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Book Review

Nick C. Ellis, Ute Römer and Matthew Brook O'Donnell: *Usage-based approaches to language acquisition and processing: Cognitive and corpus investigations of Construction Grammar*. Malden, MA: Wiley, 2016, ISBN 978 1 1192 9652 2, pp 358.

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Usage-based approaches to language acquisition and processing: Cognitive and corpus investigations of construction grammar is an ambitious book which presents a collection of studies, combining different methods such as psycholinguistic experiments and corpus analyses, to show that a usage-based Construction Grammar approach is very suitable for explaining language acquisition and processing. The book concentrates on such questions as: 1) To what degree are the abstract patterns of language learnable from noisy, variable input? 2) Does the same model account for the structure of language and for acquisition, including the similarities and differences between learning a first language and learning a second (or third and beyond)? The authors' answer is that careful study of language usage and processing shows that the shape of language, as viewed through the lens of Verb Argument Constructions (VACs), is thickly populated with the key attributes which the psychology of learning has shown encourages association and category learning. They conducted a series of studies, which are described in sequence, examining language processing in native speakers as well as first and second language acquisition. All of these complement each other, together leading to a more comprehensive view of language in general. In what follows, we will give a brief overview of the ten chapters of the book. This summary will be complemented by an overall evaluation of the volume.

Chapter 1 presents some basic insights into usage-based approaches to language acquisition, elaborating on the theoretical background of usage-based Construction Grammar; for example, the claim that there is no sharp boundary between lexicon and syntax is explained. Constructions are defined as conventionalized form–meaning mappings, and an introduction is given to the sort of construction that is analyzed in detail in the following chapters: Verb-Argument Constructions (VACs). An example of this type of grammatical construction is the caused motion construction *Pat pushed the napkin off the table* (p. 32). This schematic construction has already been the object of

Construction Grammar investigations; however, the number and quality of studies conducted by Ellis, Römer and O'Donnell and presented in this volume are innovative. The introductory chapter provides some information about VACs, which is important for the following chapters, for example, that VACs do have a meaning and are not mere syntactic patterns.

Chapter 2 reports the psychological research on the learning of categories. The authors present different factors which influence the usage-based acquisition of constructions as form-meaning pairs. Frequency effects play a key role here. The authors cite an impressive number of studies proving that the frequency of linguistic units is crucial to language acquisition. They also demonstrate the limitations of frequency-based explanations; for example, contingency is also very important. The concept of contingency, which basically conveys the question "How reliable is the mapping of forms and functions?", is nicely explained by a non-linguistic example. When learning the category of birds, "eyes and wings are equally frequently experienced features [… but] it is wings which are the distinctive cues in differentiating birds from other animals" (p. 61). This example illustrates the authors' very successful way of explaining complex linguistic phenomena – and is, at the same time, an elegant way of referring to the usage-based claim that "linguistic constructions […] are learned much like nonlinguistic categories" (p. 69). All in all, Ellis, Römer and O'Donnell identify many factors which have an effect on category learning.

Chapter 3 deals with VACs in everyday language use. For this purpose, the authors have compiled a representative sample of VACs, basing their analysis on insights from the COBUILD project (Francis et al. 1996). They use a parsed version of the British National Corpus (BNC), which with about 100 million words is a huge database. Thus, this chapter deals with corpus linguistics. One of the volume's strengths is that the authors show in detail how they went about retrieving VACs in the corpus, including concrete examples of annotations and tags. Researchers interested in corpus linguistics will benefit greatly from the detailed and specific descriptions the volume gives. Once identified, the VACs are analyzed in terms of their frequency, the type-token frequency distribution, contingency, and semantic prototypicality. Hence, this chapter in a sense takes stock of VACs, their nature and their characteristics. One crucial result here is the fact that the VACs are "coherent in their semantics" (p. 96), meaning that VACs build semantic networks. The network idea is not only metaphorical; the authors also present some helpful graphs, which illustrate the network built by verbs in a certain VAC, such as the network for the 'V about n' construction (p. 93). These numerous graphs are a

very helpful way of visualizing the complex linguistic and statistical analysis conducted by the authors.

