BOOK REVIEWS

N. C. Ellis, U. Römer and M. B. O'Donnell. (2016). *Usage-based approaches to language acquisition and processing: Cognitive and corpus investigations of Construction Grammar*. Oxford: Wiley.

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Usage-based approaches have gained increasing attention and influence in the fields of first and second language acquisition and bilingualism. At present there are a number of books on usage-based approaches to either first (L1) or second (L2) language acquisition (e.g., Tomasello, 2006; Robinson & Ellis, 2008; Littlemore, 2009; Cadierno & Eskildsen, 2015) but the present volume is unique in providing a comprehensive account of usage-based analyses of constructions, and more specifically, Verb-Argument Constructions (VACs), in both L1 and L2 data, and in investigating this from a multi-method perspective that includes not only corpus analyses but also experimental and computational approaches.

The volume is clearly structured in 10 chapters. Chapter 1 (Constructions and usage-based approaches to language acquisition) provides the theoretical background for the rest of chapters in the book. In the first section of this chapter, the central tenets of usage-based approaches to language and language acquisition are presented and discussed. A central idea in this introductory section is that research on usage-based approaches brings together researchers working from different but complimentary theoretical and empirical approaches, such as cognitive linguistics, cognitive psychology, psycholinguistics, statistical learning theory, neuroscience, corpus linguistics, conversational analysis, computational science, natural language processing, sociolinguistics and dynamic systems theory. The remaining sections of this chapter focus on construction-based approaches to language and language acquisition. Following Goldberg (1995, 2006) and Bybee (2010), among others, constructions are defined as form-meaning pairings and are considered to pervade all lawyers of language, thus blurring the traditional distinction between lexicon and grammar. Special attention is paid to basic-level constructions and VACs. Other crucial aspects of usage-based approaches that are discussed in this chapter are the pervasive phenomenon of formulaicity in language use, the inseparability of lexis, grammar and semantics, the crucial process of exemplar-based abstraction from usage events, the characterization of construction processing as probabilistic and rational, and the important role of priming effects in language processing and in dialogic alignment. The final section of this chapter presents an excellent summary of the fundamental tenets of usage-based approaches that have been discussed in

the previous sections, and clearly states the goals of this volume. The chapter finishes with a useful summary of the contents that readers will find in the following chapters of the book.

Chapter 2 (Determinants of construction learning) provides a clear and comprehensive overview of the core determinants of construction learning informed by the literature on the associative learning of cue-outcome contingencies and on research into categorization. The factors that are discussed in this chapter play a crucial role in the acquisition studies that are presented in the remaining chapters of the book, and they are therefore indispensable for understanding the theoretical underpinnings of the empirical studies that follow. The core determinants of construction learning that are discussed include factors relating to the linguistic form such as frequency (including item frequency, type-token frequencies and Zipfian frequency distributions), chunking and salience; factors relating to the interpretation of form, such as prototypicality of meaning and redundancy; factors dealing with the contingency of form and meaning; factors affecting categorization that involve both exemplar and category learning; and finally, factors relating to learner attention, such as automaticity, transfer, overshadowing and blocking. Crucially, the authors emphasize that "(t)hese factors do not operate in isolation, but they interact dynamically in every episode of usage" (p. 68).

Chapter 3 (VACs in usage) examines the extent to which the factors discussed in the previous chapter are relevant for the usage of VACs. This is investigated via a thorough and detailed analysis of the *British National Corpus* (*BNC*), a 100 million word collection of representative English usage. In the chapter there is a very detailed description of the procedures that were employed to define, review and refine the search strings that allowed the authors to retrieve VACs from the *BNC*, including the methods used to create frequency-ranked type-token lists for each VAC, to identify contingencies between verbs and VACs, and to identify the core meanings of each VAC and construct their semantic networks. A total of 18 'V preposition n' VACs were retrieved from the BNC (presented in Table 3.1, p. 78). As clearly summarized by the authors in the summary conclusions (p. 96), the analyses showed that the selected constructions were (a) Zipfian in terms of their verb type-token distribution; that is, each VAC selected a particular verb that was much more frequent than the remaining verbs; (b) selective in their verb form occupancy; that is, when measuring the degree of contingency between each VAC and verb type, particular VACs were found to select particular verbs and, in turn, particular verbs selected particular VACs; and (c) coherent in their semantics, exhibiting network structures with prototypical nodes of high betweenness centrality.

