PIRAHÃ CULTURE AND GRAMMAR: A RESPONSE TO SOME CRITICISMS

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This article responds to criticisms of the proposals of Everett 2005 by Nevins, Pesetsky, and Rodrigues (2009, this issue). It argues that their criticisms are unfounded and that Pirahã grammar and culture are accurately described in Everett 2005. The article also offers more detailed argumentation for the hypothesis that culture can exert an architectonic effect on grammar. It concludes that Pirahã falsifies the single prediction made by Hauser, Chomsky, and Fitch (2002) that recursion is the essential property of human language.*

Keywords: Pirahã, recursion, culture, immediacy of experience, universal grammar-1, universal grammar-2

1. INTRODUCTION. Nevins, Pesetsky, and Rodrigues (2009, NP&R) voice the following general objections to Everett 2005: (i) the facts and analysis of embedding/recursion proposed are weak, questionable, or wrong; (ii) the culture-grammar connection proposed is both unnecessary and illusory; and (iii) even if Everett 2005 were right in its analyses and its claims on culture-grammar connections, there are no implications for Hauser, Chomsky, and Fitch's (2002, HC&F) version of universal grammar (UG).

It is only natural that others evaluate the claims of Everett 2005. Many of my claims are very difficult to establish convincingly without quantitative data, and some tests are underway with colleagues at MIT's Brain and Cognitive Sciences Department. Nevertheless, with regard to point (i), I argue that Everett 2005 is essentially correct in its description of the facts and that it corrects errors found in Everett 1983, 1986.

Points (ii) and (iii) are theoretical. Point (ii) concerns a theoretical claim I made. Though my claim may be wrong, NP&R's objections, while reasonable in some places, fail to challenge it seriously. Point (iii) is about theoretical claims mainly due to Chomsky and their falsifiability. I argue that NP&R misunderstand the issues surrounding recursion, in particular the predictions made in relation to it by HC&F's version of UG, and the relevance of Merge to this discussion.

All data in this article were gathered by me from 1977–2007 or by Steve Sheldon from 1967–1976. In answering NP&R, I want to emphasize that their criticisms (unlike the present article) present no new data. They compare twenty-five-year-old data from Everett 1983 (the same data as Everett 1986) with the few examples in Everett 2005. Yet, as we see below, a good deal of other data has been collected to bear on the issues. I was in the field with the Pirahãs for twenty-one months prior to Everett 1983 and have spent an additional fifty-three months in the field since that time.

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Just to be clear on what is at stake, I begin by restating the conclusions that NP&R are reacting against:

> 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. (Everett 2005: 634)

Before beginning the discussion in earnest, let me clarify one additional point on which NP&R and some other commentators have been confused (perhaps because of my original wording in *CA*): it is irrelevant to any claim I have made whether Pirahã is exceptional in any of its individual properties. It makes no difference, for example, if there are many other languages that lack things that Pirahã lacks, for example, numbers, recursion, quantifiers, and so on, yet fail to manifest the IMMEDIACY OF EXPERIENCE PRINCIPLE (IEP). The IEP is called upon to explain a complex of properties of Pirahã grammar and culture that would otherwise be a disjoint list of coincidences. The form of my argument has been misunderstood by NP&R. The argument in Everett 2005 is that a set of syntactic effects (i.e. the absence of the features discussed) in Pirahã follows from a cultural characteristic, not that the cultural characteristic follows from the syntactic effects. This means that if one identifies similar syntactic features in another language, they need not share the same cause. The explanation of these features could in fact turn out to be syntactic rather than cultural. The crucial cases are languages with identical cultural characteristics ranked similarly in each culture (see §5.3 below for a methodology). If such cases are identified, then it would be reasonable to expect similar syntactic effects associated with the cultural values. This is a prediction that Everett 2005 makes regarding other language-culture pairs that is directly testable.

In other words, the predictions of my proposals are tied closely to understanding a particular culture and its values. One cannot simply point to a syntactic characteristic and expect to derive a cultural principle. For example, in their discussion of possessor constructions and grammatical number (see §2.7 and §3.1), NP&R suggest that if other languages show similarities to Pirahã, this would present problems for my analysis if the explanation for the similar phenomena in these other languages is not cultural. But their reasoning seems at times to be based on the erroneous idea that my argument derives cultural values from the syntax, rather than deriving syntactic properties from the culture. This directionality is crucial. My claim is not that a syntactic effect entails a cultural value. It is that cultural characteristics in some societies can architectonically affect these societies' grammars. As a result of NP&R's misunderstanding here, much of their article is orthogonal to my claims. This becomes clearer as we proceed.

The purpose of this response is to argue that Everett 2005 provides reasonable analyses that are superior to the analysis of my Ph.D. dissertation. In doing this I provide new evidence relevant to the issues. The subtlety of some of the issues involved makes them very difficult to resolve conclusively without extensive experimentation and quantitative studies. The same holds true for many points in all grammars ever written and is thus hardly unique to my work on Pirahã.

The article is organized as follows. I first address NP&R's objections to the noncultural empirical proposals of Everett 2005, considering the linguistic proposals and the nonlinguistic descriptions in turn. I then answer NP&R's objections to the cultural description of Everett 2005. Subsequent sections consider the culture-grammar theoretical proposal of Everett 2005 in more detail (focusing on the linkage between culture and grammar and how this comes to violate HC&F's version of UG), followed by

Hale's alternative proposal on gaps in language and culture, NP&R's remarks on Merge, and the consequences of the findings of Everett 2005 for universal grammar.

