and Sag 1994, and Steedman 1996, among others.

Thus what looks like movement is not analyzed as movement at all. An ‘extracted’ element (like the NP *Kim* in (2)) is permitted only when a corresponding element is missing within the body of the sentence. This follows from the CBG account because it is only in this way that a structure with the extracted element can satisfy all the constraints of the grammar, as explained in detail in Chapter 5.

In this book, we treat some of the most theoretically central and recalcitrant phenomena in English syntax, including *wh*-‘movement’ (Chapter 6), ‘pied piping’ effects (Chapter 5), inversion (‘I-to-C movement’), and the restricted distribution of auxiliary *do* (Chapter 2). Our analytic method is always that of CBG: simple constraint satisfaction. We should add that for the last thirty years, transformational theories have always assumed, but never precisely specified, a theory of features and values—and hence, *ipso facto*, a theory of feature structures. CBG, in making no use of transformational operations, thus streamlines the architecture of grammatical theory, analyzing more data with less theoretical apparatus.<sup>4</sup>

There is a further argument in favor of the CBG approach to grammar, if it can be shown to be empirically adequate. As argued forcefully in a number of works,<sup>5</sup> CBGs are psycholinguistically plausible. An unordered set of constraints fits well into a psycholinguistic model where linguistic and nonlinguistic information are smoothly and incrementally integrated in on-line language processing (Tanenhaus and Trueswell 1995). CBG approaches lexically encode significant grammatical information, which squares rather well with recent research in psycholinguistics (see MacDonald et al. 1994 for an overview). In addition, it has been known (at least since Fodor et al. 1974) that independent psycholinguistic evidence for the existence of transformations is lacking.

For these reasons, a precise, comprehensive description of a significant empirical domain in CBG terms is significant. If transformational operations *can* be eliminated from grammatical theory they *should* be.

### 1.2.3 The Primacy of Constructions

Although syntactic work within the transformationalist tradition frequently uses the term descriptively, ‘(grammatical) construction’ has been a *theoretical* taboo at least since the 1980s. Briefly, Chomsky argued that transformations like ‘passive’ and ‘raising’, common in earlier versions of transformational grammar, could be eliminated in favor of general conditions on structures that would allow a single operation—Move NP—to do the work of a family of such transformations. This has guided the subsequent evolution of transformational analysis where one now finds discussion of even more general operations, such as ‘Move  $\alpha$ ’ or ‘Move’. This evolution has tended to move away from construction-specific proposals toward a discussion focused almost exclusively on general principles from which the idiosyncrasy of individual constructions are supposed to be derived.

However, as already noted by McCawley (1988) in his review of Chomsky 1986, Chomsky’s discussion of the passive construction did not touch on crucial issues like the relevant verb morphology, the choice of the preposition *by*, and the role of the verb *be*. As McCawley pointed out, these properties of the construction followed from nothing under Chomsky’s proposals. Rather, they would have to be stated in a fashion that would render Chomsky’s proposal comparably stipulative to the alternative it sought to replace.

<sup>4</sup>Students of CBG sometimes think otherwise, as the feature structures of transformational theories often appear simpler by comparison. In point of fact, this is an illusion arising from the incomplete and inexplicit nature of the transformational alternatives.

<sup>5</sup>See Kaplan and Bresnan 1982, Sag and Wasow 1999: Chapter 9, and Johnson and Lappin 1999.

Closely related to these issues is the distinction Chomsky makes between ‘core’ phenomena and the ‘periphery’ of language. The core phenomena consist of ‘pure instantiations of Universal Grammar’, while the periphery consists of ‘marked exceptions (irregular verbs, etc.)’ (Chomsky and Lasnik 1993).<sup>6</sup> The move away from constructions thus leads to the study of ‘Core Grammar’.

There is a problem here as well: that of knowing which phenomena are core and which are peripheral. The literature offers virtually no criteria for distinguishing the two, though this is critical if the distinction is to have empirical content at all.<sup>7</sup> Be that as it may, there is a more serious difficulty facing any attempt to justify the move away from constructions (‘anticonstructionism’, if you will) on the basis of a concern for core grammar: the fact that there is no inconsistency between the concern for general principles of grammar (even Universal Grammar in Chomsky’s sense) and a construction-based approach to grammar.

The construction-based approach developed here illustrates the significant convergence of recent theoretical work on grammatical constructions and their properties within the CBG generative tradition. Early work in HPSG<sup>8</sup> adapted multiple inheritance hierarchies, already used in computational work in knowledge representation and object-oriented programming, to express cross-classifying generalizations about words. This same general approach has subsequently been applied in various ways to the grammar of phrases by other linguists. Two notable examples of such work are Hudson’s Word Grammar<sup>9</sup> and the framework of Construction Grammar developed by Fillmore, Kay and their collaborators.<sup>10</sup> See also Zwicky 1994, Kathol’s (1995) analysis of German clause types, and Sag’s (1997) treatment of English relative clause constructions. All of these researchers have treated generalizations about constructions in terms of cross-classifying type hierarchies.

