USAGE-BASED MODELS OF LANGUAGE

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Introduction: A Usage-Based Conception of Language

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This volume is designed to bring together various approaches to the theory and description of human language which, despite numerous differences in methodology and focus, we see as similar in a fundamental way: All share a commitment to **usage-based** models and theories of language. Since this term, introduced in Langacker (1987) (and defined in more detail in Langacker 1988) has only recently gained currency, and is liable to be misunderstood or, more probably, overly broadly applied, it will be useful to describe what this notion entails. Many of the individual authors of these papers describe their specific idea of what it means for an approach to be usage-based; we will gather up the main strands of these conceptions below, showing their interrelation and at the same time highlighting the ways in which they contrast with assumptions (explicit or tacit), methods, and aims that have been characteristic of much work in modern linguistics.

There are at least two major traditions that are usage-based in the sense of focusing on acts of language use: the Firthian tradition, which has emphasized the importance of context, including its social aspects (see for example Firth 1957); and what might be called enunciativist linguistics, in which theories of language structure are based on the speech act (e.g. Benveniste 1971, Ducrot 1984, Culioli 1995). Both of these have unbroken

traditions of influence in modern linguistics, including but not limited to some of the usage-based approaches described in this volume. But the most dominant trends in linguistics in the last generation have been squarely focused on language as a more or less fixed system, which can be studied independently of context and use and independently of its interactions with other aspects of cognition.

Recently, the field of linguistics at large has been moving towards more usage-based kinds of frameworks. The mechanics of formal linguistic theories have shifted, new methodologies have been applied, and the idea has taken root that a very narrow conception of what has to be accounted for in language is not satisfying. There are signs of increasing convergence between a number of formal models of language and approaches that have long insisted on a usage-based perspective.

In the following section we describe explicitly what it means for an approach to be usage-based, by laying out what we see as the most fundamental characteristics of that notion. The papers in the volume then illustrate how various approaches and models constructed around language use lead to fruitful generalizations and insights about the nature of language.

Aspects of a Usage-based Model

Usage-based models share a number of characteristic assumptions, discussed under the headings below.

The intimate relation between linguistic structures and instances of use of language. All the authors in this volume would agree on the need for basing posited linguistic structures on language use. However, 'linguistic structure' is ambiguous: it can refer to hypothesized structures derived by the analyst from observation of linguistic data, with no expectation that such structures are cognitively instantiated (the 'external' linguistic system, or what Lamb in this volume terms the 'theory of the linguistic extension'); or alternatively, to structures posited by the analyst as a claim about mental structure and operation (the 'internal' linguistic system). On either reading, the heading above points to a shared methodological assumption about what kinds of data to use (cf. the introductory remarks in Dickinson and Givón's paper). This aspect will be considered further below in the discussion of usage data. The second reading is the one focused on by most, but not all, of the authors, and the discussion below refers to this cognitively-oriented view of the linguistic system as a mental system.

A usage-based model is one in which the speaker's linguistic system is fundamentally grounded in 'usage events': instances of a speaker's producing and understanding language. 'Grounded in' means that linguistic representations are tightly linked to usage events in three ways: First, such instances are the basis on which a speaker's linguistic system is formed, i.e. they are

experience from which the system itself is initially abstracted (discussed further below). Second, the relation between the more abstract representations in the speaker's grammar and the usage events experienced by the speaker is much more direct than usually assumed. The abstract and the particular remain tightly linked, for the following reason. Usage events are necessarily specific in nature, in that, for example, any given linguistic utterance has lexical content. The linguistic system is built up from such lexically specific instances, only gradually abstracting more general representations, such as phonemes, morphemes, and syntactic patterns, from the repetition of similar instances of use (cf. Langacker 1987, this volume). This means that any general representations that emerge from the operation of the system necessarily are tied to, i.e. activated in concert with, specific instances of those patterns. Abstract utterances without any phonetic or lexical content do not exist.

Such links between general patterns, often called **schemas,**[1] and their instantiations have important consequences. For one thing, units of language (from phonemes to constructions) are not fixed but dynamic, subject to creative extension and reshaping with use. This leads to the third way in which representations relate to usage: Usage events are crucial to the ongoing structuring and operation of the linguistic system. Language productions are not only products of the speaker's linguistic system, but they also provide input for other speakers' systems (as well as, reflexively, for the speaker's own), not just in initial acquisition but in language use throughout life. Thus, usage events play a double role in the system: they both result from, and also shape, the linguistic system itself in a kind of feedback loop.

Langacker's paper presents a particularly explicit and detailed conception of the workings of a usage-based model, specifically the framework of Cognitive Grammar, which he has been developing over the last two decades. In his 1988 paper "A Usage-Based Model," Langacker identified three key characteristics of a usage-based model which Cognitive Grammar instantiates: it is maximalist, non-reductive, and bottom up. The first two of these properties pertain to the view, consistent with what is known about cognitive processing, that grammar is massive and highly redundant, rather than stripped down and economical. There is no need to choose between unanalyzed listings and analytical treatment of a complex language structure; the mind can potentially represent the same structure in multiple ways, and hence the grammar includes both specific items and the more general patterns they are instances of. The specific and the general are mutually linked through usage. The bottom up property adds that the specific and idiosyncratic elements of the system are privileged over the general in the acquisi-

tion and operation of the system: the general arises out of the specific, and the specific is what is most directly taken from experience.

