1 Introduction

1.1 Preliminary Remarks

There has been a long tradition in linguistics and related disciplines to separate the study of the linguistic system (i.e., langue, competence) from the study of language use (i.e., parole, performance). In formal linguistic theory, grammar is a self-contained, deductive system consisting of discrete categories and algorithmic rules that are usually analyzed without any consideration of how language is used and processed (e.g., Chomsky 1965, 1986).

This view of grammar has been challenged, however, by usage-based linguists and psychologists who have argued that linguistic knowledge, including knowledge of grammar, emerges from language use (e.g., Tomasello 2003; Goldberg 2006; Bybee 2006). In the usage-based approach, grammar is seen as a dynamic system consisting of fluid structures and flexible constraints that are shaped by general mechanisms of communication, memory and processing. Specifically, these researchers claim that grammar constitutes a network that is constantly restructured and reorganized under the influence of domain-general processes of language use (see Diessel 2017 for a review).

In order to understand the dynamics of the grammar network, usage-based researchers study the development of linguistic structure, both in history and language acquisition. One factor that has a great impact on language development is frequency of occurrence. As frequency strengthens the representation of linguistic elements in memory, it facilitates the activation and processing of words, categories and constructions, which in turn can have long-lasting effects on the development of linguistic structure. There is a large body of research indicating that frequency is an important determinant of language use, language acquisition and language change and that the cognitive organization of grammar is crucially influenced by language users' experience with particular lexemes and constructions (e.g., Bybee and Hopper 2001; Ellis 2002; Diessel and Hilpert 2016).

This book provides a comprehensive overview and discussion of usage-based research on grammar and grammatical development. The usage-based approach draws on research in functional and cognitive linguistics (e.g., Croft

2001; Hay 2003; Stefanowitsch and Gries 2003; Bybee 2010; Traugott and Trousdale 2013; Perek and Goldberg 2015) and related research in cognitive psychology and cognitive science (e.g., Elman et al. 1996; Seidenberg and MacDonald 1999; Christiansen and Chater 2008; Fedzechkina et al. 2013; Steels 2015; Ellis et al. 2016). These fields of research complement each other, but as it stands they are only loosely connected. It is the purpose of this book to integrate the various strands of research into a more unified framework and to elaborate some central principles of the usage-based approach. In particular, the book sets out to elaborate the network view of grammar.

It is a basic assumption of the usage-based approach that linguistic knowledge is organized in an associative network (e.g., Beckner et al. 2009), but although the network view of language is frequently invoked in the usage-based literature, it has not yet been developed into an explicit theory or model. To be sure, there are network accounts of morphology and lexical semantics, but syntactic phenomena are only rarely analyzed in the framework of a network model (see Diessel 2015 for discussion).

In this book, we will consider a structured network model of grammar in which all aspects of linguistic structure, including core concepts of syntax (e.g., noun, case, subject), are analyzed in terms of associative connections between lexemes, categories and constructions. The model is inspired by computational research with neural networks (e.g., Rumelhart and McClelland 1986a; Elman et al. 1996) and is intended to provide a unified framework for the analysis of language use and linguistic structure (e.g., Bates and MacWhinney 1989; Bybee 2006). Before we consider the details of the model, let us briefly consider three basic principles of the usage-based approach as a background for the subsequent discussion (see Diessel 2011a).

1.2 Three General Principles of Usage-Based Linguistics

The usage-based approach challenges basic principles of linguistic research that have long been taken for granted. In particular, it challenges the conception of three general divisions that have provided the foundation of syntactic theory since the advance of generative linguistics in the 1950s and 1960s, namely, (i) the division between linguistic knowledge and language use, or competence and performance, (ii) the dichotomy of synchronic states and diachronic development and (iii) the distinction between words and rules.

1.2.1 Linguistic Knowledge and Language Use

All (contemporary) linguists conceive of language, notably grammar, as a cognitive system that involves linguistic knowledge, but generative and

usage-based researchers make very different assumptions about the nature and origin of linguistic knowledge and its relationship to language use (Newmeyer 2003; Bybee 2006).

In the classic version of the generative approach, knowledge of grammar is grounded in a particular faculty of the mind including categories and rules, or constraints, that are part of our genetic endowment and that can generate an infinite number of sentences (Chomsky 1986; Pinker and Jackendoff 2005). Language use, or performance, involves grammatical knowledge, commonly referred to as competence, but is also influenced by general psychological processes such as sensory perception and attention that do not immediately concern the representation of grammatical knowledge. Building on this view, generative linguists separate the study of grammar, or competence, from the study of language use, as the latter involves "performance phenomena," caused by general psychological processes, that are not part of the language faculty (and therefore commonly excluded from syntactic theory).

Usage-based researchers reject the innateness hypothesis of generative linguistics and with it the related distinction between competence and performance. In the usage-based approach, language is seen as a "complex adaptive system" that has evolved for the purpose of communication and processing (e.g., Steels 2000; Beckner et al. 2009). Rather than claiming that grammatical concepts are grounded in a particular faculty of the mind, usage-based linguists argue that all aspects of linguistic knowledge, including the core concepts of grammar, emerge from general cognitive mechanisms that are not only involved in the use of language but also in other cognitive phenomena such as vision, memory and decision-making. In accordance with this view, these researchers seek to explain how linguistic structure is shaped by (nonlinguistic) factors of performance, or as Bybee (2010: 1) puts it, it is the general goal of usage-based linguistics "to derive linguistic structure from the application of domain-general processes."

