

Head-Driven Phrase Structure Grammar

The handbook

Edited by

Stefan Müller

Anne Abeillé

Robert D. Borsley

Jean-Pierre Koenig

Empirically Oriented Theoretical
Morphology and Syntax

Empirically Oriented Theoretical Morphology and Syntax

Chief Editor: Stefan Müller

Consulting Editors: Berthold Crysmann, Laura Kallmeyer

In this series:

1. Lichte, Timm. Syntax und Valenz: Zur Modellierung kohärenter und elliptischer Strukturen mit Baumadjunktionsgrammatiken
2. Bîlbîie, Gabriela. Grammaire des constructions elliptiques: Une étude comparative des phrases sans verbe en roumain et en français
3. Bowerman, Claire, Laurence Horn & Raffaella Zanuttini (eds.). On looking into words (and beyond): Structures, Relations, Analyses
4. Bonami, Olivier, Gilles Boyé, Georgette Dal, Hélène Giraudo & Fiammetta Namer. The lexeme in descriptive and theoretical morphology.
5. Guzmán Naranjo, Matías. Analogical classification in formal grammar.

ISSN: 2366-3529

Head-Driven Phrase Structure Grammar

The handbook

Edited by

Stefan Müller

Anne Abeillé

Robert D. Borsley

Jean-Pierre Koenig

Müller, Stefan, Anne Abeillé, Robert D. Borsley & Jean-Pierre Koenig (eds.).
2021. *Head-Driven Phrase Structure Grammar: The handbook* (Empirically
Oriented Theoretical Morphology and Syntax). Berlin: Language Science Press.

This title can be downloaded at:

<http://langsci-press.org/catalog/book/000>

© 2021, the authors

Published under the Creative Commons Attribution 4.0 Licence (CC BY 4.0):

<http://creativecommons.org/licenses/by/4.0/> 

ISBN: 978-3-96110-255-6 (Digital)

no print ISBNs!

ISSN: 2366-3529

no DOI

ID not assigned!

Cover and concept of design: Ulrike Harbort

Typesetting: Stefan Müller, Elizabeth Pankratz

Proofreading: Elizabeth Pankratz

Fonts: Libertinus, Arimo, DejaVu Sans Mono

Typesetting software: Xe_{La}TeX

Language Science Press

Xhain

Grünberger Str. 16

10243 Berlin, Germany

langsci-press.org

Storage and cataloguing done by FU Berlin

Contents

Preface

Head-driven Phrase Structure Grammar (HPSG) is a declarative (or, as is often said, constraint-based) monostratal approach to grammar which dates back to early 1985, when Carl Pollard presented his Lectures on HPSG. It was developed initially in joint work by Pollard and Ivan Sag, but many other people have made important contributions to its development over the decades. It provides a framework for the formulation and implementation of natural language grammars which are (i) linguistically motivated, (ii) formally explicit, and (iii) computationally tractable. From the very beginning it has involved both theoretical and computational work seeking both to address the theoretical concerns of linguists and the practical issues involved in building a useful natural language processing system.

HPSG is an eclectic framework which has drawn ideas from the earlier Generalized Phrase Structure Grammar (GPSG, [Gazdar et al. 1985](#)), Categorical Grammar ([Ajdukiewicz 1935](#)), and Lexical-Functional Grammar (LFG, [Bresnan 1982](#)), among others. It has naturally evolved over the decades. Thus, the construction-based version of HPSG, which emerged in the mid-1990s ([Sag 1997](#); [Ginzburg & Sag 2000](#)), differs from earlier work ([Pollard & Sag 1987](#); [1994](#)) in employing complex hierarchies of phrase types or constructions. Similarly, the more recent Sign-Based Construction Grammar approach differs from earlier versions of HPSG in making a distinction between signs and constructions and using it to make a number of simplifications ([Sag 2012](#)).

