

Discussion

On Cultural Constraints on Pirahã Grammar

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Everett's contribution (CA 46:621–46) has the merit of shedding new light on the relationship between culture and language. Cultural influence on the human mind has been recognized for a long time, but despite culture-based variation one can reasonably assume the existence of some universally shared components of human psychology. A universal core is crucial for the individuation of specific cognitive faculties. Since Darwin, the evidence of universal tendencies in the expression of emotions and their recognition through facial expressions testifies to a common emotional processing system in the brain (Ekman 1998).

During the past few decades, new methodologies, in particular positron emission tomography and functional magnetic resonance imaging, have made possible the *in vivo* functional exploration of the brain. Scientists may now venture into the frontier of the mind's neural basis, identifying the brain structures involved in specific mental activities. This approach is not limited to basic perception and cognition but embraces emotions, social behaviour, and spirituality, providing psychological and anthropological research with more biologically founded data (Pietrini, Furey, and Guazzelli 1999; Pietrini 2003). For those who study the neural basis of psychology, cross-cultural research asks whether, and how, culture and environment can shape the brain.

According to recent data, musical training produces different brain responses in professional as opposed to amateur musicians (e.g., Lotze et al. 2003) and may eventually determine changes in brain structure (Gaser and Schlaug 2003). Such differences may account for higher performance in skilled individuals, as suggested for London taxi drivers, whose hippocampus volume increases as a consequence of the development of navigational skills (Maguire et al. 2000). By contrast, the brain seems to be equipped with neural networks for music recognition that are universally shared and not affected by cultural familiarity (Morrison et al. 2003). Indeed, functional exploration of the brain allow us to assume

the existence of universal neural patterns devoted to universal functions of the mind. Similarly, with regard to language, universal core components are expected to rise above the differences stressed by ethnolinguistics (e.g., Enfield 2002). However, on the basis of his Pirahã language analysis, Everett states that “if the form or absence of things such as recursion, sound structure, word structure, quantification, numerals, number, and so on is tightly constrained by a specific culture, . . . then the case for an autonomous, biologically determined module of language is seriously weakened.”

Findings from functional brain studies have suggested the existence of cerebral regions universally involved, although not uniquely specialized, in language processes (Démonet, Thierry, and Cardebat 2005). Such regions respond to a variety of signals provided with communicative intentions: words, gestures, and even whistles, as in the *silbo* code of Canarian shepherds (Carreiras et al. 2005). Interestingly, Everett reports that Pirahã make extensive use of whistling, humming, and singing for communicative purposes. Moreover, traditional language areas are activated when subjects are required to learn universal-grammar-consistent rules but not when the task involves prescriptions inconsistent with it (e.g., “always put the negative word after the third word in the phrase”) (Musso et al. 2003). These results may suggest the existence of a neurobiological basis for universal grammar.

Universal grammar is a chimera in many respects. Its concrete rules have not been identified, but surely they have nothing to do with sound structure, word structure, quantification, numerals, number, verbal aspect, pronoun system, etc., that is, with the linguistic features that Everett considers. Thus, the absence (or limited nature) of these features in Pirahã cannot be used as an argument against universal grammar. Moreover, typologically, the behaviour exhibited by Pirahã is not so exotic. The only feature of universal grammar for which a substantial claim can be made at present is recursion. Significantly, because of cognitive and physical constraints, recursion is not unlimited (Hauser, Chomsky, and Fitch 2002). According to Everett, recursion is dramatically limited in Pirahã, but the examples he provides demonstrate that Pirahã does allow for recursion at least in limited domains.

Since Pirahã is undoubtedly a human language, by hypothesis it must have some universally shared features. Where are they, if not in universal grammar? Judging from the available information, Pirahã-speakers do not produce utterances incompatible with universal grammar. The hypothesis that the Pirahã neural mechanisms for language have been shaped by culture, besides being unique, remains to be proven. Functional investigation of the brain may play a key role here in revealing the neural correlates of complex linguistic processes at the culture-brain-cognition interface. Our group is investigating the brain basis of multifaceted linguistic domains such as the-moral-of-the-story (Nichelli et al. 1995) and metaphor (Bambini et al. 2005). Indeed, some aspects of metaphor have

recently been described as culture-specific (Goddard 2004), challenging the universality of metaphor as a cognitive operation. Supposedly, Pirahã culture may have played a role in shaping, for instance, the capacity for metaphor, but the hypothesis that this extends to grammatical domains seems rather daring.