Chapter 4 (VACs in L1 knowledge and processing) describes two experimental studies of native speakers' (NSs) knowledge of VACs. As stated in the introduction, the authors use the insights from the corpus-based study presented in Chapter 3

to "… determine whether and how frequency, contingency, and semantic coherence influence native speaker mental associations of verbs and VACs" (p. 99). The chapter provides a short but useful overview of these factors before presenting the two experiments. For each experiment the authors provide detailed information about the participants, the method, the types of analyses conducted on the data and the results. In the first experiment participants were presented with a series of phrases with missing verbs that represented 20 different VACs, and were asked to produce the first verb that came to mind. In the second experiment participants performed a verbal fluency task where they were presented with the same verbal stimuli as in experiment 1 but this time they were instructed to spend one minute writing all the verbs they might use for the phrase in question. The results of both studies showed that when NSs generate the verbs that they associate with the verb slot in each VAC, their responses were determined by the following factors: (a) the entrenchment of verb token frequencies for each VAC in usage; (b) the degree of contingency of the verb and particular construction, i.e., how faithful verbs are to particular VACs; and (c) semantic prototypicality, i.e., the centrality of verb meaning in the semantic network of the VAC in question. These results are convincingly interpreted by the authors as evidence for the validity and reliability of VACs in the minds of L1 speakers.

Chapter 5 (VACs in L2 knowledge and processing) presents parallel experiments to those of Chapter 4 but conducted with L2 learners of English. The aim of these experiments was to investigate whether L2 learners' VAC knowledge was similar or different from that of English NSs, and whether language typology regarding motion verb semantics (comparing learners with verb-framed and satellite-framed L1s) affected learners' performance. The experiments were performed by English NSs and by L1 German, Czech and Spanish advanced learners of L2 English. What is very interesting in this study is that in addition to comparing NS and learner VAC knowledge in the experimental tasks, the authors also compared the learner VAC knowledge with the VAC usage in the BNC. In consonance with the findings of the experiments reported in Chapter 4, the results of these studies demonstrated independent effects of VAC frequency, type-token frequency distribution, form-function contingency, and semantic prototypicality for advanced L2 learners of English. Interestingly, these data showed additional effects of cross-linguistic influence from learners' L1 to L2, especially in the case of the L1 Spanish speakers where the two languages were typologically different from each other. The results of the experiments presented in this chapter and those of Chapter 4 thus show interesting similarities and differences regarding the effects of the factors being examined on L1 vs. L2 English speakers' knowledge of VACs.

Chapter 6 (Online processing of VACs) presents five psycholinguistic experiments that investigated the effects of VAC frequency, type-token frequency

distribution, contingency, and semantic prototypicality on English NSs' online processing. In contrast to the free association tasks used in the earlier experiments, the online tasks used here involve automatic processing. The five experiments aimed at tapping different processing demands: perceptual recognition, naming, successive lexical decision, interposed lexical decision and meaning evaluation. This chapter is quite dense as it contains information about the participants, the methods, the analyses and findings of each of the experiments. However, the authors provide a useful and clear general discussion (Section 6.7, p. 176) where they summarize the patterns of effects found in all the experiments. The results of the five studies replicate the findings of the free association tasks reported in the previous chapter, and point to the crucial role of the examined factors in tasks where NSs engage in automatic online processing. As noted by the authors, these results "encourage the conception of a unified constructicon where words and VACs alike are symbolic representations, acquired from usage, statistics and all, with their subsequent processing tuned probabilistically to usage experience" (p. 184).

Chapter 7 (VACs in parent and child language) presents an impressive large-scale corpus study that examined VAC frequency, type-token frequency distribution, contingency, and semantic prototypicality on English child-directed speech (CDS), and assessed their effects on English child language acquisition. The study focused on the intransitive motion (VL), caused motion (VOL), ditransitive (VOO) and transitive (VO) constructions. The corpora that were examined were taken from the CHILDES database (MacWhinney, 2000) and included data from children aged 1;6 to 3;0 and from 3;0 to 6;0. The study tested clearly formulated hypotheses that were based on their previous experimental findings with children, adults and L2 learners (pp. 189–190). Like in Chapter 3, the reader finds detailed information about the search methods used to find the construction instances in the database. As clearly formulated in the summary conclusions section of the chapter, the results of the study showed that (a) the distribution of verb types in the VACs that were examined were near-Zipfian; (b) VACs were selective in their constituency, i.e., the frequencies of verbs in a particular VAC could not be predicted from their frequencies in the language as a whole; and (c) VACs were semantically coherent. In addition, children's VAC acquisition also followed these patterns, thus being affected by input frequency, contingency and semantic prototypicality.