In his paper in this volume, Langacker develops his original vision further to include a detailed description of the mechanics of individual usage events in terms of acts of categorization. A usage event can be precisely defined as "the pairing of a vocalization, in all its specificity, with a conceptualization representing its full contextual understanding" (p. 9). He describes how usage events relate to conventionalized (entrenched) linguistic units of various degrees of specificity through cognitive processes that are not strictly linguistic. His paper shows how the usage-based nature of Cognitive Grammar provides a natural account for a number of the most fundamental problems in linguistics, including not only the creation and understanding of novel expressions, but also the assignment of structural descriptions, judgments of well- and ill-formedness, distributional restrictions, and differences in the degree of compositionality, productivity and generality of linguistic units. In addition he describes a wide range of descriptive applications of the model, covering all aspects of linguistic systems, from phonology to syntax and semantics/pragmatics. The book-length treatments in Langacker (1987, 1991) present the theory and applications in more comprehensive detail.

The other central properties of usage-based models follow from various aspects of the close relation between structure and use described above.

The importance of frequency. Because the system is largely an experience-driven one, frequency of instances is a prime factor in its structure and operation. Since frequency of a particular usage pattern is both a result and a shaping force of the system, frequency has an indispensable role in any explanatory account of language (cf. Bybee 1988, Haiman 1991, 1994). Higher frequency of a unit or pattern results in a greater degree of what Langacker terms **entrenchment**, i.e. cognitive routinization, which affects the processing of the unit. This idea of the fundamental importance of frequency, expressed in many of the papers in this volume, sharply distinguishes usage-based models from other approaches in which frequency is an insignificant artifact, unconnected with speakers' linguistic knowledge. The role of frequency in leading to entrenchment of units in the linguistic system is a crucial aspect of Langacker's and Bybee's models. In addition the papers of Barlow and Biber in particular stress the importance of frequency in the organization of the linguistic system (although unlike the others', Biber's conception of 'linguistic system' is external, rather than internal). Frequency also plays a fundamental role in connectionist simulations of the sort described in MacWhinney's contribution, discussed below.

Bybee's paper is centrally focused on the effects of frequency. Her paper, a reexamination of the problem of *t/d* deletion, presents strong empirical

evidence of the effects of lexical frequency in the phonological (and morphological) system. Using a corpus of phonological productions, she shows that the phonetic properties of lexical items are significantly influenced by language use, in that repeated use of a word affects its lexical representation. Her results highlight the dynamic interplay between language use and the speaker's linguistic system.

Comprehension and production as integral, rather than peripheral, to the linguistic system. Given that usage events drive the formation and operation of the internal linguistic system, the structure of this system is not separate in any significant way from the (cumulative) acts of mental processing that occur in language use. The speaker's linguistic ability, in fact, is *constituted* by regularities in the mental processing of language. On this view, it does not make sense to draw a sharp distinction between what is traditionally called 'competence' and 'performance,' since performance is itself part of a speaker's competence. Instead of viewing language processing as something external to the system, which happens only to the outputs of competence, processing is rather to be seen as an intrinsic part of the linguistic knowledge system, which cannot be treated separately from it.[2] 'Performance errors,' for example, are not viewed as due exclusively to 'processing factors,' and thus are not treated as a completely separate phenomenon from other utterances not licensed by competence. Instead, all linguistic productions are seen as simply in conformance, or non-conformance, with linguistic norms to differing degrees. All of the papers in the volume contribute in some measure to closing the traditional theoretical gap between language system and language use.

Focus on the role of learning and experience in language acquisition. Since in a usage-based model instances of producing and understanding language are of central importance to the structuring of the linguistic system, they must be especially significant in the acquisition of language, when the system is in the process of taking form.

For many cognitive scientists, it is obvious that learning is central to language acquisition. Many linguists, however, would dispute this. In the recent history of linguistics, the fact of children's language acquisition has been given as *the* fundamental problem of language to be explained (Chomsky 1972). This problem is extremely intractable given the kind of deductive linguistic system traditionally envisaged (discussed further under the next heading). The solution offered has been to posit highly specific innate linguistic structures that lead to the putative development of an adult linguistic system within a few short years of a child's life. As we might expect with such a view, the role of learning and experience has consequently been minimized to an extreme extent, in favor of an 'input as trigger' model (see Chomsky 1988, Crain 1991 for strong statements of these views).

A usage-based model, which stresses the importance of instances of use and consequent cognitive entrenchment, places learning at the forefront of language acquisition. This type of model reconceives the nature of the linguistic system, such that it is far easier to see how it could be learnable. If instances of use are the prime input driving the system's formation, then positing genetically-specified guiding linguistic structures is unnecessary. A well-conceived mechanism for learning, which is also applicable to the learning of other kinds of cognitive patterns besides language, is what is needed for a basic understanding of language acquisition and its relation to general cognition. Such a mechanism does not have to be conceived of as applying to a 'blank slate' (the kinds of brain structures that support the learning mechanism are presumably themselves genetically guided, after all); but the necessity for pre-existing, hard-wired structures is minimized, a great advantage given what is known about neural development. (See Elman et al. 1998 for a thorough discussion of the issues surrounding 'innate structures' and of acquisition models.)

There are a number of strands of research emphasizing a usage-based, learning-driven perspective on acquisition. In one of these, it is shown just how little in the way of grammatical structures children actually start out with; their first complex utterances are based on specific lexical items, notably verbs. Only later do they start to abstract more general constructional patterns (Tomasello 1992; Pine and Lieven 1993; Tomasello, Lieven, Behrens and Forwergk, Forthcoming). Another line of research focuses on how children learn linguistic patterns based on their everyday bodily and social experience (e.g. Bates 1976, Bowerman 1982, Slobin 1985, Johnson 1999, MacWhinney 1999a). A related strand concentrates specifically on the structure and operation of the learning mechanism, investigating how the acquisition of particular linguistic systems can be modeled with a connectionist architecture. MacWhinney's paper in this volume is an example of this approach (see next heading).