The type-based approach to constructional analysis also has the advantage that it allows generalizations of varying grain to be expressed naturally. For example, Fillmore (1999) points out that English has various kinds of ‘inverted’ clauses, including the exclamatives in (3), the ‘blesses, wishes and curses’ in (4), the conditionals in (5), and polar interrogatives like (6):

- (3) a. Boy, *was I stupid!*  
b. Wow, *can she sing!*
- (4) a. May they live forever!  
b. May I live long enough to see the end of this job!  
c. May your teeth fall out on your wedding night!
- (5) a. *Were they here now*, we wouldn’t have this problem.  
b. *Should there be a need*, we can always call for help.
- (6) a. Were they involved?  
b. Can she sing?

---

<sup>6</sup>Recent work in the Minimalist Program, though seldom discussing the core/periphery distinction explicitly, adheres to it in practice. In fact, most work in this tradition focuses on an even narrower subset of putatively core data.

<sup>7</sup>For independent, highly convergent arguments that the core-periphery distinction is both unmotivated and largely inconsistent with independently motivated, more data-driven approaches to learning, see Jackendoff 1997 and especially Culicover 1999.

<sup>8</sup>See, for example, Flickinger et al. 1985, Flickinger 1987, and Pollard and Sag 1987.

<sup>9</sup>See Hudson 1990, 2000.

<sup>10</sup>See Fillmore 1999, Fillmore and Kay 1999, Fillmore et al. to appear, Koenig and Jurafsky 1994, Goldberg 1995, and Koenig 1999.

These are clearly distinct constructions, each involving a language-particular correlation of inverted form with a particular semantic type, as well as other kinds of idiosyncrasy. Yet these constructions are a family: they are all finite, they all realize the subject post-verbally, and they are all incompatible with uninvertible finite auxiliaries like *better*. In Chapters 2 and 6, we develop an analysis of these constructions in terms of the supertype *subject-auxiliary-inversion-phrase* (*sai-ph*). This is itself a subtype of *headed-phrase* (*hd-ph*), a general property of which is the presence of a head daughter. As the researchers cited earlier have argued, natural language generalizations typically manifest themselves at diverse classificatory grains. This fact is accurately modeled by a hierarchical system of construction types of the kind we assume here, where constraints can be placed on the most specific type of construction, on the most general type *phrase*, or on any of the intermediate types recognized by our grammar. In addition, as argued convincingly by Johnson and Lappin (1999), there are certain kinds of cross-linguistic generalizations that are quite difficult to state without a notion of construction type.

Moreover, as Ackerman and Webelhuth (1998) have suggested, a type-based system of grammar can reasonably posit that certain types are part of a universal inventory, assuming Chomsky's extremely strong version of UG. Alternatively, Ackerman and Webelhuth propose a notion of *archetype*—a recurrent type in human languages that emerges in response to more general functional and cognitive factors, yet is not 'hard-wired' as such.<sup>11</sup> These are divergent views of UG, but they are both compatible with the view that a grammar is based on the notion of construction, analyzed in terms of types, type hierarchies, and type constraints.

Let us illustrate the construction-based approach in more detail. 'Topicalized' clauses, *wh*-interrogatives, *wh*-relatives, and *wh*-exclamatives in English are another family of constructions. Each consists of an initial extracted element followed by a sentential head that contains an appropriate gap. However, only matrix *wh*-interrogatives involve auxiliary inversion. Moreover, topicalized sentences disallow a *wh*-word in the extracted position, and each *wh*-clause requires the presence of a different kind of *wh*-word within the extracted constituent:

- (7) a. [That desk], my friend from Denmark built \_\_ .  
 b. *What* did they build \_\_ ?  
 c. [*What* an ugly desk] they built \_\_ !  
 d. the desk *which* they built \_\_ . . . .

As we note in Chapter 5, the three classes of *wh*-word are not interchangeable, though, for historical reasons, they have common members. And of course each construction has its own kind of meaning.<sup>12</sup>

One could stipulate the properties of these constructions piecemeal, by positing five unrelated constructions like those in (8):

<sup>11</sup>For an insightful discussion of a similar notion that seems to us entirely compatible with our framework, see Langacker 1991.

<sup>12</sup>There are further differences (e.g. having to do with the category of the extracted element) that we will ignore for present purposes.

