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Deriving Syntactic Relations

John Bowers

"This book challenges assumptions that have gone unquestioned for too long, while hewing to the core principles of the Minimalist Program. It will be useful and thought-provoking to generative syntacticians of all theoretical persuasions."

Elizabeth Cowper, University of Toronto

A pioneering new approach to a long-debated topic at the heart of syntax: what are the primitive concepts and operations of syntax? This book argues, appealing in part to the logic of Chomsky's Minimalist Program, that the primitive operations of syntax form relations between words rather than combining words to form constituents. Just three basic relations, definable in terms of inherent selection properties of words, are required in natural language syntax: projection, argument selection, and modification.

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JOHN BOWERS

Cornell University, New York



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JOHN BOWERS is Professor in the Department of Linguistics at Cornell University. He has published two books, the most recent of which is *Arguments as Relations* (2010), published in the *Linguistic Inquiry Monographs* series. He has also published numerous journal articles and book chapters focusing primarily on the areas of predication, transitivity, argument structure, and control.

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Acknowledgments

My earliest attempt to develop a theory of syntax based on syntactic relations between words was inspired by a conversation with Chris Collins in early 2000 about his paper “Eliminating labels,” during the course of which he suggested the possibility of eliminating constituent structure. I quickly produced an (unpublished) paper titled “Syntactic relations,” followed by a longer manuscript with the same title (also unpublished), which was presented in talks and seminars at University College London and the University of Edinburgh in 2001 and 2002. Though I continued to work on the ideas in this manuscript over the next few years, I was not satisfied with the results and put it aside to pursue other interests.

Then, in the fall of 2012, partly as a result of the work in my monograph *Arguments as Relations*, I began to see the possibility of a radically different approach to the idea of replacing constituent structure with syntactic relations. I produced a draft of these new ideas that fall, which was presented in a seminar at Cornell in the spring semester of 2013. Thanks to the invaluable discussion and criticisms of the participants in that seminar, I was able to sharpen these initial ideas considerably, resulting in the first draft of *Deriving Syntactic Relations*, which was submitted to Cambridge University Press at the end of 2013. To this I eventually added two completely new chapters on syntactic variation and ellipsis, partly in response to the comments of two referees and partly as a result of further discussion in a seminar in the spring of 2015.

I am indebted to many people with whom I have discussed the ideas in this volume during its long gestation. I particularly wish to thank Neal Smith and Emmon Bach, both of whom read and commented on my early manuscript. I would like to single out for special thanks everyone who participated in my seminar in the spring of 2013. To the best of my recollection, they include (in no particular order): John Hale, Tim Hunter, Wayne Harbert, Ed Cormany, Sarah Courtney, Cara DiGirolamo, Nan Li, Todd Snider, Zachary Smith, and Miloje Despić. My apologies if I have inadvertently omitted anyone. I would also like to thank John Hale

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Introduction

Background

There have been a number of attempts in the modern era to argue that the primitives of syntactic theory should be relations (or dependencies) between words rather than constituents. Frameworks as diverse as Relational Grammar (Perlmutter 1983, Perlmutter and Rosen 1984) and its descendant Arc-Pair Grammar (Postal 1980), Dependency Grammar (Tesnière 1959, Hays 1964, Gaifman 1965, Robinson 1970, Abney 1995, Debusmann 2000, Covington 2001), Word Grammar (Hudson 1990), and Form Dependency (Manzini 1995, Manzini and Savoia 2011) have tried in various different ways to implement such a program.¹ By and large, however, these attempts have not been persuasive to mainstream generative syntacticians. I believe that there are at least five main reasons for this. The first is simply that quite a mass of important empirical and theoretical insights has built up over the last five decades within mainstream generative grammar, up to and including Minimalism. Existing relation-based theories thus tend to suffer in both empirical coverage and theoretical depth in comparison with mainstream theories based on constituent structure. The second reason is that relation-based theories have not generally come to terms with the problem of predicting the linear ordering of words at the phonetic level on the basis of syntactic representations. Instead, they have assumed linear order as a primitive of the theory (as was also the case in classical Phrase Structure Grammars), made do with *ad hoc* generalizations, or simply ignored the problem. The third reason is that proponents of relation-based theories have been primarily concerned with representation, leaving it unclear how relational structures are to be derived. Fourth, existing relational theories have not attempted to incorporate the most fundamental insight of X-bar theory

¹ See also Brody (1994) for an approach that includes both constituents and dependencies.

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and Minimalism, namely, that syntactic structure is derived in bottom-up fashion from the most basic lexical units of language. Finally, the important idea that syntax must contain so-called functional heads as well as lexical heads, which plays a crucial role in most current work in syntax, does not figure prominently in the various versions of Dependency Grammar with which I am familiar.

Despite these problems, I believe that the time is ripe to consider seriously the idea that an optimal theory of syntax must in fact be based on relations between words rather than on constituent structure. One way of going about this is to utilize the logic of the Minimalist Program, which insists that it is necessary to examine critically the primitive concepts and operations of syntax, in order to eliminate anything that cannot be shown to be absolutely essential. Chomsky (2000) suggests that the irreducible minimum required by any theory of syntax are two interface levels, SEM and PHON, whose representations are “legible” to (can be “read” by) the conceptual-intentional (CI) systems and the sensorimotor (SM) systems, respectively. In addition there must be a lexicon LEX, consisting of a finite set of words or lexical items (LIs), from which an infinite set of sentences can be constructed. The fundamental minimalist question is: What else is needed?

