Michael A. Arbib

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Against innate grammatical categories

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Abstract: Arbib claims that grammatical categories like noun, verb, and adjective derive not from evolved genetic programming but from "post-biological" historical processes. This position is supported by data from linguistic typology and language acquisition suggesting that natural human languages contain a huge, open-ended spectrum of historically shaped, constructionally based, hierarchically organized, and distributionally learned grammatical categories.

Arbib claims that "the progression from protosign and protospeech to languages with full-blown syntax and compositional semantics was a historical phenomenon in the development of *Homo sapiens,* involving few if any further biological changes" (Abstract), and that "many ways of expressing relationships that we now take for granted as part of language were the discovery of *Homo sapiens,* e.g., adjectives and the fractionation of nouns from verbs may be 'post-biological' in origin" (Section 2.0). He thus rejects the popular view that the human genome contains instructions for building into our brains an evolutionarily specialized neurocognitive adaptation called Universal Grammar (UG) which includes, among other devices, grammatical categories (GCs) like noun, verb, and adjective that serve as the building blocks of all languages and that facilitate language acquisition during childhood (e.g., Jackendoff, 2002; Pinker, 2003; Pinker & Jackendoff, in press). Instead, he aligns himself with the alternative view that over the course of hundreds (or perhaps thousands) of generations of historical language transmission and change, grammatical systems, including GCs, gradually emerged and became increasingly complex, perhaps according to well-known processes of grammaticalization that may be a byproduct of certain social-cognitive and symbolic-communicative adaptations (e.g., Givon, 1998; Heine & Kuteva, 2002; Tomasello, 2003b). While acknowledging that these are thorny, controversial issues (Christiansen & Kirby, 2003), I argue that at least as far as GCs are concerned, Arbib's position is supported by recent work in the fields of linguistic typology and language acquisition.

Croft (1991, 2000, 2001) develops a theory of GCs that is worth summarizing here because it is quite compatible with Arbib's approach and has also influenced relevant research in linguistics (e.g., Goldberg, 2003), developmental psycholinguistics (e.g., Tomasello, 2003a), and neurolinguistics (e.g., Kemmerer, 2000a,b, 2003; Kemmerer & Wright, 2002). The main thrust of this theory is that (*pace* Baker, 2003) there is no empirical evidence for highly general, universally shared GCs of the sort posited by adherents of the UG framework; instead, GCs are both language-specific and construction-specific.

GCs are identified primarily by formal criteria, i.e., by the occurrence or nonoccurrence of words in various morphological and syntactic constructions. But when this classic "distributional method" is rigorously applied in crosslinguistic comparisons, one inevitably finds that the constructions used as diagnostics for GCs in some languages are either completely absent in others or are employed in ways that seem bizarre compared to English. To take a straightforward example, inflectional criteria are commonly used to distinguish GCs, and in fact GCs do exhibit the following inflectional tendencies crosslinguistically: nouns are often marked for case, number, gender, size, shape, definiteness, and possession/alienability; verbs are often marked for tense, aspect, mood, modality, transitivity, and agreement; and adjectives are often marked for comparative, superlative, intensive, and approximative. However, some languages, like Vietnamese, lack all inflection, precluding the use of inflectional criteria for identifying GCs; and other languages have inflection but employ it in a surprising manner, as exemplified by Makah, which applies aspect and mood markers not only to words for actions that are translated into English as verbs, but also to words for things and properties that are translated into English as nouns and adjectives. Croft (2001, p. 31) notes that if one assumed that inflection for aspect and/or mood was a universal diagnostic feature of verbs, one would have to conclude that no words are verbs in Vietnamese and that nearly all words are verbs in Makah. His solution to terminological quandaries like this (and there are many of them) is to reject the UG theory of GCs—a theory that is Eurocentric at root—and focus instead on the more substantive task of identifying the GCs of individual languages according to the unique constructions of those languages, thereby respecting the diversity of grammatical systems. He also argues, however, that it is still possible to ground a universal theory of GCs in semantic and pragmatic prototypes. Thus, crosslinguistically, prototypical nouns specify objects and have referential functions, prototypical verbs specify actions and have predicative functions, and prototypical adjectives specify properties and have modifying functions.