Linguistic representations as emergent, rather than stored as fixed entities. The view of language as consisting of a set of stored units which are operated on by a set of (also stored) procedures or instructions, producing some output, is rejected by cognitively-oriented theorists of usage-based approaches. Instead, linguistic units are seen as cognitive routines. Such units are nothing more than recurrent patterns of mental (ultimately neural) activation; as such they are not 'stored' in any particular neural location, nor is it useful to think of them as being located in the types of memory 'storage devices' often posited in the psychological literature. During linguistic processing, linguistic units are part and parcel of the system's processing activity: they exist as activation patterns. When no processing is occurring, the information represented by such units simply resides in patterns of connectivity (including differential connection strengths) resulting from previous activations. Emergence as a property of linguistic systems, and the distributed nature of representations, has been argued for on linguistic grounds by linguists such as Hopper (1988, 1998) and Fox (1994). Researchers such as Elman, McClelland, MacWhinney and others have been building explicit simulative models of linguistic subsystems with these properties for some time (see below). For exploration of the notion of emergence and its implications for language and mind, see the collection in MacWhinney (1999b).

In general, those usage-based theorists who have striven for an explicit model of the internal linguistic system have based it on some form of an activation network, which is a well-known type of psychological model. A specific type of such model is a connectionist network, which has several desirable properties for a model of mind. Because it is an emergence-based system, as described above, there is no separate set of processing algorithms or rules, independent of units in the system. This accords with a well-known property of the human brain: its lack of a central processing unit that directs mental operations. Instead, each neuron is its own processor and functions by activating (or inhibiting) links to other neurons. In a connectionist network, information resides in patterns of connection weights that link (essentially contentless) nodes. Nodes can be thought of as analogous to neurons or at least complex subnetworks of neurons.

Three of the papers in the volume utilize a network representation that can be applied directly to the description of linguistic structure. Langacker, in describing the basic constructs and processes of Cognitive Grammar, also includes a connectionist interpretation of the theory, explaining in general terms how the abstract descriptive representations he utilizes can be ultimately related to an explicitly connectionist model (see also Langacker 1990). The model made reference to in Bybee's paper (described in more detail in Bybee 1988, 1994 and 1995) stresses the cognitive links between lexical items, from which phonological and morphological regularities emerge. The paper by Lamb sketches still another theoretical architecture for a connectionist linguistic/conceptual network that directly refers to and conforms as far as possible with known properties of neurons (described in greater detail in Lamb 1998). He incorporates a mechanism for bidirectional processing which captures the neural properties necessary to account for both comprehension and production in the same network. With this model Lamb goes much further than many others in directly relating the properties of linguistic and other conceptual networks to the properties of neural structure itself, one of the ultimate, albeit distant, goals of cognitive research.

Comparing these three proposed network models is instructive; the similarities are fundamental, yet the differences highlight the different foci of

interest of each model's originator and the consequent difference in levels of representation at which they operate.[3]

Other properties of connectionist models are that they are analogy driven (but see Section 6 of Langacker's paper for clarification of what this means); they involve competition among possible candidates for activation (see also Deane 1992); and their output is the result of simultaneous constraint satisfaction rather than a rule-like process. Constraint satisfaction is also characteristic of some formal linguistic theories (e.g. HPSG, Optimality Theory), although these do not go as far in the direction of eliminating the fundamental division between symbols in the system and the operations, principles or constraints such symbolic units are subject to.

Connectionist models have the advantage of being computationally implementable in principle. Thus such models can be used to simulate acquisition of specific linguistic systems, such as English past tense verb forms or German noun categories. In a connectionist learning simulation, a basic network structure without any specific information to start with is fed exemplars and in the process organizes itself into a system that produces output which (in a successful simulation) matches the patterns in the input. Specific connectionist implementations vary in the computational algorithms and architecture used; manipulating such variations allows for testing of various properties of the model, with the aim of maximal conformity with attested patterns of human learning. There is a large literature on the application of such models to linguistic problems, see for example Elman and McClelland (1984), Rumelhart and McClelland (1986), McClelland and Rumelhart (1986), and Gupta and MacWhinney (1992).

The paper by MacWhinney in this volume situates the basic ideas underlying connectionist learning simulation models in the context of developments in cognitive science. He highlights the two essential characteristics that mark their advance over the rule-based systems developed in the 60s and 70s: the lack of symbol-passing in connectionist architecture and the self-organizing nature of the systems, both of which are attractive to those seriously committed to compatibility with brain architecture. He describes a number of innovations—lexical mapping, argument frames, and systems for phonological and semantic modification—that have been applied to linguistic problems of ever greater complexity, from acquisition of morphological systems such as tense and agreement, to verb argument structure, to even more complex syntactic structures, with results in many cases rivalling those of traditional algorithmic architectures. Although connectionist models still deal with restricted systems with relatively small numbers of units, MacWhinney's contribution suggests the potential for ultimately relating such simulations to the more complex, hand-wired theoretical models of

linguists described above, as well as, perhaps, to the more scalable, but less self-organizing simulations such as found in Regier (1996).

Importance of usage data in theory construction and description. Because the linguistic system is so closely tied to usage, it follows that theories of language should be grounded in an observation of data from actual uses of language. In linguistics, the standard methodology relies on constructed examples with no naturally occurring context of production (or comprehension). This practice derives from the basic assumption, referred to above in the discussion of the competence/performance distinction, of a very indirect relation between linguistic knowledge and acts of language use. Observation of data from actual language production has been typically confined to subfields of linguistics often deemed 'peripheral': phonetics, sociolinguistics, historical linguistics, and other fields which have in practice had minimal impact on the development of linguistic theory. The study of syntax in particular, long treated as the 'core' of linguistics, has almost exclusively relied on judgments of 'grammaticality' of constructed examples.

