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## Pirahã Exceptionality: A Reassessment

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## PIRAHÃ EXCEPTIONALITY: A REASSESSMENT

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Everett (2005) has claimed that the grammar of Pirahã is exceptional in displaying ‘inexplicable gaps’, that these gaps follow from a cultural principle restricting communication to ‘immediate experience’, and that this principle has ‘severe’ consequences for work on universal grammar. We argue against each of these claims. Relying on the available documentation and descriptions of the language, especially the rich material in Everett 1986, 1987b, we argue that many of the exceptional grammatical ‘gaps’ supposedly characteristic of Pirahã are misanalyzed by Everett (2005) and are neither gaps nor exceptional among the world’s languages. We find no evidence, for example, that Pirahã lacks embedded clauses, and in fact find strong syntactic and semantic evidence in favor of their existence in Pirahã. Likewise, we find no evidence that Pirahã lacks quantifiers, as claimed by Everett (2005). Furthermore, most of the actual properties of the Pirahã constructions discussed by Everett (for example, the ban on pronominal possessor recursion and the behavior of WH-constructions) are familiar from languages whose speakers lack the cultural restrictions attributed to the Pirahã. Finally, following mostly Gonçalves (1993, 2000, 2001), we also question some of the empirical claims about Pirahã culture advanced by Everett in primary support of the ‘immediate experience’ restriction. We conclude that there is no evidence from Pirahã for the particular causal relation between culture and grammatical structure suggested by Everett.\*

*Keywords:* Pirahã, embedding, recursion, possessor, WH-movement, correlatives, numerals, myth, culture, universals, cosmology, parameters

**1. HOW SURPRISING IS PIRAHÃ GRAMMAR?** In a recent article in *Current Anthropology*, Everett (2005, henceforth *CA*) presents a series of general conclusions about human language, reached as a consequence of his investigations into the grammar of the language Pirahã. The focus of Everett’s discussion is the syntax and lexicon of Pirahã, and a ‘cultural constraint’ to which the syntax and lexicon are said to be subject.

Pirahã is a predominantly SOV language spoken by a small community of speakers living by the Maici River in Amazonas, Brazil.<sup>1</sup> It appears to be the last surviving member of the Mura language family (Nimuendajú 1948, Everett 1986). Most of the information available about the syntax and lexicon of Pirahã comes from Everett’s own earlier work, in particular his dissertation from the Universidade Estadual de Campinas (published in Portuguese as Everett 1987b, henceforth *DISS*) and a lightly revised English translation of the dissertation’s descriptive sections included in the *Handbook of Amazonian languages* (Everett 1986, henceforth *HAL*). A small number of other articles, most notably Everett 1987a, provide some further information. An online source (now unavailable), Everett 1998a, formerly offered a few glossed and translated texts. For

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<sup>1</sup> Currently approximately 250, according to Cahill (2004), a three-fold increase over the population reported in the 1970s. But see also Gonçalves 2000, which cites a 2000 figure of 360.

Pirahã culture, a principal source is the work (in Portuguese) of the Brazilian anthropologist Marco Antônio Gonçalves (Gonçalves 1993, 2001), which we draw on below. A nontechnical presentation available on the Web of some of this material (in both English and Portuguese), along with related material on Pirahã culture and language, is Gonçalves 2000.

Everett (CA:621) begins with a number of properties of Pirahã grammar that he describes as ‘very surprising’. These properties of Pirahã grammar are claimed to have a common explanation rooted in certain equally ‘surprising’ properties of Pirahã culture. Everett claims to advance a common explanation for both the grammatical and the cultural properties. He suggests that ‘Pirahã culture severely constrains Pirahã grammar in several ways, producing an array of otherwise inexplicable “gaps” in Pirahã morphosyntax’ (CA:622). In addition, he presents the cultural explanation for the morphosyntactic gaps as a challenge to foundational ideas in linguistics:

These constraints lead to the startling conclusion that Hockett’s (1960) design features of human language, even more widely accepted among linguists than Chomsky’s proposed universal grammar, must be revised. With respect to Chomsky’s proposal, the conclusion is severe—some of the components of so-called core grammar are subject to cultural constraints, something that is predicted not to occur by the universal-grammar model. (CA:622)

In this article, we argue against these claims. We suggest that some of Pirahã’s supposed ‘inexplicable gaps’ (both linguistic and cultural) are illusory, nonexistent, or not supported by adequate evidence, and that the remaining linguistic ‘gaps’ are shared with languages as diverse as German, Chinese, Hebrew, Wappo, and Adyghe. Since these are languages spoken within cultures that do not share the key properties of Pirahã culture as described by Everett, the arguments for ‘startling’ or ‘severe’ conclusions are significantly weakened.

The grammatical gaps and cultural properties that Everett considers important are given in 1 (CA:621).<sup>2</sup>

(1) Pirahã gaps

SYNTAX

a. the absence of embedding

LEXICON/SEMANTICS

b. the absence of numbers of any kind or a concept of counting and of any terms for quantification

c. the absence of ‘relative tenses’

d. the absence of color terms

e. the simplest pronoun inventory known

CULTURE

f. the absence of creation myths and fiction<sup>3</sup>

g. the absence of any individual or collective memory of more than two generations past

h. the fact that the Pirahã are monolingual after more than 200 years of regular contact with Brazilians

i. the absence of drawing or other art

j. the simplest kinship system yet documented

k. one of the simplest material cultures documented

<sup>2</sup> We have taken the liberty of reordering the claims and numbering them, but they are otherwise quoted directly.

<sup>3</sup> This claim also appears in a more general form, as discussed in §5.

All of these supposed properties of Pirahã language and culture are claimed to follow from a single ‘cultural constraint’, the IMMEDIACY OF EXPERIENCE PRINCIPLE.

- (2) IMMEDIACY OF EXPERIENCE PRINCIPLE (IEP): Communication is restricted to the immediate experience of the interlocutors. (*CA*:622)

Our first general point of disagreement with *CA* concerns Everett’s presentation and analysis of the facts of Pirahã grammar. We have examined Everett’s data and conclusions in *CA* in light of what we can learn of the language from both *CA* and from the previous literature, including available examples and connected texts. Much of our report concerns claim 1a about embedding, since this is the point said to most directly challenge ‘Chomsky’s proposed universal grammar’. We believe that many of the seemingly exotic and inexplicable phenomena that supposedly bear on the question of embedding are incorrectly analyzed in *CA*. In fact, we show below that considerations of word order and semantic scope argue in favor of the existence of embedding in Pirahã. Moreover, the constructions and restrictions discussed by Everett in this connection turn out to be neither exotic nor otherwise inexplicable, but show properties that are known (and in some cases well known) from other languages of the world.

We have also looked into the evidence for claim 1b concerning quantification, but have examined in less detail the other lexical gaps claimed for Pirahã.<sup>4</sup> In these domains, the relevance of Everett’s empirical claims to the IEP is much less clear. Furthermore, the properties summarized in 1b–e, to the extent that they are true of Pirahã, are attested in other languages as well (just like property 1a, the putative lack of embedding).

This claim is of most direct relevance to our second point of disagreement with *CA*, which concerns the proposed causal link between Pirahã culture and grammar. If we are correct in our first point, then the phenomena of Pirahã that are crucial to Everett’s claims are found in other languages as well. To the extent that speakers of these other languages participate in widely divergent cultures that do not share the supposedly surprising features of Pirahã culture, we are left with no argument that the grammatical peculiarities of Pirahã under discussion in *CA* require a cultural explanation in terms of the IEP. We also have reasons for skepticism about some of Everett’s assertions concerning Pirahã culture itself, though we only touch on this issue in §5. If our skepticism in this domain is warranted, then the IEP as stated in 2 is not just irrelevant to grammar; it also fails as an observation relevant to Pirahã culture.

Our final point of disagreement with *CA* concerns the claim of ‘startling’ or ‘severe’ conclusions concerning ‘the universal-grammar model’ (p. 622). For one thing, if the facts themselves have been mischaracterized and misanalyzed, and if no links between Pirahã culture and grammar have been demonstrated, there is nothing more to discuss. But even if the facts were not in dispute, no startling or severe conclusions would necessarily follow.

The term UNIVERSAL GRAMMAR (UG), in its modern usage, was introduced as a name for the collection of factors that underlie the uniquely human capacity for language—whatever they may turn out to be (Chomsky 1965:5ff.). There are many different proposals about the overall nature of UG, and continuing debate about its role in the explanation of virtually every linguistic phenomenon. Consequently, there is no general universal-grammar model for which the claims of *CA* could have consequences—only a wealth of diverse hypotheses ABOUT UG and its content. But *CA*’s

<sup>4</sup> *CA* appeared with brief commentaries by a number of researchers, and a reply by Everett. Many of the points in 1b–e are discussed at length in the commentaries, but the first of these is discussed in less detail, hence our choice of emphasis.

conclusions might indeed bear on PARTICULAR PROPOSALS about UG (just as research on any single language is likely to bear on such proposals). It is therefore worth considering which proposals these might be.

The specific claim at stake appears to be the idea that certain properties of UG are particular to language and do not play a role in other cognitive domains:

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, as I have argued, then the case for an autonomous, biologically determined module of language is seriously weakened. (CA:634)

We believe, however, that the empirical claims of CA not only fail to weaken ‘the case for an autonomous, biologically determined module of language’, but they are also irrelevant to it. Imagine, for the sake of argument, that the list in 1 is valid, and imagine that Everett has also shown a causal connection between the cultural and the linguistic items on the list. Even if such a connection should exist, it poses no conceivable challenge to the proposition that some features of UG are unique to language. After all, no full account of any linguistic data could limit itself to principles of UG. The very existence of linguistic diversity makes it clear that experience plays a key role in the determination of every individual’s grammar, and acts as a constraint on language use as well. Since a speaker’s experience, in turn, is shaped by innumerable social and cultural factors, the existence of systematic links between culture and language is far from unexpected.

As it happens, work within linguistics, as well as cross-disciplinary investigations of ‘ethnosyntax’ (Enfield 2002, Wierzbicka 1979), has already uncovered many ways in which values of cultural importance may be reflected in the grammatical and lexical properties of a language. Forty years ago, Hale (1966) argued that principles of culturally specific kinship organization play a role in the morphosyntax of Australian languages—work that inspired the subfield sometimes called KIN-TAX. Other examples of well-studied interaction between culture and grammar include honorific inflection and social deixis (Prideaux 1970, Shibatani 1990, Langacker 1994, among others), gender and kinship relations as reflected in grammatical differences in men’s and women’s speech (Dunn 2000), spatial deixis (Bickel 2000), and the range of other examples discussed by Enfield (2002) and Evans (2003). Each phenomenon of this sort raises specific questions (including issues of language acquisition and use). But the discovery of an interaction between a cultural and a grammatical feature can be said to challenge a hypothesis about UG only if that hypothesis demonstrably PREDICTS the absence of the interaction. Everett cites no such hypothesis and (most importantly) offers no such demonstration.

We conclude that the claims in 1 are irrelevant to the broad questions about UG that they are intended to engage. We therefore turn our attention to more specific questions. Are the empirical claims about the Pirahã language and culture correct? Which facts about the Pirahã language MIGHT find a predictive causal explanation in Pirahã culture? What does Pirahã teach us about particular linguistic phenomena such as embedding? Questions like these (which could be asked about any language) are interesting for reasons closely connected to our various objections to CA. Although there is no LOGICAL conflict between the ideas about UG just discussed and the possibility that some linguistic properties might covary with culture, actual research often suggests striking DISSOCIATIONS between the properties of a given culture and the grammar of the language(s) spoken within that culture.

It is a common observation that for all their diversity, languages are made to a great extent of familiar pieces, much like the wide variety of shapes and objects that can be assembled from a limited array of Lego blocks. This general characterization of the constrained nature of linguistic variation is consistent with a variety of theories about the nature of the building blocks and the ways in which they may be combined in particular languages. Nonetheless, it still characterizes well the practical experience of linguists who encounter the data of an unfamiliar language. It is in this context that makes it meaningful to describe languages by typologically characterizing their properties ('head-final', 'wh-in-situ', etc.) and to use standard names for these properties, even when describing unfamiliar languages.

The principles-and-parameters research tradition in linguistics explains this common experience as a consequence of specific limitations on linguistic variation provided by UG (Taraldsen 1979, Chomsky 1981, 1995:Ch. 1, Rizzi 1982:Ch. 2, Baker 2001, Anderson & Lightfoot 2002, among many others; see also Newmeyer 2005). UG is thought to characterize the human language faculty in a manner that leaves a number of choices open, with linguistic experience fixing these choice-points in any given person's internal grammar. (See Yang 2002 and Snyder 2007 for recent proposals about the process and for discussion of alternatives.) The recurrent practical experience of linguists discussed above is thought to dovetail with the results of research into the interaction of universal and language-particular aspects of grammar during the actual process of language acquisition.

As a practical matter, a linguist investigating grammar in the manner described above generally embarks upon the task with a theoretical framework in mind—a set of beliefs about aspects of grammar that might be considered almost nonnegotiable and invariant across languages, together with a set of expectations about ways in which languages do vary. As a LOGICAL matter, of course, it is possible that beliefs considered nonnegotiable will turn out to be false, and it is never good to be so rigid about one's expectations that it becomes impossible for a new discovery to offer the element of SURPRISE. One might disagree with Everett's claims about universal grammar, reject the IEP and the claimed link between culture and grammar, and still agree that Pirahã grammar presents us with just such a surprise (in which case, one might wish to rethink aspects of syntactic theory in light of the new results). We argue, however, that most of the properties of Pirahã highlighted by Everett (*CA*) present no such surprise.

Such conclusions might seem mundane, unworthy of special comment. In fact, however, claims that lie at the opposite pole from Everett's can be as interesting as Everett's own. We noted above that the discovery of an interaction between culture and grammar should come as no particular surprise, since we know that grammar is partly molded by experience. If, however, we should discover that the scope of these interactions is limited, and that these limitations are principled, we can then use the contrast between interactions and noninteractions to form new specific hypotheses about UG and the cognitive systems that govern the contrast.

In the sections that follow, we suggest that several of the properties of Pirahã that Everett views as specially constrained by their culture might in fact support the exact opposite conclusion. If we are correct, many of them are properties also found in such languages as German, Adyghe, Quechua, and Korean. If speakers acquire the same types of languages whether their home is a German city, a village in the Caucasus, or the banks of the Maici River in Amazonas, Brazil, we have discovered just the kind of disassociation between language and culture that sheds light on the nature and structure of UG. We find this too to be a possible result of extraordinary interest—not at all mundane, in the end.

Before turning to the substance of our arguments, we should offer a few words about our sources and reasons for relying on them. As we noted earlier, the most comprehensive source of information about Pirahã syntax and morphosyntax is the dissertation in Portuguese and its English rendering by Everett himself (i.e. *DISS* and *HAL*). We are impressed with the clarity and consistency of these sources, which might suggest that this earlier work can serve as a fair guide to basic properties of Pirahã, as well as to those complex properties of the language that it discusses in depth.

Like any linguist's description of any language, *DISS* and *HAL* are presumably imperfect. Even the best, most comprehensive report on a language inevitably leaves important questions unanswered and even unasked (cf. Culicover 2004:131). Furthermore, no descriptive work, especially pioneering work on an undescribed language, is likely to be free of simple error. All things being equal, then, one might expect that the later work would be a more reliable guide to Pirahã than the earlier work, where the two bodies of work differ. One might therefore object to our reliance on earlier sources in preference to *CA*, which offers a very different perspective on the language. We ourselves would agree with this objection, if *CA* or other later work gave us reason to discard the descriptions in *DISS* and *HAL*. This is not the case, however. In fact, a striking characteristic of the *DATA* presented in *CA* is its consistency with the earlier descriptions. The small number of actual Pirahã examples that appear in *CA* look very much like examples familiar from *DISS* and *HAL*. For the most part, they could easily have been included in the earlier works as additional examples of points already made there.

At the same time, *CA* contains statements ABOUT the facts (and analyses that predict new facts) that appear to be directly contradicted by data presented and analyzed in *DISS* and *HAL*. If *CA* had reanalyzed the contradictory data successfully, or pointed to factual errors in the earlier work, it would be very reasonable to part company with *DISS* and *HAL* and seek some new account of the correct facts. This is not, however, the situation. *CA*'s new claims are in general presented with only a cover statement that *CA* 'supersedes any other published or unpublished statement by me on those aspects of Pirahã grammar here addressed' (*CA*:621, n. 1), without any discussion (or even acknowledgment) of specific relevant published counterevidence. *DISS* and *HAL*, by contrast, appear to offer an adequate descriptive framework for understanding not only the data that they present, but most of the new data in *CA* as well.

In general, the Pirahã that emerges from the literature as a whole is a fascinating language—but at the same time, it is just a language among other languages of the world, a claim that casts no aspersions on Pirahã. We mean 'just a language' in the same spirit in which one might say that a cat, human, or armadillo is 'just a mammal'. That observation does not make cats, humans, or armadillos any less fascinating or remarkable in their own right, but calls attention to the unity that underlies the diversity of mammalian species. The Pirahã language described in *DISS* and *HAL*, even when coupled with the Pirahã data offered in *CA*, gives us no cause to suspect that Pirahã displays 'gaps that are very surprising from just about any grammarian's perspective' (*CA*:622). Instead, we devote much of our discussion in the following sections to showing that the Pirahã constructions discussed by Everett in *CA* actually reveal properties of Pirahã that are amply attested elsewhere among the world's languages.

Finally, some remarks about our presentation of data in this article. As a policy, we cite Pirahã examples verbatim as they appear in our sources, with only minor formatting and stylistic changes (e.g. abbreviations of glosses); there are only a few exceptions to this, and they are explicitly indicated. It is important to note, however, that this policy somewhat obscures the actual continuity of the data across our older and newer sources, since Everett's style of presentation differs in the two bodies of work. *DISS* and

*HAL* present Pirahã examples in a standard manner, with dashes and spaces separating morphemes judged to be independent, and with glosses and translations offering a fair approximation of the meaning as rendered into Portuguese (*DISS*) and English (*HAL*). In most cases, one can easily discern the contribution of the individual morphemes to the meaning of the whole. Similar data when presented in *CA*, however, have a rather different character. Morpheme division is more extreme and less semantically transparent. Thus, for example, *CA* offers the gloss ‘cloth arm’ where *HAL* has ‘hammock’, and represents the Pirahã rendering of ‘all’ with the gloss ‘big’.<sup>5</sup> *CA* also makes some terminological choices that may be uncorrected typographical errors. The most important of these is *CA*’s gloss for the nominalizing suffix *-sai*, which is ‘NMLZR’ in *HAL* (*nominalizador* in *DISS*), but ‘nominative’ in *CA*. Note as well that the glottal stop is rendered with an apostrophe in *CA*, and with the letter <x> in *DISS* and *HAL*. In all such cases, however, we retain verbatim the glosses and transcriptions of our sources, in order to facilitate comparison with the originals.