(8) a. *topicalized-clause*:

$$\begin{array}{c} \text{S} \\ \left[ \begin{array}{cc} \textit{fin} & \\ \text{ROOT} & + \\ \text{SLASH} & \{ \} \\ \text{CONTENT} & \text{decl} \end{array} \right] \end{array} \rightarrow \boxed{\mathbb{1}}[\text{WH} \quad \text{none}] \quad \mathbf{H}: \begin{array}{c} \text{S} \\ \left[ \begin{array}{cc} \textit{fin} & \\ \text{INV} & - \\ \text{SLASH} & \{ \boxed{\mathbb{1}} \} \end{array} \right] \end{array}$$

b. *inverted-wh-interrogative-clause*:

$$\begin{array}{c} \text{S} \\ \left[ \begin{array}{cc} \textit{fin} & \\ \text{ROOT} & + \\ \text{SLASH} & \{ \} \\ \text{CONTENT} & \text{int} \end{array} \right] \end{array} \rightarrow \boxed{\mathbb{1}}[\text{WH} \quad \text{wh-int}] \quad \mathbf{H}: \begin{array}{c} \text{S} \\ \left[ \begin{array}{cc} \textit{fin} & \\ \text{INV} & + \\ \text{SLASH} & \{ \boxed{\mathbb{1}} \} \end{array} \right] \end{array}$$

c. *uninverted-wh-interrogative-clause*:

$$\begin{array}{c} \text{S} \\ \left[ \begin{array}{cc} \textit{fin} & \\ \text{ROOT} & - \\ \text{SLASH} & \{ \} \\ \text{CONTENT} & \text{int} \end{array} \right] \end{array} \rightarrow \boxed{\mathbb{1}}[\text{WH} \quad \text{wh-int}] \quad \mathbf{H}: \begin{array}{c} \text{S} \\ \left[ \begin{array}{cc} \textit{fin} & \\ \text{INV} & - \\ \text{SLASH} & \{ \boxed{\mathbb{1}} \} \end{array} \right] \end{array}$$

d. *wh-exclamative-clause*:

$$\begin{array}{c} \text{S} \\ \left[ \begin{array}{cc} \textit{fin} & \\ \text{SLASH} & \{ \} \\ \text{CONTENT} & \text{excl} \end{array} \right] \end{array} \rightarrow \boxed{\mathbb{1}}[\text{WH} \quad \text{wh-excl}] \quad \mathbf{H}: \begin{array}{c} \text{S} \\ \left[ \begin{array}{cc} \textit{fin} & \\ \text{INV} & - \\ \text{SLASH} & \{ \boxed{\mathbb{1}} \} \end{array} \right] \end{array}$$

e. *wh-relative-clause*:

$$\begin{array}{c} \text{S} \\ \left[ \begin{array}{cc} \textit{fin} & \\ \text{ROOT} & - \\ \text{SLASH} & \{ \} \\ \text{CONTENT} & \text{rel} \end{array} \right] \end{array} \rightarrow \boxed{\mathbb{1}}[\text{WH} \quad \text{wh-rel}] \quad \mathbf{H}: \begin{array}{c} \text{S} \\ \left[ \begin{array}{cc} \textit{fin} & \\ \text{INV} & - \\ \text{SLASH} & \{ \boxed{\mathbb{1}} \} \end{array} \right] \end{array}$$

But this somewhat redundant formulation is quite distinct from current views of construction grammar and certainly distinct from the theory we present here.

A construction-based grammar, in fact, derives constraints like the ones shown in (8) as theorems of a more abstract system of phrasal types. As already noted, by organizing phrases into a multiple inheritance hierarchy, one can posit higher-level types and formalize the relevant cross-cutting generalizations. Thus all of these clauses are subtypes of what we call *head-filler-phrase*—a kind of phrase whose immediate constituents are a filler daughter (the extracted element) and a ‘slashed’ clausal head daughter. This type is a subtype of *headed-phrase* and is subject to the Generalized Head Feature Principle, which requires that the syntactic and semantic

properties of the mother and the head daughter be shared *by default*. These constraints govern the relevant superordinate types and their subtypes. Thus, all phrases of type *topicalized-clause* must obey the properties of *head-filler-phrase* and *headed-phrase* in addition to whatever constraints are imposed directly on the type *topicalized-clause*. This constraint inheritance is violated only when a constraint on some subordinate type contradicts a *default* constraint on some superordinate type, e.g. the GHFP.