2. RESPONSE TO CRITICISMS ABOUT THE CLAIM THAT PIRAHÃ LACKS RECURSION.

2.1. ABSENCE OF INTENSIONAL VERBS. Since so much of what follows concerns recursion, I begin this section with a working definition of recursion (of which embedding is a special case—thanks to Shalom Lappin, p.c., for suggesting this particular formulation): RECURSION consists in RULE (OR OPERATION) SETS THAT CAN APPLY TO THEIR OWN OUTPUT AN UNBOUNDED NUMBER OF TIMES.

HC&F claim that recursion, which they never define (but see §6.2 below), is the essential property of the NARROW FACULTY OF LANGUAGE (FLN)—perhaps the ONLY property of FLN.[1] It seems reasonable to test this assertion by looking for evidence for recursion in a given language's semantics and syntax. So let's revisit the evidence in Pirahã.

One of the first places anyone might look for evidence of recursion in a language is in its verbs. Does it have intentional (the general class of verbs that reveal mental states, for example, 'want', 'believe', 'desire', etc.; see Searle 2007) or intensional verbs? The latter include verbs in which the truth conditions of the embedded clause are altered, usually from a de re to a de dicto reading. Since these are the verbs raised by NP&R, I confine myself to this class here.

Only the de re reading is available for nonintensional verbs.

(1) #Mr. Howard was killed. But Jesse James was not.

This sequence of sentences can be judged as false even if the speaker did not know that Mr. Howard = Jesse James. Intensional verbs, by contrast, do allow de dicto readings.

(2) I believe Mr. Howard was killed but that Jesse James was not.

It cannot be said that I was in error about my belief reported in 2, even if Mr. Howard = Jesse James.

Intensional verbs can be detected via the modified truth conditions of their complements. They are thus good tests for embedding in a language. Some linguists (Mark Steedman, p.c.) claim that if a language has intensional verbs, then, ipso facto, it has recursion.

In my investigations to date, I have found no intensional verbs in Pirahã. Intensional notions (want, desire, believe, etc.) are expressed as verb suffixes. I have not found any evidence that truth conditions vary according to which verb an NP is a complement of, though of course more research is needed before anyone assert categorically that Pirahã lacks all verbs of this type. Pirahã uses the verb *gai* 'to say' or a combination of a rich range of verbal suffixes to express most intentional states that would be carried by a variety of verbs in other languages (and in this Pirahã is not all that unusual among the languages of the Amazon or the world). But while this article does not provide

[1] HC&F (p. 1573):

> In fact, we propose in this hypothesis that FLN comprises only the core computational mechanisms of recursion as they appear in narrow syntax and the mappings to the interfaces. If FLN is indeed this restricted, this hypothesis has the interesting effect of nullifying the argument from design, and thus rendering the status of FLN as an adaptation open to question.

In spite of what some have claimed, this quote must be interpreted as a prediction or it has no connection to empirical research, as we see in the quote from Chomsky in the text on the significance of my research. Had they said that recursion was valuable but not essential, then Pirahã would not falsify this specific claim.

absolutely conclusive evidence that Pirahã lacks recursion or embedding, the data are consistent with the proposal that it lacks both. Moreover, my no-recursion analysis correctly predicts the absence of intensional verbs.[2]

2.2. SENTENCES MARKED WITH THE SUFFIX *-sai*. In this section I reconsider the original analyses of embedded clauses found in Everett 1986, why I have abandoned them, and why NP&R's arguments that my earlier analyses were superior are wrong.

There are a couple of candidates for complement-clause-taking verbs in Pirahã, namely, the speech verbs 'to order' and 'to say', which are common in Pirahã. Everett 1983, 1986 analyzed the contents of these verbs as complement clauses, nominalized by the suffix *-sai*. In Everett 2005 I analyze them as juxtaposed old information. NP&R spend considerable effort to show that my original analysis was better and that *-sai* is indeed a nominalizer. Let's review the evidence again here.

IMPERATIVES. In many languages, speech-act verbs like 'order' take embedded complements. Even in these, however, the exact structure of the embedded constituent is subject to considerable debate (cf. Gazdar et al. 1985, Van Valin 2005, and the literature of minimalism for different answers). Further complicating the analysis of potential complements, semantically similar verbs can take very different kinds of complements (as in *to speak* vs. *to say*). Such issues raise the question of how one could tell whether a verb in one language was like *to speak*, taking no complement or only an NP complement, or like *to say*, which takes a sentential complement.

A reliable diagnostic is the scope of negation. So NP&R (p. 375ff.) use the scope of negation in an attempt to argue that Pirahã does have embedding, observing correctly that the discourse in 3 entails different scopes.

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

This contrast is due to the fact that *not* can take scope over *make* in 3a but not in 3b, since it cannot take scope across a sentence boundary. This is why the absence of examples like 3a is so clear and so interesting in Pirahã. NP&R miss this. To give a Pirahã example, consider 4, from Everett 1986:254 (ex. 210a).[3]

[2] This is not to say that Pirahã lacks de re vs. de dicto constrasts.

(i) A. Xaoói hi xaoxaagá xahoahíai.
foreigner 3 was other.day
B. Xmh. Paóxaisi pío hoagáitahá?
hmm Dan simultaneously came
A. Hiabiigá. Paóxaisi hi aboóbaihiaba.
no Dan 3 did.not.come
A: 'The foreigner came by here yesterday.' B: 'Oh really? Did Dan come?' A: 'No, Dan did not come.'

This brief exchange can have a de dicto reading just in case the speaker did not recognize that Dan WAS in fact that foreigner that came. But this type of de dicto reading has nothing to do with embedding under an intensional verb.