Over the years, there have been groups of HPSG researchers in many locations engaged in both descriptive and theoretical work and often in building HPSG-based computational systems. There have also been various research and teaching networks, and an annual conference since 1993. The result of this work is a rich and varied body of research focusing on a variety of languages and offering a variety of insights. The present volume seeks to provide a picture of where HPSG is today. It begins with a number of introductory chapters dealing with various general issues. These are followed by chapters outlining HPSG ideas about some of the most important syntactic phenomena. Next are a series of chapters on other levels of description, and then chapters on other areas of

linguistics. A final group of chapters considers the relation between HPSG and other theoretical frameworks.

It should be noted that for various reasons not all areas of HPSG research are covered in the handbook (e.g., phonology). So, the fact that a particular topic is not addressed in the handbook should not be interpreted as an absence of research on the topic. Readers interested in such topics can refer to the HPSG online bibliography maintained at the Humboldt Universität zu Berlin.¹

All chapters were reviewed by one author and at least one of the editors. All chapters were reviewed by Stefan Müller. Jean-Pierre Koenig and Stefan Müller did a final round of reading all papers and checked for consistency and cross-linking between the chapters.

Open access

Many authors of this handbook have previously been involved in several other handbook projects (some that cover various aspects of HPSG), and by now there are at least five handbook articles on HPSG available. But the editors felt that writing one authoritative resource describing the framework and being available free of charge to everybody was an important service to the linguistic community. We hence decided to publish the book open access with Language Science Press.

Acknowledgements

We thank all the authors for their great contributions to the book, and for reviewing chapters and chapter outlines of the other authors. We thank Frank Richter, Bob Levine, and Roland Schäfer for discussion of points related to the handbook, and Elizabeth Pankratz for extremely careful proofreading and help with typesetting issues. We also thank Elisabeth Eberle and Luisa Kalvelage for doing bibliographies and typesetting trees of several chapters and for converting a complicated chapter from Word into \LaTeX .

We thank Sebastian Nordhoff and Felix Kopecky for constant support regarding \LaTeX issues, both for the book project overall and for individual authors. Felix implemented a new \LaTeX class for typesetting AVMs, `langsci-avm`, which was used for typesetting this book. It is compatible with more modern font management systems and with the `forest` package, which is used for most of the trees in this book.

¹<https://hpsg.hu-berlin.de/HPSG-Bib/>, 2020-03-18.

We thank Sašo Živanović for writing and maintaining the forest package and for help specifying particular styles with very advanced features. His package turned typesetting trees from a nightmare into pure fun! To make the handling of this large book possible, Stefan Müller asked Sašo for help with externalization of forest trees, which led to the development of the memoize package. The HPSG handbook and other book projects by Stefan were an ideal testing ground for externalization of `tikz` pictures. Stefan wants to thank Sašo for the intense collaboration that led to a package of great value for everybody living in the woods.

The code of the book is available on GitHub, and we hope that it may serve as a role model for future publications of HPSG papers.

References

- Ajdukiewicz, Kazimierz. 1935. Die syntaktische Konnexität. *Studia Philosophica* 1. 1–27.
- Bresnan, Joan (ed.). 1982. *The mental representation of grammatical relations* (MIT Press Series on Cognitive Theory and Mental Representation). Cambridge, MA: MIT Press.
- Gazdar, Gerald, Ewan Klein, Geoffrey K. Pullum & Ivan A. Sag. 1985. *Generalized Phrase Structure Grammar*. Cambridge, MA: Harvard University Press.
- Ginzburg, Jonathan & Ivan A. Sag. 2000. *Interrogative investigations: The form, meaning, and use of English interrogatives* (CSLI Lecture Notes 123). Stanford, CA: CSLI Publications.
- Pollard, Carl & Ivan A. Sag. 1987. *Information-based syntax and semantics* (CSLI Lecture Notes 13). Stanford, CA: CSLI Publications.
- Pollard, Carl & Ivan A. Sag. 1994. *Head-Driven Phrase Structure Grammar* (Studies in Contemporary Linguistics). Chicago: The University of Chicago Press.
- Sag, Ivan A. 1997. English relative clause constructions. *Journal of Linguistics* 33(2). 431–484. DOI: [10.1017/S002222679700652X](https://doi.org/10.1017/S002222679700652X).
- Sag, Ivan A. 2012. Sign-Based Construction Grammar: An informal synopsis. In Hans C. Boas & Ivan A. Sag (eds.), *Sign-Based Construction Grammar* (CSLI Lecture Notes 193), 69–202. Stanford, CA: CSLI Publications.