In parallel, the types in (8) inherit constraints from other supertypes. For example, the type *wh-interrogative-clause* is a subtype of *interrogative-clause*, from which it inherits the requirement that its content is a question. The treatment of the other types of clause in (8) is similar, involving the supertypes *exclamative-clause*, *relative-clause* and *clause*. Once the proper type hierarchy is constructed and the relevant constraints are defined for all these supertypes, the stipulations specific to the types in (8) become minimal. They reduce in fact to something like those shown in (9):

- (9) a. *topicalized-clause*:  $\left[ \begin{array}{c} \text{S} \\ \text{ROOT} \quad + \end{array} \right] \rightarrow \left[ \text{WH none} \right] \mathbf{H}:[\text{fin}]$
- b. *wh-interrogative-clause*:  $\text{S} \rightarrow \left[ \text{WH wh-int} \right] \mathbf{H}$
- c. *wh-exclamative-clause*:  $\text{S} \rightarrow \left[ \text{WH wh-excl} \right] \mathbf{H}:[\text{fin}]$
- d. *wh-relative-clause*:  $\left[ \begin{array}{c} \text{S} \\ \text{ROOT} \quad - \end{array} \right] \rightarrow \left[ \text{WH wh-rel} \right] \mathbf{H}$

#### 1.2.4 Some Syntactic Consequences

The simplified analysis just sketched only approximates the one we develop in this book. Our analysis will account for numerous more subtle facts about these constructions, for example the following:

- *Wh*-interrogatives and *wh*-relatives (but not topicalizations or exclamatives) can be a subjectless infinitival:
 

(10) a. I wonder [who (\*for Sandy) to visit].  
       b. The person [in which (\*for you) to place your trust] . . . .  
       c. \*Bagels, (for) Sandy to like.  
       d. \*How big a bagel (for) Sandy to like!
- In English, subjunctives never appear in interrogatives:
 

(11) a. \*What be he careful of?  
       b. \*I wonder what he be careful of?  
       c. \*I wonder whether he be careful.
- The filler phrase in all *wh*-constructions need not be the *wh*-word, but may be a phrase properly containing the appropriate *wh*-word, subject to constraints that we specify:
 

(12) a. I wonder [[whose pictures]/\*[pictures of whom] they liked]?  
       b. The person [[to whose mother] they were talking] . . . .  
       c. [What a/\*What some nice person] he is!

- Uninverted *Wh*-interrogatives appear only in embedded environments:
  - (13) a. \*Who(m) Kim will visit?
  - b. I wonder [who(m) Kim will visit].
- Certain auxiliaries must head inverted clauses; other auxiliaries may not:
  - (14) a. Aren't I allowed to go?/\*I aren't allowed to go.
  - b. What aren't I allowed to see?/\*They revealed [what I aren't allowed to see.]
  - c. Aren't I the cutest thing you ever saw!
  - d. \*What be/being/been he careful of?
- Subject *Wh*-interrogatives appear in both embedded and unembedded environments:
  - (15) a. I wonder [who left].
  - b. Who left?
- Only interrogatives allow multiple *wh*-expressions:
  - (16) a. Who read what?
  - b. I wonder [who read what].
  - c. \*How many presents they gave to how many people!
  - d. \*The person [[whose pictures of whom] they liked best]...
- In a multiple *wh*-interrogative, only the first *wh*-expression can be modified by *the hell*, *in tarnation*, and the like:
  - (17) a. I wonder [who the hell saw Kim/\*who the hell].
  - b. \*Lee visited who the hell?
- Only interrogative *wh*-words can be modified by *the hell*, *in tarnation*, etc:
  - (18) a. \*Anyone [who the hell saw them].
  - b. \*What the hell a nice person she is!
- There are also topicalized interrogative, exclamative, and imperative clauses:
  - (19) a. That kind of antisocial behavior, can we really tolerate in a civilized society?  
(Radford 1988)
  - b. People that stupid, am I ever fed up with!
  - c. The Roman Forum, be sure to visit when you're in Rome!
- 'Root' is the wrong notion for restricting the constructions in (9); 'main clause phenomena' may also appear in certain embedded environments:
  - (20) They argued convincingly \*(that) [problems of this sort, they would never be able to deal with].
- In simple finite VPs, which also determine the grammar of subject *wh*-interrogatives in our analysis, only 'polarized' forms of the auxiliary *do* may appear:
  - (21) a. Kim didn't go to the store.
  - b. Kim did not/TOO/SO go to the store.
  - c. \*Kim dīd go to the store.
  - (22) a. \*Who dīd leave?
  - b. Who dīdn't leave?
  - c. Who dīd not leave?
  - d. Who DID leave?

- Counterexamples to standard accounts of ‘superiority’ violations exist in multiple *wh*-interrogatives, in reprises and more generally, when accentual prominence is properly considered:

- (23) Who wondered what WHO was doing?  
 (= Who are the *x, y* pairs such that *x* wondered what *y* was doing?)
- (24) A: What did Agamemnon break?  
 B: What did WHO break?
- (25) a. Who took WHAT WHERE?  
 b. What did WHO take WHERE?  
 c. Where did WHO take WHAT?