Speaker intuitions about constructed examples are an invaluable tool, provided that such data are treated with all appropriate care. Their use requires at least the following: an acceptance and appreciation of the cline of acceptability and the interspeaker variability that is typically associated with such examples; an understanding of the nature of 'deviance' from linguistic norms; and most generally, some serious reflection on what such judgments actually tell us. But even with such judicious use, intuitions about constructed data cannot be treated as the sole, or even primary, source of evidence as to the nature and properties of the linguistic system.

A usage-based theory, whether its object of study is the internal or external linguistic system, takes seriously the notion that the primary object of study is the language people actually produce and understand. Language in use is the best evidence we have for determining the nature and specific organization of linguistic systems.[4] Thus, an ideal usage-based analysis is one that emerges from observation of such bodies of usage data, called corpora. But even if not based primarily on such data, at a minimum, analyses must ultimately be at least consistent with production data.

One often-used type of corpus is a collection of production data comprising many texts produced by many speakers or writers. Such a corpus is not, of course, a mirror of the exact input that has shaped a particular individual's linguistic system. For one thing such corpora, as they are currently structured, typically omit almost all the context of use of the language captured by the corpus, and context, as discussed below, is an indispensable component of usage-based approaches. In addition, there is a danger that a corpus containing a mixture of text-types will neutralize genre-specific patterns of the kind discussed in Biber's paper. These caveats notwithstand-

ing, textual corpus data provide a sampling of usage that can reflect general patterns very faithfully. Used sensibly, such data can give an insight into such questions as which units are most entrenched in speakers' linguistic systems (via examination of frequency of constructions, collocations etc.) and how such units relate to each other in the grammatical system. For an account along these lines based on the frequency of English reflexive constructions of various types in spoken and written corpora, see Barlow (1996).

The papers in this volume by Verhagen, Biber and Barlow all use linguistic corpora to search for patterns in usage events. Verhagen and Barlow are interested in the nature of linguistic representations, while Biber seeks to provide empirically well-grounded descriptions of such aspects of language as words, grammatical features, text types, and the relations between these.

Verhagen's paper uses corpus data from three centuries to investigate differences between older and modern Dutch in relation to the use of the causative verbs *laten* and *doen*. By looking at frequency data in various genres of texts and with various types of participants (e.g., causers and causees that are animate vs. inanimate, male vs. female), he is able to demonstrate that *laten* and *doen* have undergone a complex set of changes in variation patterns over the centuries (see further below). His main methodological point is that in order to arrive at insights about cognitive and cultural models invoked by the use of *laten* and *doen*, investigation of corpora of actual usage events is indispensable.

Biber in his corpus-based investigations concentrates not so much on individual constructions, but on quantitative association patterns, i.e. clusters of cooccurring lexical and grammatical features, which he relates to different genres (i.e. different types of usage situations). In this volume, Biber reveals associations between different lexical items (*promise* and *tell*) and different argument structures (intransitive, transitive, etc.), which are in turned linked to specific genres or registers (e.g. Academic Prose and Conversation). He shows that strong linguistic associations in one register may represent rather weak associations in other registers, highlighting the intimate connection between choice of forms and context of use.

Barlow investigates the relation of patterns of usage to grammatical structure. It is clear that highly frequent, fixed collocations found in corpora, such as *from time to time*, can be tied to well-entrenched schemas or constructions. But what of the patterns in corpora that do not appear to be equivalent either to fixed units, on the one hand, or completely novel, creative utterances, on the other hand? Barlow explores the idea that the semi-fixed, semi-creative structures found in language use may be the result of a merger or blending process (Fauconnier and Turner 1996), which takes entrenched forms as one input in the creation of a blended structure. Evidence

for this notion is based in Barlow's paper on the corpus-based analysis of idioms such as *make hay while the sun shines*, which turn out to display a surprising range of variability in form. The intimate intertwining of such idioms with other grammatical patterns calls for a rethinking of the often assumed division between productive syntax vs. fixed expressions.

A number of other studies in this volume investigate quantitative patterns in linguistic production data. Bybee, as already mentioned, uses a phonetically-transcribed corpus to study the effects of frequency on phonological variation. Ariel examines quantitative patterns in referential expressions and agreement marking in a variety of written and spoken texts of English and Hebrew. She compares occurrences, in various person and other categories, of a range of forms along a portion of what she has elsewhere identified as the Accessibility Hierarchy (Ariel 1990): here, the continuum from full NPs, to pronominal elements of various degrees of reduction, to 'pure agreement' forms, to no agreement.[5] Ariel shows that the predominant typological agreement pattern of first and second person agreement marking vs. no third person marking is motivated by the consistently greater referential accessibility (high salience) of the speech act participants compared to third person referents. Previous generalizations about the motivations for reduction and fusion processes, particularly by Bybee (1985), pointed to two factors, the conceptual coherence of adjacent morphemes ('relevance'), and the degree of frequency of phonological adjacency. Ariel's paper thus points to a more complex interaction between frequency and cognitive factors in the domain of reference than previously recognized.

Dickinson and Givón utilize still another data-oriented methodology to study linguistic productions. They investigate the recall of events in visually observed 'stories' under a range of experimental conditions. Their ultimate aim is to determine whether interactional vs. informational aspects of an ongoing communicative process are processed and entrenched in episodic memory in different ways. In this study they find that verbal interaction after a viewing episode significantly affects the recall of events, with different types of interaction (e.g. cooperative vs. uncooperative) affecting the degree of recall of the events. They suggest that cooperative interaction facilitates the coherent consolidation of information in memory. Dickinson and Givón's investigation illustrates the potential usefulness of manipulating cognitive variables under controlled conditions for discourse production. Most generally, it provides a valuable corrective to the often-assumed dichotomy between cognitively-oriented studies, which often ignore the interactional aspects of discourse, vs. interaction models, which often deemphasize cognitive processes.

