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Introduction

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1.1 Introduction

This volume constitutes the first in a series of books on work in constraint-based lexicalist theories of grammar published by CSLI Publications. The books in this series are intended to make available in easily obtainable and affordable form a broad range of linguistic, foundational, and computational work in constraint-based lexicalist (CBL) frameworks such as Head-Driven Phrase Structure Grammar (HPSG), Lexical-Functional Grammar (LFG), and related frameworks such as Construction Grammar. The papers in the present volume represent the revised versions of talks presented at conferences and workshops on HPSG (which were held annually between 1994 and 1997 in Copenhagen (Denmark), Tübingen (Germany), Marseilles (France), and Ithaca (United States)).

We would like to thank the many reviewers who participated in the reviewing processes for the initial presentation and the final selection for this volume. The resulting line-up of papers documents the unusual breadth of coverage and insight into linguistic structure that the framework of HPSG makes possible. Special thanks go to Dan Flickinger, Emily Bender, Tony Gee, Rob Malouf, and Susanne Riehemann for their most generous help with the preparation of the final manuscript.

We would also like to thank the authors of the papers for their enthusiasm and for the care they took in accommodating reviewers' criticisms and suggestions. As editors, we feel that the present volume faithfully represents the diverse research interests of linguists, logicians,

We would like to thank Ivan Sag for helpful comments on an earlier draft. The opinions expressed here are entirely those of the authors.

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and computer scientists working on HPSG (and the related framework of Construction Grammar), as well as the common core of ideas and methodological concerns that bind them together into a unified and mutually supportive research community.

1.2 HPSG as a Theory of Grammar

HPSG was created in a research collaboration between Carl Pollard and Ivan Sag that began in the 1980s and continues to this day (cf., in particular, Pollard and Sag 1987, Pollard and Sag 1994). The theory evolved directly from Generalized Phrase Structure Grammar (GPSG) as developed in the late 1970s and early to mid 1980s. Together with LFG, which emerged around the same time, GPSG provided one of the most well-known demonstrations that interesting grammatical phenomena can be adequately described in a *monostratal* framework, i.e., one that dispenses entirely with multiple levels (or stages) of syntactic representations and the transformations that mediate among them. But as much as HPSG is indebted to its predecessor for a great deal of the conceptual and formal foundations of the current theory, it is a mistake—a common one, it turns out—to think of HPSG as simply a variation on GPSG. For one thing there are strong influences from Categorial Grammar, LFG, and Government-Binding Theory that have reshaped the way that HPSG addresses many analytical issues. In addition, one of the chief features setting it apart from GPSG is the highly developed theory of lexical information, both in the form of lexical rules and multidimensional inheritance hierarchies. The latter is an especially powerful tool for expressing linguistically significant lexical generalizations as well as paradigmatic relationships among lexical items. Recent proposals to extend inheritance hierarchies to syntactic description (e.g., Sag 1997, Kathol 1995) have, moreover, opened a very fruitful exchange with Construction Grammar (Fillmore and Kay Forthcoming).

HPSG continues to attract scientists from diverse academic disciplines, reflecting the HPSG community's belief that language must be studied from several different perspectives simultaneously in order for a full theory of linguistic structures and their usage to emerge. One crucial decision that Pollard and Sag made early on and which continues to inform all present work, is that HPSG should be a scientific theory of observable language. That is, the object of study cannot be arbitrarily restricted (by removal of recalcitrant data) as is the case with Chomsky's Principles and Parameters (P&P) approach to syntax, which restricts its attention to structurally regularized and exceptionless objects dubbed 'core languages':

> The systems called "languages" in common sense usage tolerate exceptions: irregular morphology, idioms, and so forth. These exceptions do not fall naturally under the principles-and-parameters conception of UG. (Chomsky 1986, 147)

> ... it is hardly to be expected that what are called "languages" or "dialects" or even "ideolects" will conform precisely or perhaps even very closely to the systems determined by fixing the parameters of UG ... (Chomsky 1981, 7)

HPSG's methodology insists upon accepting linguistic analyses as explanatory only when they can be shown to be compatible with a broad and representative database of facts from a given language. This is sometimes misunderstood as a lack of interest in linguistic explanation and a mere focus of the theory on description. But HPSG is as much interested in finding explanations for linguistic facts and the human language faculty as other grammatical frameworks. What sets HPSG (and other CBL frameworks with similar methodologies) apart from P&P is that its methodological underpinnings require a considerably more careful and complete demonstration of analytical success before one is entitled to the claim of having provided an explanatory analysis. This cultural difference between the work in HPSG and the dominant P&P framework can be documented in several ways.

First, as already mentioned, the HPSG community is very unforgiving about analyses with obvious counterexamples. References to the "non-core status" of counterexamples or suggestions that as yet undetected explanatory principles will someday account for obvious counterexamples do not suffice to overcome this community's belief that explanation entails broad description.

A second explanatory hurdle concerns the level of analytic precision. This ever-present concern can be seen in many of the contributions to this book, which are at pains to prove that the analytical tools they employ are mathematically and logically sound and computationally efficient. We conjecture that it is precisely this feature of the HPSG culture that attracts not only linguists but also a considerable number of logicians, mathematicians, and computer scientists to the framework. This arguably makes this linguistic research community very diverse in terms of the scientific and academic qualifications of its members. The formal expertise available in the community, as well as the demand for formal demonstrations of internal consistency and the empirical success of new linguistic proposals has spawned the creation of a considerable number of so-called *grammar development environments*, i.e., computer programs that allow the linguist to develop and test HPSG grammars (without any particular programming expertise). Each of these dozen or so environments allows the researcher to demonstrate the standards of precision and formality expected by the community. Many authors make the implementations of their theories available for public inspection on the Internet or through other demonstrations.