[3] Nonobvious abbreviations in example glosses are as follows: ASSOC: associated, CHAR: characteristically, CMPL: completive, COMP.CERT: complete certainty, CONN: connective, CONT: continuative, DESID: desiderative, DUR: durative, EMPH: emphatic, FOC: focus, FRUST.INIT: frustrated initiation, HEAR: hearsay, INCHO: inchoative, INTENT: intention, INTER: interrogative, INTNS: intensive, ITER: iterative, LOGIC.PROG: logical progression, MOVE: DOWN: movement down, MOVE:UP: movement up, NEG: negative, NOMLZR: nominalizer, OLD.INFO: old information, REL.CERT: relative certainty, REM: remote, SECOND: secondary discourse participant, TEMP: temporal, UNCERT: uncertainty, and VERT.UP: vertical up.

(4) Ti xibíib-i-hiab-iig-á kahaí kai-sai.
1 order/allow-CONN-NEG-CONT-REM arrow make-OLD.INFO
(i) 'I am not ordering you to make an arrow.' *or*
(ii) 'I will not let you make an arrow.'

NP&R claim of this example that 'Example 25 [my 4—*DLE*] 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 [my 3b—*DLE*], or else the senseless ''I am not ordering you. Arrow making!'' ' (p. 375).

NP&R are mistaken. There is no imperative in the second clause, and the scope of negation is monoclausal. The second clause can mean that someone makes 'an arrow', 'many arrows', 'the arrow', and so forth. NP&R's translation is unwarranted. The proper translation of 4 is 'I am not ordering you. You make the/an arrow(s)', with the looseness of interpretation in Pirahã all that is implied by the English translation. Moreover, the forms and meanings described in Everett 1986 are not exhaustive. As discussed in Everett 2007, *-sai* is not a nominalizer, but a marker of old information (see also Gibson et al. 2009 and earlier in this section). Therefore, *kai-sai* would be used just in case arrow-making has already been talked about or assumed in the discourse in which the utterance is made. *kai-sai* is not a nominalized form, and in fact *kai* can take a variety of verb endings in this context. And contra what NP&R claim, the translation of 'arrow' in 4 is not necessarily indefinite. There are many other expansions of the second clause possible, with and without *-sai*. Moreover, the two clauses do not even need to be adjacent. A few examples are given in 5.

(5) a. Ti gí xibíibihiabiigá. Gíxai kahaí kai-baaí-koí.
1 2 am.not.ordering 2 arrow make-INTNS-CHAR
'I am not ordering you. You really (know how) to make arrows.'
b. Ti gí xibíibihiabiigá. Ti gí xoog-i-baaí. Gíxai kahaí kaí
1 2 am.not.ordering 1 2 want-CONN-INTNS 2 arrow make
xígiaoaxáí-sai. Pixái xíga.
INTER-OLD.INFO now precisely
'I am not ordering you. I really want an arrow. You make an arrow. Now.' (This can have a humorous reading because the connotation is very different from the literal meaning.)
c. Ti gí xibíibihiabiigá. Gíxai kahaí báaxáí kai-baaí.
1 2 am.not.ordering 2 arrow attractive make-INTNS
'I am not ordering you. You really make pretty arrows.'
d. Ti Xisaabi xibíibihiabiigá. Hi xahaigí kobai-haí.
1 name am.not.ordering 3 sibling search.for-REL.CERT
'I am not ordering Xisaabi. He will search for his sibling.'
f. Ti xahaigí xibíibihiabiigá. Hi soxoa kahaí kai-pá.
1 sibling am.not.ordering 3 already arrow make-REM
'I am not ordering my sibling(s). He/they already made the/an arrow.'

To sum up: these examples show that the negative suffix, *hiab*, takes scope only over the verb to which it is suffixed, *xibíib*, not over the following sentence. The semantic connection between the sentences in 5a–f is loose and determined mainly by context and discourse, as we expect from parataxis, rather than by recursion-based restrictions (see §6.2 below for how recursion limits interpretative options).

As we see in §3.3, moreover, there are likewise no cases of interclausal scope relations between quantifiers of any sort in Pirahã. These are reasons to analyze examples of intersentential relations as parataxis in Pirahã. The basic form of evidence for parataxis and against embedding or recursion in the syntax comes from the semantic looseness of the connection between the two paratactic clauses.

NONQUOTATIVE COMPLEMENT CLAUSES. NP&R argue that *-sai* clauses violate my claim that there is no embedding in Pirahã. If they and Everett 1986 are correct that this is a nominalizing suffix, then it would indeed be plausible to conclude that *-sai* marks embedding as nominalizers often do (see Koptjevskaja-Tamm 1993). But the connection to nominalization does not go through when we consider the fuller range of contexts and inflectional suffixes that can be associated with *-sai*. Part of what led me astray in my original Ph.D. research was an overreliance on the elicitation of individual sentences, rather than on detailed surveys of Pirahã discourse.

Consider first 6, which NP&R discuss at length.

(6) (Hi) xob-áaxáí. (Hi) kahaí kai-sai.
(3) see-well (3) arrow make-OLD.INFO
'He is really smart/very talented. (That is with respect to the fact that) he makes arrows.'

The second verb above, 'to make', is a bare root followed by *-sai*. This looks like nominalization until we see that: (i) the verb can take a full range of inflection (7); (ii) that the sentence in which *-sai* appears can also appear as a main clause (9a); (iii) that *-sai* is not even required in the clause (8); and (iv), that *-sai* can appear on both clauses simultaneously (9b).

(7) Kóhoi hi kahaí kai-b-íigí-sai.
name 3 arrow make-MOVE:DOWN-CONT-OLD.INFO
'Kóhoi is finishing making arrows.'