## 2. THE IMMEDIACY OF EXPERIENCE PRINCIPLE AND THE SYNTAX OF EMBEDDING IN PIRAHÃ.

**2.1. COULD ABSENCE OF EMBEDDING FOLLOW FROM THE IEP?** The IEP in 2 is proposed as a unifying causal explanation for the linguistic and cultural gaps listed in 1. For the IEP to be a useful and constructive theory of how culture affects language structure, there should be a logical connection between what the IEP asserts and what it is said to predict. *CA*, however, is quite inexplicit about the logic by which the IEP makes predictions in either the cultural or linguistic domains.

The cultural consequences of the IEP are claimed to be reflected in properties 1f–k, but *CA* itself gives few details about how the IEP actually predicts these properties. (There are also issues of fact at stake in Everett’s (*CA*) characterization of Pirahã culture; see §5.1.) For example, the supposed absence of creation myths presumably arises because no living individual will claim to have been ‘present at the moment of creation’. If the Pirahã were to tell such a narrative, the IEP would be violated, since they could claim neither to have witnessed the creation nor to have heard the myth from someone else who could make such a claim. But *CA* itself does not spell out the connection, so we must fill in the blanks for ourselves. Likewise (as a *Language* referee notes), the

<sup>5</sup> Wierzbicka (2005), in a commentary on *CA*, criticizes *CA*’s glossing practice as ‘exoticiz[ing] the language rather than identifying its genuinely distinctive features. To say that *ti ’ogi* means, literally, “my bigness” (rather than “we”), she objects, ‘is like saying that in English *to understand* means, literally, “to stand under.” To deny that *hi ’ogi* means “all” is to make a similar mistake’ (p. 641). Of course, the more detailed glosses could in principle turn out to reflect the cognitive processes of Pirahã speakers. As it happens, however, Everett himself raised just this issue in his earlier work, in the context of Pirahã compounding, and suggested an answer that differs from the answer implicit in *CA*’s glosses:

The criterion used to classify the examples to follow as compound words rather than merely phrasal constructions is semantic. For example, . . . the syntagmeme *xabagi soixaoxisai* may be understood as ‘toucan beak’ or ‘saw’, according to the context. However, the majority of speakers who, for example, ask me for a saw (or other instrument with a compound name) find it very amusing and surprising when I make some sort of remark relating ‘saws’ and ‘toucan beaks’. In my opinion, they are not even aware of the relationship unless they stop to reflect for a moment. (*HAL*:322)

This paragraph from *HAL* is followed by a presentation of Pirahã N-N compounds with similar properties: ‘foot handle’ (= ‘ladder’), ‘bow vine’ (= ‘bowstring’), and ‘foot leather’ (= ‘shoe’); as well as N-A compounds glossed ‘thorn crooked’ (= ‘scissors’) and ‘mouth big’ (= ‘type of bass (fish)’). Though *CA* offers no comment about these earlier observations (and does not mention the change in glossing style), it is certainly possible that the more detailed style of glossing reflects a more accurate understanding of the language than previously achieved (as a referee points out).

limited material culture and the claimed absence of artistic endeavor among the Pirahã might reflect a culture in which individuals plan and evaluate action strictly in terms of ‘utility for immediate purpose’—but how the IEP actually distinguishes the arts and technologies that the Pirahã accept from those that they reject is once again not made explicit.

The claimed grammatical consequences of the IEP (properties 1a–e) present difficulties of a similar sort that are, if anything, more severe. Once again, *CA* offers few details about how these consequences might actually follow from the IEP. Consider, for example, *CA*’s discussion of the ‘absence of embedding’ in Pirahã. This linguistic gap is perhaps the centerpiece of *CA*, described as ‘[an] unusual feature . . . , perhaps the strangest of all’ (*CA*:628) and unique to Pirahã (*CA*:622). To evaluate this claim, we must first know what the term ‘embedding’ is supposed to mean. *CA* itself characterizes embedding for its purposes as in 3.

- (3) EMBEDDING: ‘putting one phrase inside another of the same type or lower level, e.g., noun phrases in noun phrases, sentences in sentences, etc.’ (*CA*: 622).

The characterization in 3 actually describes ‘self-embedding’ rather than embedding proper (though we use *CA*’s terminology throughout) and is vague on a few key points, including whether ‘putting one phrase inside another’ refers to the structural relation of IMMEDIATE DOMINANCE or merely DOMINANCE and what criteria might identify phrases as ‘of the same type or lower level’. It is also crucial to determine what is meant by PHRASE—in particular, whether it may consist of just one word, or necessarily contains two or more words (e.g. is *John* a nominal phrase in *John arrived?*).

Fortunately, some of these issues can be clarified by examining the data that Everett presents in *CA* as relevant to the issue of embedding. The question of dominance vs. immediate dominance, for example, seems to be settled in favor of simple dominance by *CA*’s discussion of relative clauses. *CA* includes the absence of English-style relative clauses in its list of evidence for the absence of embedding in Pirahã. Since such clauses are immediately dominated not by another clause, but by a nominal phrase, they would not be excluded if ‘putting one phrase inside another’ meant immediate dominance. It is presumably the fact that some higher phrase is clausal (at least the matrix clause) that excludes relative clauses from Pirahã as an illegal instance of a clause ‘embedded’ within another clause. We may also deduce from *CA*’s choice of examples that the criterion of ‘sameness’ relevant to embedding is fairly coarse-grained (perhaps limited to the traditional parts of speech). Otherwise, we might not expect such distinct clause-types as relative clauses and declaratives to count as ‘the same’, when *CA* clearly intends the distinction between them not to matter. Finally, we suspect that the term ‘phrase’ in 3 is intended to single out syntactic configurations containing more than one word, since Pirahã does not exclude noun phrases whose constituents are a pair of bare nouns. Examples include simple possessive constructions (which we discuss at length in the next subsection), as well as the compound nouns mentioned in n. 5. *CA*’s notion of the absence of embedding might therefore be stated in more precise terms as 4.

- (4) Ban on embedding in Pirahã: No phrase  $\alpha$  may dominate a multiword phrase  $\beta$  unless  $\alpha$  and  $\beta$  belong to distinct syntactic categories (under a fairly coarse-grained classification).

If so, we can now ask whether 4 does indeed follow from the IEP as stated in 2. We believe it does not. *CA* appears to suggest that one can get from the IEP to the

absence of embedding in two steps. The first step relates the ‘immediacy of experience’ requirement to a ‘one event per utterance’ restriction.

(5) **Step 1: ‘Immediacy of experience’ entails ‘one event per utterance’:**

‘[Pirahā grammar and other ways of living are restricted to concrete, immediate experience (where an experience is immediate in Pirahā 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 . . . [T]his is not to say that a single event cannot be expressed by more than one utterance but merely that multiple events are not expressed in a single utterance/sentence.’ (CA:622, n. 3)<sup>6</sup>

It is the restriction to one event per utterance, in turn, that is claimed to entail the absence of embedding.

(6) **Step 2: ‘One event per utterance’ entails ‘absence of embedding’:**

‘If indeed there is no embedding in Pirahā, how might this lack be related to cultural constraint? Embedding increases information flow beyond the threshold of the principle of immediacy of information encoding. Although Pirahā most certainly has the communicative resources to express clauses that in other languages are embedded, there is no convincing evidence that Pirahā in fact has embedding . . . This would follow from the principle of immediacy of information encoding, which I take to be the iconic principle constraining the grammar’s conformity to cultural constraint.’ (CA:631)

In fact, however, immediacy of experience does not entail one event per utterance; and the principle of one event per utterance does not predict the absence of embedding.

Consider the first step, from immediacy of experience to one event per utterance. As far as we can tell, these notions are independent. Imagine that X has personally witnessed Y uttering the sentence *A boat is coming*. Suppose X now reports on Y’s action with an English-style embedded clause as in 7.

(7) Y said [that a boat is coming].

The IEP as elaborated in 5 is not violated by 7. The boat’s arrival counts as immediate experience for X since it was ‘recounted as seen’ by the living individual Y; and Y’s speech act is immediate experience because X witnessed it personally. Example 7 does, however, violate the principle of one event per utterance, since it mentions two distinct events, Y’s speech act and the boat’s arrival. An utterance may satisfy the IEP and still violate the principle of one event per utterance, so the latter clearly does not follow from the former. If embedded clauses like the bracketed constituent in 7 are impossible in Pirahā, as claimed in CA, it is at best the principle of one event per utterance that excludes it. Since immediacy of experience does not entail one event per utterance, it is thus irrelevant even as a potential predictor of 4.<sup>7</sup>

<sup>6</sup> In his reply to an earlier version of this article, Everett (2007a:4) offers the following reformulation of the IEP: ‘Declarative Pirahā utterances contain only assertions related directly to the moment of speech, either experienced (i.e. seen, overheard, deduced, etc.—as per the range of Pirahā evidentials, as in Everett ([HAL:]289)) by the speaker or as witnessed by someone alive during the lifetime of the speaker’. This reformulation, as far as we can tell, does not answer the objections that we raise here.

<sup>7</sup> If the IEP is a constraint on communication or ‘ways of living’ (cf. 5), it is not clear why it should care about the ‘utterance’ as a unit at all. All things being equal, we should expect the information communicated by 7 to be uniformly allowed or uniformly excluded by the IEP, regardless of the grammatical means used to convey this information. As we discuss below, however, Pirahā is claimed to disallow 7 but to permit the expression of the same information with two distinct sentences.

Consider now the second step, from one event per utterance to the absence of embedding. This link faces a problem that is just as straightforward: most cases of embedding do NOT invoke multiple events. Suppose that Pirahã speech is limited to one event per utterance, just as CA claims. Such a constraint would indeed block 7, where the embedded clause describes an event distinct from the event described by the main clause. The instances of embedding in 8, however, would not be blocked.

- (8) a. The apple [that I am now looking at] (clause embedded within  
is rotten. clause)  
b. [Mary's brother]'s canoe has a hole. (NP embedded within NP)  
c. Old [men and women] arrived. (conjoined Ns embedded  
within NP)

Neither the relative clause in 8a, nor the possessor in 8b, nor the conjoined nouns in 8c describes a distinct event, yet all three count as embedded. Crucially, all three are constructions claimed to be missing in Pirahã as a consequence of the ban on embedding. Clearly, even if Pirahã did show a general ban on embedding, this ban could not follow from one EVENT per utterance any more than one event per utterance itself follows from the IEP. Consequently, the IEP, the restriction to one event per utterance, and the absence of embedding are three logically independent claims. Even if there were a general ban on embedding in Pirahã, we would have no reason to attribute this ban to the IEP.

The failure of the cultural principle IEP to predict the absence of linguistic structures like 8a–c is not a startling conclusion. We noted earlier that there is a significant body of research devoted to connections between linguistic and cultural phenomena, quite independent of CA. Nearly all this work, however, focuses on how the PRESENCE of a grammatical feature reflects a distinction that has cultural importance (as in the example of Hale's 'kin-tax'). In such domains, it is not hard to imagine a path between culture and grammar. Even here, however, important questions are left open by current research, according to Evans (2003:14), who cautions that this work (characterized as a 'neo-Whorfian renaissance') 'has not been accompanied by a body of work on the complementary question: by what *mechanisms* do cultural preoccupations find their way into linguistic structures'. CA instantiates a much less common type of claim: that the ABSENCE of a grammatical feature reflects the PRESENCE of particular cultural values. In this type of case it is harder to informally discern a path from culture to grammar, precisely because more indirect mechanisms would have to be at work. Consequently, the details become even more important.

Even in the absence of a logical connection between the IEP and the absence of embedding, we might ask whether there is at least some evidence supporting the CONJECTURE that such a connection might exist. Crosslinguistic and cross-cultural investigation might have supplied such evidence. If CA had examined a number of societies with and without the IEP, and a number of languages with and without a ban on embedding, and if a correlation between these properties were observed, we would have good reason to suspect a link, even if we could not yet explain it.<sup>8</sup> In fact, however, CA discusses only Pirahã as an example of a language without embedding, and presents only Pirahã

<sup>8</sup> One example of such a result is Hay and Bauer's (2007) report of a 'robust' but currently unexplained correlation between phonemic inventory size and number of speakers. They arrived at their conclusions on the basis of a survey of 216 languages, including Pirahã. As a consequence of their study, there is now some reason to conjecture that Pirahã's ten-phoneme inventory ('the smallest yet recorded, to my knowledge' (HAL:315)) might be connected to its small number of speakers, even in the absence of a conclusive explanation for such a link. (Hay and Bauer discuss a number of possible proposals, but leave the ultimate explanation unresolved.)

society as an example of a culture with the IEP. Thus, even the weaker claim of an unexplained correlation is unsupported.

There is, however, an even weaker claim that one might fall back on, to which we now turn. If the grammatical properties of Pirahã grouped under the rubric ‘absence of embedding’ were crosslinguistically unusual, one might reasonably believe that their presence in Pirahã requires some special explanation. If, in addition, Pirahã society is also culturally unusual, one might at least SUSPECT that a common factor lies behind the linguistic and cultural properties—even in the absence of facts supporting this suspicion. It is in this context that one might regard as relevant CA’s otherwise puzzling insistence that Pirahã’s gaps are ‘unusual’ and ‘very surprising from just about any grammarian’s perspective’, as well as the claim that Pirahã is the ‘only language known’ that displays gaps such as the absence of embedding (CA:622).

In the immediately following subsections, we argue that the available evidence fails to support even this weakest claim, at least as far as embedding is concerned. We focus first on the syntax of possessors, and then turn to three kinds of embedded clauses: non-*WH*, interrogative, and relative. In each case, we argue that the syntax of Pirahã is neither unusual nor surprising, nor is Pirahã the only language known with the properties under discussion. The relevant properties of Pirahã are attested in other languages, including languages spoken in cultures that do not obey the IEP. There is thus no reason to demand a special explanation for the linguistic properties of Pirahã, and no reason to suspect a correlation with culture in these domains. We conclude with a brief discussion of one construction discussed in CA that does look unusual: the syntax of *gái-* ‘say’. We argue that, whatever its idiosyncrasies, this construction does not provide an argument against clausal embedding in Pirahã, and we suggest a possible analysis for it.

**2.2. CONSTRAINTS ON EMBEDDING: POSSESSIVES IN GERMAN AND PIRAHÃ.** CA’s references to embedding as a syntactic phenomenon absent in Pirahã but present in other languages presuppose the existence of hierarchical phrase structure, a concept common to many research traditions in syntax (e.g. Wells 1947, Chomsky 1975, Sag et al. 2003). In recent work associated with the minimalist program, hierarchical phrase structure is understood as a reflection of the iterated application of the structure-building rule Merge (Chomsky 1995). Since this is the perspective on syntactic structure adopted in much of the work targeted by CA and more recent presentations by Everett (e.g. Everett 2007b, commenting on Hauser et al. 2002), we adopt it as background for our discussion as well. Our observations do not depend on this mode of presentation, however, and may easily be recast in a variety of theoretical frameworks.

Merge takes two linguistic units as input and combines them to form a set (a PHRASE), in which one element is designated as the phrase’s head.<sup>9</sup> Two kinds of linguistic units may serve as input to Merge: (i) lexical items, and (ii) phrases formed by previous applications of Merge. Since Merge may take previous applications of Merge as input, the rule is RECURSIVE. Iterated Merge yields the full variety of phrase structures studied in syntactic research—structures composed of lexical items and phrases that were themselves produced by Merge.

Though recursive Merge may be seen as ‘smart’ in providing for a rich repertoire of structures (complementation, external argument assignment, modification, etc.), it is also ‘dumb’ in an important respect. No mechanism built into Merge prevents the

<sup>9</sup> Though Merge presents a ‘bottom up’ view of syntax, also familiar from work in other grammatical traditions (categorical grammar, for example), the points made in the text can easily be recast from a ‘top down’ perspective of the sort familiar from much generative syntax through the 1980s, or from the perspective of a grammatical framework indifferent as to directionality.

rule from repeating ‘too much’. Both qualities of Merge are crucial to the familiar observation that there is no such thing as ‘the longest sentence’, nor any principled bound to sentence length (Chomsky 1956:113). Once we know (A) that a verb (e.g. *thinks*) may undergo Merge with a sentence (forming *thinks that . . .*) and (B) that a chain of subsequent applications of Merge may yield a larger sentence (*Mary thinks that . . .*), we also know (C) that the larger sentence may itself be merged with *thinks*—and (D) that the procedure may repeat an unbounded number of times, yielding an infinite number of possible sentences.

At the same time, although Merge may IN PRINCIPLE combine any two lexical items or phrases an unbounded number of times, not every imaginable instance of Merge is acceptable in actual languages. There are many restrictions on Merge that constrain the repertoire of structures that individual languages allow. Consider a simple example from English. A verb may merge with a sentence, as in *Mary thinks [that the world is round]*. Likewise, a verb may merge with a noun or nominal phrase, as in *Mary translated [poems]*. Nouns, by contrast, are different. Although a noun can merge with a sentence, as it does in *(the) claim [that the world is round]*, a noun in English may not merge directly with another noun or noun phrase, as in the unacceptable noun phrase *\*translation [poems]*, on a reading in which *poems* is an argument of *translation* (cf. *translation of poems*).<sup>10</sup> Adjectives behave similarly. We may say *Storms destroy houses*, but we may not describe such a storm as *destructive houses* (with the meaning expressed by the phrase *destructive to houses*). Some languages share these particular restrictions, but many others do not. Those languages that differ from English may, however, impose other requirements on nouns and noun phrases that have been merged with other nouns or with adjectives—special case morphology, for example, which may differ from the morphology found in verbal contexts. These facts all represent constraints on Merge, instances in which application of a general rule is blocked by independent properties of the language. These restrictions, and the laws that underlie them, form a continuing topic of syntactic research and debate.<sup>11</sup>

<sup>10</sup> Unless the result is a compound, in which case the word order is the opposite of that found in an English verb phrase, for example, *poem translation*.

<sup>11</sup> At least one important difference among theories of phrase structure is relevant to our discussion. Confusion about this distinction may explain a perplexing aspect of the Pirahã literature: Everett’s assertions in writings more recent than *CA* that Pirahã lacks not just embedding, but also RECURSION (Everett 2006, 2007a,b).