Thus, the papers in this volume offer an eclectic array of different methodologies and data sources, each with its own advantages (and disadvan-

tages). In our view, there is nothing to be gained by an insistence on, or rejection of, one particular method or type of data, even if we are far from a complete methodological synthesis. The most immediate aim is to determine how the various sorts of evidence relate to what speakers do in natural usage of language, and to understand what each kind of data can tell us about how ordinary comprehension and production of language work.

The intimate relation between usage, synchronic variation, and diachronic change. Patterns in usage data are in general patterns of variation along different dimensions of various kinds, from formal to social. In a cognitive usage-based model, variant linguistic forms can be thought of as alternate possibilities licensed by the linguistic network. The selection of a given entrenched variant for activation is governed by a complex set of motivating factors, including system-internal as well as contextual, situational factors. As observed in the seminal work of Labov, variation is highly structured, not only in the individual's system, but across groups of speakers. The effects of usage on the linguistic system as described earlier lead us to expect that speakers' language will be influenced by the productions they hear in particular speech communities of which they are members. As noted in Kemmer and Israel (1994: 167), "the more speakers talk to each other the more they will talk alike, and so linguistic variation will pattern along lines of social contact and interaction."

Bybee's paper demonstrates that greater frequency of a word correlates with greater phonological reduction in final consonant clusters. She makes the important claim that reduction occurs as a gradual diachronic process in the systems of individual speakers, by virtue of frequent repetition. Thus, linguistic usage is seen to be the locus of language change. Bybee sees speakers as initiating, and responding to, diachronic microchanges in their own and others' linguistic systems in the form of introductions of motivated variants and (lexically-influenced) change in the frequency of those variants that they hear around them. This influence is relatively weak, since learned conventional patterns, particularly with a system as automated as phonology, are strong.[6] But it is in principle measurable over time and with enough usage events.

Different speakers will not have precisely the same experience and will thus differ somewhat in the frequency of variants they exhibit. But speakers who interact with each other more are predicted to have more similar patterns of variation. Looking across groups defined by degree of interaction, rather than simply across individuals, we can see that the inevitable result, as well as reinforcer, of the kinds of microchanges Bybee envisages, is sociolinguistic variation, as speakers are influenced by those they interact with most and also influence them in turn.

In the case at least of motivated phonetic reductions, the change in proportion of variants typically proceeds in the direction of increase in the occurrence of the reduced variant(s), as the articulatory motivation for the change is reinforced by the increasing conventionalization of the reduced variant. When the proportion of 'non-reduced' variants has dropped to insignificance, historical linguists will refer to a diachronic change (reduction or loss); but clearly, the whole process has been characterized by change, and both children and adults have participated in it. At every stage also, the same motivations are operative: cognitive, articulatory, and social, affecting the perception and production acts of individuals. The effects of these motivations on each usage event are very slight, but cumulative over many usage events over time. Bybee's paper, in empirically linking lexical frequency with low-level synchronic variation, provides a new view of the relation between variation and lexical diffusion.

In a usage-based model of language change,[7] specific instances are extremely significant. Lexical items are important in syntax as well as phonology and morphology, and in syntax likewise we expect to find a similar relation between synchronic usage patterns and diachronic change. For example, it has been shown for English that basic clause-level constructions are linked with specific classes of verbs, and that particularly frequent verbs have a special relationship to their characteristic constructions (Goldberg 1998). Links between constructions and lexical items that frequently occur in them also appear to drive creative extensions of syntactic constructions, both synchronically and with cumulative diachronic effects over time (Israel and Kemmer 1993, Israel 1996).

Two other papers in the volume that relate synchronic patterns of variation in linguistic usage to patterns of diachronic change are those by Ariel and Verhagen. Ariel's paper addresses in comprehensive detail the question of why and how agreement markers develop out of personal pronouns. The data she provides on patterns of pronoun and agreement use in Hebrew in various genres is an excellent illustration of particular phases in the development of agreement markers, as well as a demonstration of the importance of referential accessibility as a motivation for forms and choice of variants in person paradigms. Verhagen's paper gives insight into how subtle changes in meaning of *laten* and *doen* in causative constructions can be tracked by observing shifts in frequency of these elements across various linguistic categories and genres.

The contributions of Bybee, Ariel, and Verhagen all illustrate that a dynamic, usage-based conception of the internal linguistic system provides a natural framework for understanding why variation and change exist in the first place, as well as for understanding the mechanisms that produce and

propagate patterns of variation and change.[8] Acquisition, variation, and diachronic change are all reflexes of the dynamics of linguistic usage.

The interconnectedness of the linguistic system with non-linguistic cognitive systems. It is plausible, indeed a null-hypothesis, to assume that the process of abstracting what is similar in recurrent experiences (**schema abstraction** in Langacker's terms) is not intrinsically different in language from what happens for other types of experience. Humans are sensitive to patterns in experience, and learned patterns can be of many different types, constrained in particular ways by general properties of our cognitive makeup and our earliest pre-linguistic experience. Linguistic structure in this view is a subset of conceptual structure. The field of Cognitive Linguistics in general has elaborated this point in great detail, emphasizing, for example, the encyclopedic nature of linguistic concepts (Haiman 1980, Lakoff 1987, Langacker 1987, Lamb 1998). The work of Charles Fillmore on frame semantics is particularly important in showing how conventional linguistic units like words and grammatical constructions are understood against the background of conventional situations of use which include far more than linguistic information. He demonstrates, for example, that the semantic roles of participants in verbal events cannot be described solely in terms of generalized 'case roles', but instead emerge from highly structured frames of knowledge about particular kinds of actions and interactions (Fillmore 1977, Fillmore and Atkins 1992). These ideas lead to the notion of cognitive and cultural models as frameworks of understanding for the meanings of linguistic expressions. Such models are coherent systems of knowledge of varying degrees of complexity, from the simple and basic image schemas discussed in Lakoff (1990) to highly intricate and culture-specific models extracted from cultural and social experience, as in the paper by Verhagen.