We hope that the subsequent chapters, where all these matters are analyzed in detail, will serve to illustrate the explanatory power of construction-based approaches to grammar.

*Clauses* are pervasive in this book. The *clause*, in our view, is a special kind of construction that correlates a particular syntactic combination (a subject with a VP head; a *wh*-less filler with a sentential head, etc.) with a kind of *message*. Messages, as detailed in Chapter 3, are the semantic kinds most fundamental to communication: propositions, questions, facts, and outcomes. ‘Smaller’ entities in our ontology (e.g. atomic individuals, SOAs, and situations) serve as the building blocks from which atomic messages are constructed. A clause is thus a kind of construction that packages constituents into a communicatively significant unit. Not all message-denoting phrases are clauses, however. For example, two clauses can be coordinated into a phrase whose content is a complex message, but the coordination construction is not clausal because it must also allow non-clauses to be coordinated. Thus clauses in a certain sense serve to ground the recursion of complex messages in our theory.

### 1.3 Semantic Preview

In this section, we place our work in a broader semantic context and provide an overview of the semantic proposal we argue for in subsequent chapters.

#### 1.3.1 Beyond Montague Semantics

In a series of ground-breaking works published in the late 1960s and early 1970s (see Thomason 1974a), Richard Montague showed how to analyze certain aspects of the meaning of natural language expressions using tools from mathematical logic. He also demonstrated that such an analysis could provide a precise alternative to Russell’s (1905) view that the outward form of language is misleading and hence not amenable to *direct* semantic analysis. Montague’s framework provides a formalization of an essentially Fregean view of semantics.<sup>13</sup> However, Montague’s framework has been criticized with respect to at least three fundamental issues:

1. **Cognitive construal:** Montague’s theory of propositions, in contrast to Frege’s (unformalized) version, is subject to the problem of *logical omniscience*.<sup>14</sup> This impairs significantly its ability to serve as the semantic component of a broader cognitive theory of mind.

<sup>13</sup>Albeit one that Frege might not have endorsed. Frege analyzed propositions in terms of senses that have internal structure. However, the fine-grain achieved in Frege’s analysis gets lost in Montague’s formalization. Of course, the formalization was motivated by the need to clarify the nature of the units that make up Fregean senses.

<sup>14</sup>*Logical omniscience* is the property of assigning identical content to logically equivalent sentences. There is by now a large literature on this problem. For a succinct illustration of the problem in a doxastic context, see Kamp 1990.

2. **Ontology:** Montague's possible worlds-based ontology is an intensionalized version of the sparse entity/truth value ontology advocated in Wittgenstein's *Tractatus* (see Thomason 1974b). Montague's ontology is hence both cognitively unwieldy and impoverished. (See Bealer 1982 and Barwise and Perry 1983 for detailed discussion.)
3. **Context:** Montague's framework offers an account of context dependence by relativizing interpretation to a pragmatic index. However, as already pointed out by Cresswell (1973), this latter notion is quite arbitrary. The components of an index are determined in an essentially ad hoc way and, moreover, such a view of context lacks the external coherence needed to underwrite complex notions like deixis and bridging reference (see, for example, Clark 1977).<sup>15</sup>

All three issues are crucially important when constructing an account of the meaning and use of interrogatives. It is obvious that if a semantic theory is to serve as a component in a theory of how agents interact in conversation, then it must have the potential for cognitive construal. For example, it must be possible to explain how queries and assertions function in affecting the information states of agents in dialogue.<sup>16</sup>

The importance of integrating contextual factors into the grammatical analysis of interrogatives becomes evident in connection with the notion of answerhood, which lies at the heart of explaining what interrogatives mean. As discussed briefly below and at length in Chapter 3, existing accounts of interrogative meaning have seriously underestimated the extent to which context influences answerhood.

Ontological analysis is also vital to a proper explanation of the meaning of interrogatives. The predicates *believe* and *know* are commonly thought of as selecting for a propositional argument. However, as Vendler (1972) pointed out, this view is highly problematic. To take one example from the many we discuss in Chapter 3, the word *know* licenses inference patterns such as (26), whereas the word *believe* is incompatible with both *fact*-NPs and interrogative clauses:

- (26) a. Bo knows/believes that Mo left.  
 b. A: Who left?  
 B: Bo knows a fact that resolves that question.  
 Hence, Bo knows who left.  
 c. A: Who left?  
 B: #Bo believes a fact that resolves that question.  
 B': #Bo believes who left.

That such facts cannot be reduced to idiosyncratic syntactic subcategorization is demonstrated by (27) and, more intriguingly, by the fact that such patterns are cross-linguistically universal:

- (27) a. A: Jo left yesterday.  
 B: Bo knows/believes that.  
 b. A: Who left yesterday?  
 B: #Bo believes that.  
 c. A: Who left yesterday?  
 B: Bo knows that.