Chapter 4 turns to another method of linguistic analysis, namely experimental studies. As mentioned above, one of the book's strengths is its combination of corpus linguistics and experimental data. Having established the inventory of VACs in the previous chapter, the authors now address the question of what native speakers know about VACs. In order to answer this question, Ellis, Römer and O'Donnell present two experiments they conducted with native speakers of English. Both experiments use a free association task to see which verb the participants choose to complete the gap in a presented VAC stimulus. These studies show the effects of type-token frequency distribution, contingency, and semantic prototypicality of the VACs. This means that a native speaker's choice of verb in a stimulus like "he ___ about the …" (p. 103) is influenced by the verb's token frequency, the contingency of the verb to appear in that VAC, and the role that the verb's meaning plays in the semantic framework of the VAC, in this case the "V about n" VAC. Thus, this chapter provides evidence for the claim that VACs are a relevant category in the speaker's mind.

Chapter 5 employs the same methods as the previous chapter, but its object of investigation is second language acquisition. The authors use the same experimental setting for advanced learners of English (L2 learners). The selection of learners as participants in the series of experiments again reflects the careful and well-thought-out way in which the authors set up their study: the learners form a homogeneous group in terms of their advanced level of English, their background, etc. However, their mother tongue (L1) differs across three different languages: Czech, German, and Spanish. The experiments confirm the results presented in chapter 4. Just like native speakers, L2 learners of English are also sensible to the statistics of VACs in the input. Again, the type-token frequency distribution, the contingency, and the semantic prototypicality are shown to be significant for the selection of a verb in a given VAC. Secondly, there is also a new insight due to the difference in the learners' mother tongue. The authors are able to prove that the L1 affects the learners' performance, so there is a clear effect of transfer from L1 to L2. This finding is in line with previous results in studies of second language acquisition (cf. Bybee 2008; Ellis 2013). Taking both findings in this acquisition part of the volume, Ellis, Römer and O'Donnell provide clear evidence for two different, crucial factors influencing second language acquisition: "L2 constructions reflect usage of both L2 and L1" (p. 151).

Chapter 6 remains within the methodological section of psycholinguistic experiments, addressing the online processing of VACs. The authors now turn again to native speakers of English and present five different experiments conducted with university students. In these experiments, a wide range of methods is used, such as recognition tasks and lexical decision tasks. As shown in a very clear table that summarizes the results of all five experiments (p. 177), Ellis, Römer and O'Donnell were able to replicate the findings that they achieved with production tasks (results presented in chapter 4). Thus, they once again show the robust effects of the type-token frequency distribution, the contingency, and the semantic prototypicality of a verb in a VAC. The results here complement those obtained in chapter 4 and together form an extremely convincing picture of VAC knowledge in the speaker's mind.

Chapter 7 turns again to the method of corpus analysis, but the focus now lies on the acquisition of VACs in first language acquisition. Ellis, Römer and O'Donnell use the extensive CHILDES database (MacWhinney 2000) to address VACs in children's language production and in child-directed speech. They find that children's acquisition of VACs is influenced by the type-token frequency distribution, the contingency, and the semantic prototypicality of verbs and the corresponding VACs in the input. The Zipfian-like distribution of verbs in a certain VAC helps children to understand this VAC's central meaning, starting with the most frequent, semantically very general verb, and then slowly discovering more specific verbs. This process is not a new finding (cf. Clark 1978), but to date there has not been any empirical research that demonstrates the development in such great detail.

Chapter 8 is parallel to chapter 7, extending the corpus analysis to VACs in second language acquisition. In a sense, it also corresponds to chapter 5, where an experimental setting was used to shed light on second language acquisition processes. The corpus used here is part of the ESF project carried out in the 1980s (Dietrich *et al.* 1995) and consists of longitudinal production data from seven learners at different acquisition stages. In this corpus study, data from beginners and intermediate learners is used, whereas the psycholinguistic experiment described in chapter 5 was conducted with advanced learners. Again, the learners have different L1 backgrounds, with four learners with Italian as a mother tongue, and three with Punjabi.

Chapter 9 contributes further to the understanding of language from a usage-based perspective: computational analyses complete the wide range of methods that the volume combines. Two different computer simulations are presented, investigating the interactions of VAC properties in language learning, usage, and change. First, connectionist models seek to explain the

acquisition of VACs from usage. Ellis, Römer and O'Donnell find that VAC categories can only be learned by their syntactic behavior, but that VAC acquisition is more successful when semantic information is also available. Second, language change is analyzed via agent-based modeling of complex adaptive systems. One important result in this section is that language usage and change are best modeled by the principle of least effort, where "the speaker takes both [his/her own] and the listener's perspective into account, optimizing joint actions by minimizing both ambiguity and redundancy" (p. 277f).