The rule Merge (and its counterparts in many approaches) is category-neutral, combining lexical items and phrases of any type. Because of the category-neutrality of Merge, every case of a phrase contained in a larger phrase counts as a demonstration of the rule’s recursivity. Earlier models of phrase structure within generative grammar (e.g. the ‘base component’ of Chomsky 1965) were quite different in this regard. Although these models included a general template for structure-building operations, the rules themselves were category-specific. Separate rules were responsible for building a sentence, a noun phrase, a verb phrase, and so forth. Consequently, the property of recursion could properly be ascribed only to a rule that takes the same category as an input and as an output. The rule introducing English possessors was a standard example: NP → NP’s N . . . In addition, a CHAIN of rules applying in sequence could also be said to show recursion as a unit—once again, so long as the same category appears in both input and output of the chain. A standard example of this generalized notion of recursion was sentence embedding (Fillmore 1963). If the first rule of the relevant chain was S → NP Aux VP and the second rule VP → V S, this chain of rules could be said to show recursion, even though the individual rules do not.

In fact, precisely those constructions that were typically presented as evidence for recursion in earlier models are the ones discussed in *CA* under the rubric of absence of embedding. Indeed, in the context of early generative grammar, the absence of this list of constructions from a language might have constituted a demonstration that the language lacks recursion. In a model with category-neutral Merge, however, a language that lacks recursion would be considerably more exotic. No sentence in such a language could contain more than two words. Pirahã is manifestly not such a language.

Some restrictions on Merge have a more complex character, such that a particular instance of Merge appears to prevent other instances of Merge from occurring. In English, for example, once an adjective has taken a direct object, the resultant phrase may not merge as a modifier to the left of a noun: *the destructive (\*to houses) storm*. Once again, other languages—even closely related languages such as German—lack this restriction.<sup>12</sup>

- (9) der [das Haus zerstörende] Sturm (German)  
 the the house destroying storm

But German shows other restrictions on Merge, including constraints on embedding absent from English. To pick an example of particular relevance to Pirahā, English allows prenominal possessive noun phrases to embed other possessive noun phrases, as we already saw in 8b, but German does not (Krause 2000a,b, Roeper & Snyder 2005).<sup>13</sup>

- (10) a. John's car (English)  
 b. Hans-ens Auto (German)  
 (11) a. [John's car]'s motor (English)  
 b. \*[Hans-ens Auto]-s Motor (German)

The study of constraints like the ones just discussed, and the investigation of how such constraints vary across languages, is the bread and butter of research in syntax. The mere discovery that there are syntactic configurations that some languages disallow is not surprising in itself. Surprise comes when the particular constraints discovered in a given language turn out to be novel, or fail to fit models of grammar that have been proposed on the basis of data from other languages, thereby requiring a new, more adequate view of the ways in which recursion may be constrained.

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Everett stresses the supposed absence of recursion in Pirahā because, in his opinion, it poses a challenge to recent prominent arguments by Chomsky (*passim*) and by Hauser, Chomsky, and Fitch (2002) that the 'computational capacity of recursion' might be the main species-specific ability that led to the emergence of language. In summarizing the alleged challenge, however, Everett (2007b) mischaracterizes what Hauser and colleagues mean by recursion as 'the ability for one phrase to reoccur inside another phrase of THE SAME TYPE' [emphasis ours]—as if Hauser and colleagues had the framework of early generative grammar in mind. In fact, as the text of Hauser et al. and related work makes clear, what is at stake is in fact the GENERAL ability to build phrases that contain phrases as subparts. Consequently, the absence of particular instances of embedding in Pirahā (like the absence of particular instances of embedding in any language) is irrelevant to Chomsky's and Hauser et al.'s general claims about recursion.

<sup>12</sup> As Brian Joseph (p.c.) notes, English does allow *the house-destroying storm*, but crucially *house-destroying* is a compound adjective, not a multiword phrase.

<sup>13</sup> Replying to an earlier version of this article, Everett (2007a) offers two relevant citations from websites (credited to Manfred Krifka, p.c.) as evidence that some German speakers allow possessor recursion with full NPs, especially when the possessors are kinship terms or proper names. A third example shows an agreeing pronoun rather than a genitive phrase as the most embedded possessor and exemplifies a distinct construction, as Gereon Müller has pointed out to us. (A possessive pronoun follows the determiner, for example, when the two cooccur, in contrast to other possessors.) Though Everett's actual examples are somewhat questionable (one is a translation from an English newspaper article, and another is a three-word photo caption from an 'car tattoo' site, that is, not a full sentence), there does indeed appear to be speaker variation. In our own survey of ten German speakers, seven disallowed not only examples like 10b, but also comparable examples with proper names or kinship terms, for example, *\*Peters Vaters Auto* 'Peter's father's car'. The remaining three disagreed or were less sure. (Many speakers find prenominal genitives stilted or archaic, but this does not appear to affect their ability to offer clear contrastive judgments.) Though further work should shed light on the nature of speaker variation in this domain, the observation does not affect our main point: that the grammars of (many) German speakers show a restriction seemingly identical to that described for Pirahā. If anything, these observations reinforce our point, since German speakers who disagree about possessor recursion show no sign of differing with respect to the IEP.

The structures in 11 are instances of embedding in *CA*'s sense, as already discussed in connection with 8b. We might therefore entertain the hypothesis that German shows a general ban on embedding like that claimed for Pirahã. Examples like 9 are immediate counterexamples to this proposal, however. Here the noun phrase *das Haus* 'the house' is embedded without any difficulty within a larger noun phrase. Likewise, the fact that German uses embedded clauses in its counterparts to English sentences like *Mary thinks that the world is round* again makes it clear that there is no general constraint against embedding in German. Consequently, even if one did believe that an absence of embedding might follow from a cultural constraint like the IEP, we could not attribute the absence of recursively embedded prenominal possessors in German to such a fact. Instead, there must be some independent switch available to human languages that 'turns off' the possibility of recursion within possessive phrases. The switch itself might be fairly abstract in nature, and the literature does contain proposals as to what this switch might be. Krause (2000a,b) argues, for example, that the relevant factor concerns the mechanisms that license genitive case. She shows that the kind of effect seen in 11b is not limited in German to noun phrases, but is also found in other genitive environments, such as the direct objects of particular verbs and prepositions. If this proposal is correct, the ban on prenominal possessors in German is related to mechanisms of case assignment within noun phrases, and not to a generalized absence of embedding of the sort in 4.

The distribution of possessors in German is strikingly similar to Pirahã. A prenominal possessor is possible, but a possessor noun phrase may not itself contain a possessor. 'Possessor recursion' (cf. n. 11) is thus blocked.

- (12) a. possessor construction  
 xipoógi hoáoí hi xaagá  
 Xipoógi shotgun 3 be  
 'That is Xipoógi's shotgun.' (HAL:205, ex. 22)
- b. possessor within a possessor ('possessor recursion')  
 \*[kó'óí hoagí] kai gáihí 'íga  
 name son daughter that true  
 'That is Kó'óí's son's daughter.' (CA:630, ex. 35)

*CA* presents these facts as an instance of a general ban on embedding in Pirahã. Everett explains how this particular constraint on embedding might result from the IEP as follows: 'Every Pirahã knows every other Pirahã, and they add the knowledge of newborns very quickly. Therefore one level of possessor is all that is ever needed' (CA: 631). Everett does not make clear how these considerations relate to the IEP, or to the considerations quoted in 5. As we noted in our discussion of 8, possessor embedding does not invoke multiple events.

The fact that German appears to show the very same restriction suggests to us a more obvious and parsimonious proposal: that whatever syntactic switch turns off prenominal possessor recursion in German is also at work in Pirahã. The contrast between German and English already demonstrates that possessor embedding is a dimension along which languages may vary. Furthermore, the culture shared by most German speakers is surely more similar to that of most English speakers than either English-speaking or German-speaking cultures are to the culture of the Pirahã. (This is certainly the case with respect to the broad-brush properties discussed in *CA*.) The fact that, in this domain, German and Pirahã appear to share a linguistic property not shared by English is just the kind of dissociation that renders an explanation in nonlinguistic cultural terms for 12a–b unlikely.

In contrast, Everett's cultural explanation fails to explain the facts. As Everett notes (CA:630), the Pirahã do have alternate ways of expressing possessors of possessors (as, of course, do German speakers). Consequently, it cannot be the case that what is culturally unnecessary is ineffable.<sup>14</sup> More crucially, his account of 12b seems to cut the data the wrong way. If 'Kó'of's son's daughter' is excluded because everyone knows the familial relations of any individual who might be mentioned, then even ONE LEVEL of possession should be equally excluded for similar reasons, for example, 'Kó'of's son'.<sup>15</sup>

Of course, one might abandon the idea of a cultural explanation for 12b and still entertain the hypothesis that the Pirahã contrast in 12a–b reflects a general ban on embedding within the language. This hypothesis would entail that the German facts have a different explanation from their apparent Pirahã counterparts, since the ban on possessor embedding in Pirahã would form part of a larger generalization not available for German. In the following sections, however, we argue that no such larger generalization holds in Pirahã.

**2.3. THE WORD ORDER AND SEMANTICS OF EMBEDDED NON-WH CLAUSES IN PIRAHĀ.** Much of the discussion of embedding in CA is devoted to the claim that there are no embedded clauses in Pirahã. The Pirahã do have ways of communicating the same messages as those communicated by English sentences with embedded clauses. Everett claims, however, that the Pirahã way of expressing such concepts never involves embedded sentences. In this, Everett (CA) disagrees strongly with Everett (HAL). As we argue, the evidence supports Everett's earlier description over his more recent claims. We focus our attention in this section on embedded sentences that function as COMPLEMENTS, and consider other types of embedded clauses later.

In fact, the constituents that we (in agreement with HAL) would identify as complement clauses in Pirahã look quite familiar from a crosslinguistic perspective. The verb of a complement clause in Pirahã bears special morphology and is more 'nominal' than the verbs of main clauses. The morpheme typically found on the verb in Pirahã embedded complement clauses is *-sai*, glossed as 'NOMLZR' (nominalizer) by Everett (HAL). A verb that bears *-sai* lacks the ability to show tense and aspect distinctions (HAL: 279), and thus might be called nonfinite as well as nominal. Some examples are given in 13–16. (We discuss examples with the verb 'say' in §2.6 below.) We have added brackets around what we would identify as embedded clauses and have boldfaced the suffix *-sai*, for convenience.<sup>16</sup>

<sup>14</sup> The example offered by Everett (CA:630, ex. 37) is given in (i).

(i) 'ísaabi kai gáihíí 'íga kó'of hoagí 'aisigí-ái  
 name daughter that true name son the.same-be  
 'That is 'ísaabi's daughter. Kó'of's son being the same.'

Everett notes that 'the juxtaposition makes it clear that 'ísaabi is Kó'of's son'.

<sup>15</sup> Furthermore, since 'Kó'of's son' is acceptable, it should be possible to embed this phrase as a possessor, so long as no additional familial relation is invoked, for example, 'Kó'of's son's canoe'. Unfortunately, neither CA nor other written sources provide relevant data.

<sup>16</sup> Nonobvious abbreviations in example glosses are as follows: ASSOC: associate, ATEL: atelic, Cmpl: complete, COMP.CERT: complete certainty, COMPTZR: complementizer, CONT: continuative, DEP: dependent, DESID: desiderative, DIR: direction, DISC.PRT: discourse particle, DUR: durative, EMPH: emphasis, EP: epenthetic, FRUST.INIT: frustrated initiation, IMPF: imperfect, INTENT: intention, INTER: interrogative, INTNS: intensive, INTNSF: intensifier, NEG: negative, NOM: nominative, NOMLZR: nominalizer, OBL: oblique, PERF: perfect, POSSN: possession, PROX: proximate, REL.CERT: relative certainty, REM: remote, STAT: stative, TEL: telic, TEMP: temporal, UNCERT: uncertainty.

- (13) hi ob-áaxái [kahaí kai-**sai**]  
 3 see/know-INTNS arrow make-NOMLZR  
 'He really knows how to make arrows.' (HAL:263, ex. 232)
- (14) xoogíái hi xob-áaxái [xapaitísi xohoi-**sai**] hiaitíhi  
 Xoogíái 3 see-well Pirahã.language speak-NOMLZR Pirahã  
 xigiábi-koí  
 people.like-EMPH  
 'Xoogíái really knows how to speak Pirahã, like the Pirahã.'  
 (HAL:222, ex. 94)
- (15) kóxoí soxóá xibíib-i-haí [tiobáhai bífo kai-**sai**]<sup>17</sup>  
 Kóxoí already order-PROX-REL.CERT child grass do-NOMLZR  
 'Kóxoí already ordered the child to cut the grass.' (HAL:263, ex. 231)
- (16) ko xoogíái góí tiobáhai xibíib-a-áti [xabo-óp-i-**sai**]  
 VOC Xoogíái 2.IMP child order-REM-UNCERT turn-go-EP-NOMLZR  
 'Hey, Xoogíái! Make your child return!' (HAL:220, ex. 83)

The special morphological properties of the embedded verb in such examples are not crosslinguistically unusual. As is well known, it is quite common for embedded clauses to look more 'nominal' than their main-clause counterparts, due to a partial or complete suppression of tense, aspect, or agreement distinctions found in the verbs of main clauses. Koptjevskaja-Tamm (1993) adopts from Stassen 1985 the term DERANKED (vs. BALANCED) for reduced embedded clauses of this sort. Koptjevskaja-Tamm offers many examples of languages that (either exclusively or quite generally) use deranked constructions with nominal properties for complement-clause embedding. A random sampling of languages with this property might include Quechua (Hermon 1985, Lefebvre & Muysken 1987), Turkish (George & Kornfilt 1981, Kelepir 2001, Kornfilt 2001), Inuktitut (Johns 1992), and Adyghe<sup>18</sup> (Polinsky & Caponigro 2008). Classical Latin (Lakoff 1968) and Ancient Greek (Smyth & Messing 1956) also show deranked embedded clauses (almost exclusively, in the case of Classical Latin complement clauses).<sup>19</sup>

In fact, deranked embedded clauses appear to be common among Amazonian languages (see Derbyshire 1987:321). Aikhenvald and Dixon (1999:456), discussing Pirahã, characterize the pattern in 13, in which 'a complement clause from English may be translated with a *-sai* nominalized clause', as a 'typical Amazonian trait'. Amazonian languages whose published descriptions suggest deranking as a normal or exclusive property of embedded clauses include Apalai (Koehn & Koehn 1986:73), Jarawara (Dixon & Vogel 2004:448–89, 468–72), Wai Wai (Hawkins 1998:76ff.), and perhaps Macushi (Abbott 1991:67–82).

Everett (CA) does discuss the possibility that the bracketed constituents in examples like 13–16 might be deranked embedded clauses (his own earlier view), but rejects that proposal in favor of an alternative that involves no embedding:

<sup>17</sup> We are unsure whether *tiobáhai* 'child' is syntactically part of the embedded clause, as we have bracketed it, or is a postposed object of the matrix clause. The former possibility is consistent with the SOV property of the language and might suggest that *xibíib-* should have been glossed as 'make', which is another of its meanings, to judge by HAL:220 (exx. 83–84). See below for further discussion of postverbal objects in Pirahã.

<sup>18</sup> Adyghe nominalized embedded clauses do show tense distinctions, but like nominals, take a determiner and case marking. Polinsky and Caponigro (2008) argue that they actually show relative-clause syntax, which would distinguish them from (obvious analyses of) Pirahã.

<sup>19</sup> In some cases, the number of tense distinctions may be reduced but not absent in embedded clauses; for example, nominalized clauses in Quechua are not tenseless, but show a smaller set of tense distinctions than main clauses (Lefebvre & Muysken 1987). Both Latin and Ancient Greek (Brian Joseph, p.c.) also show voice marking in their embedded infinitives.

There are two plausible analyses for this construction [= 13]. The first is that there is embedding, with the clause/verb phrase ‘arrow make’ nominalized and inserted in direct-object position of the ‘matrix’ verb ‘to see/know well.’ The second is that this construction is the paratactic conjoining of the noun phrase ‘arrow-making’ and the clause ‘he sees well.’ The latter analysis seems to fit the general grammar of Pirahã better. This is because as an object the phrase ‘arrow-making’ should appear before the verb, whereas here it follows it. And, whereas normally there is optional clitic agreement available with any direct object, there is never any clitic agreement with such ‘object complement clauses’ in Pirahã (Everett [1987a]). Further, although the order of ‘complement’ and ‘matrix’ clauses can be reversed, the ‘embedded’ clause can never appear in direct-object position. (CA:629)

We argue below that this discussion does not present a coherent alternative to an analysis in terms of embedding. We suggest that Everett’s observations about word order actually SUPPORT an analysis in terms of embedding, and that the argument from clitic agreement is inconclusive.

Before turning to these points, however, let us consider Everett’s proposed alternative: ‘paratactic conjoining’. In this construction, two normal clauses are juxtaposed, and certain elements may be omitted from the noninitial clauses of the sequence. In his earlier work, Everett (HAL:223–24) uses the term in a more standard sense, to describe the structures that convey comparison in Pirahã. Note the omission of the verb in the second clause of 17, characteristic of such constructions.<sup>20</sup>

- (17) paratactic conjoining (HAL:223, exx. 95, 96)
- a. xisaitoógií hi kapiigakagakai-baí xoogiái hi koíhi xabaxáigio  
 Xisaitoógií 3 study-INTNSF Xoogiái 3 little only  
 ‘Xisaitoógi studied a lot. Xoogiái (studies) very little.’
- b. batío paga póoko xoogiái hi mais paga bíi<sup>21</sup>  
 Martinho pay little Xoogiái 3 more pay well  
 ‘Xoogiái pays better than Martinho.’

The two clauses in such constructions appear to be on an equal footing: neither of the clauses shows the suffix *-sai*, and neither shows other signs of subordination.

As Noonan (1985) notes, parataxis may be used in some languages to express what other languages would express with clausal embedding of the sort found in English. In such circumstances, the second clause is ‘interpreted as a separate assertion; [is] syntactically not a subordinate clause; [and] can’t take a complementizer’ (Noonan 1985:65). Lango (Nilo-Saharan, Uganda), discussed at length by Noonan, has both parataxis, seen in 18a, and nonparatactic complementation, seen in 18b, which also shows deranking in the form of an infinitival verb. (The language also allows finite complementation, as Noonan discusses.)