Verhagen's paper takes as its starting point the general conceptual system of 'force dynamics' proposed in Talmy (1988), a cluster of related cognitive models which structure the expression of causation and interpersonal manipulation in language (see also Kemmer and Verhagen 1994). In Verhagen's diachronic study of Dutch *laten* and *doen* causative constructions, he demonstrates the centrality of language- and culture-specific force dynamic models in the functioning and change of the system of expression of causation. He argues that the changes in these constructions are linked with a set of changes in the models of personal and social interaction which form the underpinning for the meanings of the two verbs. For example, certain changes in the frequency of use of the two verbs relate to changes in the relations of authority between people in Dutch culture in the last two centuries. Verhagen's paper leads to some thought-provoking (re)consideration of the relation between language and culture.

The crucial role of context in the operation of the linguistic system. If as suggested above the processes of linguistic abstraction and categorization are not different in kind from such processes in other cognitive domains, then it is highly likely that both linguistic and non-linguistic patterns will be processed and learned in an integrated way. All aspects of language, from phonetics to semantics, are open to influence from both linguistic and non-linguistic context. Moreover, there is always the potential for regular aspects of context to become conventionalized and thus part of the linguistic system itself. In phonology, for example, both recurrent aspects of the articulatory and the social context are abstracted together and conventionally linked with phonological variants (Kemmer and Israel 1994). In semantics, it is well known that elements from pragmatic contexts in which an expression typically occurs can become part of its conventional meaning (Traugott, Forthcoming; see also Langacker, this volume Section 4.3).

There is always a complex interaction between cognitive representations (which have themselves been abstracted from many similar contextualized experiences) and contextual factors in the immediate situation of use. Verhagen in his paper highlights the indirectness of this relation as follows:

> Usage always involves specific speakers/writers, hearers/readers, at a specific time, in specific contexts; and since these influence production and understanding, facts of production and understanding do not in themselves relate immediately and unambiguously to the abstract models invoked by the words. (Verhagen, this volume: 270)

The context-dependent nature of linguistic production and understanding entails, among other things, the inevitable underspecification of linguistic forms. Language does not hold or "convey" meaning per se, but simply provides *cues* for meaning construction in context. A conceptualization occurring in a specific instance of language use is evoked by the linguistic forms used, but is necessarily far richer than any information specifically associated with those forms; such information, as noted above, is merely an abstraction from experience or use of the forms. This general view has been emphasized particularly by Fauconnier (e.g. Fauconnier 1997), influenced by Ducrot, referred to earlier; and it is a prominent feature in Langacker's work as well. Langacker, in his analysis of the mechanics of individual usage events in this volume, provides in effect a precise description of the relation between conventional linguistic categories and how speakers employ them to create meaning in context. The paper by Verhagen provides rich detail on the intimate interaction of contextual factors with the conventionalized cognitive models associated with linguistic forms.

The importance of context and in particular the social aspects of context for understanding the form and nature of language has historically been more of a major feature of British and other European linguistic traditions than traditions dominant in the U.S. such as American structuralism and Chomskyan linguistics. In Firthian linguistics in particular, as mentioned earlier, context plays a key role. This tradition has been continued in work by linguists such as John Sinclair and Michael Stubbs (e.g. Sinclair 1991, Stubbs 1996), who not only examine textual patterns such as collocations, but also the context of use of such patterns, whether relating to register, institutions, or culture. The work of Biber likewise emphasizes the connection between language use and situational, social and textual factors, with a concentration in the paper in this volume on the latter.

<p style="text-align:center">*   *   *   *</p>

With this volume, our intent is to bring together a wide range of approaches in a context that highlights the importance of a fundamentally usage-based conception of language. In doing so we wish to make these ideas available not only for mutual cross-fertilization of the approaches represented but also to researchers working with other linguistic frameworks. This volume will be of interest not only to linguists but also to those in allied disciplines—psychologists, cultural and social anthropologists, applied linguists, computer scientists, artificial intelligence researchers, and others concerned with the nature of language and how it relates to cognitive functioning and social interaction. The study of language use, as illustrated in this volume, has a great deal to tell us about the way human language works.

Notes

We are indebted to Michael Israel for insightful comments on an earlier draft of this Introduction. Any errors of interpretation of the work of authors cited is our sole responsibility.

1. A schema can be defined as a cognitive representation comprising a generalization over perceived similarities among instances of usage. Schemas arise via repeated activation of a set of cooccurring properties, and are used to produce and understand linguistic expressions. Langacker's paper describes how schemas are used to categorize (or license) utterances. In syntax schemas go by the name of constructional schemas or constructions. For various modes of representation of linguistic schemas, see in addition Bybee and Slobin (1982), Fillmore et al. (1988), Barlow and Kemmer (1994).

2. As Croft shows in his empirical study of the relation between intonation units and syntactic constructions, "the units employed for spoken communication are basically the units stored as constructions in the mind" (Croft 1995: 872-3).