Examples 6 and 7 occur just in case we are talking about arrow-making in general, or about Kóhoi's skills, so long as the verb marked by *-sai* indicates old information. Comparing 8 and 9, the form and meaning of the second clause in 9 are difficult to reconcile with analyzing it as a complement to the first clause. And there is no reason to treat the relationship between the clauses in 8 any differently.

(8) (Hi) xob-áaxáí. (Hi) kahaí kai-baaí.
(3) see-well (3) arrow make-INTNS
'He makes arrows well.'

(9) a. Kóhoi xob-áaxáí xáagí-sai.
name see-well permanent:to.be-OLD.INFO
'Kóhoi really knows his stuff.'
b. Kóhoi xob-áaxáí xáagí-sai. Kóhoi hi kahaí
name see-well permanent:to.be-OLD.INFO name 3 arrow
kai-b-íigí-sai.
make-MOVE:DOWN-CONT-OLD.INFO
'Kóhoi really knows his stuff. He is finishing making arrows.'

If both clauses refer to topical information, both can bear the *-sai* suffix. If *-sai* were a nominalizer, however, we would not expect it to appear on both clauses since, presumably, a nominalized clause would not be a stand-alone sentence (cf. **John running the store*, **Rome's destruction of Carthage*).

So although some *-sai*-marked sentences may superficially look nominalized, they are not. The reduced inflection on *-sai* is a common feature of markers of old information or topicalization (see Givón 1983 on topics and old information in discourse).

The same phenomenon is observed with the verb *kosaagá* 'to be ignorant of'.

(10) (Hi) ko-s-aagá. (Hi) kahaí kai-baaí.
(3) eye-NEG-be (3) arrow make-INTNS
'He does not know how to make arrows very well.'

(11) (Hi) ko-s-aagá. (Hi) kahaí kai-sai-híai.
(3) eye-NEG-be (3) arrow make-OLD.INFO-HEAR
'He does not know how to make arrows, or so I hear.'

Other evidence that *-sai* marks old information comes from its function in marking nominal discourse participants, whether these are word sequences or morphologically simple nouns, as in 12 and 13.

(12) Kóxoi-sai (hi) kahá-p-ií.
name-OLD.INFO (3) go-MOVE:UP-INTENT
'Kóxoi-sai left.'

(13) a. xiohói xiboíti
wind cut
'cut wind'
b. xiohói xiboíti-sai
wind cut-OLD.INFO
'propeller'

Since *-sai* marks old information, we predict that it can be used in a much wider range of structures than those in my thesis or the description in Everett 1986. Subsequent examination of texts and, more recently, experimental work conducted with Ted Gibson and Mike Frank in a Pirahã village support this (Gibson et al. 2009). It appears on conditional sentences, nouns, and declarative sentences in order to mark old information, usually topical, in the discourse.

CONDITIONALS. NP&R (n. 23) claim that *-sai* might really be two morphemes, one marking conditionals and the other marking nominalization. They claim that the former cannot mark old information and further cite Everett 1986:264 to show that the conditional use of *-sai* is marked by high tone, while the nominalizing suffix is low tone.

In their discussion NP&R refer to new fieldwork on this suffix conducted by Gibson and colleagues (2009) to test claims already found in Everett 1986. The paper that is underway to report the results of this research concludes that *-sai* is most likely a marker of old information, contra what NP&R say above. Gibson and colleagues conclude that whatever *-sai* is, it is not a nominalizer. Contra NP&R, the fact that *-sai* appears with conditionals supports my analysis. The conditional use of *-sai* is only found on events known to both speaker and hearer via the preceding discourse or immediate nonlinguistic context. There is no need to invoke different morphemes, as NP&R suggest, because the meaning of *-sai* 'old information' is the same in all cases. This interpretation has the additional advantage of being more parsimonious since it doesn't involve assuming ambiguity in a functional morpheme. In addition, the association of conditional clauses with old information is not unusual. Haiman (1978) argued that conditionals are topical. And, again, contra my earlier nominalizing analysis, all verbs with *-sai* can be fully inflected, though this is rarer precisely because of *-sai*'s marking of old or topical information (see Givón 1983).

As an example of the conditional use of *-sai*, consider the following. During a cloudy day when both speaker and hearer are aware of the possibility or presence of rainy conditions, one might use *-sai* to say 'If it rains tomorrow I will not go'. *-sai* might also be used as a conditional if speaker and hearer had been discussing rain. But if rain is not part of the previous discourse or immediate circumstances, the conditional is as in 14, that is, without *-sai*.

(14) Pii-boi-baaí-hai. Ti kahápi-hiaba.
water-MOVE:DOWN-INTNS-INTENT 1 go.away-NEG
'It is raining a lot. I will not go.'

The conditional sentence in 14 is not marked by *-sai*, but by context and (usually) rising intonation. Rising intonation is commonly used whether or not *-sai* is present. The latter fact means that occasionally a *-sai* 'conditional' will have higher pitch, though a *-sai* 'nominalizer' will not. But the pitch difference is a function of conditional intonation. *-sai* itself is marked (underlyingly) by low tone, so there is no evidence for two *-sai*s, contra NP&R (see Everett 1979 for Pirahã tone rules).

2.3. CORRELATIVES. Everett 2005 argues that Pirahã correlative clauses also fail to show evidence of embedding. But NP&R (p. 380ff.) disagree. In fact, they claim that any correlative in any languages entails embedding.

But this reasoning is circular. If one wants to determine whether Pirahã correlatives entail embedding, one cannot assert, as NP&R do, without argumentation or definition, that all correlatives in all languages entail embedding. This assumes what one is trying to determine. In my analysis of Pirahã, correlatives are formed paratactically (hence my use of 'co-relative'). Consider the evidence in 15, not discussed in any previous work.