- (18) paratactic and infinitival nonparatactic complementation (Lango)
- a. Án àpóyò àcégò dógólá (paratactic)  
 I remembered.1SG closed.1SG.SUBJ door  
 ‘I remembered it; I closed the door.’ (‘I remembered to close the door.’)
- b. Án àpóyò cègò dógólá (nonparatactic (infinitive))  
 I remembered.1SG close.INF door  
 ‘I remembered to close the door.’ (Noonan 1985:78, exx. 149, 150)

<sup>20</sup> It is conceivable that 17a shows gapping, rather than paratactic conjoining, much like English *Mary studied a lot, and John just a little*. Johnson (2003, 2006) argues at length that gapping involves coordination below the sentence level (and ‘across-the-board’ movement of the verb), and thus cannot be parataxis.

<sup>21</sup> The lexical items in this example, with the exception of the proper names and the clitic *hi*, are all Portuguese, a point to which we return in §5.2.

As Noonan notes: ‘In [18a], the second predicate *àcégò* is fully inflected for person and tense-aspect. In [18b], the second predicate *cèggò* ‘to close’ is an infinitive, inflected neither for person nor tense-aspect’ (1985:78).

On a paratactic analysis of Pirahã *-sai* clauses, we have no explanation for the absence of tense and aspect morphology on the second verb, nor for the presence of *-sai*.<sup>22</sup> Pirahã examples like 13–16 thus resemble 18b much more than they resemble 18a. An analysis in terms of embedding, where the embedded verb is obligatorily deranked, makes immediate sense of the Pirahã constructions as an instance of a phenomenon found in many languages. Furthermore, as far as we can tell from the available data, a *-sai* clause fulfills the selectional requirements of some nearby predicate—just as we expect from a nominalization or embedding marker.<sup>23</sup>

Everett’s principal argument for parataxis concerns word order. When the direct object is a nominal, Pirahã typically shows OV order. By contrast, examples like 13–16 must be taken to show VO order, if the *-sai* clauses are true objects of the finite verb. It might look at first glance, therefore, as though we have a simplicity argument in favor of the thesis that Pirahã lacks clausal embedding. In fact, however, the argument points the other way. As documented crosslinguistically by Dryer (1980), it is quite common to find clausal complements following a main verb in languages that are otherwise generally or uniformly OV.<sup>24</sup> This is the case in Hindi, German, and Wappo, as in 19–21.

<sup>22</sup> An investigation of the prosody of such examples would also be relevant. A paratactic analysis of 13–16 might well lead us to expect two obligatorily separate intonational phrases, while an embedding analysis might at least allow a single intonational phrase (see also Slobin 2007). We thank an anonymous referee for these observations.

<sup>23</sup> The arguments for embedding in this section are logically independent of the specific claim that *-sai* marks embedded clauses. We believe, however, that every published example containing clause-final *-sai* (in CA itself as well as Everett’s earlier work) is consistent with such an analysis. In his reply to the earlier version of this article, however, Everett (2007a:10) claims that *-sai* has a function irrelevant to nominalization or embedding: ‘[I]n unpublished analysis subsequent to Everett (1986), I have discovered that *-sai* in fact marks old information and is not a nominalizer at all’. No empirical evidence is presented for this new claim, besides a single proper name that appears to bear *-sai* as a suffix. Missing, for instance, are examples of varying discourse contexts that covary with the presence of *-sai*—the kind of evidence one must produce to support a claim of this sort. Even if the claim were true, it would not argue against an analysis of *-sai* as a marker of clausal embedding or nominalization, since *-sai* might be ambiguous between a determiner marking old information and a clause-embedder or nominalizer. Much the same dual function, after all, is played by English *that* and German *das(s)*. (We thank Brian Joseph for raising the possibility that the multiple uses of *-sai* are homophonous and reflect diachronic convergence.) Furthermore, *-sai* could also mark a clause as old information while simultaneously functioning as its nominalizer; the two functions are not incompatible.

Everett (2007a:10–12) also presents example 13 in variants with and without *-sai* in both clauses, concluding from this that *-sai* is not a marker of subordination. The absence of *-sai*, however, does not necessarily signal lack of embedding any more than the absence of English *that* or comparable markers in other languages does (e.g. Kansai Japanese; Saito 1987). Unfortunately, all of the verbs in the single paradigm of optional *-sai* presented by Everett (2007a) are in a simple uninflected present tense (despite the fact that Everett describes them as ‘FULLY inflected’ (emphasis his)). This makes it impossible to determine the range of inflectional possibilities available in these arguably embedded and matrix contexts.

Recently, Sakei, Stapert, and Sauerland (2007) have argued on the basis of new fieldwork that *-sai* may appear as a suffix to the antecedent of a conditional. They argue on the basis of their data that *-sai* in at least these contexts cannot be a marker of old information. But HAL:264 (ex. 239) presents a conditional marker *-sai* whose high tone distinguishes it from nominalizing *-sai*, and which apparently is compatible with tense and aspectual distinctions. Consequently, we may be dealing with distinct morphemes.

<sup>24</sup> Dryer (1980:128) offers the following generalization (his ‘final-over-internal-position hypothesis’): ‘Whenever sentential NPs of the same grammatical relation differ in their relative tendencies to occur in clause-final position as opposed to clause-internal position, the difference will be that sentential NPs will exhibit a greater tendency than simple NPs to occur in clause-final position rather than clause-internal position’.

- (19) Hindi
- a. OV (nominal object)  
Raam bacca dekhtaa hai.  
Raam child see AUX  
'Raam sees the child.'
- b. VO (clausal object)  
Raam kahtaa hai [ki vo bacca dekhtaa hai].  
Raam say AUX that he child see AUX  
'Raam says that he sees the child.'
- (20) German
- a. OV (nominal object)  
Hans hat die Kinder gesehen.  
Hans has the children seen  
'Hans has seen the children.'
- b. VO (clausal object)  
Hans sagte, [dass er die Kinder gesehen hat].  
Hans said that he the children seen has  
'Hans said that he has seen the children.'
- (21) Wappo (Yukian, California)<sup>25</sup>
- a. OV (nominal object)  
ʔah ce k'ew haʔis-khiʔ.  
I DEM man know-STAT  
'I know that man.'
- b. \*VO (nominal object)  
\*ʔah haʔis-khiʔ ce k'ew.  
I know-STAT DEM man  
(Dryer 1980:130, quoting Li et al. 1977, Thompson et al. 2006:5–6)
- c. VO (clausal object)  
ah haʔis-khiʔ [te takaʔ mani-ya].  
1SG.NOM know-STAT 3SG basket carry-DUR.DEP  
'I know s/he is taking the basket.' (Thompson et al. 2006:144, ex. 135)

The bracketed elements in 19–21 are clearly not main clauses. They show elements that are not found in main clauses such as complementizers (in Hindi and German), characteristic embedded-clause word order (in German), and 'dependent form' morphology (Wappo; Thompson et al. 2006:140).

The word-order pattern seen in Pirahā is thus not at all unusual for a language with embedded clauses. The postverbal position of clausal arguments presents no puzzles that require special explanation in terms of a general ban on embedding or the IEP. In displaying VO word order where the object is a clause, Pirahā makes a typologically common choice from the menu of possibilities available to the languages of the world—the choice of a postverbal clausal complement in an otherwise OV language. This is a choice made by languages associated with diverse cultures and by languages with a varied range of other linguistic properties.

<sup>25</sup> The acceptable OV variant is inferred from our sources. We make the morpheme divisions and use the transcription from Thompson et al. 2006. The authors note (p. 5) that '[t]he verb-medial order seen in [21b] was never offered or accepted in simple clauses', but 'with complement clauses, particularly with first person subjects, the word order becomes considerably freer'. OSV and SOV are also offered as possible alternative orders in such cases. We chose a different example (21c) from Dryer to show the dependent verb form.

Concerning the reason for this effect, a number of proposals might be entertained. Stowell (1981) linked the behavior of embedded clauses in SOV languages like German to their inability to receive syntactic case. Work inspired by Kayne's (1994) ANTISYMMETRY theory of linearization, however (for example, Zwart 1993, 1997), argues that the SVO order seen with clausal complements in languages like German, Dutch, or Hindi is actually the neutral, underlying order, and that SOV is a derived word order, in response to syntactic requirements imposed on nominal objects. By contrast, Hawkins (1990, 1994) suggests that considerations of sentence processing guide the positioning of structurally complex phrases such as clauses. A hypothesis of this last type leads one to expect, in contrast to the purely syntactic proposals, that VO might be a general option in languages like Pirahã, dispreferred but chosen when the object exceeds some threshold of heaviness or complexity.

The extant data on Pirahã provide some evidence for the last of these possibilities. Although SOV is the dominant order in Pirahã, Everett's earlier work offers a number of examples of SVO order in which the object is not a clause, but a heavy NP, as well as other examples where the postverbal object might well have been focused (though actual prosodic data are not available). Some of these examples involve heavy objects with appositive modifiers (e.g. 22a,b).

(22) SVO in Pirahã (objects in italics)

- a. ti xoba-i-sog-abagaí *hiatíhí ti xahaigí*  
 1 see-EP-DESID-FRUST.INIT Pirahã 1 brother  
 'I want to see the Pirahã, who are my brothers.' (HAL:212, ex. 55)
- b. tiobáhai koho-ái-hiab-a *tomáti gihio-kasí píaii táí píaii*  
 child eat-ATEL-NEG-REM tomato bean.name also leaf also  
 '(The) children do not eat tomatoes or beans or leaf(y vegetables).' (HAL:226, ex. 107)
- c. ti soxóá kap-í-hí *baaí*  
 1 already shoot-PROX-COMP.CERT wild.pig  
 'I already shot a wild pig.' (HAL:295, ex. 361)

It is therefore not even clear that a NOMINAL object 'should appear before the verb'—a key premise of Everett's argument for parataxis over embedding. If postverbal position is a general option for complex or heavy objects in Pirahã, the postverbal position of a clausal *-sai* complement might be expected for reasons of heaviness or complexity alone.

In fact, Everett notes in *HAL* that when oblique objects 'are larger than five or six syllables they tend to undergo movement to postverbal position. This is apparently a stylistic mechanism to avoid overcrowding of the space between S and V, reminiscent of "Heavy Shift"' (HAL:206). Though examples like 22a–c do show nonoblique postverbal objects, it is possible that clausal complements pattern with oblique objects in showing a more obligatory correlation between postverbal position and heaviness. Clausal complements pattern with obliques in another way as well: in failing to undergo doubling by a pronominal clitic (Everett 1987a:248, n. 6, CA:629). This is, in fact, the only observation besides word order presented in *CA* as support for a nonembedding analysis of (what look like) complement clauses in Pirahã.<sup>26</sup>

<sup>26</sup> The distribution of clitic doubling in Pirahã may reflect another property that obliques and clausal arguments have been argued to share. Neither needs to be licensed by abstract case, as first suggested by Vergnaud (2006, orig. 1976), and developed in much subsequent work. It is this fact that allows both obliques and clauses to function as complements to non-case assigners such as adjectives and passivized verbs.

It is also worth noting that Pirahã might allow SOV to some degree even when the object is a clause—a fact that could support our suspicion that an SOV ~ SVO alternation is an option possibly governed by factors like heaviness. Example 23 shows the clause *ti xap-i-sai* ‘me to go’ sandwiched between the third-person subject of ‘want’ and the verb ‘want’ itself.

(23) SOV with clausal direct object in Pirahã

hi ti xap-i-sai xog-i-hiab-a  
3 1 go-EP-NOMLZR want-EP-NEG-REM

‘He doesn’t want me to go.’

(HAL:278, ex. 290)

An example like 23 could not involve paratactic conjunction of ‘he want’ and ‘my going’ unless paratactic conjunction were to allow the wrapping of the first conjunct around the second, in defiance of CA’s argument from word order in favor of paratactic conjunction. Paratactic conjunction cannot produce a subject and verb of one sentence separated from each other by the lexical material of an independent sentence. Example 23 appears, however, to be unique in the corpus of published examples, so we cannot say what factors permit this ordering, nor what accounts for its seeming rarity.

Finally, semantic considerations can also provide evidence about whether a clause is embedded or not. There is no interpretation of 23 corresponding to HAL’s translation that could involve either distinct sentences (‘Him! My going! He doesn’t want!’?) or paratactically conjoined sentences (‘Him and my going and he doesn’t want?’), precisely because SOV word order does not even raise the question of an analysis in which S-V and the putative O constitute distinct sentences in a discourse. In what follows, we raise a number of other interpretive considerations that support the conclusion that clausal arguments are semantically embedded complements to the matrix verb.

Within connected discourse, it is a well-known fact that the scope of negation (as in 23) does not extend across a sentence boundary (unlike such phenomena as pronominal anaphora). Thus, the interpretation of elements like negation may itself guide us in deciding on the correct syntactic analysis. For example, the English discourse in 24b cannot be understood as synonymous with 24a, despite the fact that the complement of *order* has essentially the semantics of an imperative.

- (24) a. I am not ordering you to make an arrow.  
b. I am not giving you an order. Make an arrow!

The negation associated with *order* may take the complement of *order* in its scope, but it may not take within its scope an independent sentence, even one that specifies an order. Exactly this sort of example appears to be found in Pirahã as well, as documented by Everett (HAL:254, ex. 210a) in connection with example 25 below.

(25) ti xibíib-i-hiab-iig-á kahaí kai-sai  
1 order-EP-NEG-CONT-REM arrow make-NOMLZR

(i) ‘I am not ordering you to make an arrow.’ *or*

(ii) ‘I will not let you make an arrow.’ (both translations from HAL)

Example 25 contains a negated main verb *xibíib* ‘order’ whose negation clearly takes the postverbal *-sai* clause in its scope. If 25 simply displayed two loosely connected sentences, the example could only mean something like 24b, or else the senseless ‘I am not ordering you. Arrow making!’. If Everett’s translations in HAL (not called into question in CA) correctly reflect the meaning of the example, the speaker of the sentence denies that an intensional relationship of order-giving holds between himself/herself and the embedded proposition ‘that you make an arrow’. In other words, the proposition is a dependent argument of the matrix verb and within the scope of higher negation.

It is also of interest that the nonfinite verb in 25 is the creation verb ‘make’, and that the direct object of ‘make’ is understood as indefinite (‘an arrow’). Given the semantics of creation verbs such as ‘make’ and the use to which sentences like 25 are normally put, it is most likely that the main-clause negation takes the embedded direct object within its scope in the reading in (i). The speaker is not discussing a PARTICULAR arrow that already exists but somehow remains unmanufactured, but is rather discussing the absence of an order requiring the addressee to perform the activity of arrow-making. This is a reading in which the semantic argument of the verb ‘order’ is not ‘arrow’, but the proposition ‘that you make an arrow’. It is as a consequence of this fact that negation and the intensional verb ‘order’ can also take semantic scope over the direct object within that proposition.<sup>27</sup> Everett (*HAL*:278) also notes specifically that when associated with verbs like ‘want’, *-sai* corresponds in meaning rather closely to the irrealis use of the infinitive in English, as opposed to the kind of meaning for which English would use a gerund in *-ing*. Thus, in connection with 23, he notes that the example means only ‘he doesn’t want me to go’, and not ‘he doesn’t like my going’ (a reading that Everett marks with an asterisk to indicate its unavailability).

Considerations like those discussed in this section suggest quite strongly that when it comes to clausal embedding, Pirahã is a language like any other. We saw that Everett’s argument from word order, while it did present facts of interest, did not argue against the existence of clausal embedding in Pirahã, but merely situated the language’s embedded clauses in a well-known typology. The argument from clitic doubling suggested that Pirahã embedded clauses have a property in common with oblique nominals (for which no paratactic analysis was proposed). Finally, we saw that the semantics of the clauses discussed in this section appear to be incompatible with a nonembedding analysis, but quite ordinary once clausal embedding is assumed.

**2.4. INTERROGATIVE CLAUSES AND CLAUSAL EMBEDDING.** In the discussion so far, we have been arguing not only against the specific claim that Pirahã lacks embedding, but also against the more general claim that the facts at issue are typologically novel or particularly surprising. It is, of course, quite likely that Pirahã syntax does contain surprises for the researcher—every language does. In the domains discussed so far, however, Pirahã seems to have chosen its properties from a familiar menu of possibilities. Where Pirahã differs from English or Portuguese, its properties have turned out to be shared by other languages, like German and Hindi.

The same is true for the interrogative clauses of Pirahã. The data concerning interrogative clauses presented in *HAL* suggest that Pirahã differs from English—but resembles many other languages of the world—in lacking overt WH-movement.

<sup>27</sup> Though we base our conclusions on the intended meaning of 25 reported in *HAL*, we want to emphasize that whether this particular utterance is an imperative or a declarative, sentences of this type will be crucial to the full investigation of embedding. Intensional verbs and negative contexts are among the first areas that should be considered if one believes that clauses that might be analyzed as embedded (and that have been analyzed as such in print) are actually independent sentences. No such investigation is undertaken in *CA*, and the issue is not even raised. Everett’s (2007a) reply to an earlier version of this article, however, does include a brief discussion of 25. In agreement with our interpretation of the facts, he identifies the utterance not as an order, but as a reassurance that an order to make an arrow is NOT being given. He then suggests the following two-sentence ‘free translation’ of 25 as a substitute for the translation in *HAL*: ‘I am not ordering you. (That is, that you) make an arrow’. In fact, this translation invokes embedding just as the original did, as the obligatoriness of *that* in its second clause makes clear.

- (26) WH-interrogatives
- a. xabagi **go gĩso** xigí xog-i (híx)  
 Xabagi WH DEM ASSOC want-PROX (INTER)  
 ‘How much does Xabagi want?’ (HAL:239, ex. 149)
- b. gahió **go gĩso** xab-óp-ai  
 airplane WH DEM turn-go-ATEL  
 ‘When will the airplane return?’ (HAL:239, ex. 150)
- c. xisaabi hi **go gi** ái ko-ab-ái-p-í  
 Xisaabi 3 WH DEM(?) be(?) die-DUR-ATEL-IMPF-PROX  
 ‘Why did Xisaabi die?’ (HAL:240, ex. 160)

This observation is confirmed by Everett (HAL:245) in a short section entitled ‘Position of the questioned element’, which states: ‘There is no movement of the questioned element’. It thus seems clear that one of the choices made by Pirahā from the syntactic repertoire available to human languages is the choice to leave question words in situ. In this, Pirahā is behaving like Japanese, Korean, Turkish, Chinese, and numerous other languages whose interrogative syntax has been studied intensively over the past several decades. As 26a shows, a clause-final interrogative particle may mark the construction as a question, which is also a well-known property of many such languages.