1.2.2 Synchronic States and Language Development

In order to study the (long-term) effects of language use on linguistic knowledge, one has to consider the way in which linguistic structures evolve over time. Ever since Saussure ([1916] 1994), the field of linguistics has been divided into two major research areas: synchronic linguistics, which is concerned with the analysis of linguistic states at a particular point in time, and diachronic linguistics, which is concerned with the analysis of language change. Prior to Saussure, linguistic structure was generally analyzed in light of its development – synchrony and diachrony were studied together in a unified framework (Paul [1880] 1920). But since the advance of linguistic structuralism, the study of synchronic states and language change has been split

into separate fields of research with distinct goals and different methods. The division of labor has been reinforced by the innateness hypotheses of generative grammar. If grammar is grounded in a particular faculty of the mind, language change concerns only the periphery of grammar and the innate core can be studied from a purely synchronic perspective.

Usage-based linguists have questioned the usefulness of the structuralist division between synchronic and diachronic linguistics. If we conceive of grammar as an emergent system, all aspects of linguistic structure, including the core concepts of syntax, are subject to change, and in order to understand the nature of this system, one has to study language development, both in history and acquisition. This explains why usage-based linguists have emphasized the importance of grammaticalization for syntactic theory (Boye and Harder 2012) and why some usage-based scholars have turned to the study of language acquisition (Goldberg 2006). In the structuralist paradigm, grammatical research is primarily concerned with the analysis of linguistic states, but in the usage-based model, the focus of analysis is on the dynamics of the linguistic system (Hopper 1987).

1.2.3 Words and Rules

Finally, usage-based linguists have challenged the traditional distinction between words and rules, which is perhaps the most fundamental dichotomy of (traditional) linguistic theory (Pinker 1999). Words are signs or symbols that combine a particular phonetic form with a particular concept or meaning, whereas rules are commonly defined as (cognitive) algorithms that serve to combine abstract categories into larger structures. Phrase structure rules, for instance, combine word class categories (and phrases) into syntactic constituents (PP → P NP).

On this view, linguistic rules are completely different entities from words or lexemes, which are stored and processed in different modules of the mind. In the classic version of generative grammar, language consists of two general components: the mental lexicon, which includes words and idiomatic expressions, and grammar, which includes syntactic categories and rules or constraints (Chomsky 1965, 1986).

The distinction between lexicon and grammar has been a cornerstone of linguistic theory, but this distinction has lost some of its importance over the past 25 years as an increasing number of theoreticians has argued that linguistic structure is licensed by constructions rather than by algorithmic rules (Fillmore et al. 1988; Goldberg 1995). A construction is a holistic pattern in which a particular configuration of structural elements is associated with a particular function or meaning. A noun phrase such as *John's car*, for instance, can be seen

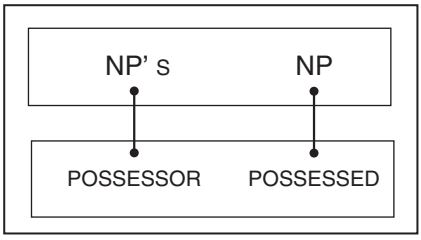

Figure 1.1 The English genitive construction

as a construction (with two slots for nominal expressions) that typically designates a particular semantic relationship of possessor and possessed (Figure 1.1).

The notion of construction is of central significance to the usage-based analysis of grammar. In fact, usage-based linguists have drawn so frequently on theoretical concepts of construction grammar that the two approaches are often presented as a unified framework (Tomasello 2003; Goldberg 2006). Note, however, that the notion of construction grammar subsumes a whole family of related theories that are not all usage-based (see Hoffmann and Trousdale 2013 for an overview). Indeed, one of the earliest and most influential construction-based theories, that is, the sign-based theory of construction grammar developed by Fillmore and Kay (1999), explicitly maintained the generative conception of competence and performance and paid little attention to usage and development. However, other varieties of construction grammar take a dynamic perspective and have made important contributions to the usage-based approach (e.g., Croft 2001; Goldberg 2006; Steels 2013; Hilpert 2014).

1.3 Goal and Scope of the Book

To summarize the previous discussion, usage-based linguists conceive of language as a dynamic system of emergent structures and flexible constraints that are in principle always changing under the pressure of domain-general processes, that is, processes that do not only concern the use of language but also nonlinguistic cognitive phenomena such as visual perception, memory retrieval and automatization. The focus of analysis is on the development of linguistic structure rather than on particular linguistic states.

The emergentist view of linguistic structure has far-reaching consequences for the study of grammar. Traditionally, grammatical analysis presupposes a "toolkit" of primitive categories that are defined prior to the analysis of any particular structure (Jackendoff 2002: 75). The "toolkit approach" has dominated syntactic theory for many decades (see Croft 2001 for discussion); but if

we think of language as a dynamic system of emergent structures and fluid constraints, we cannot approach the study of grammar with a predefined set of primitive categories. On the contrary, what we need to explain is how linguistic categories evolve, stabilize and change. The underlying hypothesis is that all aspects of linguistic structure, including the most basic categories, such as noun, word and phrase, are emergent and fluid.

That does not mean, however, that linguistic structure is completely unconstrained in the usage-based model of grammar. Like any other grammatical theory, the usage-based theory of grammar rests on particular assumptions about the nature of linguistic structure and the overall organization of the linguistic system. As I see it, there are two general aspects of cognition that constrain grammar in the usage-based approach: (i) the domain-general processes that shape linguistic structure in the process of language use, and (ii) the network architecture of the grammatical system. It is the general goal of this book to elaborate on these two aspects of the usage-based model and to combine them into a coherent account.

The two following chapters introduce the basic assumptions of the current approach. We begin with the architecture of the grammar network (Chapter 2) and then turn to domain-general processes of language use (Chapter 3). In the remainder of the book, we will consider the various aspects of the model in more detail. Each chapter is concerned with particular cognitive processes and a specific aspect of the network model.