Chapter 8 (VACs in L2 acquisition) builds on the previous chapter and presents a corpus study of VACs in L2 acquisition, again examining VAC frequency, type-token frequency distribution, contingency, and semantic prototypicality in the European Science Foundation corpus. As stated in the introduction, this corpus study complements the work discussed in Chapter 5. Whereas in Chapter 5 experimental data were collected from advanced L2 learners of English with German, Czech, and Spanish linguistic backgrounds, the present study examined VAC usage

in longitudinal production data from beginning and intermediate learners with Italian and Punjabi L1s. In the introduction the authors also point to a novelty in the present study: it provides distributional information not only for the verb slot in the selected VACs (VL, VOL and VOO) but also for other components of the constructions (e.g., pronominal and nominal objects and prepositions). Specific hypothesis are again postulated, which are the same as the ones pursued in previous chapters but adapted to L2 learning (p. 217–218). The results of this study confirmed the five hypotheses: (1) the frequency distribution for the types occupying the verb slot of each VAC was near-Zipfian; (2) the first-learned verbs in each VAC appeared more frequently in that construction in the input; (3) the path-breaking verb for each VAC was much more frequent than the other members of the verb group; (4) the first learned verb in each VAC was prototypical of that construction's action semantics but at the same time it was also generic and widely applicable (e.g., *go* for VL construction, and *put* for VOL construction); and (5) the first-learned verbs in each VAC were more distinctively associated with that construction in the input. These findings were also true for the other slots in each VAC. In the final discussion, it would have been useful if the authors had discussed the findings of the present study in relation to the ones found in Chapter 5.

Chapter 9 (Computational models of language usage, acquisition, and transmission) presents two types of computer simulations that "allow the investigation of the dynamic interactions of factors relevant in language learning, processing, and use" (p. 242). The first computer simulation involved the use of two contrastive connectionist architectures (with and without a semantic layer) to simulate the emergence of the VACs described in Chapter 8. The details provided in relation to how the simulations were conducted can be difficult to follow for the non-specialist reader but there is a useful summary of the results in Section 9.3.3 (p. 257). The second computer simulation used CAS agent-based modelling to investigate "how usage affects language transmission across generations, and how social understanding and a shared desire for efficient communication underlie type-token distributions in language (p. 242). There is a clear explanation of the key features of language understood as CAS and the basic characteristics of agent-based modelling in Section 9.4.2 (pp. 262–264). The explanations of how the computer simulations were performed are explained in such detail that allows non-specialist readers to understand the procedures that were followed. At the end of the chapter (Section 9.6, p. 277) there is a useful summary of the findings in both types of computer simulations. The connectionist architecture that included semantic information showed that "learning is sensitive to input frequencies, reliabilities of form-meaning-use mapping, and function" (p. 277), whereas the architecture without semantic information showed that the VACs that were examined could also be learned but at a slower pace, suggesting that VAC acquisition is speeded by semantic bootstrapping. Concerning the

agent-based modelling, the study showed that the Principle of Least Effort strategy, which optimizes joint actions as the speaker takes both his/her and the listeners' perspective into account, propagated language most faithfully, communicated the conceptual structure, and best fit Zipf's law in usage.