3. Difference in level of analysis gives rise to apparent differences that on closer inspection fade in significance. For example, Bybee rejects the existence of linguistic units such as 'phonemes.' Langacker's representations make reference to such units, but as his discussion of the

connectionist interpretation of his model makes clear, he also views them as being reducible to patterns of activation and connection weights, immanent in the network, rather than separately-stored entities. His linguistic units have status in the network as higher-order representations similar to Lamb's higher-level nections (i.e., linking points for distributed information); they represent cognitive routines, i.e. entrenched patterns of co-activation. Bybee's networks have only lexical nodes, whose connections capture the same distributed information at a lower level. In both Langacker's and Bybee's models, phonemes ultimately reduce to motor routines at the lowest level, affected by the preceding and subsequent motor processes in speech. It remains to be seen if there are any empirical consequences that follow from whether entrenched units other than lexical items are redundantly represented as nodes in the network.

4. The work of Chafe (e.g. Chafe 1994) has contributed greatly to an understanding of how cognitive processing of language, particularly regarding focus of attention and topic development, relates to naturalistic language production (crucially including intonation) in discourse.

5. Pioneering work on reference and topicality which also studied quantitative patterns of referential forms in discourse was carried out by T. Givón and his associates (e.g. Givón 1983).

6. Moreover, in phonological production particularly, early experience may lead to greater entrenchment than later learning, due to greater plasticity in the motor cortex during childhood.

7. See Croft (2000) for theory of language change that is fundamentally usage-based.

8. Ferguson (1990) also stresses the close relation between patterns of variation and change. He shows how examining the differing probabilities of occurrence of phonological variants and their respective favoring conditions gives clues to what type of general diachronic process is underway, since superficially similar patterns of change can be distinguished by looking at their different associated patterns of synchronic variation.

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A Dynamic Usage-Based Model

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1. The Usage-Based Conception

For better or for worse, I admit to having coined the term **usage-based model**. In *Foundations of Cognitive Grammar*, I described such a model as follows: "Substantial importance is given to the actual use of the linguistic system and a speaker's knowledge of this use; the grammar is held responsible for a speaker's knowledge of the full range of linguistic conventions, regardless of whether these conventions can be subsumed under more general statements. [It is a] nonreductive approach to linguistic structure that employs fully articulated schematic networks and emphasizes the importance of low-level schemas" (Langacker 1987a: 494). Subsequently, in the paper titled "A Usage-Based Model" (Langacker 1988), I described the "maximalist," "non-reductive," "bottom-up" nature of Cognitive Grammar. In these respects it stood in contrast to the "minimalist," "reductive," "top-down" spirit of generative theory, at least in its original (archetypal) formulation. Let me start by briefly describing each property.

Generative theory has always tried to minimize what a speaker has to learn and mentally represent in acquiring a language. Its minimalism was originally based on economy: the best grammar was the one that did the job with the fewest symbols. In recent years, the emphasis has shifted to posit-

ing a richly specified universal grammar, so that the role of experience in learning a language involves little more than the setting of parameters. By contrast, Cognitive Grammar accepts that becoming a fluent speaker involves a prodigious amount of actual learning, and tries to minimize the postulation of innate structures specific to language. I consider these to be empirical issues. If one aims for psychological reality, it cannot be maintained on purely methodological grounds that the most parsimonious grammar is the best one. Should it prove that the cognitive representation of language is in fact massive and highly redundant, the most accurate description of it (as a psychological entity) will reflect that size and redundancy. Regarding the issue of innate specification I make no apriori claims. I do however subscribe to the general strategy in cognitive and functional linguistics of deriving language structure insofar as possible from more general psychological capacities (e.g. perception, memory, categorization), positing inborn language-specific structures only as a last resort. I anticipate, moreover, that any such structures would constitute specialized adaptations of more general abilities, and thus be continuous with them rather than separate and *sui generis*.

The issue of reductionism pertains to the relation between general statements and more specific statements that amount to special cases of them. Suppose a speaker has learned both a general "rule" (such as the pattern for combining prepositions with their objects) and certain specific expressions which instantiate the pattern (e.g. *for me*, *on the floor*, *in the garage*). Traditionally, in generative accounts, the instantiating expressions would be excluded from the grammar on grounds of economy. Since they are regularly derivable by rule, to list them individually would be to miss a generalization. This reasoning however rests on the spurious assumption that rules and lists are mutually exclusive (the **rule/list fallacy**). There is a viable alternative: to include in the grammar both rules and instantiating expressions. This option allows any valid generalizations to be captured (by means of rules), and while the descriptions it affords may not be maximally economical, they have to be preferred on grounds of psychological accuracy to the extent that specific expressions do in fact become established as well-rehearsed units. Such units are cognitive entities in their own right whose existence is not reducible to that of the general patterns they instantiate.

The "top-down" spirit of generative grammar is evident in its emphasis on general rules and universal principles, as well as its historic neglect of lexicon, low-level subpatterns, and the patient enumeration of idiosyncrasies. Less-than-fully-general phenomena were in fact embarrassing and problematic from the outset, handled by a series of ad hoc devices (e.g. the "rule features" proposed in Lakoff 1970) appended to the rule-based system. Now certainly an objective in Cognitive Grammar is to capture whatever gener-

alizations the data will support. There are nonetheless several respects in which the framework manifests a "bottom-up" orientation. For one thing, it recognizes that linguistic patterns occupy the entire spectrum ranging from the wholly idiosyncratic to the maximally general. In a complete account of language structure, fully general rules stand out as being atypical rather than paradigmatic. Another facet of Cognitive Grammar's bottom-up orientation is the claim that "rules" can only arise as schematizations of overtly occurring expressions. However far this abstraction may proceed, the schemas that emerge spring from the soil of actual usage. Finally, there is reason to believe that lower-level schemas, expressing regularities of only limited scope, may on balance be more essential to language structure than high-level schemas representing the broadest generalizations.