Since Pirahā is a WH-in-situ language, it is surprising that CA uses as an argument for the nonexistence of clausal embedding the observation that a ‘questioned element’ may not move from (what we would call) an EMBEDDED clause. The argument is advanced on the basis of the unacceptability of 27b, an attempted interrogative counterpart to 27a (= our example 13).

- (27) a. hi ob-áa’ái [kahaí kai-sai]  
 3 see/know-INTNS arrow make-NOMLZR  
 ‘He really knows how to make arrows.’ (CA:629, ex. 25a, HAL:263, ex. 232)
- b. \*hi gó ’igi-ai ’ob-áa’ái [\_\_ kai-sai]  
 3 WH ASSOC-do/be see/know-INTNS make-NOMLZR  
 ‘What thing [does he] know well to make?’ (lit. ‘What associated thing he knows well to make/making?’) (CA:629, ex. 27)<sup>28</sup>

If Pirahā is a language without overt WH-movement, we can hardly draw any conclusions about whether a particular phrase is an embedded clause on the basis of the failure of a WH-phrase to overtly extract from it. We conclude that the unacceptability of examples like 27b is not instructive either about the right analysis of the bracketed phrase in 27a, or about the existence of embedding in Pirahā more generally.

We might ask, however, whether the WH-phrase may remain in situ within the putative complement clause selected by ’ob- ‘see/know’, but take scope over the higher clause—yielding the intended meaning for 27b. The answer to this question appears to be yes, given the acceptability of Everett’s example in 28, in which the interrogative expression *hi gó ’igi-ai* ‘what’ remains within the clause whose verb is *kai-sai* ‘making’. In this example, *gó* ‘what’ is clearly the object of *kai-* ‘make’, but the meaning of the example as a whole is interrogative.

<sup>28</sup> The glosses for 27a follow HAL and 13. (CA has ‘see’ instead of ‘see/know’, ‘attractive’ instead of ‘INTNS’, and ‘nominative’ instead of ‘NOMLZR’.) We have supplied the interlinear gloss to 27b on the basis of other glosses in CA and HAL. The two translations for 27b, however, are from CA.

- (28) [hi gó 'igí-ai kai-sai] hi 'ob-áa'ái  
 3 WH ASSOC-do/be make-NMLZR 3 see/know-INTNS<sup>29</sup>

'What associated thing he knows well to make/making?' (CA:629, ex. 26)

Everett claims that the *kai-sai* clause must precede *'ob-áa'ái* here, a fact that might suggest a limitation on the otherwise common extraposition of *-sai* complements that we have seen throughout this section. Everett does not offer the relevant example of an ungrammatical postverbal complement, but his text suggests that an example like 29 would be unacceptable, as we have indicated below.

- (29) \*hi 'ob-áa'ái [hi gó 'igí-ai kai-sai]  
 3 see/know-INTNS 3 WH ASSOC-do/be make-NMLZR

(based on CA:629, ex. 26, judgment as given in text)

For Everett, the impossibility of 29 follows from two claims: first, that 'there is no embedding' in Pirahã; and second, that 'the interrogative word must always be initial in the phrase'. As we have seen, the second claim is false. Remarkably, if we also abandon the first claim, the pattern seen in 28–29 once again turns out to be familiar from another language—in this case Bengali.<sup>30</sup> As Bayer (1996:272–73) notes, embedded clauses in Bengali may be either preverbal or postverbal, but if an embedded clause contains a WH-phrase that takes main-clause scope, the embedded clause must be preverbal.

- (30) Bengali counterparts to 28–29

a. preverbal embedded clause

ora [ke aS-be] Sune-che (cf. 28)

they who come-FUT.3 hear-PST.3

matrix scope: 'who have they heard will come?'

[also: embedded scope: 'they have heard who will come']

b. postverbal embedded clause

ora Sune-che [ke aS-be] (cf. 29)

\*matrix scope: \*'who have they heard will come?'

[OK embedded scope: 'they have heard who will come']

The pattern seen in Bengali and Pirahã might be syntactic in origin, a direct effect of linear or syntactic position on extraction possibilities. Alternatively, one might argue that prosodic requirements related to the presence of an interrogative WH-word are at stake here, as in languages like Basque and Hungarian in which the location of WH-phrases has been argued to be partly determined by prosody (Arregi-Urbina 2002, Szendrői 2003). We leave the actual resolution of these questions open, except to stress two key points. First, no argument against embedding follows from the interrogative data presented in CA. Second, the placement of WH-phrases shows a pattern familiar among the world's languages.

Pirahã also shows the standard profile of a WH-in-situ language in several respects beyond those discussed. For example, as 31a,b show, Pirahã permits WH-phrases to take scope out of adjuncts that are islands for WH-extraction in languages like English, as seen in 32 (Cattell 1978, Huang 1982, Longobardi 1985).

<sup>29</sup> We depart from our policy of reproducing CA glosses verbatim and give a gloss here parallel to the one we supplied for 27b. The gloss in CA has 'information question' for 'WH' and 'nominative' for 'NMLZR'.

<sup>30</sup> We are grateful to Norvin Richards for bringing these facts to our attention.

(31) WH-in-situ within adjunct clauses (Pirahã)<sup>31</sup>

- a. xaoóí hi kaoí hiabaí-so gixai<sup>32</sup> xoá-boí-haí  
 foreigner 3 who pay-TEMP 2 buy-come-REL.CERT  
 ‘[When the foreigner pays whom] you will buy (merchandise)?’
- b. kaoí hi gí hiabaí-so gíxai xoá-boí-haí  
 who 3 2 pay-TEMP 2 buy-come-REL.CERT  
 ‘[When who pays you] you will buy (merchandise)?’

(HAL:243, ex. 167b–c)

## (32) overt WH-movement from adjunct clause (English)

- \*Who, when the foreigner pays \_\_, will you buy merchandise?

Pirahã here shows a well-attested contrast between overt WH-movement languages like English and languages like Chinese that lack overt WH-movement (Huang 1981, 1982).

The examples in 31 make another point relevant to the topic of this section. In keeping with his general claim that Pirahã lacks clausal embedding, Everett (CA:630) asserts that the language actually has no embedded ‘when’-clauses. In support of this claim, he offers only one argument: that in examples like 33 below (and presumably 31a–b as well) ‘[t]here is almost always a detectable pause between the temporal clause and the “main clause”’.

- (33) kohoai-kabáob-áo<sup>33</sup> ti gí ’ahoai-soog-abagaí  
 eat-finish-TEMP I you speak-DESID-FRUST.INIT  
 ‘When [I] finish eating, I want to speak to you.’ (lit. ‘When eating finishes,  
 I speak-almost want.’) (CA:630, ex. 31)

From this, Everett concludes: ‘Such clauses may look embedded from the English translation, but I see no evidence for such an analysis. Perhaps a better translation [of 33] would be “I finish eating, I speak to you”’.

Everett’s ‘better translation’ for 33, however, is problematic in two respects. First, it ignores the import of the suffix *-áo*, glossed in CA itself as ‘temporal’. Second, it ignores the desiderative suffix *-soog* on ‘speak’. The latter is an omission of particular significance. If Everett’s initial translation offered in 33 is correct, rather than the alternative translation, the ‘when’-clause almost certainly modifies the time of SPEAKING, not the time of WANTING. As a consequence, the ‘when’-clause is in the semantic scope of ‘want’. This makes it unlikely that we are dealing with independent sentences. Everett’s prosodic claim is also consistent with the embedding analysis. It would be quite normal for a prosodic boundary to appear to the right of a preposed adverbial clause. English, in fact, appears to show just such a boundary (orthographically marked by a comma), and the existence of embedded adverbial clauses in English is not in dispute.

Furthermore, it is unlikely that any similar alternative two-utterance translation could be offered for the WH-constructions in 31a–b. To judge from Everett’s discussion of these examples in HAL, these structures, though unknown in spontaneous speech, were understood and accepted by Pirahã consultants. The presentation in HAL suggests that

<sup>31</sup> A referee asks whether the WH-forms in 31 might be functioning as indefinite rather than interrogative pronouns, which would alter the semantics somewhat. We cannot exclude this possibility, though (as the referee notes) the result would be a somewhat different interpretation, for example, ‘When the foreigner pays someone, will you buy?’.

<sup>32</sup> In HAL, a high tone on the *i* of *gixai* is found in 31b, but not in 31a.

<sup>33</sup> The temporal suffix *-áo* here is a postconsonantal allomorph of *-so* seen in 31a–b (HAL:263).

they were interpreted with the buying event semantically within the temporal scope of the foreigner-paying event.

**2.5. RELATIVE CLAUSES AND CORRELATIVES.** Relative clauses of the type found in English show a clause embedded within another clause (albeit with a nominal phrase boundary intervening). Thus, like complement clauses, they are canonical examples of embedding. In support of the claim that such embedding is absent from Pirahã syntax, *CA* asserts that ‘Pirahã has no relative clauses proper’. ‘However’, Everett continues, ‘it does have a co-relative clause’ (*CA*: 630). This remark is puzzling, since co-relatives (which we call *CORRELATIVES*, following common practice) involve the syntax of embedding in *CA*’s sense no less than other relative clauses.

A correlative construction consists of a subordinate adjunct clause that contains a relative or interrogative phrase, and a main clause that contains a nonrelative, noninterrogative *COUNTERPART* to the relative or interrogative phrase. Examples from Hindi and Tibetan are given in 34 and 35.

(34) Hindi correlative (Bhatt 2003:486)

[**jo** **CD** sale-par hai], Aamir **us** **CD-ko** khari:d-ega:  
**REL CD** sale-on be Aamir **that CD-ACC** buy-FUT.M.SG  
 ‘Aamir will buy the CD that is on sale.’ (lit. ‘Which CD is on sale, Aamir will buy that CD.’)

(35) Tibetan correlative (Cable 2010)

[Deb gagi khyodrang gis mthong na] nga de nyon gi yin.  
 book which you ERG see if I that buy NON.PAST AUX  
 ‘I will buy whatever book you see.’

The syntax and semantics of correlatives have been the subject of extensive investigation in a number of languages (e.g. Keenan 1985). It is not in doubt for such languages that a correlative clause belongs to the same sentence as the phrase it semantically modifies.<sup>34</sup> (Note, for example, that the Tibetan correlative ends with the subordinator *na* ‘if’.) In fact, correlatives often obey even stronger locality conditions. Bhatt (2003), for example, offers a series of arguments that identify the position in which correlative clauses are attached in the Indo-Aryan languages as a position as syntactically close as possible to the phrase that they semantically modify.

Everett in *HAL* offers an observation (not discussed in *CA*) that suggests much the same thing for Pirahã. He notes that ‘Pirahã only relativizes direct objects and subjects’ (p. 277). He takes this restriction to support the crosslinguistic relevance of the ‘accessibility hierarchy’ for relativization proposed by Keenan and Comrie (1977). There is no reason to expect such a restriction to hold of distinct sentences that are merely juxtaposed. As a restriction on syntactic attachment, however, it is unexceptional. Pirahã thus seems to present relative clauses whose syntax is certainly different from English, but Pirahã relative clauses nonetheless seem to be very much ‘relative clauses proper’.

Not surprisingly, the *WH*-phrase in a Pirahã correlative, like its counterpart in Pirahã interrogatives, does not undergo overt movement and remains in situ. In this respect, the Pirahã correlative is just like the Tibetan correlative in 35 above. More generally, though the available data on Pirahã correlatives are limited to a very few examples, we find no evidence of significant differences between Pirahã correlatives and their

<sup>34</sup> A referee notes that the term ‘embedding’ is sometimes used so as to exclude clause-peripheral constituents such as hanging topics and correlatives. The point of relevance to us, however, is the fact that correlatives count as embedded under the description provided in *CA*, and therefore must count as part of the same ‘utterance’ (*CA*’s term) as the main clause, for the purposes of the IEP.

counterparts in other languages. The examples offered in *HAL*, for example, look quite unexceptional from a crosslinguistic standpoint. A literal rendition of 36a might be ‘What lead-shot Xoogíái sent, [that] lead-shot ran out’, and for 36b, ‘What/That very hammock you just showed me, I want the hammock’.

(36) Pirahã correlative

- a. [xoogíái hi **go-ó** **hoasígikoí** bíib-i **híx**] **hoasígikoi**  
 Xoogíái 3 **WH-OBL lead.shot** send-PROX **COMPTZR/INTER lead.shot**  
 koab-áo-b-i-i  
 run.out-TEL-PERF-PROX-COMP.CERT  
 ‘The lead shot which Xoogíái sent ran out.’ (HAL:276, ex. 282)
- b. ti **baósaápisí** og-abagaí **gíxai** [**go-ó** **baósaápisí**  
 1 **hammock** want-FRUST.INIT 2 **WH-OBL hammock**  
 big-áo-b-í-i **xai sigíái**]  
 show-TEL-PERF-PROX-COMP.CERT be(?) **same**  
 ‘I want the same hammock which you just showed me.’  
 (HAL:276, ex. 281)

Relativization in Pirahã thus looks like another case in which the language chooses its properties from the same list of possibilities as other languages. The choice between English-style adnominal relativization and Hindi-style correlative is familiar, as are the general properties of the Pirahã correlatives themselves.

*CA* offers no data or argumentation that contradict this picture. *CA* considers only the single example in 37 (punctuated as below). The example is quite similar to 36b (except for the absence of *sigíái* (and *híx*), which *HAL* indicates is optional).

- (37) ti baósa-ápisí 'ogabagaí. Chico hi goó bag-áoba  
 I cloth-arm want name he what sell-CMPL (CA:630, ex. 33)

*CA*'s discussion is limited to the following remarks:

Here there is a full sentence pause between the verb 'ogabagaí 'want' and the next clause. The two sentences are connected contextually, but this is not embedding. Each is an independent, well-formed sentence. The second sentence, on its own, would be a question, 'What did Chico sell?' In this context, however, it is the co-relative. (CA:630)

As we noted when discussing clause-initial adjuncts, the existence of a pause or prosodic boundary is fully compatible with an analysis in terms of embedding (absent an independent characterization of the notion ‘full sentence pause’). The fact that the string *Chico hi goó bag-áoba* may function as an interrogative sentence may be no more relevant to Pirahã than the comparable English fact about the substring *who left the room* in *The man who left the room was asleep*. We thus see no evidence suggesting that the Pirahã correlative is an independent clause, and no reason to accord to it an analysis radically different from that which one would invoke for its Hindi and Tibetan counterparts.

**2.6. CLAUSAL COMPLEMENTATION AND THE VERB ‘SAY’.** In support of the claim that Pirahã lacks embedding, *CA* discusses one phenomenon for which we cannot present a direct counterpart in other languages: the syntax of sentences with the verb *gái* ‘say’. Though we cannot offer a conclusive analysis of the relevant facts, they do not form an argument for the general absence of embedding.

In the complement clauses discussed in §2.3, the verb appears with the suffix *-sai*. This suffix is viewed as a nominalizer in *HAL* and other work (including *CA*), in part because it blocks the appearance of tense and aspect morphology on the verb to which it is attached. One might take this as an indication that *-sai* is indeed a nominalizer,

since nouns across languages typically lack tense and aspect morphology (though not always; see Burton 1996, Demirdache 1996, Nordlinger & Sadler 2004, and Tonhauser 2007, among others). In fact, *-sai* has other nominal uses.<sup>35</sup> It may attach to an argument-taking verb to yield an instrument nominal.<sup>36</sup>

(38) *-sai* instrument nominals

- a. xiohói xiboít-i-**sai**  
wind cut-EP-NOMLZR  
'wind cutter (i.e. propeller)' (HAL:277, ex. 284)
- b. xií kai-**sai**  
thing make-NOMLZR  
'thing maker (i.e. factory)' (HAL:277, ex. 285)
- c. xaoói hi [tábo xait-i-**sai**] xao-xaagá  
foreigner 3 board sleep-EP-NOMLZR POSSN-have  
'The foreigner has a sleeping-board (i.e. a bed).' (HAL:278, ex. 289)

If *-sai* is a nominalizer incompatible with tense morphology, its behavior in reported-speech constructions poses a puzzle exemplified in 39. When reported speech is introduced by the verb *gái* 'say', it is *gái* that usually bears *-sai* and therefore lacks tense and aspect inflection. It is the reported-speech clause, in turn, that lacks *-sai*—and the verb of this clause contains normal tense and aspect inflection.<sup>37</sup>

- (39) kohoibíhai hi **gái-sai** hi hi **xogi-hiab-iig-á** gáihí  
Kohoibíhai 3 say-NOMLZR 3 3 want-NEG-CONT-REM that  
'Kohoibíhai said (that) he's not wanting that.' (HAL:259, ex. 223)

Everett (CA:629) presents this pattern as an additional argument for the absence of embedding in Pirahã. Discussing 40 below, he claims that the 'simplest translation' of NP + *gái-sai* in examples like 40 is 'as a possessive noun phrase "my saying," with the following clause interpreted as a type of comment. The "complement clause" is thus a juxtaposed clause interpreted as the content of what was said but not obviously involving embedding' (CA:629). It is in the spirit of this analysis that Everett offers the translation identified as 'literal' for 40 below (CA:629, ex. 24).

- (40) tí gái-sai kó'ói hi kaháp-íí  
I say-NOM [sic] name he leave-INTENT  
'I said that Ko'ói intends to leave.' (lit. 'My saying Kó'ói intend-leaves.')

If the analysis of *tí gái-sai* as a possessive noun phrase is correct, there is an alternative analysis of the construction as a whole that is worth considering—an analysis that does involve embedding. As discussed in HAL:205, Pirahã displays a null copula in a variety of copular sentences, much like Hebrew and Russian.

- (41) null copula  
a. giopaíxi hi sabí-xi  
dog 3 wild-EMPH  
'The dog is really wild.'

<sup>35</sup> The suffix is also used as a valence-reducing device (HAL:219).

<sup>36</sup> If the Pirahã nominals in 38 have the structure [N [N V + N]], they are examples of nominal embedding of the sort claimed to be absent in Pirahã. It may be interesting to ask whether further embedding is possible (e.g. whether *xiohói xiboít-i-sai kai-sai* might be acceptable as a translation of 'propeller maker'), or whether, as in Swedish (Roeper & Snyder 2005), nominal compounds may not have recursive left branches.