Chapter 10 is a summary of the volume, which includes reflections on limitations of the results and an outlook toward consequent research questions. It makes great sense that, within this chapter, the results are arranged according to the linguistic domain that they refer to; thus, there are individual sections dedicated to VACs in usage, the processing of VACs, the acquisition of VACs (in both L1 and L2), the learning of VACs (including didactic implications), and, finally, VACs in computational models. Each section gives a very careful and balanced summary and evaluation of the studies conducted and the results obtained. The authors are not afraid to point out aspects which might be criticized in their analyses, such as their method for retrieving VACs from the BNC (cf. chapter 3). However, all the limitations that Ellis, Römer and O'Donnell name are minor aspects. They certainly do not influence the meaningfulness of the results achieved. This last chapter of the volume consolidates all the findings of the numerous studies. They complement one another perfectly and allow the authors to make their point convincingly: namely, that language usage, acquisition and change are best modeled by a usage-based Construction Grammar approach. And, on a more general level, that language must be seen as a complex adaptive system—with all the implications evoked, like, importantly, the need for more interdisciplinary research.

Taken as a whole, the work paints humans as complex, efficient, adaptable social beings who inhabit a particular world and particular bodies. Language is understood as a key aid in categorizing the world; VACs are a central part of that categorizing. Given that humans do not have powers of mental telepathy, language is a tool used "to organize, process, and convey information, from one person to another, from one embodied mind to another" (p. 23). Language is an integral part of being human which cannot be separated from general human cognition and social nature. Speech cannot be separated from the speaker.

The authors extend the acquisition analysis to L2 through examining longitudinal production data (beginners through intermediary in the ESF corpus) for the distributional information concerning the acquisition of verbs and other slots in VACs. The frequency distribution in both the input and the L2 production for each slot is near Zipfian, with the first learned elements prototypical of the VAC's semantics.

The notion that humans are sensitive to both the frequency of linguistic tokens and the contexts in which they occur points to the importance of recognizing that meanings are constructed in social interaction involving cooperative activity and shared cognition. The authors argue that a successful dialog requires the participants to use language to align their mental representations in order to make mental contact. One of the most interesting findings from the corpus analyses concerns VAC priming in dialogic interaction. An analysis of adult interactions shows conversation partners scaffold and co-construct meaning, as seen in the strong tendency for interlocutors to repeat chunks of each other's language, including VACs. The results of the corpus findings are underscored by evidence from a simulation focusing on interactive dialog and possible speaker discourse strategies (Zipf 1949).

In addition, the volume contains many tables and graphs of many different kinds: A semantic network of VAC meanings is, for example, illustrated by a colorful network of all the meanings, and correlations are visually represented by plots, etc. These graphs are carefully chosen and greatly help the reader to comprehend the analyses, especially the statistical ones. Ellis, Römer and O'Donnell make extensive use of a new feature that the publisher Wiley offers: They provide many supporting files online, which means that many more tables and graphs are available on Wiley's web page than in the book itself. This volume is the first one with this kind of bonus material, and one could hardly imagine a study better suited to start this novelty. Readers are highly recommended to consult these extra tables and graphs.

The authors ask the reader to understand the perspectives and types of experiments and analysis used by cognitive linguists, corpus linguists, psychologists, psycholinguists, cognitive scientists, learning theorists, child language acquisitionists, neuroscientists, computational scientists, complex systems theorists, and discourse analysts. They ask the reader to follow the thought processes of this broad array of researchers, understand the questions they ask, and weigh the import of their answers. At times the detailed reporting of the methodology and statistical modeling is dense.

Nevertheless, the presentation of the methodology and experimental materials make sophisticated methodology, such as connectionist modeling and simulations, accessible. This is a real boon for researchers not already versed in these multiple perspectives. The volume is a primer on how to build a research program, including recognition of limitations, and the value of cross-fertilization of many different but complementary empirical and theoretical approaches. It is a splendid synthesis of usage-based theory and empirical analyses, and it will be of inestimable value to all researchers working within this framework, which provides vital empirical evidence examining a CL/UB framework and forcefully demonstrates the importance of frequency, contingency, and prototype effects in the coming together of language structure and conceptual structure. We believe that the merits of methodological triangulation outweigh and compensate for the deficiencies of the book, which is highly recommended for its presentation of the cognitive-neuro and computational sciences and usage-based approaches to language.

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