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<sup>15</sup>Groenendijk and Stokhof (1991a) and Chierchia (1995) provide a new version of Montague's theory that allows interesting aspects of context dependence and contextual change to be modeled.

<sup>16</sup>We use 'interrogatives' as a cover term for a class of constructions, 'questions' for the class of entities denoted by interrogatives, and 'queries' for speech acts that involve posing questions.

As we discuss in Chapter 3, such universals remain unaccounted for in existing Montagovian approaches to interrogatives (e.g. those of Karttunen 1977 and Groenendijk and Stokhof 1984). The importance of working out the ontology of natural language is recognized in lexical semantics (see for instance the program initiated by Pustejovsky 1995). However, with some interesting but isolated exceptions (e.g. Bach 1981, Chierchia 1985, Moens and Steedman 1988, and Asher 1993), the issue of an adequate ontology for natural language semantics has been neglected in contemporary formal semantics. Many insights that have arisen in the philosophical literature, most influentially those of Vendler, have not led to significant attempts to develop a theory that supplants the existing overly sparse Montagovian ontology. As Kamp (1996) has observed with respect to research on the distinctions between events, facts, and propositions, “that so many of those questions remain unanswered and so few have been answered deserves to be considered one of the great scandals of semantics.” (p. 106)

Deferring detailed argumentation to later chapters, we suggest here that various intrinsically problematic aspects of Montague Semantics affect its ability to elucidate the meaning and use of interrogatives. What, then, is a viable alternative?

### 1.3.2 Situation Theory and Situation Semantics

In their book *Situations and Attitudes*, Barwise and Perry (1983) present a new approach to semantics, which they argue should supplant Montague’s framework. Two aspects of their program should be mentioned:

- (28) a. **An information-conditional approach to semantic modeling:** Barwise and Perry suggest that the logical underpinning for semantics be a theory of the information that agents can acquire as they interact in the world. Given this, the framework they develop provides tools for describing external reality in terms that can capture the resource-bounded nature of perception.
- b. **An utterance-based formulation of semantics:** Barwise and Perry argue that context dependence should not be tackled by viewing context as an incidental modality that somehow affects sentences. Rather, semantics should take utterances, spatio-temporally located speech events, as the entities whose contents it analyzes. In their view, meanings pertain to types of utterances. Indexicality is then accommodated directly as the dependence on features that characterize a speech event.

In essence, semantic work inspired by *Situations and Attitudes* branched in two distinct directions, which correlate with (28a) and (28b). One direction, involving formally oriented work, came to be known as Situation Theory (ST). The second direction, concerning itself with more grammatically oriented work using tools developed by situation theorists, acquired the name Situation Semantics (SitSem).

By far the most influential contribution of ST has been the recognition that the semantic ontology needs ‘sub-world’ entities such as situations or events to explain, among other things, the semantics of naked infinitive constructions and domain restriction in quantification. At the same time, despite the initial interest created by ST, its impact on working semanticists has been limited. One limiting factor has been the lack, until recently, of stable modeling techniques in ST. Possibly more important is the perception that an ST approach requires buying into a very rich ontology whose empirical justification has been insufficient. One can relate this concern to the dearth of work that tries to simultaneously combine on a large scale: (a) a linguistically well-

motivated ontology, (b) a well worked-out model theory, and (c) formal grammatical analysis. As we mentioned above with respect to syntax, as long as attention is focused on highly restricted sets of phenomena, theories are intrinsically underdetermined by data. Without integrative work of the sort just described, the illusion emerges that all semantic theories are essentially equipotent.

One of the central aims of this book is to demonstrate the viability and vitality of a situation semantics approach. To this end, we provide extensive linguistic argumentation for an ontology needed to analyze the contents of all the major types of finite clauses in English, with particular focus on interrogatives. We use the framework developed by Seligman and Moss (1997) to ground this ontology model-theoretically. We then show how to represent this model theory within a version of the well-developed formalism of Typed Feature Structures. On one hand, as is shown in Chapter 3, the ontological approach of Montague Grammar can be related to that of ST, rather than viewing the former as being disconnected from the latter.<sup>17</sup> On the other hand, we believe that a situation semantics approach provides particular benefits as semantics begins to confront the radical context dependence of actual dialogue. The analyses of reprise and ellipsis phenomena that we present in Chapters 7 and 8, including accounts of short answers (29a), direct sluicing (29b), reprise sluices (29c), and literal reprises (29d), will provide a particularly clear illustration of how situation semantics can be applied to radically context-dependent semantic problems:

- (29) a. A: Who managed to annoy no one?  
       B: No one.
- b. A: Did anyone call?  
       B: Yes.  
       A: Who?
- c. A: Did you meet Makriyannis.  
       B: WHO?
- d. A: Did Mo dupe the judges?  
       B: Mo?