<sup>37</sup> The puzzle arises even if *-sai* is not an infallible marker of clausal embedding (see n. 23), given our independent arguments for the availability of embedding in Pirahã, and the expectation that it is main clauses that will be finite and embedded clauses that may appear deranked.

b. kohoibíhái hi kaií gáíhi

Kohoibíhái 3 house that

‘That is Kohoibíhái’s house.’

(HAL:205, exx. 26–27)

The existence of null-copular constructions raises the possibility that the possessive noun phrase in examples like 40 might be connected with the rest of the utterance not by ‘juxtaposition’ but rather by a null copula, as in English sentences such as *My claim is (that) Ko’oi intends to leave*, where the material following the copula is an embedded clause.

This alternative does raise two important questions that we cannot answer conclusively. First, why is tense and aspect morphology available to the embedded clause, when (as discussed above) other complement clauses in Pirahã are generally ‘deranked’? Also, why does *gái* fail to take a clausal complement like those we have discussed in previous sections? That these questions remain unanswered does not favor CA’s characterization over our alternative, since the contrast between properties of *gái* and other verbs also receives no explanation in CA and does not appear to follow from the IEP.<sup>38</sup> In answer to the second question, one might posit that *gái*, though glossable as ‘say’, is syntactically intransitive (thus showing a selectional dissociation of the sort studied by Grimshaw (1979)), or at least disallows a proposition as its internal argument, much like English *speak* or *utter* (cf. \**Mary spokeluttered that she was about to leave*). If this view is correct, indirect speech reports in Pirahã might take the shape they do because the language contains no *verbum dicendi* with the selectional properties of English *say*.

Crucially, though an indirect speech report must involve a nominalized, nonfinite form of *gái*, there is no reason (under our alternative analysis) to expect that finite uses of *gái* are excluded more generally. Everett, however, claims the opposite, asserting that ‘the verb “to say” (*gái*) in Pirahã is always nominalized. It takes no inflection at all’ (CA:629). In fact, the published data show numerous counterexamples to the claim that *gái-* always appears with the nominalizing suffix *-sai*, and to the claim that it takes no inflection at all, for example HAL:232 (ex. 120) and DISS:198 (ex. 420), both of

<sup>38</sup> Despite glossing *gái* as ‘say’, CA appears to suggest that the IEP actually predicts the absence in Pirahã of the types of verbs that take propositional complements in other languages. It appears to be with this claim in mind that CA:629 asserts that ‘Pirahã has no verb “to think,” using instead (as do many other Amazonian languages . . .) the verb “to say” to express intentional [sic] contents’. Perhaps the absence of a verb whose sole meaning refers to mental states might be deemed significant because it would reflect not just the putative absence of recursion, but also the cultural constraints imposed by the IEP. Pirahã does, however, have lexical items that take a mental state as a semantic argument, such as the word *hoagá* ‘contrary to what you might expect’ (HAL:225, 303–4), which clearly requires reference to the abstract mental states of others (as well as an evaluation of the counterfactualty of such beliefs). There is also a distinct word glossed in HAL as ‘ignorance’, seen in (i).

(i) xí gáí-sai xioitaábi ti xóos aagá  
3.FEM say-NOMLZR Xioitaábi 1 ignorance have  
‘“Xioitaábi”, she said, “I don’t know”.’

(HAL:283, ex. 314)

CA’s own glosses (CA:629, exx. 25–27) also call attention to the fact that Pirahã expresses ‘know’ with the word otherwise glossed ‘see’ (cf. 14 above). Since Ancient Greek had a similar property (using the perfect tense of ‘see’ to mean ‘know’), we doubt that a language that associates seeing and knowing must reflect an intellectual restriction to the here and now. Furthermore, though English has a distinct verb *think*, it also uses *see* for a similar notion, as in the common expressions *I see* and *I see your point*. Also, as a referee has pointed out to us, the development of verbs of perception into verbs of cognition is crosslinguistically common, arguably reflecting facts about cognitive organization more general than culture-specific contingencies (Sweetser 1990).

which show *gái* inflected for remote past, or the following example, which shows atelic morphology on an instance of *gái* introducing direct speech.

(42) finite uses of *gái*

ti xagía **gá-xai-aí** ko kab-i-si<sup>39</sup> baósaápi  
 1 DISC.PRT say-be-ATEL eye NEG-EP-NOMLZR hammock  
 bag-áo-b-á-há  
 sell-TEL-PERF-REM-COMP.CERT

‘I was saying ‘(The man) without eyes sold the hammock’.’

(HAL:275, ex. 280)

**2.7. INTERIM CONCLUSION.** In this section, we focused first on the logical claim that a community adhering to the IEP should speak a language without embedding—that is, that the IEP predicts the first gap listed in 1. We demonstrated that there is no logical connection between the IEP and embedding. We also noted the absence of any cross-cultural evidence of a correlation. Nonetheless, as we noted, if Pirahã did show an unusual general ban on embedding, that fact would be noteworthy in itself. If the Pirahã were also culturally distinctive, we might at least wonder whether the two observations were connected.

We therefore turned our attention to the syntax of Pirahã itself and examined each of the constructions presented in *CA* as evidence of lack of embedding. In every case, it turned out that there was no evidence against embedding, and in some cases there was evidence to the contrary. Furthermore, the syntax of the relevant constructions turned out to be not nearly as unusual as claimed in *CA*. Almost every detail presented as an unusual feature of Pirahã that should be attributed to the IEP turned out to be familiar from languages whose speakers do not obey the IEP. The only exception was the special behavior of *gái* ‘say’, whose exceptionality does not appear to be predicted by the IEP in any case. The evidence did not merely fail to support the claimed link between Pirahã culture and grammar in the area of embedding; it also suggested the opposite conclusion: that in the domains discussed in this section, we find not a correlation, but a dissociation.

**3. NUMBER WORDS AND OTHER QUANTIFIERS.** We turn now to the second gap listed in 1, the ‘absence of numbers of any kind or a concept of counting and of any terms for quantification’ (*CA*:621), claimed to follow from the IEP. Like *CA*’s statements about embedding, this claim is largely new in *CA*. Under the heading *quantidades* (quantities), for example, the vocabulary list in *DISS* includes the entries in 43.

(43) ‘quantities’

a. hói	‘one’	e. xogió	‘all’
b. hoí	‘two’	f. xóíhi	‘a little’
c. xaíbaí/báagiso	‘many’ (count nouns)	g. xaíboái	‘half’
d. xapagí/[xogíí] <sup>40</sup>	‘much’ (noncount nouns)	h. xi ába	‘nothing’

The proposal made in *CA* entails that the translations in 43 are inaccurate, and that Pirahã utterances that use these words do not involve quantification.

It is the claimed absence of number words that has probably attracted the most public attention among all the gaps listed in 1. We thus begin with this part of the proposal. Much of the debate about Pirahã number words has concerned possible connections

<sup>39</sup> *-si* (HAL:279) is another nominalizer, distinct from *-sai*.

<sup>40</sup> We have added *xogíí* to the list as an alternative to *xapagí* ‘much’, on the strength of HAL:274 (which tentatively describes the two as ‘interchangeable’), to facilitate discussion below.

between the ability to reason quantitatively and the presence of numeric vocabulary in one's language (Gordon 2004). We do not discuss these broader cognitive issues here, focusing instead on the linguistic facts and the proposed link to the IEP.

The list in 43 suggests that Pirahã includes two number words: *hói* 'one' and *hoí* 'two' (segmentally homophonous, but differing in the placement of tone). In CA:623, however, Everett proposes that *hói* actually means 'small size or amount'; that *hoí* means 'somewhat larger size or amount'; and that Pirahã lacks number words altogether. The link to the IEP is said to be the following: counting 'involves quantification, which entails abstract generalizations that range in principle beyond immediate experience, rather than qualification, which entails judgments about immediate experience' (CA: 627).

Our first question once again concerns the logic of the proposal, independent of the empirical questions at stake. Does the IEP actually predict the absence of numerals? If by 'qualification' is meant 'modification', it seems to suggest that referring to a pair of canoes as 'large canoes' might communicate a judgment about immediate experience, but describing them as 'two canoes' could not. This conclusion seems unwarranted. Imagine, for example, that a Pirahã speaker WERE able to perform an act of counting (or subitizing) on some canoes, and reached the conclusion that they number two. Subsequent use of the phrase 'two canoes' would involve no information outside the speaker's personal immediate experience (since the speaker personally experienced the act of counting). The IEP would not be violated by the phrase 'two canoes' any more than it would be violated by the phrase 'large canoes'. Furthermore, even if the act of counting somehow falls outside the bounds of personal experience, why should degree of precision matter? If identifying a set as 'two canoes' violates the IEP, identifying the same set as a 'somewhat larger amount of canoes' should also violate the IEP. Not only does the IEP fail to predict the absence of number words, but it also fails to distinguish between the word meanings said to be blocked and the word meanings said to be allowed in Pirahã.

At this point, one might imagine falling back on the weaker claim of an unexplained correlation between the IEP and the absence of number words, following the model of our discussion in §2.1. As we already noted in that section, however, no meaningful correlation can be claimed between the IEP and other phenomena in the absence of information about societies other than the Pirahã with the IEP.

Continuing to follow the model of our discussion of embedding, we ask next about the weakest relaxation of the claims in CA that would still be of interest. If Pirahã were unique in the domain of number words, and also unique culturally, one might at least conjecture that some common explanation might underlie both types of exceptionality. It is not clear, however, whether Pirahã is indeed linguistically exceptional in this area. Though it is not usually claimed that other languages lack number words entirely, radically impoverished number systems are not uncommon in the Amazon, and have been noted elsewhere as well (especially in Australia and Papua; see Dixon 2002:67, cited by Levinson (2005) in his commentary on CA).<sup>41</sup> In addition to systems that stop at two, or have limited number words above two, Hammarström (2006:6) notes that:

There are a number of languages, all in the Amazon, for which there is an explicit statement that they lack (exact) numerals above one. These are Nadëb (Weir 1984:103–104), pre-contact Mocovi (Grondona 1998:91) (cf. Gualdieri 1998:294–295) and for the related Pilagá (Vidal 2001:129), pre-contact Jarawara

<sup>41</sup> We are grateful to an anonymous referee and to Harald Hammarström (p.c.) for suggesting some of the points about number systems that follow.

(Dixon [ & Vogel] 2004:559), Jabutí (Aikhenvald and Dixon 1999:358) (cf. van der Voort 2004:212), Canela-Krahô (Green 1997:181), Krenák (Loukotka 1955:125), Chiquitano (Adam and Henry 1880: 19) (cf. Tormo 1993) as well as all Campa and Machiguenga groups, Arawán Culina, Arabela and Achuar (Wise and Riggle 1979:88).

Interestingly, as has been noted in the literature, numeral systems are one domain in which a connection between culture and language is plausible ('beyond dispute', in the opinion of Greenberg (1978:291); see also Winter 1999 and Epps 2008:282–83). A hunter-gatherer society with limited commerce is precisely the kind of environment in which a 'small number system' might be expected to survive without pressure to grow larger.<sup>42</sup> No specific recourse to the IEP is necessary to explain an implicational relation between language and culture in this domain.

Pirahã could be grouped easily with the languages cited by Hammarström unless it can be shown that it is special in lacking even a word for 'one'. Unfortunately, investigations into Pirahã number words still leave the facts unclear. In the most recent study, Frank and colleagues (2008) conducted a pair of experiments with a small group of Pirahã speakers, designed to test (among other things) for the existence of number words.<sup>43</sup> In the first condition, the experimenters placed ten spools of thread on a table, one at a time. As each spool was added, Everett asked the subject a question reported as 'how much/many is this?'.<sup>44</sup> As Frank and colleagues note, the subjects' responses were consistent with earlier translations of Pirahã *hói* as 'one' (and possibly also with *hoí* as 'two'). Every subject answered with *hói* in the presence of a single spool, and every subject answered with *hoí* when a second spool was added. With three to ten spools of thread, subjects' answers were a mixture of *hoí* and *báagiso* 'many' (= 43c).<sup>45</sup>

A second condition that reversed the procedure, however, yielded a strikingly different result. This experiment began with ten spools on the table, which were removed one at a time. This time, one subject offered *hói* for as many as six spools, with one additional speaker producing *hói* as each additional spool was removed. At three spools and lower, every subject used *hói*. Despite the subjects' very different behavior in the two conditions, Frank and colleagues conclude that the results favor CA. 'Because each of the three words [*hói*, *hoí*, and *báagiso*] was used for a dramatically different range of values in the ascending and the descending elicitations', they write, 'these words are much more likely to be relative or comparative terms like "few" or "fewer" than absolute terms like "one"' (Frank et al. 2008:820). This conclusion strikes us as

<sup>42</sup> In fact, Harald Hammarström (p.c.) reports a correlation between hunter-gatherer subsistence and restricted numeral systems, though no clear correlation related to commerce (Hammarström 2008).

<sup>43</sup> Both experiments are grouped by Frank and colleagues under the rubric 'experiment 1'. The work reported as 'experiment 2' tested Pirahã subjects' ability to perform nonverbal quantitative tasks, which we do not discuss here.

<sup>44</sup> According to Michael Frank (p.c.), the WH-phrase was *go gúiso*, glossed in HAL:239–40 (especially ex. 153) as 'WH DEM', a generic WH-phrase also used to form 'what'- and 'when'-questions. The use of 'what' in 'how many' questions is also reported by Dixon and Vogel (2004:408, exx. 15.62–63, and pp. 559–60) for the Amazonian language Jarawara (they suggest the gloss 'what about').

<sup>45</sup> The use of 'two' for higher numbers might place Pirahã with the languages cited by Hammarström as lacking a genuine 'two'-word. Alternatively, one might appeal to Barner and Bachrach's (2008) discussion of similar behavior by young children who they identify as having reached a stage at which they know 'one' and 'two' but not higher number words. They offer a Gricean explanation according to which the scalar implicature that yields 'exact' readings of numerals will not apply to a number word whose successor is not known. An English-speaking child (or a Pirahã adult) who knows 'one' and 'two' will therefore feel free to offer 'two' for higher quantities because there is no more informative competitor available (e.g. 'three').

premature, since no explanation is offered for the difference in findings between the two conditions (addition vs. removal of spools).

At the same time, the work raises a question of considerable importance in the context of our discussion: how would speakers of other ‘small number system’ languages like those listed by Hammarström behave in identical conditions? Since we do not know the answer to this question yet, we cannot conclude at present that Pirahā’s treatment of numeric quantities demands a special explanation beyond the factors that account for other languages with reduced numeral systems.<sup>46</sup>

Let us now add to the discussion the other quantity words listed in 43. Everett already noted in *DISS* and *HAL* that some of these have nonquantificational uses. He notes, for example, that *xothi* in 43f ‘is translatable either as “small” or “few/small quantity of” ’ and that *xogii* in 43d may be translated as ‘either “large” or “much/large quantity of” ’ (*HAL*:274). In *CA*, he is claiming, in effect, that the nonquantificational meanings are their only use, and that these words only act as modifiers describing a set as ‘big’ or ‘small’.

For quantifier-like words that do not have obvious nonquantificational uses, *CA* appeals to the meanings of the word’s component parts. This claim is echoed in interlinear glosses that, unlike the glosses in *DISS* and *HAL*, resolutely reflect the nonquantificational uses of quantificational morphemes, and by translations labeled ‘literal’ that take the meanings of the morphemes at face value. As part of a demonstration that

<sup>46</sup> Everett in *CA* also notes that Pirahā lacks the grammatical category of number, describing this property as ‘very rare’ and suggesting that ‘[t]here may be no other language that lacks the grammatical category of number’ (*CA*:623). In this connection, Everett cites Corbett (2000:50), who in turn cites Pirahā as the sole example of a language without number. Corbett also discusses at length, however, a class of languages that show the phenomenon of GENERAL NUMBER. These are ‘languages in which the meaning of the noun can be expressed without reference to number’ (p. 10), in which a sentence glossed as ‘I saw dog’ (with ‘dog’ showing general number) is true if the speaker saw one or more dogs. As he notes, ‘there are many languages of this type from various linguistic families’. (Examples are discussed from Bayso (Cushitic, Ethiopia) and the Fouta Jalon dialect of Fula (Guinea, Sierra Leone, Senegal).) Corbett also claims that languages with general number have one or more forms that disambiguate in favor of a particular number: singular, plural, or both. If so, this property does distinguish such languages from Pirahā as described by Everett.

In fact, however, it is not clear whether the languages identified by Corbett as general-number languages necessarily show an opposition between general number and a specified number. If so, Pirahā once again falls together with other languages. Corbett describes Japanese as a language with the opposition ‘general number’ vs. ‘plural’. As Corbett notes, the form *inu* ‘dog’, for example, does not ‘specify number’, and may be used to refer to a single dog or a group of dogs. He also notes that there is a form *inu-tati*, which Corbett glosses as ‘dogs’ and calls a ‘plural form’. In fact, however, recent work on Japanese *-tati* (e.g. Kawasaki 1989, Nakanishi & Tomioka 2004) shows that its semantics are more complex. *X-tati* actually means something like ‘group represented by X’. Thus, it may be suffixed to a proper name, for example, *Taro-tati*, with a meaning something like ‘group headed by Taro’, and when suffixed to a description like *inu* ‘dog’ may denote a group containing nondogs, so long as dogs somehow represent the group. Similar phenomena have been discussed in Chinese (Nakanishi & Tomioka 2004) and Afrikaans (den Besten 1996).

Pirahā appears to have a form that may have properties in common with Japanese *-tati*: the postnominal element *xaitiso*, sometimes glossed as ‘also’. According to Everett (*HAL*:281), Pirahā *N + xaitiso* is one way of expressing the ‘notion of plurality’ in Pirahā. Unlike Japanese *N + tati*, the noun in the Pirahā construction does not pick out the representative of a group, but rather the OTHER members of the group, that is, the participants in a group who participate in a situation ‘in conjunction with the primary participant’. As Everett notes, *xaitiso* has other uses (including a more straightforward ‘also’), so there is clearly more to discover about *xaitiso*. Nonetheless, the existence of *xaitiso* suggests that Pirahā is not unique in lacking number in the sense discussed by Corbett, but falls together with languages like Japanese that have both general number and other devices for expressing plurality. See the subsection on pronouns (below) for more discussion of *xaitiso*, in particular, the analysis by Sheldon (1988:n. 1) of pronoun + *xaitiso* sequences as instances of plural pronominals.

Pirahã lacks a word for ‘most’, for example, 44 is offered as ‘the closest expression[] Pirahã can muster’ to ‘We ate most of the fish’ (CA:624).