Chomsky himself has already gone quite far in the direction of simplifying syntax, eliminating X-bar theory as well as unnecessary levels such as D-structure and S-structure entirely, leaving just the primitive operations of Merge, Move (partially reducible to Merge), and Agree. However, the resulting theory, though considerably simpler, is still firmly based on the notion of constituent structure. The Merge operation produces a new syntactic object which is simply a set consisting of just the two objects that are the input to Merge. The syntactic object produced in this way can in turn be part of the input to another application of Merge. The syntactic object produced by each application of Merge is thus carried along throughout the derivation, building up a full constituent structure for each sentence. The question is whether even a system this pared-down is still too rich. I believe that it is and that a still simpler theory in which the primitive objects are not constituents but relations (or dependencies) between words will suffice. If so, then the notions of constituent structure and movement can be eliminated entirely from syntactic theory and replaced with a set of asymmetric relations between words. Going a step further, I would argue that not only is a relational theory of syntax *possible* but that it comes very close to being the optimal solution to the problem of relating the representations of SEM and PHON, given the most basic legibility conditions imposed on those levels by CI and SM, respectively, and assuming that the only place that

semantic, syntactic and phonetic information is stored in a finite set of lexical items (LIs) contained in the lexicon (LEX) of each language.

Overview

The goal of this book is to achieve a radical simplification of syntactic theory by eliminating the notions of constituent structure and movement from narrow syntax, replacing them with asymmetrical dependency relations between words. In its final form, the theory proposed here generates such relations by means of a simple binary operation *Form Relation* (FR), which takes as input a pair of lexical items α and β and produces an ordered pair $\langle\alpha, \beta\rangle$, where β satisfies a selection condition required by α . FR applies in strictly bottom-up fashion. Crucially, relational derivations are bottom-up not only in the obvious sense that each application of FR adds a new relation, but also in the sense that the item containing the selection condition (the head) is always lower than the selected item (the dependent). An important consequence of this approach is that the notion of an “extended projection” in the sense of Grimshaw (1990) is built directly into the structure of the theory without having to be stipulated.

Given a theory of this form, it can be shown that the appearance of constituent structure and movement simply arise from the incremental application of Spell-out, together with the most basic legibility requirements of phonetic representation. Minimally, these are (i) the phonetic representations of lexical items must be linearly ordered, and (ii) the phonetic representation of every head must be legible to SM. The illusion of constituent structure arises directly from requirement (i) together with the incremental nature of the Spell-out algorithm, which ensures that once a string is formed at PHON it cannot be disrupted by any later application FR. The illusion of head movement arises from (ii), via a general condition that permits a dependent containing an illegible symbol to be replaced by the phonetic form of its head. The illusion of constituent movement is more complex, arising from the fact that certain heads may have an athematic argument selection feature, combined with the legibility requirements of both PHON and SEM. In such a case, the linear ordering requirement of PHON, together with a requirement of SEM similar to the θ -Criterion, jointly require that the phonetic form of a previously selected head be displaced leftward. Finally, it turns out that Spell-out, given these assumptions, can be stated in the following maximally simple and general form without having to assume that order is a primitive of the theory as in Kayne

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(2010): given a relation $\langle \alpha, \beta \rangle$, the phonetic form of β must precede the phonetic form of α , i.e. dependents precede heads.

In the theory proposed here there are just three basic types of selection: (i) lexical projection, (ii) argument selection, and (iii) modification. Each is strictly and exhaustively definable in terms of inherent formal properties of heads. Furthermore, it turns out that the possible orders in which these three relation-types may be formed is automatically determined by FR together with a universal constraint, termed *Immediate Gratification* (IG), which requires that selection requirements of heads be satisfied immediately. This principle, which is independently needed in order to ensure that derivations operate in strict bottom to top fashion, also solves a fundamental problem that has plagued constituent-based grammars, namely, the fact that there is no way to determine, except by arbitrary stipulation, the order in which two selection requirements associated with the same head are to be satisfied.

A theory of this form leads naturally to a novel approach to adverbial and adjectival modification, based on the idea that it is the modifier that has a selection feature and the modified that is selected. Modifiers can then be precisely defined as a third type of head that has selectors of its own but which, in contrast to both arguments and lexical projections, is not itself selected as an argument by any other head. Hence the modification relation falls out in an entirely natural way from the structure of the relational theory.

Another fundamental problem that a relation-based theory is able to shed light on is how to account for the range of word order variation found in human language. It turns out that a very small set of simple word order parameters—some very general in application, others highly specific—are sufficient to account for the observed range of cross-linguistic variation, while maintaining, with varying degrees of transparency, the universal order of projection of syntactic heads.

Another welcome consequence of a relational approach to syntax is that the range of morphosyntactic phenomena found in natural language, such as Case (both inherent and structural), agreement, and applicative morphology, can be explained as simple reflexes in PHON of the restricted range of possible relations between heads and dependents permitted by the theory, without having to introduce a new primitive relation analogous to the Agree operation assumed in current minimalist theories. This makes it possible, I argue, to eliminate the minimalist assumption that derivations are driven by the need to value and delete uninterpretable morphological features, replacing it with the more natural assumption that Case and agreement features are simply a means of making syntactic relations visible at PHON. Ultimately, then, what drives