### 1.3.3 Some Semantic Theses

We now wish to point out a number of concrete areas in which we believe our account constitutes a significant advance over previous work, and indeed points to flaws in fundamental assumptions that have dominated past work on the meaning and use of interrogatives.

## Questions and Answerhood Conditions

The semantic universe we create allows us to formally ground a common intuition about questions, namely that they are akin to open propositions. Specifically, we identify questions with propositional abstracts. In fact, the open-proposition view has a long history which goes back at least to Jespersen (1924) and Cohen (1929). However, although this view resurfaces periodically, it has to date not managed to survive in the face of competition from alternatives which we call Exhaustive Answerhood Conditions (EAC) approaches, whose most influential representatives are Karttunen (1977) and Groenendijk and Stokhof (1984, 1989, 1997). As we discuss in Chapter 3, existing proposals to treat questions as open propositions run into significant formal

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<sup>17</sup>This point has been emphasized in work by Cooper (for instance, Cooper 1993).

and empirical problems, for instance in the domain of coordination. Moreover, they leave several crucial issues entirely unanswered.

Perhaps the most serious of these inadequacies is a failure to offer an account of so-called *exhaustive* answerhood as needed to explicate the meaning of interrogatives embedded by factive predicates (e.g. *know*, *discover*, and *reveal*), which license inferences like the following:

- (30) a. Mo discovered who participated in the heist.  
 b. Hence, Mo discovered a fact that resolved the question who participated in the heist.

Indeed, providing an account of such clauses served as the defining problem of EAC approaches like Karttunen's and Groenendijk and Stokhof's. Nonetheless, as we detail in Chapter 3, EAC approaches do not ultimately deliver an adequate account of answerhood. This is for two main reasons. First, such approaches ignore the intricate contextual factors that play an important role in the notion of exhaustiveness. Second, other equally important semantic notions of answerhood exist, such as the notion of *aboutness* (Ginzburg 1995a). It is *aboutness* that underlies the intuitions speakers have about the coherence of replies to queries, regardless of their truth or specificity. As we will see, EAC accounts of *aboutness* that derive this notion from exhaustiveness are inadequate.

We will show that, within the semantic universe we define, the various formal and empirical problems facing an open-proposition approach to the semantics of interrogatives can be solved. Furthermore, we will demonstrate that a variety of answerhood notions needed for semantic and pragmatic explanation can readily be defined. Thus, the notion of question we provide is not identified with any particular notion of answerhood; rather it constitutes a means of *underspecifying* answerhood.

## **Wh-Expressions Are Not Generalized Quantifiers**

Our view of what questions are leads to an extremely simple view of *wh*-phrase meaning. Essentially, a *wh*-phrase does two things: (1) it enables an abstraction to occur, over the parameter that the *wh*-phrase associates with the semantic argument role it fills and (2) it introduces certain restrictions over that argument-role—personhood for *who*, inanimateness for *what*, the common-noun property for *which*-phrases, etc. We say ‘essentially’ because we argue in fact that interrogative *wh*-phrases have three distinct types of use:<sup>18</sup> (1) an *independent* use, which is our primary focus in this book; (2) a *functional(ly dependent)* use; (3) a *reprise* use. We demonstrate in Chapters 6 and 7 that, in spite of these differences, a single constraint captures the commonality of these three uses in building up a question. The differences among the three types of use arise from independent mechanisms—lexical, in the case of functional readings, and constructional, in the case of reprise readings.

This view of *wh*-phrase meaning, which we claim accounts for all interrogative uses in English, contrasts with a view of *wh*-phrases as generalized quantifiers. The syntactic motivation for this highly entrenched view, particularly among syntacticians, is examined below.<sup>19</sup> The quantificational view also has some semantic motivation, such as the need to account for the ambi-

<sup>18</sup>We also provide analyses of *wh*-phrases as they occur in exclamative and (to a lesser extent) relative clauses. These, we suggest, behave somewhat differently from interrogative *wh*-phrases.

<sup>19</sup>The view of *wh*-expressions as quantifiers has antecedents in remarks made by Carnap (1937) and Reichenbach (1947).

guity manifested in sentences such as (31a) given that they can elicit responses such as (31b) or as (31c):

- (31) a. A: Which movie did each senator condemn?  
 b. B: *Naked Lunch*.  
 c. B: Helms condemned *Huckleberry Finn*, Lieberman condemned *Crash*, . . .