(44) Pirahã ‘most’

**ti** **'ogi-áaga-ó**                      'ítii'isi **'ogi-ó** 'i kohoai-baaí, koga  
 I big-be(permanence)-DIR fish big-DIR she eat-INTNS nevertheless  
 hói hi hi-i kohoi-hiaba  
 small.amount INTNS INTNS-be eat-not

‘We ate most of the fish.’ (lit. ‘My bigness ate [at] a bigness of fish, nevertheless there was a smallness we did not eat.’) (CA:624, ex. 11)

The expression *ti 'ogi-áaga-ó*, despite its ‘literal’ translation and gloss, is in fact composed of the first-person pronoun, as noted, and the expression *'ogiáagaó*. This expression in turn is repeated in the succeeding example in CA, described as ‘the closest I have ever been able to get to a sentence that would substitute for a quantifier like ‘each,’ as in ‘Each man went to the field’ ’ (CA:624). This time *'ogiáagaó*, however, is not broken into distinct morphemes, and is glossed as ‘bigness’ rather than ‘big-be(permanence)-direction’. By contrast, in a (no longer accessible) online dictionary of Pirahã (Everett 1998b), the phrase in 44 is translated straightforwardly as ‘all of us, todos nós’; and in HAL:282, Everett describes *'ogiáagaó* as follows: ‘There is only one collective form in my data, *xogiáagaó* “everyone”. This is probably another case of a complex morpheme which has come to function as a crystallized form. I have not yet attempted an analysis of its component morphemes’.

It is certainly possible that the etymology of *'ogiáagaó* consists of *'ogi*, glossed as ‘big’ in HAL, combined with a copular verb that denotes permanent states (followed by the oblique marker *-ó*). Such an etymology does not mean, however, that the expression is computed in this way by living speakers, any more than the origin of English *every* as a compound of *ever* + *each* or the literal meanings of *lot* in *a lot of* requires us to imagine that English speakers compute their meanings from their etymological component parts. Everett provides no evidence in CA that speakers are sensitive to the component parts of words like *'ogiáagaó*. Even supposing that speakers do morphologically decompose these words, Everett does not consider the possibility that the various morphemes constitute an idiom whose noncompositional meaning is the universal quantifier.

Furthermore, even if certain quantifiers such as ‘most’ are missing in Pirahã, this does not entail that the language lacks quantifiers in general. In fact, the absence of a lexical item ‘most’ is a property of languages whose culture clearly fails to obey the IEP. Russian, for example, lacks a quantifier ‘most’ and it too ‘resorts’ to an expression that one might etymologically gloss as ‘bigness’: *bol'sinstvo* (from *bol'sh-* ‘big’)—though its more normal translation is ‘majority’. Likewise, the Portuguese counterpart of *most* is *aluma maioria*, which derives from *maior* ‘bigger’. English has similar deficiencies. Though English does have a word *most*, it lacks a word for the complement set of *most* and resorts to circumlocution (*a minority of, less than half of, etc.*). As a referee notes, the English expression *just a little* can be used in such circumstances as well, and shares with Pirahã a size word that has been recruited for other purposes. Since the cultures in which Russian, Portuguese, and English are spoken have rich arrays of number words, color terms, and fairly complex kinship systems, we once again see a familiar dissociation among the properties that Everett claims are linked.

Finally, Everett’s main semantic argument for the absence of quantificational vocabulary in Pirahã comes from an anecdote said to reveal nonquantificational truth conditions for the word *báaiso*, glossed by Everett as ‘whole’ in scare-quotes (CA:625). For reasons

of space, we cite only Everett's translations, with *báaiso* itself replacing the scare-quoted gloss.<sup>47</sup>

(45) anaconda discourse

'[S]omeone has just killed an anaconda and upon seeing it, utters [45a]. Someone takes a piece of it, and after the purchase of the remainder the content of [45a] is reaffirmed as [45b].'

- a. 'The foreigner will likely buy *báaiso* anaconda skin.'  
 b. 'Yes, he bought *báaiso*.'

Everett asserts that 'it would simply be dishonest and a violation of the meaning of "whole" to say, "He bought the whole anaconda skin"' when a piece had been removed. He concludes that *báaiso* cannot actually mean 'whole' in Pirahã. According to Everett, 'there is no truly quantificational-abstraction usage of *báaiso* "whole"' because, more generally, its 'truth conditions are not equivalent to those of real quantifiers' (CA:625).

In our opinion, this argument is not sound. The foreigner did buy the entirety of the skin that remains (the entire portion available for sale). There is nothing dishonest or linguistically deviant in using the word 'whole' to refer to the entirety of a remnant. Just the opposite, in fact. Among the most intensively studied properties of quantification in human language is the much-studied phenomenon of DOMAIN RESTRICTION (von Stechow 1994, Stanley & Szabó 2000, among others). As Stanley and Szabó put it, when someone utters the sentence *Every bottle is empty*, '[i]t is unlikely that what she intends to convey is that every bottle in the universe is empty; she most likely intends to convey that every one of a restricted class of bottles (say, the bottles in the room where she is, the bottles purchased recently, etc.) is empty. And, if the context is right, she can succeed in communicating such a proposition' (2000:219). This phenomenon is ubiquitous among quantifiers and ubiquitous among the languages of the world. As Lewis (1986:164), cited by von Stechow (1994:28), notes: 'Remember that part of the ordinary meaning of any idiom of quantification consists of susceptibility to restrictions; and that restrictions come and go with the pragmatic wind'.

To judge from the evidence, the anaconda anecdote reveals nothing more surprising than the fact that Lewis's pragmatic wind blows across the Maici River in Brazil just as it blows everywhere else that human speakers use language.<sup>48</sup> If anything, the anaconda story teaches us that *báaiso* probably is a quantifier after all—and that once again, Pirahã is quite unexceptional from the point of view of linguistic typology.<sup>49</sup>

<sup>47</sup> Though the word is glossed as 'whole' in three examples in CA (Everett's exx. 15–17), it is decomposed (without comment) into four component morphemes in the gloss to another example (Everett's ex. 14a), where it is rendered as 'touch-causative-connective-nominalizer'.

<sup>48</sup> It could also be the case that *báaiso* is a quantifier, but not the one first supposed. For example, it might mean 'almost all' (or 'roughly all'), in which case the story makes sense without reference to domain restriction. Further refinements may help as well. With reference to an example (CA:625, ex. 17) containing the sequence '*isi báaiso*, glossed as 'animal "whole"', Everett notes: 'Sentences like this one cannot be uttered acceptably in the absence of a particular pair of animals or instructions about a specific animal to a specific hunter. In other words, when such sentences are used, they are describing specific experiences, not generalizing across experiences' (CA:625). This might mean nothing more than that *báaiso* should be translated as 'all of THE' or 'the entirety of THE', that is, as inherently partitive—or, if our first suggestion is also correct, 'ALMOST all of THE'.

<sup>49</sup> In fact, in our judgment, the English version of 45 is also acceptable (with *báaiso* rendered as 'the whole'), so long as the context is appropriate. We can easily imagine a person at a buffet dessert table who finishes off the cake being described as having eaten 'the whole thing' whether or not others had previously taken slices of it. The key factor is whether any of the cake is left, and whether that fact is viewed as noteworthy.

4. PERFECT TENSE, COLOR TERMS, AND BORROWED PRONOUNS. We do not deal in any depth with the remaining three properties listed as significant gaps in the Pirahã language. Everett himself discusses them in less detail, and the questions we would ask are now familiar.

For example, Everett (CA:631) takes it as a significant consequence of the IEP that Pirahã lacks a ‘perfect tense’. No explanation is offered as to why the IEP should entail the absence of perfect tense, so long as both the semantic reference time and event time (whose relation is crucial to the perfect) fall within the immediate experience of the speaker. In any case, many languages throughout the world for whose cultures the IEP is not in question (for example, Russian) lack this kind of tense. As far as we can tell, therefore, the absence of perfect tense in Pirahã is irrelevant to the discussion.

The claimed absence of color terms, in turn, strongly recalls the discussion of quantifiers in the preceding section. Though Kay and colleagues (n.d.) and Everett himself (DISS:346) identify a number of Pirahã expressions as color terms, some or all of them can be decomposed into component morphemes that are not color-related. Thus, for example, the fact that the word glossed as ‘yellow’, ‘orange’, and ‘red’ in DISS is not ‘morphologically simple’ (and can be decomposed as ‘blood + nominalizer’, i.e. ‘bloodlike’) is taken as support for the claim that ‘there are no color terms in Pirahã’ (CA:627). As we did in the previous two sections, we might start by asking how exactly the IEP predicts the absence of color terms (a question not addressed by Everett), or why the existence of an etymology outside the color domain entails that the derived word is not a color term. Concerning the link to the IEP, Kay (2005) notes that when a color term is used to modify a noun, it constitutes a report on an experience that is ‘about as direct as experience gets’ (p. 636). ‘Color sensations’, he continues, ‘would appear to qualify as exemplifying “direct, concrete experience” if anything does’ (p. 637). Consequently, if an immediate experience principle is true of the Pirahã and has any obvious consequence for the Pirahã language, it would be the PRESENCE of color terms, not their absence, that is relevant.

Finally, Everett (CA:628) lists as another gap predicted by the IEP the fact that ‘Pirahã has the simplest pronoun inventory known’. We find no connection between simplicity of pronominal inventories and the IEP, and CA does not explain the link at all. If the referent of a pronoun’s antecedent forms part of a speaker’s immediate experience, the pronoun itself should be usable. The simplicity or complexity of Pirahã’s pronoun inventory should be irrelevant to the discussion.

What may be surprising about the Pirahã pronominal inventory is the claim that it makes no number distinctions. If we take this description at face value, Pirahã is a counterexample to Greenberg’s (1963:96) universal 42: ‘All languages have pronominal categories involving at least three persons and two numbers’, which is further expanded by Ingram (1978:227) as ‘[t]here are at least four persons in every language: *I, thou, he, we*’. Harley and Ritter (2002:503) cite two languages, Maxakalí and Kwakiutl, as examples of minimal systems that conform to this universal. Their feature system for pronominal inventories predicts a simpler system, however—exemplified by Pirahã. Though Pirahã is the only such language that they could find, the key point (if their feature system is correct) is that one needs no appeal to the IEP to explain the existence of such a language. It is a predicted point in an overall typology of pronoun systems.

But as Everett noted in his own earlier work (HAL:281ff.), Pirahã can in fact specify plural anaphora and has a number of ways of doing this. One of them involves the morpheme *xaitiso* discussed in n. 46 above, glossed as ‘also’ in HAL. The glosses and

first translation below are from *HAL*. The parenthesized translation reflects Everett's discussion in the accompanying text.

- (46) *ti xaítiso xis ohoa-i-hai*  
 1 also food search-PROX-REL.CERT  
 'I also will search for food.' ('We will search for food.')

(*HAL*:281, ex. 303)

In *HAL* (p. 281), Everett informally attributes to Sheldon the view that such forms as *ti xaítiso* constitute a single word, and indeed Sheldon (1988:n. 1) offers the following pronominal paradigm for Pirahã.

- (47) pronouns in Pirahã (Sheldon 1988:n. 1; orthography adapted to *HAL*'s conventions)
- |   | SG        | PL               |
|---|-----------|------------------|
| 1 | <i>ti</i> | <i>tixaítiso</i> |
| 2 | <i>gí</i> | <i>gíxaítiso</i> |
| 3 | <i>hi</i> | <i>hixaítiso</i> |

It may be that we are once again faced with a Pirahã that looks exceptional only if one insists on glosses that reflect a particular etymology. The Pirahã pronominal system might be no more unusual than that of Mandarin.

- (48) pronouns in Mandarin
- |   | SG        | PL    |
|---|-----------|-------|
| 1 | <i>wo</i> | women |
| 2 | <i>ni</i> | nimen |
| 3 | <i>ta</i> | namen |

If, however, Pirahã should turn out to lack a number distinction in its pronominal system, there is still no argument that we must attribute this property to a principle like the IEP. There are other languages that look like Pirahã even under this description of the facts. For example, Karitiana, a Tupi language (Arikém branch) of Rondonia (Brazil), though otherwise quite different from Pirahã, displays no singular-plural distinction for third-person pronouns (or other nominals) (Müller et al. 2006a,b, C. Everett 2006:303, table 13.3, Storto 2007).<sup>50</sup> Once again, a feature of Pirahã that Everett attributes to the IEP can be viewed instead as a particular choice that other languages also make from an existing repertoire of possibilities.<sup>51</sup>

**5. PROPERTIES OF PIRAHĀ CULTURE.** Our discussion so far has focused on the linguistic gaps of 1, attributed by *CA* to the IEP. In this section, we turn briefly to the cultural

<sup>50</sup> It is possible to disambiguate singular and plural reference in the first and second persons by suffixing the third-person pronoun and an anaphoric morpheme to the singular pronouns.

<sup>51</sup> Everett also calls attention to the possibility that the Pirahã pronouns were 'borrowed recently' from another language (Thomason & Everett 2001) as evidence that the language 'seems to have gotten by without them' (*CA*:628). No evidence is presented, however, for the claim that the borrowing was recent (a claim not made by Thomason and Everett), and no evidence is offered against the proposition that the borrowed pronouns replaced an earlier set of pronouns. Furthermore, as Thomason and Everett themselves point out, other languages besides Pirahã have borrowed pronouns, including Miskito, Alesa (Kinkade 1978), Iatmul (Foley 1986), Proto-Chamic, and Chavacano. They note that 'a search of the literature, especially for Southeast Asia and the Pacific but also in the Americas and elsewhere, turns up a sizable number of examples of borrowed pronouns' (2001:303), and they discuss the types of contact situations that might be likely to lead to such borrowing.

gaps, which are also said to follow from the IEP, noting a few domains in which now-familiar concerns arise, both logical and empirical. In what follows, we focus our attention on gaps 1f–h, and do not discuss either the Pirahã kinship system or their material culture. We discuss Everett’s claims about Pirahã art only in passing.

**5.1. MYTHS AND THE MYTHIC PAST.** Everett states (CA:632) that ‘[t]he Pirahã do not create fiction, and they have no creation stories or myths’, and attributes this gap to the IEP. Unfortunately, important details of this claim are presented imprecisely and inconsistently, which makes it hard to know exactly what the IEP is thought to predict. Our questions about the claim include: (i) why creation myths are singled out, and (ii) what distinction (if any) the IEP makes between CREATING a narrative and HAVING one. We begin with the issue of creation myths.

A wealth of information about Pirahã mythology can be found in two extensive studies by Gonçalves (1993, 2001), an anthropologist who lived with the Pirahã for eighteen months over a period of eight years (1986–1993), documenting and analyzing their cosmology (initially in the context of the conventions for naming children). Gonçalves is in agreement with CA about the absence of creation myths. As his work makes clear, however, the Pirahã do have narratives about the mythic past. Though he presents no Pirahã creation myth, Gonçalves does cite a striking story about the RE-creation of the world by the demiurge Igagai after a cosmic cataclysm:

In the beginning of the world, the first level immediately above that of the Pirahã was situated much lower than it is today. It was situated very close to the level in which they live. The moon, when it rose, appeared very low. One day, at night, a man decided to shoot arrows at the moon. He climbed a high tree and released the arrow. He hit the moon in the middle and its blood began to spurt. With all the blood that ran, the moon perished. The sky above began to fall. The men ran and cut long and thick tree-trunks to support the upper earth that was descending upon them. They succeeded in avoiding the collapse but not the darkness. The world became dark. All of the forest animals came close to where the Pirahã lived. Fearfully, they went to live atop the trees. The water of the rivers began to dry and all of the fish died. The forest animals also went dead with thirst. . . . *Igagai* [a demiurge] knew how to make fish and other animals. He had made many, but they inhabited the level above where the Pirahã lived. *Igagai* decided therefore to slowly bring the beasts to an intermediate level that was empty. He threw them, because he was afraid of breaking his arm with the heavy beasts. He threw the fish but always missed the river, and the fish fell in the forest and died. In view of this situation he created the *boto* [Amazon river dolphin] and threw it in the river, teaching it at the same time how to create fish. . . . [*Igagai*] told the Pirahã not to prey upon the animals or the fish. It was necessary to wait until there were enough to eat. *Igagai* made another moon, and made a small hole in the earth above, in the direction of the river above, so that enough water could fall into the Pirahã’s level and fill the rivers below. *Igagai* made first the river Maici and afterward the river Marmelos. During this time, the Pirahã fought a lot with other Indians in the region. They fought so much that all the men died, only leaving three women in the world. *Igagai* gave a fruit, *tobahai* (*sorvinha*, milk tree) so they would become pregnant and have male children. The male children were born, only without a penis, so *Igagai* made a penis of straw. The women that were alone were also without fire to cook their food. They couldn’t stand eating it raw anymore. One day they cried until *Igagai* heard them and sent fire. (Gonçalves 1993: 39–41, abridged)<sup>52</sup>

Gonçalves notes the absence of any reference (in this or other Pirahã narratives) to the origins of *Igagai* or the other humans and animals mentioned—evidence that this story is not quite a creation myth.

As we discussed in §2.1, the IEP does provide a reason for a culture not to develop a creation myth: no living speaker witnessed the creation of the universe, and no living individual heard about the event from someone who witnessed it. The same considera-

<sup>52</sup> We have translated from Portuguese all quotations from Gonçalves (1993, 2001).

tions, however, should block ANY story set in a mythic past, not just a creation myth. Everett himself in later papers (Everett 2006:144, 2007a:6) appears to extend his claim to myths more generally, replacing the phrase ‘creation myths’ with ‘myths’ when mentioning this cultural gap. Since the IEP predicts the absence of myths in general, not just creation myths, stories like the one quoted above (and others cited by Gonçalves)<sup>53</sup> stand as apparent counterexamples to the IEP.<sup>54</sup>

At this point, the question of creating vs. merely ‘having’ a story arises. In the section of *CA* devoted to the absence of myths, Everett notes that the Pirahã have told him stories concerning ‘cosmology, the origin of the universe, etc.’ (*CA*:632). He rejects the possibility that these stories might be counterexamples to the IEP, however, with the comment that they are not ‘indigenous’, but borrowed from other cultures. As formulated in *CA*, however, the IEP does not care about such distinctions. Whether or not a speaker has personally created a story, and whether or not its ultimate author was a Pirahã, the IEP blocks the recounting of ANY event that does not fall within the immediate experience of the storyteller.