(15) Ti baósaápisí xoog-abagaí. Xigi-ábií xaoói. Chico hi goó
1 hammock want-almost ASSOC[4]-remain foreigner name 3 FOC
baósaápisí bagá-boí. Baósaápisí xais-igí-ai.
hammock sell-away hammock same-ASSOC-be
'I want a hammock. I am like a Brazilian. Chico sold a/the hammock. It is the same one.'

In 15 we see a juxtaposition typical of Pirahã texts. The sentence restricting reference is separated from the sentence containing the affected noun by yet another sentence. It is difficult to hypothesize that the third sentence is embedded in the first one in this (typical) case. That is, it is never the case that the restricting sentence is required to follow or precede the restricted sentence. The rules of interpretation linking them are not sentence-level semantic operations.

Semantic evidence comes from binding and negation. Even when adjacent, the restricting sentence can be negated, providing an indirect type of restriction that is not expected in embedded relatives.

(16) Ti baósaápisí xoog-abagaí. Xigi-ábií xaoói. Chico hi goó
1 hammock want-almost ASSOC-remain foreigner name 3 FOC
baósaápisí bagi-hiaba. Baósaápisí kapióxio.
hammock sell-NEG hammock different
'I want a hammock. Chico did not sell the hammock. It is a different hammock.'

[4] The gloss 'associated' refers to a Pirahã cultural concept of expected association, lexicalized in various ways in the language. In the morphemic glosses it would be roughly equivalent to 'comitative'.

Example 16 is also how one would communicate the idea 'I don't want the hammock that Chico sold'. But in the Pirahã case, these are separate sentences and separate assertions. Thus for correlatives, as for quotatives, the paratactic analysis is superior to the embedding analysis. Nevertheless, NP&R (p. 380) go on to claim that Everett 2005 provides independent evidence that the targets of relativization in Pirahã are embedded. They note correctly that Everett 1986:277 claims that 'Pirahã only relativizes direct objects and subjects'. And they accurately cite me as saying in that passage that I took 'this restriction to support the crosslinguistic relevance of the ''accessibility hierarchy'' for relativization proposed by Keenan and Comrie (1977)' (p. 380). If Everett 1986 were correct, this restriction could indicate the presence of a closer, perhaps embedding, syntactic relationship between the two clauses. And it is not unreasonable for them to conclude that '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'' ' (p. 380).

But this is the wrong conclusion to draw because the facts are not quite as described in Everett 1986, though they are close. First, consider the NP accessibility hierarchy. As it turns out, the real generalization is not that only subjects and objects can be relativized. It is, rather, that only topics may be relativized and that only subjects and objects may be topics. That is, subjects and objects are the only grammatical relations chosen by Pirahã discourse to be topics. This has no implications for recursion. Once a topic has been established, then the paratactic correlative offers further, reference-narrowing information about the topic of the discourse as a whole. Second, the *goó* particle in the examples is not a WH/relative marker per se. And it is always optional in relatives. Study of it in the years since Everett 1986 reveals that it marks focused or highlighted (e.g. 'that very one') words, one per clause, either subject or object. In questions it marks a pronoun as focused. In relatives the relativized noun is the highlighted element of the relevant section of discourse.[5]

One further bit of evidence against analyzing correlatives as embedded comes from the binding conditions of Chomsky 1981.

(17) Chico hi goó baósaápisí bagá-boí. Ti baósaápisí xogií.
name 3 FOC hammock sell-away 1 hammock want
'Chico sold a/the hammock. I want a/the hammock.'

If this involved right or left embedding, then it should not be possible for the two tokens of 'hammock' to corefer.[6] If they are in the same sentence, especially in a normal relative structure, then one of the occurrences of 'hammock' might be expected to c-command the other, violating the common constraint that one nonpronominal noun cannot bind another (as in **John wants John to come to the party* or even **John wants the hammock that Bill sold the hammock*).

[5] For example, consider the sentence in (i), from a story about a man who got lost in the jungle.

(i) Kaxaxái hi goó xaabaita xoo.
name 3 FOC lost in.jungle
'Kaxaxái [topic] got lost in the jungle.'

[6] If this were some sort of coordination where neither noun 'c-commands' the other, then the binding condition would not be violated, perhaps. But coordination structure seems unlikely since Pirahã lacks coordination generally (see §2.8 below).

2.4. TEMPORAL CLAUSES. Let us turn now to consider evidence that there are no adjunct clauses in Pirahã, beginning with temporal clauses.

The best evidence for the syntactic status of temporal clauses is found in their semantics. There are well-known scope ambiguities that arise in embedded temporal clauses, for example, the one in 18.

(18) A secretary cried after each executive resigned.

One of the reasons that the *after*-clause and other such temporal clauses of English are analyzed as embedded into a larger phrase is because of the scope ambiguity available in the semantics of the entire sentence. There are two readings. In the first, one secretary cried after the resignation of all the executives. Under the other, a different secretary cried after the resignation of each of the executives. This requires that the quantifier *each* be allowed to take wide scope over *a secretary* for the latter reading, or that the indefinite *a secretary* take scope over *each* for the former reading. In the absence of clear structural evidence for embedding, as is the case in Pirahã, the semantics of scope and binding are two important sources of information for the nature of the relationship between the 'main' clause and the temporally delimiting clause. Both sources of evidence in Pirahã favor a nonembedding analysis of Pirahã temporal clauses—there are no relevant scope ambiguities and the binding facts would be surprising if embedding were involved.