As the American structuralists discovered (e.g., Bloomfield, 1933; Harris, 1946, 1951), when the distributional method is carefully adhered to in the study of particular languages, one routinely finds that the set of words that fill the role of a GC in one construction are rarely 100% identical to the set of words that fill the role of what is supposedly the same GC in another construction; instead there are distributional mismatches that spread far and wide across many constructions. This was robustly verified by Gross (1979), who found that in a large-scale grammatical model of French containing 12,000 words and 600 rules, no two words had exactly the same distribution across constructions, and no two constructions licensed exactly the same set of words. More recent research indicates that particular languages usually contain a vast number of GCs arranged in a multidimensional network or inheritance hierarchy with extremely narrow-range GCs at the bottom and more broad-range GCs at the top (e.g., Croft, 2001; Culicover, 1999; Davis, 2001; Francis & Michaelis, 2003; Malouf, 2000; Taylor, 2004). Culicover (1999) presents dozens of detailed analyses of highly restricted GCs in English—e.g., the quantifier *enough* follows the adjective that it modifies (*tall enough*), while *too, very, this, that, so,* and *how* precede the adjective (*too tall, very tall, this tall,* etc.). Regarding the traditional GCs of noun, verb, and adjective in English, each of them decomposes into a cluster of GCs with varying degrees of generality. All English nouns occupy the head position in subject noun-phrases, but, importantly, this is a construction-specific property (as well as a language-specific property, since not all languages have "subjects" like English; cf. Dryer, 1997), and further investigation leads to a proliferation of subclasses such as pronouns, proper nouns, count nouns, and mass

nouns, each of which breaks down into even smaller and quirkier groupings—e.g., proper nouns for days of the week and months of the year require different spatially-based prepositions when used in expressions for temporal location (*on/*in Saturday, in/*on August*; cf. Kemmerer, in press). As for English verbs, they all inflect for tense/aspect in main clauses, but again this is a construction-specific property justifying only the category that Croft (2001) calls "morphological verb," and closer scrutiny reveals that verbs display a tremendous range of distributional diversity, fractionating into roughly 50 classes and 200 subclasses based on combined syntactic and semantic criteria (Levin, 1993). Finally, there are apparently no distributional criteria that justify a single overarching adjective category in English, as suggested by facts like the following. Some adjectives are both attributive and predicative (*the funny movie, that movie is funny*) whereas others are only attributive (*the main reason, *that reason is main*) or only predicative (**the asleep student, that student is asleep*) (Bolinger, 1967). Moreover, when multiple adjectives occur prenominally, their linear order is determined primarily by which of several semantically and pragmatically defined subclasses they belong to, thus accounting for why it is grammatical to say *the other small inconspicuous carved jade idols* but not **the carved other inconspicuous jade small idols* (Bache, 1978; Kemmerer, 2000b; Martin, 1969; Quirk et al., 1985).

Turning to issues involving language acquisition, Culicover (1999) uses the logic of learnability theory to argue that children do not really need the kind of GCs that proponents of the UG framework posit as elements of an innate language faculty: "If it can be shown [as it obviously can] that the subcategories must be learned, then there is little basis for assuming that the major categories are not learned" (p. 41). He therefore denies the "Universal Category Hypothesis" and defends the alternative "Contingent Category Hypothesis," which maintains that the learner "has to compare all of the words of the language with one another, form hypotheses about which of them function in a similar way, and on the basis of these similarities determine what the categories are" (p. 37). From a more empirical perspective, Tomasello (2003a) invokes extensive naturalistic and experimental data to demonstrate that children do appear to induce the myriad GCs of particular languages in a manner similar to what Culicover proposes—namely through a process of "functionally based distributional analysis" (p. 169) which entails starting with simple, frequently occurring constructions that serve very basic communicative purposes, and gradually shifting to more complex, infrequent constructions that have more specialized functions.

Taken together, these considerations support the view that human languages contain a huge, open-ended spectrum of historically shaped, constructionally based, hierarchically organized, and distributionally learned GCs—a view that is very much along the lines of what Arbib's framework implies.

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