As I articulate the usage-based conception in the following sections, two basic themes ought to be borne in mind. First, the assumptions made about mental abilities and cognitive processing are, I think, both minimal and relatively non-controversial. If the approach proves adequate from the linguistic standpoint (and I take the entire body of work in Cognitive Grammar as suggesting that it is), then its psychological plausibility argues strongly in its favor. Second, this usage-based model achieves a high degree of conceptual unification: a few basic mechanisms are operative in all domains of language structure and afford a unified account of phenomena traditionally handled separately and in very different ways. Provided once more that the model is shown to be linguistically adequate, its unifying nature is another strong point in its favor. These factors, together with the austerity they entail in the positing of both psychological and linguistic entities, render the model intrinsically desirable. It seems to me that linguistic theorists should want to make it work as their first option and should abandon it only with great reluctance.

2. Psychological Phenomena

I start by recognizing a number of basic and very general psychological phenomena that are essential to language but certainly not limited to it. The first of these, which I refer to as **entrenchment**, has also borne such labels as "routinization," "automatization," and "habit formation." The occurrence of psychological events leaves some kind of trace that facilitates their reoccurrence. Through repetition, even a highly complex event can coalesce into a well-rehearsed routine that is easily elicited and reliably executed. When a complex structure comes to be manipulable as a "pre-packaged" assembly, no longer requiring conscious attention to its parts or their ar-

rangement, I say that it has the status of a **unit**. It is convenient notationally to indicate unit status by means of boxes or square brackets, enclosing non-unit structures with closed curves or parentheses: [A] vs. (A).

A second basic phenomenon, **abstraction**, is the emergence of a structure through reinforcement of the commonality inherent in multiple experiences. By its very nature, this abstractive process "filters out" those facets of the individual experiences which do not recur. We will mostly be concerned with a special case of abstraction, namely **schematization**, involving our capacity to operate at varying levels of "granularity" (or "resolution"). Structures that appear very different when examined in fine-grained detail may nonetheless be quite comparable in a coarse-grained view. A **schema** is the commonality that emerges from distinct structures when one abstracts away from their points of difference by portraying them with lesser precision and specificity. I use a solid arrow for the relationship between a schema and a more specific structure that **instantiates** or **elaborates** it: A → B. The formula indicates that B conforms to the specifications of A but is characterized in finer-grained detail.

Also fundamental to cognition is the ability to **compare** two structures and detect any discrepancy between them. This operation involves an inherent asymmetry, whereby one structure functions as a **standard** of comparison, the other as its **target**. We can reasonably consider **categorization** to be a special case of comparison, obtaining when the standard represents an established unit and the target (at least originally) is novel. Categorization is most straightforward when there is no discrepancy, i.e. when the standard can be recognized in the target because the latter fully satisfies its specifications. In this case the two structures stand in an elaborative relationship: [A] → (B). An act of categorization may also register some disparity between the categorizing structure and the target. In this case I speak of **extension**, indicated with a dashed arrow: [A] ---> (B).

Yet another basic phenomenon is the combination of simpler structures to yield a more complex structure. Let us call this **composition**. It involves the **integration** of two or more **component** structures to form a **composite** structure. If [A] and [B] are units, not previously combined, their integration to produce the novel composite structure (C) can be given as follows: ([A] [B])$_C$. The formula should not however be taken as implying that (C) is merely the union of [A] and [B], nor that [A] and [B] occur unmodified in (C). When motor routines are chained together into a complex action, their coordination entails that no component routine is manifested in precisely the form it would have in isolation; typing *kl*, for instance, is not just the same as typing *k* then typing *l*. The same is clearly true of speech sounds, and (I would argue) of most any kind of conceptual integration. A composite structure has to be regarded as an entity in its own right, not

strictly reducible to it components. For this reason I speak of **partial compositionality**.

Let us mention, finally, the well-known phenomenon of **association**, in which one kind of experience is able to evoke another. The particular kind of association that concerns us is **symbolization**: the association of conceptualizations with the mental representations of observable entities such as sounds, gestures, and written marks. An established symbolic relationship—a **symbolic unit**—is conveniently given as [[A] / [a]], where upper and lower case stand respectively for a conceptualization and a symbolizing structure. A symbolic structure is said to be **bipolar**: [A] is the **semantic pole**, and [a] the **phonological pole** (in the case of sounds).

While there may be differences in approach and terminology, I consider it self-evident that something akin to each phenomenon has to be ascribed to cognition generally and to language in particular. It should also be evident that these operations occur in various combinations, some applying to the results of others. Composition, for example, is applicable to its own output—composite structures can in turn function as components integrated to form a more elaborate composite structure. Repeated episodes of composition yield constituency hierarchies having indefinitely many levels of organization. Here is another plausible sequence of operations: (A$_1$), (A$_2$), (A$_3$) > [A] > ([A] → (A$_4$)) > [[A] → [A$_4$]]. From a series of similar experiences, represented as (A$_1$), (A$_2$), and (A$_3$), a schema emerges that embodies their commonality and achieves the status of a unit, [A]. This structure is subsequently used to categorize a new experience, (A$_4$), which instantiates it. If (A$_4$) recurs and continues to be recognized as an instance of [A], both it and the categorizing relationship undergo entrenchment and gain unit status. [[A] → [A$_4$]] then constitutes an established categorization.

I suggest that repeated applications of such processes, occurring in different combinations at many levels of organization, result in cognitive assemblies of enormous complexity. The vision that emerges is one of massive networks in which structures with varying degrees of entrenchment, and representing different levels of abstraction, are linked together in relationships of categorization, composition, and symbolization. This is precisely the view of language that I advocate, and for many years I have been trying to demonstrate that all facets of linguistic structure can be reasonably described in these terms.