Of course, scope ambiguities involving quantifiers might be absent because I am right and Pirahã has no quantifiers. Nevertheless, there are Pirahã sentences where it is appropriate to look for ambiguous readings, that is, where it is allowable to interpret nouns as bare plurals. Consider the English 19.

(19) Secretaries cried after executives resigned.

In English and other examples, with bare plurals like these, either *executives* or *secretaries* can take wide scope (though there is no broad consensus in the semantics community as to how this happens). This kind of interclausal ambiguity is never found in Pirahã, however, so far as I have been able to determine, arguing against an embedding/recursion analysis of Pirahã temporal sentences.

(20) a. Xipóihií xohisí-baaí. Xigihi kahápi-so.
woman cry-INTNS man leave-CMPL
(i) 'A woman cried. A man left.'
(ii) 'Women cried. A man left.'
(iii) 'A woman cried. Men left.'
(iv) 'Women cried. Men left.'

b. Xigihi kahápiso. Xipóihií xohisíbaaí.
(i) 'A man left. A woman cried.'
(ii) 'Men left. A woman cried.'
(iii) 'A man left. Women cried.'
(iv) 'Men left. Women cried.'

The readings given are the only ones available. They are ambiguous, but not with respect to scope, only with respect to number. The plural readings do not have the ambiguity of the English 19. This pair of sentences can only mean that some group of women cried and some group of men left. To get a distributive reading, an explicit listing must be given (e.g. 'John left. Mary cried.' 'Bill left. June cried.' etc.)

NP&R (p. 379) take issue with the translation of temporal sentences like 21.

(21) Kohoái-kab-áo-b-áo. Ti gí xahoai-soog-abagaí.
eat-finish-TEMP-MOVE:DOWN-TEMP 1 2 speak-DESID-FRUST.INIT
'When [I] finish eating, I want to speak to you.'

They claim first that I ignore the translation of the suffix *-áo*, which I have traditionally glossed as 'temporal'. Second, they note that I ignore the desiderative suffix *-soog* on 'speak'. They claim that this is important because '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'' ' (p. 379).

I do not think this is the correct interpretation of this sentence (not even for the English gloss). To see why, let's consider the translation of *-ao*, which I previously glossed as 'temporal'. I give this analysis and then return to the example above.

The *-ao*/*-so* suffix (these are morphophonological alternants) turns out to be a completive aspect marker. It may mark either the verb or the sentence or both.

(22) a. K-ab-áo-b-á.
object-finish-CMPL-MOVE:DOWN-REM
'It is finished.' *or* 'He/she/it finished.'

b. Ti soxoá xísi kap-áo-b-a.
1 already animal shoot-CMPL-MOVE:DOWN-REM
'I just/already shot the animal.'

(23) a. Ti xítiixisi kohó-aí-so.
1 fish eat-do-CMPL
'I ate fish.'

b. Ti xítiixisi koh-áo-b-aó.
1 fish eat-CMPL-MOVE:DOWN-CMPL
'I completed eating.' ('I ate until there was no more of the object left.')

(24) a. Kaógiái xaaboó-pái-ta-h-aó. Kaógiái
name return-MOVE:UP.do-ITER-INTENT-CMPL name
bíí-oo-ab-á.
blood-instrument-NEG-COMPL
'Kaógiái returned. Kaógiái was tired.' (free: 'When he returned, Kaógiái was tired.')

b. Kaógiái bííooabá. Kaógiái xaaboópaitahaó.
'Kaógiái was tired. Kaógiái returned.' (free: 'Kaógiái was tired when he returned.')

The innermost *-áo* in 23b marks an accomplishment. The outermost marks a resultant state of completion, that is, that you are not only done eating but that you are also full or the food is gone (similar to a present perfect tense—see §3.4 below). The *-ao* suffix is marked high-low when modifying the verb root and most commonly low-high at the end of the sentence (but see 21 above). In both sites it marks completion and in both places it alternates morphophonologically with *-so* (*-ao* after consonants, *-so* after vowels).

Example 24 also presents a problem for an embedding analysis of Pirahã temporal sentences. If the *-ao* sentence were embedded in the preceding or following sentence (or vice versa) in 24a and 24b, then one occurrence of *Kaógiái* would bind the other, in clear violation of Chomsky's (1981) binding condition-C. Under my analysis, there is no binding problem because the two tokens of *Kaógiái* are in separate sentences.

Now let us consider the scope of the 'when'-clause in 21. Does it modify the time of speaking or wanting? In fact, it marks neither. The sentence with *-áo* merely refers to the end of point of the event of eating. One of the possible interpretations of this juxtaposition is that the desired, unrealized event will follow the completed event. But the sequence could also mean: 'Hey, you finished eating! I want to talk to you'.

2.5. WH-MOVEMENT. Everett 2005 offers evidence from the dislocation of WH-words for the absence of embedding in Pirahã. Consider, for example, the contrast in 25 and 26.

(25) a. **Hi goó** kai-baaí-sai. Hi xob-áaxáí.
3 FOC make-INTNS-OLD.INFO 3 see-well
'What [thing/kind of] making [does he] know well?' (lit. 'He what associated making sees well?')

b. Hi xobáaxáí. **Hi goó** kai baaí-sai.
'He knows well. What does he intensely make?'

(26) ***Hi goó** xobáaxáí. __ kai-sai
'What thing [does he] know well to make?' (lit. 'What associated thing he knows well to make/making?')

The explanation for this contrast is that neither 25 nor 26 contains an embedded clause. Each pair is two separate sentences. In a question, the order of the clauses must be that in 25a or 25b, not 26. This follows if there is no embedding, because if we want to place the interrogative word-initial in the phrase then we need to place its containing sentence to the left of its paratactic partner. Otherwise, the WH-word would be 'orphaned' from any sentence, as in the English hypothetical example in 27.