Part I

Introduction

Chapter 1

Basic properties and elements

Anne Abeillé

Université Paris Diderot

Robert D. Borsley

University of Essex

Head-Driven Phrase Structure Grammar (HPSG) is a declarative and monostratal version of generative grammar, in which linguistic expressions have a single relatively simple constituent structure. It seeks to develop detailed formal analyses using a system of types, features, and constraints. Constraints on types of *lexical-sign* are central to the lexicon of a language and constraints on types of *phrase* are at the heart of the syntax, and both lexical and phrasal types include semantic and phonological information. Different versions of the framework have been developed, including versions in which constituent order is a reflection not of constituent structure but of a separate system of order domains, and the Sign-Based Construction Grammar version, which makes a fundamental distinction between signs of various kinds and the constructions which license them.

1 Introduction

Head-Driven Phrase Structure Grammar (HPSG) dates back to early 1985 when Carl Pollard presented his *Lectures on HPSG*. It was often seen in the early days as a revised version of the earlier Generalized Phrase Structure Grammar (GPSG) framework (Gazdar, Klein, Pullum & Sag 1985), but it was also influenced by Categorical Grammar (Ajdukiewicz 1935; Steedman 2000), and, as Pollard & Sag (1987: 1) emphasized, by other frameworks like Lexical-Functional Grammar (LFG; Bresnan 1982), as well. Naturally it has changed in various ways over the decades. This is discussed in much more detail in the next chapter (Flickinger, Pollard & Wasow 2021, Chapter 2 of this volume), but it makes sense here to distinguish

three versions of HPSG. Firstly, there is what might be called early HPSG, the framework presented in Pollard & Sag (1987) and Pollard & Sag (1994).¹ This has most of the properties of more recent versions but only exploits the analytic potential of type hierarchies to a limited degree (Flickinger 1987; Flickinger, Pollard & Wasow 1985). Next there is what is sometimes called Constructional HPSG, the framework adopted in Sag (1997), Ginzburg & Sag (2000), and much other work. Unlike earlier work this uses a rich hierarchy of phrase-types. This is why it is called constructional.² Finally, in the 2000s, Sag developed a version of HPSG called *Sign-Based Construction Grammar* (SBCG; Sag 2012). The fact that this approach has a new name suggests that it is very different from earlier work, but probably most researchers in HPSG would see it as a version of HPSG, and it was identified as such in Sag (2010: 486). Its central feature is the special status it assigns to constructions. In earlier work, they are just types of sign, but for SBCG, signs and constructions are quite different objects. In spite of this difference, most analyses in Constructional HPSG could probably be translated into SBCG and vice versa. In this chapter we will concentrate on the ideas of Constructional HPSG, which is probably the version of the framework that has been most widely assumed. We will comment briefly on SBCG in the final section.

The chapter is organized as follows. In Section 2, we set out the properties that characterize the approach and the assumptions it makes about the nature of linguistic analyses and the conduct of linguistic research. Then, in Section 3, we consider the main elements of HPSG analyses: types, features, and constraints. In Section 4, we look more closely at the HPSG approach to the lexicon, and in Section 5, we outline the basics of the HPSG approach to syntax. In Section 6, we look at some further syntactic structures, and in Section 7, we consider some further topics, including SBCG. Finally, in Section 8, we summarize the chapter.

2 Properties

Perhaps the first thing to say about HPSG is that it is a form of Generative Grammar in the sense of Chomsky (1965: 4). This means that it seeks to develop precise and explicit analyses of grammatical phenomena. But unlike many versions

¹As discussed in Richter (2021), Chapter 3 of this volume, the approaches that are developed in these two books have rather different formal foundations. However, they propose broadly similar syntactic analyses, and for this reason it seems reasonable to group them together as early HPSG.

²As discussed below, HPSG has always assumed a rich hierarchy of lexical types. One might argue, therefore, that it has always been constructional.