As argued in Chapter 4, such ambiguities are anything but straightforward ‘scope ambiguities’. We consider past treatments of this phenomenon and show that accounts treating *wh*-phrases as quantifiers are forced to adopt otherwise unmotivated mechanisms to account for the ambiguity. In contrast, we will defend the strategy of Engdahl (1980, 1986), who proposes tackling the ambiguity in terms of an additional *functional* use of *wh*-phrases. We also provide additional arguments for a non-quantificational view of *wh*-phrases, the most detailed of which concerns the presuppositions associated with *which*-phrases.

## ***Wh*-Phrase Meaning and Dislocation**

The utterance-based formulation of semantic theory pioneered by situation semantics (see above) has for the most part been perceived as obscure, and thus has rarely been pursued. This apparent obscurity is the result of a pervasive simplifying assumption and a frequently asserted dogma. The simplifying assumption, almost universally shared by generative grammarians and formal semanticists, is that a grammar should describe a homogeneous speech community. The dogma, promoted in various writings (see, for example, Chomsky 1986), holds that the proper domain of study for linguistics is something Chomsky calls ‘I(nternalized)-language’, as opposed to ‘E(xternalized)-language’. E-language is described as “a collection of actions, utterances, linguistic forms (words, sentences) paired with meanings, or a system of linguistic forms or events” (Chomsky 1986: 19), whereas I-language is described as a biologically endowed “notion of structure in the mind of the speaker” (Chomsky 1986: 21).

We believe that this is a false dichotomy. One may agree that grammatical theory is a subfield of cognitive science and, as such, needs to contribute to mental, and even biological, modeling. However, this in no way entails adopting a solipsistic perspective on the agents whose grammatical systems are being modeled. Quite to the contrary, a variety of evidence requires us to adopt a realist position, where grammars describe types of speech events in which embodied agents *interact* with one another. Reprise utterances, a detailed analysis of which we provide in Chapter 7, constitute some of the evidence for this claim.

The issue of whether or not grammars can be assumed to pertain to homogeneous speech communities and the issue of E-language vs. I-language might seem remote from the more concrete task of developing a grammar for interrogatives. In fact, there is an interesting connection between these issues, mediated by the assumption that *wh*-phrases are syntactic operators. This view, taken together with the possibility of movement at distinct derivational levels, often has been offered as an explanation for a putative linguistic universal, namely that *wh*-phrases are obligatorily fronted. With this approach, languages can be partitioned into those where *wh*-phrases obligatorily move ‘in the syntax’, such as English, and those where such movement takes place at an abstract level of Logical Form, such as Mandarin. Indeed, the role played by LF in such explanations played an important role in its achieving canonical status in linguistic theory. Sen-

tences such as (32)—in particular (32a,b), where the wide scoping *wh*-phrase occurs within an island—have rarely been thought to pose a threat to the assumption that *wh*-fronting is obligatory:

- (32) a. Merle knows who ate WHAT?  
 b. Mo dislikes Merle and WHO ELSE?  
 c. You're leaving WHEN?

The reason for this is the commonly held belief that (1) such sentences can only be used as *reprise* questions—Bolinger's term for a class of uses which includes, but is not limited to 'echo' questions—and furthermore (2) the syntax and semantics of such forms are outside the purview of grammar proper. In Chapter 7, we argue that both these assumptions are false. We show, based in part on insights of previous research, that reprise uses obey various well-known grammatical constraints. Moreover, given a theory of utterance processing, which we sketch briefly, a variety of reprise utterances can be described simply, without postulating additional theoretical apparatus. Of course, in order to develop a grammar for reprising one must drop the assumption that grammars pertain to homogeneous speech communities, since the very point of a reprise is to highlight differences in the information states of speech participants. Indeed, one must allow utterances as entities in the grammatical ontology since utterances are indeed the antecedents of reprise queries.

Given an analysis of the semantics of reprise utterances, we will be able to demonstrate that English also allows for non-reprise *wh*-interrogative constructions in which no *wh*-phrase is dislocated. For instance:

- (33) Lester: I've been working here for 14 years. You've been here for how long? A month?  
 [from the movie *American Beauty*]

The analysis we develop for such constructions extends surprisingly to yield an analysis of so called intonation questions—declarative constructions used to pose polar questions:

- (34) Bo will also attend the convention?

## 1.4 Conclusion

The chapters of this book are interconnected to an unusual degree. The consequences of a proposal in one chapter are often intimately involved with the details of another. For this reason, we have included three appendices that lay out the overall theory of the book in a manner more uniform and complete than the presentations in any one chapter.

Finally, we note that many of the analyses presented here have made their way into the large-scale computational grammar of English developed by the LINGO project at Stanford University's Center for the Study of Language and Information. For the beginnings of a computational implementation based directly on the grammar of this book, see Callison-Burch 2000 and Ginzburg et al. 2000.