(27) **Who* You came to town yesterday. __ did Bill see?

This argument against embedding from dislocated WH-words in Pirahã was stated without new evidence in Everett 2005. NP&R argue, correctly, that if Pirahã lacks 'overt WH-movement', as I argued in Everett 1986, my arguments in Everett 2005 do not go through. However, Pirahã, contra Everett 1986, DOES allow overt WH-'movement'. Here I give the data that show overt WH-movement in Pirahã. I then argue that these data support my 2005 analysis. And I argue that they also present problems for NP&R's counterarguments based on 'adjunct scope' and WH-words.

I begin by pointing out that WH-questions most commonly take the form of copular clauses in Pirahã. The most common way to ask information questions (not merely echo questions) is as in 28.

(28) a. Kaoí xigí-ai?
who ASSOC-be
'Who is/was it?'

b. Hi goó xigí-ai?
3 FOC ASSOC-be
'What was/is it?'

However, interrogatives can also appear with other arguments in sentences or paratactic constructions, as in 29–31.

(29) paratactic

a. Kaoí xigí-ai? Kohoibiíhiai hi kobai-haí.
'Who is it? Kohoibiíhiai saw it.'

b. Hi goó xigí-ai? Kohoibiíhiai hi koabáipi.
'What is it? Kohoibiíhiai killed it.'

(30) nonparatactic

a. Kohoibiíhiai kaoí xob-áo-b-á?
name who see-CMPL-MOVE:DOWN-REM
'Who did Kohoibiíhiai see?'

b. Kaoí Kohoibiíhiai xobáobá?
(i) 'Who did Kohoibiíhiai see?'
(ii) 'Who saw Kohoibiíhiai?'

(31) a. Paóxaisi hi goó koabáipí?
Dan.Everett 3 FOC kill
'What will Dan kill?'
b. Hi goó Paóxaisi koabóipí?
(i) 'What will Dan kill?'
(ii) 'What will kill Dan?'

Now back to 29 above. The reasoning behind analyzing such examples as parataxis is the same as for relative clauses. The clauses need not be adjacent, and WH-words are too far removed structurally (they are in separate sentences) from their potential matrix clause to be connected to it by movement. So consider that in 32 *kaoí* 'who' is associated with an independent verb, *xigíai* 'to be with', and that in 33 if we propose that *Hi goó xigíai* 'what' has been extracted from the clause beginning with *Koihoibiíh-iai*, this would entail movement across the intervening independent sentence.

(32) Kaoí xigí-ai? Kaxaxái hi xahoái-hiab-a. Kohoibiíhiai hi kobai-haí.
who ASSOC-be name 3 speak-NEG-REM name 3 see-REL.CERT
'Who is it? Kaxaxái didn't speak (didn't say anything). Kohoibiíhiai saw it.'

(33) Hi goó xigí-ai? Ti baai-aagá. Ti xahoai-baaí-soog-abagaí.
3 FOC ASSOC-be 1 fear-be/have 1 speak-INTNS-want-FRUST.INIT
Koihoibiíhiai hi ko ab-ái-p-í.
name 3 eye not-cause-MOVE:UP-INTENT
'What is it? I am afraid. I want to speak intensely. Kohoibiíhiai killed it.'
(lit. 'caused its eye to stop suddenly')

There is no syntactic theory I am aware of in which *Hi goó xigí-ai* could be extracted from the rightmost clause to the left periphery in 33. I conclude that these WH-sentences provide evidence against embedding in Pirahã.[7]

Now, the fact that Pirahã DOES have overt WH-movement raises a problem for NP& R's account, namely, for their suggestion that the scope properties of WH-elements in Pirahã fit the profile of a typical WH-in-situ language in which adjunct WH-phrases may take scope out of their containing clause, contra the case with WH-movement languages. The data are found in examples like the following.

(34) WH-in-situ within adjunct clauses (Pirahã)
a. Xaoói hi kaoí hiabaí-so. Gíxai xoá-boí-haí.
foreigner 3 who pay-CMPL 2 buy-come-REL.CERT
'The foreigner completes paying whom. You will buy (merchandise)?'
b. [Kaoí hi gí hiabaí-so.] Gíxai xoá-boí-haí.
who 3 2 pay-CMPL 2 buy-come-REL.CERT
'[When who pays you] you will buy (merchandise)?'

(35) overt WH-movement from adjunct clause (English)
*Who, when the foreigner pays __, will you buy merchandise?

(36) scope out of 'adjunct' in Pirahã
[Hi goó[8] xigí-ai]. [(Hi) kai-sai]. Hi xob-áaxáí.
3 FOC ASSOC-do/be (3) make-OLD.INFO 3 see-well
'What does he know how to make well?'

[7] One might ask how I missed examples of WH-movement in my dissertation. The answer is that movement is much less common because of the ambiguity produced when the WH-word is moved—without case-marking or other devices it is more difficult to tell whether the WH-word refers to the subject or object with movement than without. This ambiguity is often difficult for the Pirahãs. It was very hard for me in the early stages of learning the language. This could also be why paratactic constructions are more common.

[8] *goo* 'focus' is often shortened in rapid speech to *go*.

NP&R say about such examples that:

> Everett claims that the *kai-sai* clause must precede [*xobáaxáí*] 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 [my 37—*DLE*] would be unacceptable, as we have indicated below. (p. 378)

(37) hi xob-áaxáí [hi goó xigí-ai kai-sai]
3 see-well 3 FOC ASSOC-do/be make-OLD.INFO
'He really knows. What does he make?'