A third methodological restriction that enters into the concept of explanation in HPSG is the prohibition against the use of empirically and theoretically undermotivated analytical tools that P&P analyses systematically depend on for "explanation". Among others, HPSG does not permit its analyses to refer to:

- phonologically and morphologically abstract (i.e., non-observable) case distinctions (so-called "Cases");
- phonologically abstract affixes;
- phonologically inert functional heads;
- structure-destroying movement operations, especially "covert" movements (to "Logical Form") whose existence is not empirically observable.

For instance, Ackerman and Webelhuth (1998) list 21 different functional heads that have been proposed in various places in the P&P literature and which would be postulated to exist for every language—often in unobservable form—according to those versions of the P&P theory that attempt to reduce all natural languages to identical sentence structures.

It may first appear that the proliferation of functional heads in P&P is analogous to the rich inventory of features in HPSG; however this would constitute a serious misunderstanding of the role that features play within CBL theories.

While feature-based analyses are often viewed as inelegant or non-explanatory, the putative descriptive economy of many P&P analyses is obtained only because of the extraordinary fact that no actual theory of features has ever been articulated for that framework. Similarly, even though features are alluded to in much of the P&P work (cf., for instance, Chomsky's recent notion of movement as movement of features), the principles of their distribution within and across syntactic categories have never been developed in sufficient detail to evaluate their empirical consequences, and certainly not with the high degree of precision that is standard in HPSG. This is particularly apparent in the case of head and agreement features and there is no reason to believe that the use of functional categories would make a fully developed theory of P&P features more economical than its HPSG counterpart.

Furthermore, features in CBL theories are classificatory devices grounded in manifest distinctions in the languages under consideration.

This differs quite starkly from functional categories which, while occurring within a hypertrophy of tree-configurational relations, serve as curiously lexical reifications of certain constructional distinctions that are pervasive in natural language.

Another, particularly extreme example of explanation by assuming the unobservable is found in Baker's (1996) book on polysynthetic languages and brought out in the review of that work by Koenig and Michelson (1998, 135):

> Not only are all (nonincorporated) NP arguments in fact zero *pro's* in Mohawk, but there are also zero incorporated roots. Finally, in cases of three-place predicates such as *-u-* 'give', the goal argument is realized as a PP complement whose head is a null preposition and whose complement is a null *pro*!

Within HPSG's methodology, analyses would not count as explanatory, if in order to make the theory's principles applicable to observable data, the linguist must first postulate a multitude of affixes, words, and phrases that are neither audible nor visible, and for which there is no theory-independent motivation from the data under analysis.

In sum, there is less talk about explanation in works on HPSG, simply because explanation is a more substantive notion that is harder to achieve: Satisfying the explanatory prerequisites of the community simultaneously is very difficult, which means that progress typically is slow and cumulative rather than seemingly instantaneous.

On the other hand, progress gained by toil is not easily foiled. The stringent quality control imposed on HPSG analyses ensures that explanatory generalizations can almost always be ported to subsequent evolutions of the theory. In this way, the carefully maintained balance between explanation and description protects the theory from the regular cataclysmic changes that rock a theory like P&P. To illustrate, there was great hope in the 1980s—expressed in works such as Chomsky 1981 and in many syntax textbooks since—that the basic structure of natural language was understood well enough that the derivation of the syntactic forms of individual languages was merely a matter of systematically describing the set of parameters and their options.

Contrast this with the following recent evaluation of the conceptual underpinnings and the empirical success of the Minimalist Program of Chomsky 1995, the current version of the P&P theory:

> The overall character of the minimalist program is highly speculative, as Chomsky notes throughout MP. In a recent paper (Chomsky 1996) he is virtually categorical on this point 'There are minimalist questions, but no specific minimalist answers' ... Whatever answers

> can be discovered will result from following the research agenda of the program. Unfortunately, how this is to be done is rather unclear ...
> (Freidin 1997, 580)

A parallel reduction in empirical coverage of the current P&P theory is mentioned in Chomsky 1995, 242 "... many open questions remain, including some that are quite central to language." Chomsky's sentence ends in a footnote that reads "we still have no good phrase structure theory of such simple matters as attributive adjectives, relative clauses, and adjuncts of many different types."

HPSG sails a smoother course. At the present time the theory neither claims to have all the right answers nor even to know all the right questions to ask about the structure of natural language and the human language capacity. On the other hand, by proposing concrete, carefully worked out, and well motivated analyses based on a thorough inspection of a wide variety of empirically observable data, the theory has offered *many* answers to *many* questions that *any* linguistic theory will eventually have to answer. The papers that we have collected in the present book continue this tradition of making systematic progress through solid and reliable research.

1.3 An Overview of the Papers in this Volume

We now turn to a brief summary of each article. The diversity of the topics covered will give the reader some idea of the wide array of phenomena HPSG and Construction Grammar typically address.

1.3.1 Argument Structure

Several papers deal with argument structure, in particular, the relationship between the valence lists and the argument structure list (ARG-ST) introduced in recent HPSG (see, for instance, Dini and Balari 1997).

Michael Dukes shows how the ARG-ST list can be used to model phenomena that were assumed to argue for multistratality. Concentrating on Chamorro objects, Dukes demonstrates that the presence of an ARG-ST list on lexical entries allows us to account monostratally for instances where the order of combination of subcategorized for elements is dissociated from their relative obliqueness. The former is encoded in the various valence lists, while the latter is represented by the ordering of elements on the ARG-ST list.

Chris Manning and Ivan Sag make a similar point and argue on the basis of Russian and Austronesian languages that both valence and ARG-ST lists are needed. In particular, they show that the Austronesian 'voices' affect the valence lists, but not necessarily the ARG-ST