

Meier, Jane. 2017. *Language universals and linguistic typology*. Oxford: Basil Blackwell.

Chapter 2

The evolution of HPSG

Dan Flickinger

Stanford University

Carl Pollard

Ohio State University

Tom Wasow

Stanford University

HPSG was developed to express insights from theoretical linguistics in a precise formalism that was computationally tractable. It drew ideas from a wide variety of traditions in linguistics, logic, and computer science. Its chief architects were Carl Pollard and Ivan Sag, and its most direct precursors were Generalized Phrase Structure Grammar and Head Grammar. The theory has been applied in the construction of computational systems for the analysis of a variety of languages; a few of these systems have been used in practical applications. This chapter sketches the history of the development and application of the theory.

1 Introduction

From its inception in 1983, HPSG was intended to serve as a framework for the formulation and implementation of natural language grammars which are (i) linguistically motivated, (ii) formally explicit, and (iii) computationally tractable. These desiderata are reflective of HPSG's dual origins as an academic linguistic theory and as part of an industrial grammar implementation project with an eye toward potential practical applications. Here (i) means that the grammars are intended as scientific theories about the languages in question, and that the analyses the grammars give rise to are transparently relatable to the predictions

(empirical consequences) of those theories. Thus HPSG shares the general concerns of the theoretical linguistics literature, including distinguishing between well-formed and ill-formed expressions and capturing linguistically significant generalizations. (ii) means that the notation for the grammars and its interpretation have a precise grounding in logic, mathematics, and theoretical computer science, so that there is never any ambiguity about the intended meaning of a rule or principle of grammar, and so that grammars have determinate empirical consequences. (iii) means that the grammars can be translated into computer programs that can handle linguistic expressions embodying the full range of complex interacting phenomena that naturally occur in the target languages, and can do so with a tolerable cost in space and time resources.

The two principal architects of HPSG were Carl Pollard and Ivan Sag, but a great many other people made important contributions to its development. Many, but by no means all, are cited in the chronology presented in the following sections. There are today a number of groups of HPSG researchers around the world, in many cases involved in building HPSG-based computational systems. While the number of practitioners is relatively small, it is a very active community that holds annual meetings and publishes quite extensively. Hence, although Pollard no longer works on HPSG and Sag died in 2013, the theory is very much alive, and still evolving.

2 Precursors

HPSG arose between 1983 and 1985 from the complex interaction between two lines of research in theoretical linguistics: (i) work on context-free Generative Grammar (CFG) initiated in the late 1970s by Gerald Gazdar and Geoffrey Pullum, soon joined by Ivan Sag, Ewan Klein, Tom Wasow, and others, resulting in the framework referred to as Generalized Phrase Structure Grammar (GPSG: [Gazdar, Klein, Pullum & Sag 1985](#)); and (ii) Carl Pollard's Stanford dissertation research, under Sag and Wasow's supervision, on Generalized Context-Free Grammar, and more specifically Head Grammar (HG: [Pollard 1984](#)).

2.1 Generalized Phrase Structure Grammar

In the earliest versions of Generative Grammar ([Chomsky 1957](#)), the focus was on motivating transformations to express generalizations about classes of sentences. In the 1960s, as generative linguists began to attend more explicitly to meaning, a division arose between those advocating using the machinery of transforma-