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Joan Bybee

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pp. 238

The central assertion of this book is that the mental representation of the phonology of each word must maintain a detailed record of the usage of that word. Crucial evidence for this is that frequency of usage (token frequency) has a substantial effect on the susceptibility of a word to undergo analogic, regularising change, while the number of words with a similar phonological shape (type frequency) determines the extent to which those words group together in 'gangs' and thereby behave in a similar fashion, with for example in English a gang of words such as *cling*, *fling*, *sling*, *sting*, *string* and *swing* supporting each other in the maintenance of an irregular pattern for their past tense inflections.

According to Bybee, not only are detailed frequency records maintained in the lexicon, but the brain also keeps track of co-occurrence with other words. Consequently, when trying to explain seemingly complex phenomena such as the use of linking consonants in French, one only needs to make reference to the frequency of co-occurrence of a pair of words in order to determine the patterns of liaison between them, and this provides evidence that the brain also maintains substantial information about the context in which a word is used. In the past, many researchers have tried to interpret French liaison phenomena in terms of syntactic structures, but Bybee suggests that such efforts are doomed to failure as only the frequency of co-occurrence is relevant.

Thus a fundamental aspect of the model outlined in this book is that the lexical representation of each word must be substantially richer than a simple set of segment-sized elements such as phonemes. In fact, Bybee claims that it is not just the full surface realisation of each word that is kept in the lexicon, but also that traces of at least some individual exemplars must be stored as well, as a single prototype for

a word would be inadequate to keep track of the occurrence of different variants. In addition, she claims that the lexicon maintains a full mental representation for all inflectional variants of words, including regular forms such as *works*, *worked*, and *working*, which are stored in their entirety in a dense network of closely linked but separate entries, and furthermore that frequently occurring phrases such as *don't know* and *going to* are also stored, allowing an easy path for the development of compact forms such as *dunno* and *gonna*.

Of course, this kind of model which proposes such a massively inefficient system of lexical storage will be highly controversial, as it conflicts directly with the fundamental assumptions of traditional structuralism as well as generative phonology, both of which claim that the lexicon is organised in a highly efficient representation based on segment-sized units entirely eschewing the storage of any kind of redundant information. Bybee argues that the intricate phonological rules of generative phonology which operate to derive the surface form of each word from a simple and efficient underlying representation are implausibly complex, and so such processes are completely absent from the usage-based system that she envisages. Instead of the traditional assumption that lexical storage is efficient but derivation of the surface form may be complex, she proposes that our huge mental capacity actually means that efficiency of storage is not an issue and so there is no problem for the mental lexicon to include plenty of redundant information. Furthermore, if there are essentially no phonological rules to convert an underlying representation into the surface form of a spoken word with all its allophonic detail, this can explain how production of a word can be very quick.

What role, then, is there for phonology if the brain stores a full allophonic representation of the surface form of each word, even including a range of variants? Bybee proposes that phonology emerges from the data, as a summary of regularly occurring patterns, and that to understand the common sound patterns

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252

found throughout the languages of the world, it is essential to consider the diachronic effects of natural phonological processes such as assimilation, reduction of coda consonants, and the merging of sounds. The evolution of languages along natural paths that seek to balance ease of articulation with efficiency of comprehension can be expressed in terms of rules, and similarly the end product of this diachronic process can be described by means of a complex phonology, but descriptive rules such as these are radically different from the kind of derivational rules that have so often been proposed elsewhere.

Some of the details of the model of lexical storage outlined in this book are not fully fleshed out. For example, if lexical representation is not in terms of segment-sized units, where do phonemes come from? If a complete record of each word is stored in the brain, there seems nothing to stop each word having a completely idiosyncratic vowel, so how is it that different listeners can generally agree on the number of distinct vowels in a language? Is this a product of our all-encompassing, general-purpose tendency to categorise things, so that for example we tend to subdivide the visible frequency spectrum into a small number of colours even though there is no physical basis for such a classification? Indeed, Bybee suggests that language makes use entirely of general-purpose cognitive faculties, denying a role for the kind of dedicated language-processing modules in the brain that have been proposed by Chomsky and others. So is vowel categorisation similar to the classification and naming of colours? Or do the vowels of different words naturally congregate into a small number of distinct regions of the auditory vowel space which listeners can subsequently generally agree on? If so, how? Furthermore, the nature of the mental representation of words is not entirely clear. Although Bybee provides useful diagrams illustrating the links between words with the same start, the same

end, and similar meaning, and she furthermore suggests that the phonological representation of words is in terms of gestures, it is never quite clear exactly what shape those gestures take.

Although some of the details of the model could benefit from further elaboration, in order to support her assertions, Bybee does provide substantial evidence from 20 years of research, particularly on the nature of regular and irregular inflections in English, the shared patterns of various declensions of verbs in Spanish, and the occurrence of word-final liaison in French. Apart from a brief survey of the phonological structure of syllables of different languages (pp. 208–210), nearly all the material is from European languages, which is perhaps a pity as a more substantial consideration of a wider range of languages would be likely to provide important data in a number of areas pertinent to the model. However, her data is always thoroughly presented and clearly explained, and in the end one has no reason to suppose that lexical storage in English and Spanish is fundamentally different from that in Chinese or Korean, so the conclusions that are presented in this book on the basis of meticulous research into a few European languages do have solid, substantial, well-argued evidence to support them.

Inevitably, many readers will disagree with the conclusions that are drawn by Bybee, but they are presented elegantly and carefully, and all the material is richly thought-provoking. The fresh insights into the nature of phonology that are presented in this book, based on the recent work not just of Bybee but also of many researchers from around the world, will be of great value and interest to all phonologists, and even those who do not agree with her conclusions should find most of the material exceptionally stimulating.

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