Chapter 10 (VAC usage, processing, acquisition and transmission) provides a comprehensive picture of the research presented in the previous chapters on L1 and L2 usage, processing, and acquisition, discusses its limitations, makes insightful suggestions for future research, and outlines important implications for both theory and practice. On the whole, the research presented in this volume provides empirical evidence for the crucial role of regularities of usage on language processing and learning. Future research should examine other types of constructions in corpora that include a larger variety of speakers, genres and registers. Operationalizations of verb semantics could also become more refined, and there is a "a need to look in much more detail at prototype effects (Taylor, 2015), semantic cohesion, and polysemy, their measurement in corpora of usage, and their effects upon acquisition and processing" (p. 282). Future research on the L1 processing of constructions could benefit from neuroimaging techniques (e.g., fMRI, EEG, MEG) and other experimental paradigms such as eye-tracking and MAZE tasks. In relation to L2 processing, future research could, for example, include longitudinal and cross-sectional corpora that would allow for the investigation of VAC knowledge in learners of different L1s and at different levels of L2 proficiency. Regarding L1 and L2 acquisition, there is need for large-scale individual longitudinal analyses using large, dense corpora with analyses involving both thin and thick descriptions (Geertz, 1973). Some pedagogical implications of the L2 acquisitional research presented in this volume include developing teaching materials that make no strict distinctions between lexis and grammar, and focus instead on typical associations of lexical items and constructions. Form-focused instruction could involve teaching constructions that are semantically related, highlighting which meanings are most typically construed by which construction, and specifying the lexical items that are most common to appear in each construction. Learners could also be made aware of the differences between the constructions in their L1 and L2. Teaching constructions could thus benefit from cognitive linguistic approaches, and thus involve teaching constructions via images, illustrations and animations as well as through gestures. At the end of the chapter, the authors call for an integration of the cognitive and social aspects of language, and advocate for integrative theories like Emergentism (e.g., MacWhinney, 1999; Ellis & Larsen-Freeman, 2006), Dynamic Systems Theory (e.g., de Bot, Lowie, & Verspoor, 2007) and Language as a Complex Adaptive System (Beckner et al., 2009) that allow to study the rich, complex and dynamic interactions between individual cognition, consciousness, experience,

embodiment, brain, and self, on the one hand, and social human interaction, society, culture and history, on the other.

In conclusion, the present volume presents an ambitious and impressive usage-based account of language processing and acquisition from the perspective of Construction Grammar. The book provides in-depth theoretical insights combined with extensive empirical work on L1 and L2 speakers, children and adults, incorporating converging evidence from different research methodologies. This is clearly one of the strengths of the book, its multifacetedness both in terms of the phenomena that are examined, the type of data that are analyzed and the research methods that are used. The book will definitively be an excellent resource for L1 and L2 researchers and students interested in language and language acquisition at large, and in usage-based approaches to language learning in particular.

References

Beckner, C., Blythe, R. A., Bybee, J., Christiansen, M. H., Croft, W., & Ellis, N. C. (2009). Language is a complex adaptive system: Position paper. *Language Learning*, 59(S1), 1–26.

Bybee, J. (2010). *Language, usage, and cognition*. Cambridge: Cambridge University Press.

Cadierno, T., & Eskildsen, S. (Eds.). (2015). *Usage-based perspectives on second language learning*. Berlin: Mouton de Gruyter.

de Bot, K., Lowie, W., & Verspoor, M. (2007). A dynamic systems theory to second language acquisition. *Bilingualism: Language and Cognition*, 10, 7–21.

Ellis, N. C., & Larsen-Freeman, D. (2006). Language emergence: Implications for applied linguistics (Special Issue). *Applied Linguistics*, 27, 558–589.

Geertz, C. (1973). Thick description: Toward an interpretative theory of culture. In C. Geertz (Ed.), *The interpretation of cultures: Selected essays* (pp. 3–30). New York: Basic Books.

Goldberg, A. (1995). *Constructions: A construction grammar approach to argument structure*. Chicago: Chicago University Press.

Goldberg, A. (2006). *Constructions at work: The nature of generalization in language*. Oxford: Oxford University Press.

Littlemore, J. (2009). *Applying cognitive linguistics to second language learning and teaching*. Basingstoke, UK: Palgrave MacMillan.

MacWhinney, B. (1999). *The emergence of language*. Hillsdale, NJ: Erlbaum.

MacWhinney, B. (2000). *The CHILDES project: Tools for analyzing talk, vol. 2: The database* (3rd edition). Mahwah, NJ: Erlbaum.

Robinson, P., & Ellis, N. C. (Eds.). (2008). *Handbook of cognitive linguistics and second language acquisition*. New York/London: Routledge.

Tomasello, M. (2006). *Constructing a language: A usage-based theory of language acquisition*. Boston: Harvard University Press.

Taylor, J. R. (2015). Prototype effects in grammar. In E. Dabrowska & D. Divijakk (Eds.), *Handbook of cognitive linguistics* (pp. 562–579). Berlin: Mouton de Gruyter.

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