More interestingly, as Gonçalves (p.c.) has pointed out to us (and as also stressed in Gonçalves 2005), the influence of neighboring peoples on the Pirahã’s mythological views can be seen not as evidence of a restriction placed on the Pirahã by unique features of their culture, but as a sign of their INTEGRATION into a broader Amazonian culture. Gonçalves (2005:136, n. 1) observes, for example, that ‘myths about the origin of the world that have as their theme a cataclysm initiated by the “land above that falls down on the men” appear to be common in tropical South America’, citing examples from origin myths of the Barasana, Apapocuva, and Yanomami. He also notes that these myths also share with the Pirahã story the motif of the collapse being successfully thwarted by human efforts. Furthermore, Bruna Franchetto (p.c.) has observed that many Lowlands groups in Brazil, though possessing myths about the origins of various entities, lack a distinct indigenous myth in which the universe comes into existence ex nihilo. The logic of this point should be familiar by now. If Pirahã culture shares both myths and ‘myth gaps’ with other societies in its Amazonian ‘discourse area’ (Beier et al. 2002), and if the IEP is not a feature of these other societies, the case for the IEP

<sup>53</sup> In *CA*, Everett suggests that Gonçalves’s reports contain inaccuracies, but cites no instances. Though his work is ‘the most reliable ever done by an anthropologist’, he writes, ‘one simply cannot come to the best conclusions about Pirahã meanings working through the medium of the very poor Portuguese of Pirahã informants. Gonçalves based much of his research on work with two Pirahã informants whose Portuguese was somewhat better than that of most Pirahã . . . but even their Portuguese was insufficient for getting at the meanings of terms as they emerge both from the culture and especially from the very complex morphological structure of Pirahã’ (*CA*:632, n. 19). In the same vein, Everett (2007a), replying to an earlier version of this article, characterizes the myth that we cite as ‘NOT a Pirahã text’ (Gonçalves does not present it as such), but ‘pieced together from the Pirahã’s pidgin-like Portuguese and Gonçalves’s pidgin-like Pirahã’. For such remarks (whether or not they are just) to count against our discussion here, however, Everett would need to highlight errors in Gonçalves’s report with a very particular property: once corrected, they remove the narrative from the mythic past and place it within the immediate experience of today’s Pirahã.

<sup>54</sup> Everett (2007a) suggests that the Pirahã believe that they have actually seen characters of the ‘spirit’ world when others are ‘possessed’ by these beings, and that they also believe that they personally witness such events. As Everett puts it, ‘These are to them real experiences and seeing spirits to them is as real as seeing macaws. There is no violation of the IEP in any of this’ (2007a:24). This claim should raise the question of why a Pirahã could not also be possessed by the creator of the universe (or one of the creator’s first creations), and thus acquire the ability to recount a creation myth without violating the IEP. This resort to the ‘reality’ of mythic or spiritual events eliminates the role of the IEP in explaining the distinction between the myths that the Pirahã can and cannot recount, and renders the IEP devoid of any explanatory power in this domain.

as the explanation for this cultural pattern is weakened—just as it was at comparable points in our discussion of Pirahã’s linguistic gaps.<sup>55</sup>

At the same time, we should observe (as stressed by Gonçalves (p.c.)), that the practice of formal or ritualized storytelling is not a feature of Pirahã culture, as it is among some other indigenous groups in Brazil—despite the existence of mythic narratives like the story cited above. Gonçalves notes, for example, that there are other tribes in Brazil (for example, the Paresi, an Aruak group of Mato Grosso, with whom he has also worked) whose rich mythology is supported by a storytelling tradition and a special style of ‘mythological speech’. With the Pirahã, the researcher learns about the knowledge of various narratives most typically in a context in which they are asked questions about particular facts or beliefs. When asked about the structure of the cosmos, for example, the Pirahã describe the series of ‘levels’ alluded to in the mythical narrative cited above. These are populated by *abaisi*—imperfect, deformed, but immortal copies of humans and animals that are created when their perfect counterparts in our level (called *ibiisi*) have suffered an injury. An elaborate belief system, described at length by Gonçalves (1993:39–41, also 53–54), charts the relation between *ibiisi* and *abaisi*. As Gonçalves (p.c.) notes, ‘what is important to emphasize is the evident existence of a mythological imagination, reflected in all spheres of Pirahã culture (in the description of the cosmos, in the description of beings that inhabit the cosmos, in their dreams, in their shamanism, in their songs, and in some mythical fragments)’.

**5.2. PIRAHÃ MONOLINGUALISM.** Everett states that the ‘Pirahã continue to be monolingual after more than 200 years of contact with Brazilians and other non-Pirahã’ (CA: 622). He explains their failure to learn Portuguese in particular as a consequence of the claim that ‘Portuguese is incommensurate with Pirahã in many areas and culturally incompatible, like all Western languages, in that it violates the immediacy-of-experience constraint on grammar and living in so many aspects of its structure and use’ (CA: 634). Since the Pirahã are claimed to be monolingual, not merely resistant to Portuguese, a similar hypothesis of incommensurability would presumably be made about the culture

<sup>55</sup> A referee suggests that CA’s claims about Pirahã art might also fall into this category, noting that other hunter-gatherer societies of Amazonia also lack an artistic tradition (while differing from the Pirahã in the grammatical properties of their languages). Indeed, despite the inclusion of ‘absence of drawing or other art’ on CA’s list of cultural gaps, there is no reason why the IEP should preclude drawing or art, so long as it reflects the artist’s personal experience. Significantly, Everett’s own Pirahã website (Everett 1998a, no longer accessible) displayed several drawings by Pirahã, described in the following terms: ‘They represent what they are familiar with; the planes that pass over them, the boats that bring the traders up the river, and the animals that surround them’. Discussing children’s toys, Everett notes (in an appendix to an expanded online version of CA) that ‘[t]he people know how to make (spinning) tops, whistles, toy canoes, and carved dolls’ (as also observed by de Oliveira and Rodrigues (1977:30)) and offers a description of the model planes made by Pirahã boys in imitation of the planes that visit their community—also described by Colapinto (2007:120). More obviously problematic for the IEP are drawings reproduced in Gonçalves 2001 that illustrate the levels of the cosmos, and the relation between *ibiisi* and their *abaisi* counterparts described in the text below. These presumably belong to the class of drawings categorized by Everett as ‘extremely crude stick figures representing the spirit world claimed to have been directly experienced’ (CA:622). Concerning the claim that beings of the spirit world actually constitute an object of direct experience, see n. 54 above (which argues that such claims make the IEP vacuous in the relevant domain).

Everett’s characterization of the Pirahã drawings as ‘extremely crude stick figures’ is consistent with a general insistence on the noncentrality of art in Pirahã culture. For example, Everett appends to his remark that the ‘Pirahã know how to make’ a variety of toys the additional observation ‘but they never do so unless asked’. Likewise, Everett as quoted by Colapinto offers the casual discarding of a boy’s beautiful self-made model airplane as a refutation of the reporter’s ‘doubts’ about the Pirahã’s claimed lack of art. In fact, the IEP makes no predictions about the quality or cultural importance of Pirahã art.

and language of the Pirahã's indigenous neighbors as well (though Everett does not clarify this point).

We believe that there are grounds for caution about these claims, since other reports indicate some ability among the Pirahã to communicate in Portuguese and local indigenous languages. (See Levinson 2005 for similar concerns.) Gonçalves's (2000) online description of the Pirahã, for example, states:

Most men understand Portuguese, though not all of them are able to express themselves in the language. Women have little understanding of Portuguese and never use it as a form of expression. The men developed a contact 'language' allowing them to communicate with regional populations, mixing words from Pirahã, Portuguese and the Amazonian *língua geral* (a Tupi-based trade language more commonly known as *nheengatu*).

Consistent with this picture, de Oliveira (1977:66), who investigated Pirahã kinship terminology in 1973, reports receiving assistance from five young men whose Portuguese she described as 'reasonable' ('de razoável entendimento'), as well as two older men who had worked for the 'civilizados'. The men also served as de Oliveira's interpreters with the Pirahã women.

Even Everett's own descriptions of his early fieldwork experiences suggest a picture more nuanced than total 'monolingualism'. In the expanded online version of *CA* (appendix D), Everett recalls, for example, that '[i]n my first visit to the Pirahã, they tended to give Tupian (Nheengatu) words as answers to my attempts to elicit vocabulary in their language'. He also notes, in discussing Pirahã myths, that '[i]n the early days, before I spoke Pirahã, I would occasionally try to use Portuguese to elicit the information. Often this or that Pirahã informant would tell me (in Portuguese) that they had stories like this and would even tell me bits and pieces, which I thought were similar to Christian stories or Tupi legends common in that part of Brazil' (*CA*:632–33).

Furthermore, Pirahã examples included in *Diss* and *HAL* contain clear borrowings from Portuguese. Especially noteworthy is 17b above, all of whose lexical items are Portuguese borrowings. Finally (as a referee notes) Thomason and Everett's (2001) argument that Pirahã borrowed its pronouns from a Tupí-Guarani language would, if correct, provide evidence for some level of second language acquisition by the Pirahã in the past—especially telling since pronouns are likely to be borrowed only by speakers with substantial familiarity with the donor language. Though we acknowledge (as a referee cautions) that lexical borrowing is not an infallible sign of bilingualism, it does provide evidence of meaningful linguistic contact with other groups and raises questions about *CA*'s claim that foreign languages are inaccessible to the Pirahã because of IEP-induced cultural incommensurability.

Finally, even if monolingualism is the norm among the Pirahã, there are many possible explanations for such a situation.<sup>56</sup> These include political conflicts in the past that may have left their stamp on the current linguistic situation. The anthropologist Nimuendajú (1948:267), reporting on 'several brief contacts' with the Pirahã in 1922, describes a negative, 'unresponsive' attitude that 'made field research among them difficult', but suggests a reason for their behavior: 'Their indifference and aloofness is probably more apparent than real, and seems to stem from their deep resentment at seeing their old enemies, the *Parintintin*, being favored by the governmental authorities,

<sup>56</sup> One might also take issue with the presupposition that cultural values are uniform enough within a community to talk about overarching properties like monolingualism (or the IEP) in the first place. Bickel (2000:164), for example, cautions that '[g]iven the ubiquity of cultural diffusion and multiethnic interaction, any notion of "THE culture of x" is highly suspicious if at all viable'.

whereas they, who had never been hostile to the Neo-Brazilians, were treated with much less regard' (1948:267). He goes on to note a linguistic situation not unlike that described by Gonçalves and Everett: 'In spite of several decades of contact with Neo-Brazilians, their knowledge of Portuguese and of the *Lingua Geral* never exceeded a dozen words'.<sup>57</sup> If multilingualism remains less common among the Pirahã than among other groups in their region, it might be a lasting legacy of the unequal political situation described by Nimuendajú, rather than the IEP.<sup>58</sup>

**6. CONCLUSIONS, NONCONCLUSIONS, AND PROSPECTS.** Thirty years before the publication of *CA*, in a paper entitled 'Gaps in grammar and culture', Ken Hale (1975) reflected on the cultural and cognitive implications of a language that appeared to lack number words, most color terms, and relative clauses. The language in question was Warlpiri, whose properties, Hale thought, exemplified a more general puzzle:

If one looks at a variety of languages in the world, one is struck by the observation that certain grammatical devices are found, in virtually identical form and function, in many distinct languages regardless of genetic relationship or historical contact. I am not referring here to the various formal universals which have been identified in recent years, but rather to certain specific highly recurrent grammatical devices—for instance: relative clauses; the passive; negation with variable sentence internal scope; topicalization; and others. The overall impression one gains through such an examination of a variety of the world's languages is that these devices are universal. Nonetheless, it is a fact that a great many languages lack specific ones. (Hale 1975:299–300)

In his response to this puzzle, Hale argued that the absence of particular lexical or grammatical items does not necessarily signal the absence of the corresponding concepts and categories, but instead may merely represent 'gaps in the conventionalized instantiation of universally available categories' (1975:312). Hale supported his view with an array of arguments and analyses. He was able to show, for example, that though the Warlpiri lack number words, they do not lack the principle of counting. Likewise, though the Warlpiri lexicon contains only two morphologically simple color terms, Hale suggested that the patterning of morphologically complex color descriptions indirectly reflects the same Berlin-Kay color hierarchy that otherwise restricts the lexicon more directly. Furthermore, though Warlpiri lacks adnominal relative clauses, Hale noted that an adsentential conditional clause can be used to the same effect—and then argued that the adnominal relative (in languages that have them) is in fact related by a movement rule to the adsentential relative. Having argued for this analysis (developed further in Hale 1976), Hale proposed that, despite an apparent relative clause gap in Warlpiri syntax, 'the *universal* aspects of relative clauses . . . are among those linguistic elements which are universally available to humans as a part of their heritage. In this, the relative clause is similar to the universal basic color categories—they are universally available, and gaps in explicit instantiation are merely gaps in the conventionalized use of what is universally available' (Hale 1975:308).

<sup>57</sup> Nimuendajú also notes that Pirahã was mutually intelligible with the Mura language of Manicoré (not yet extinct in 1922). The Mura are presented by Nimuendajú as quite different from the Pirahã in attitude. If the Mura did not obey the IEP, but the Pirahã of the day did, one might wonder why their languages were mutually intelligible if there really is a cultural-incommensurability barrier separating the Pirahã from people without the IEP.

<sup>58</sup> As a referee notes, other cultural or linguistic peculiarities of the Pirahã might be understood within a historical context as the result of a 'break in transmission' induced by European contact, of the sort discussed by Hemming (1978), among others.

Hale saw no contradiction between the idea that the ‘biological heritage’ of humans includes universal grammatical categories and the possibility that the instantiation of some of these categories may be culturally guided:

While it seems reasonable to attempt to explain the filling of a grammatical gap by appealing to a linguistic notion—i.e., the relationship between surface syntactic structure and semantics—it is clear that such an appeal is entirely inappropriate to any attempt to explain why a universally available conceptual construct, such as counting, or the basic color categories, should receive conventionalized representation in the lexicon of a particular language. Here it is quite reasonable to expect there to be a relationship between non-linguistic aspects of culture and the filling of a gap—in fact, it is commonplace to find cultural elaboration reflected in lexical structures. (Hale 1975:311)

The conclusions offered in *CA* concerning Pirahã’s apparent gaps are, of course, quite different: that its grammar is ‘tightly constrained’ by the cultural property IEP, and that ‘the case for an autonomous, biologically determined module of language is seriously weakened’ as a consequence. We have argued, however, that most of the aspects of Pirahã discussed in *CA* not only fail to reveal grammatical properties ‘tightly constrained’ by Pirahã culture, but they also seem to show just the opposite. First, virtually all of the various grammatical properties discussed by Everett appear to be attested in other languages, and most stand in no detectable law-governed relation to culture. At many points, the description of linguistic and cultural facts was at unacknowledged odds with previous research. At other points, essential supporting evidence was simply missing. Furthermore, even independent of the facts of Pirahã, the cultural principle supposedly at stake—the immediacy of experience principle—failed to make the predictions claimed for it. Finally, as we argued in §1 (in the spirit of Hale’s remarks quoted here), even if *CA* were correct about the facts and their explanation in terms of a cultural principle, no conflict would arise with the idea that humans possess an ‘autonomous, biologically determined module of language’.<sup>59</sup>

Throughout this article, we have tried to be transparent in our review of the evidence and in our discussion of its potential consequences. As we considered each claim, we often had to begin by clarifying the proposal and its links to other parts of *CA*. At each point, we have tried to make our reasoning explicit, so that other readers of *CA* might determine for themselves whether we have interpreted the paper correctly. Next, we tried to ask what data might distinguish *CA*’s claims from alternatives—that is, what *CA* predicts about the facts of Pirahã and other languages, and which of these predictions are logically unique to *CA*. We then attempted to evaluate *CA*’s proposals in light of these predictions. Although we have concluded that virtually all *CA*’s major claims are unsupported, we have also tried to distinguish those claims that are actually contradicted by the evidence from those that are merely not superior to obvious alternatives.

Our discussion of Pirahã grammar was informed by all of the available literature on the topic. As we conducted our research, we were naturally aware that older work might contain errors corrected in newer work. Consequently, where a claim in *CA*

<sup>59</sup> There is another possible view of the relation between culture and grammar that we have not so far considered. The grammar of a language like Pirahã might be composed of a set of choices from a universal repertoire, just as we have argued here, and still be tightly constrained by cultural factors, but in a sense different from that advanced in *CA*. The set of possibilities for the grammar of a language, on this view, would be independent of culture, but the SELECTION of particular possibilities over others could interact with aspects of culture. The IEP, however, clearly fails to play such a role, and no other obvious cultural origin yields the grammatical properties discussed here. We thank William Davies (p.c.) for raising this issue.

appeared to be contradicted by data in DISS and HAL, it could have been the more recent work that turned out to be correct. In at least the most important cases, however, we would have expected to find the disagreement acknowledged, and the considerations that motivate the new view made explicit. As we have noted repeatedly, this was not the case, despite Everett's assertion (replying to criticism by Levinson) that 'all these claims have been independently established in publications listed in the paper' (CA: 644). CA claims, for example, that the embedded clauses documented and described in the earlier work are not actually embedded clauses, but offers no account or even acknowledgment of the published facts that seem to favor the old view over the new. Similarly, CA offers as an argument for the absence of embedding the specific impossibility of long-distance overt WH-movement, but makes no mention of the fact that Pirahã lacks overt WH-movement entirely.

CA presents its claims as a challenge to current work in linguistics—a characterization that has attracted considerable attention in the press as well as within the field. Though we have argued that this challenge is illusory, we have no doubt that Pirahã (like any language) may eventually present the field with actual challenges. Future research on Pirahã is likely to discover grammatical phenomena that go beyond the data presented in CA, DISS, and HAL, and some of these discoveries might well turn out to bear on more general questions about the nature of language.

Such research might show, for example, that Pirahã WH-in-situ constructions are NOT just like those in intensively studied languages like Chinese, but present puzzles that might require fundamental revision in our understanding of these constructions. Likewise, we might learn that current explanations for the lack of prenominal possessor recursion in German cannot extend to Pirahã, which might make us rethink the analysis of the German examples (or rethink the claim that Pirahã shows the same phenomenon). Research on the prosody of Pirahã could help establish major constituent boundaries, and thereby shed light on the status of clausal embedding and parataxis in the language. Work on these issues or others not yet uncovered might in turn be crucial to an entire host of deeper questions—and who knows where such investigations might ultimately lead? The results of such research are almost guaranteed to be of interest, since we have never seen a language that did not have something important to reveal.

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