Reply

The authors of this comment are courteously critical of my proposal that culture constrains grammar in Pirahã. Their objections are three. First, since Pirahã obviously shares features with other grammars, then, they reason, since universal grammar is the only source available for such similarities, Pirahã cannot be a problem for universal grammar. Second, Pirahã clearly shows recursion, so how can I claim that it doesn't have it? Third, they find my proposal that culture constrains grammar in Pirahã "daring" (a nice euphemism)—in other words, they are far from convinced. I will answer these in turn. I will also take this opportunity to answer a number of queries on the immediacy-of-experience principle proposed in my article so that the connection between culture and grammar will be clearer to syntacticians, naturally sceptical of such a connection.

With regard to universal grammar, I have pointed out in Everett (2005b, 2005c) in response to Anderson and Lightfoot (2002, 2005) that this is a relatively anemic hypothesis which not only fails to establish its core proposal, namely, that the stimuli in the environment are too poor to underwrite language acquisition, but is far from the only hypothesis available to explain cross-linguistic regularities (see especially Simon 1996 and Tomasello 2005).

With regard to recursion, I was referring primarily to the kind illustrated in (1) (often called "embedding"),

$$(1) \quad A \rightarrow AB$$

rather than the kind represented in (2) (system recursion):

$$(2) \quad \begin{array}{l} \text{a. } A \rightarrow BC \\ \text{b. } B \rightarrow DE \\ \text{c. } C \rightarrow AF \end{array}$$

In the original paper, I showed evidence against 1 when I often meant 2. Because of this lack of clarity, Bambini and colleagues are correct that in some examples Pirahã seems to have system recursion but not embedding. However, in work in progress I tighten up the arguments (thanks to comments by syntacticians David Pesetsky and David Adger) so as to rule out system recursion as well, thus strengthening the case against the view of "creativity in human language" advocated by Hauser, Chomsky, and Fitch (2002).

With regard to the cultural constraint on grammar, the following restatement represents a significant simplification over the original proposal, since it eliminates the ancillary

clause on lack of embedding: Declarative Pirahã utterances contain only assertions related directly to the moment of speech, either experienced (i.e., seen, overheard, deduced, etc., as per the range of Pirahã evidentials [see Everett 1986, 289]) by the speaker or witnessed by someone alive during the lifetime of the speaker.¹ This captures exactly the facts that were listed in the article:

Lack of embedding: Since embedded sentences are not assertions (Cristofaro 2005), they cannot be used. To avoid these, the grammar of Pirahã will not have rules of the type in 1 above. If I am successful in demonstrating that there are no prepositional phrases or verb phrases in Pirahã, I will have also demonstrated the lack of recursion more generally in the grammar.

Absence of number and numerals: These are skills that have both immediate and wider application, ranging beyond immediate experience. Since the latter uses would violate the immediacy-of-experience principle, however, these are not available in the grammar (interestingly, counting and numerals involve recursion, which could be taken as evidence that Pirahã lacks *all* recursion).

Absence of relative tenses: These involve assertions defined in terms other than the moment of speech. When I say in Pirahã, "When you arrive, I will go," as I show in Everett (1993), both "arriving" and "going" are defined relative to the moment of speech. (Again, however, one could argue that relative tenses involve recursion and so are for this reason unavailable.) More complex tenses would violate the immediacy-of-experience principle.

Simplicity of kinship terms: All kinship terms are related directly to the one speaking (the controller of the "moment of speech," i.e., ego), and none are defined in terms of other relations (i.e., there are no kinship terms that involve recursion, e.g., grandfather, grandson).

Absence of color terms and quantifiers: Color terms and quantifiers can identify immediate experiences, as can numbers, but, like numbers, are avoided by the grammar because they also entail a significant component of ranging beyond immediate experience.

Absence of myths and fiction: These violate the evidentiality constraint in the immediacy-of-experience principle.

One reader wondered why Pirahã has nouns if it avoids expressions that can violate immediate experience, since there could be, for example, abstract nouns. First, Pirahã lacks abstract nouns. Second, it cannot do away with the (semantic) category of nouns, because all languages must have terms that represent entities and terms that provide information about them.

Again, I am making no claims that Pirahã reasoning lacks

1. The original formulation (2005a, 622) was: "Grammar and other ways of living are restricted to concrete, immediate experience (where an experience is immediate in Pirahã if it has been seen or recounted as seen by a person alive at the time of telling), and immediacy of experience is reflected in immediacy of information encoding—one event per utterance." David Adger (personal communication) rightly points out that I will need to discuss how this applies to modality.

recursion, for example. In fact, I would be shocked to learn that it did. But this recursion is lacking in the grammar. The crucial point again is that Pirahã culture constrains Pirahã grammar and that the lack of embedding, etc., follow from the cultural value in the immediacy-of-experience principle, showing that cultural forces may play an evolutionary role in shaping grammars.

—Daniel L. Everett

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