NP&R are incorrect. The clause containing *kai-sai* must precede the clause containing *xobáaxáí* only if the speaker wishes to place the WH-like expression *hi goó* 'what' initial in the series. Example 37 is not ungrammatical, contra NP&R. I stated this unclearly in Everett 2005. That is a common order. But it is not required. I make no claim on required orderings of the sentences as a whole. Both 36 and 37 are grammatical.

Now that it is clear, however, that Pirahã is not a WH-in-situ language, it does not follow, as claimed by NP&R (p. 378), that Pirahã fits the 'standard profile' of a WH-in-situ language. In fact, since Pirahã does allow WH-movement, a severe problem is raised for NP&R's assertion. If Pirahã WH-questions involved embedding, as they suggest, then the scope of the 'adjunct clause' would be a problem for their WH-in-situ typology because WH-movement languages are not supposed to show this effect according to them. But under the no-embedding analysis I am proposing, the scope properties are unsurprising—they are separate clauses interpreted by different rules.

2.6. QUOTATIVES.

DISTRIBUTION OF *-sai*. As I observed in Everett 2005, the distribution of *-sai* in quotatives is strange if it is a nominalizer/subordinator, but it is expected if it is a marker of old information. The 'strangeness' of the nominalizing analysis has to do with the fact that the *-sai* appears on the verb of speech rather than the content of the speech (what we would normally expect to be the complement). As we see directly, other facts disfavoring the analysis of *-sai* as a nominalizer are its appearance on both clauses in quotatives (38b) and the fact that *-sai*-marked clauses can be fully inflected (38b). Let's begin by considering 38.

(38) a. Hi gái**-sai**. Tiobáhai kab-iig-á.
3 say-OLD.INFO child not-CONT-REM
'He says-sai there is no child here.'

b. Hi gá-xai-á-b-í**-sai**. Tiobáhai
3 say-do-stay-VERT.UP-CONN-OLD.INFO child
kab-í-**sai**-áaga-há.
not-CONN-OLD.INFO-be-COMP.CERT
'He says-sai there is no child here.'

If *-sai* is a marker of old information then this accounts for its occurrence on the verb *gai* 'to say' in quotatives, that is, on what would normally be thought of as the main clause. This is because the quote contains the new information, while the verb 'to say', *gai*, is old information, reporting on the activity of a known discourse participant. Under this simple analysis, then, there is nothing left to explain.

SCOPE OF NEGATION. NP&R instead offer a 'null copula' analysis of Pirahã quotatives, continuing with their assumption that *-sai* is a nominalizer, in order to argue for embedding/recursion.

It requires some heavy lifting to get their null-verb analysis of *-sai* to work, but their result is more complex and less able to account for the facts than my own. Their alternative faces several problems, including scope, lack of independent support, and the optionality of *-sai* (as data from Everett 1986, which NP&R cite, show).

NP&R begin by analyzing the *gai-sai* quotative clause as a possessive noun phrase. Although Everett 2005 did suggest this, based on one form of the verb *gai*, the analysis is wrong, in light of the fuller distribution of *-sai* with fully inflected *gai* in the same context.[9]

First they claim that Pirahã shows independent evidence for null copulas, as in 39 (their 41).

(39) null copula
a. Giopaíxi hi sabí-xi.
dog 3 wild-EMPH
'The dog is really wild.'
b. Kohoibiíhai hi kaiíi gáihi.
Kohoibiíhai 3 house that
'That is Kohoibiíhai's house.' (*HAL*:205, exx. 26–27)

They then speculate that possessives might be null-copula constructions, rather than juxtaposed sentences, as proposed in Everett 2005. But this analysis assumes that *sabí* in 39a is an adjective; this is incorrect. It is a verb meaning 'to be wild/angry' and can be fully inflected. This is seen in examples like 40–42, a common expression used when approaching someone else's home in the village.

(40) Giopaí sabí-hiab-oxoi-híx?
'Are the dogs mean/wild/fighting/angry?'

or

(41) Giopaí sabí-sahaxáí.
'Dogs, don't bite me/be wild to me/swarm about me.'

or, in other contexts

(42) Xaoói hi sabí-baaí-híai. Hiatíihí hi sabí-hiabiigá.
'Foreigners are angry/wild. Pirahãs are not being angry.'

Example 39b is not a clause at all, just a noun sequence. It could be used in a context appropriate for a similar construction, for example, *John's house* in English. For example, two people are walking along and one points to a house and says simply *John's house*. Or it could be used as an answer to the question *Whose house is that?—John's house*.

To summarize: the null copula is not independently supported by the data. In fact, NP&R recognize problems with their own analysis:

> 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? (p. 383)

The answer is that these are nonquestions to begin with. As we have seen, tense and aspect are always available to any clause and it becomes ever less likely that they are

[9] I did claim in Everett 2005 that one form of the verb 'to say', *gaí* (with a low tone on the [a] and a high tone on the [i]), always seems to be accompanied by *-sai*. That is why I said that THAT FORM was never inflected. But this is a reduction on just that tonal form of the verb. Other forms of the verb 'to say' are inflected.

embedded. Second, *gai* takes no clausal complement. Considerations of scope, adjacency, and so on preclude this analysis. I conclude that though NP&R are unable to resolve the problems that the placement of *-sai* in quotatives raise for their analysis, these facts are predicted straightforwardly in my analysis.

NP&R (p. 383) seem to suggest in this section that analyzing direct and indirect speech as parataxis is strange. But in fact it is common in many languages, including English.

(43) Peter was going to town. Or so he said.

(44) I threw up. That is what John said anyway.

Example 43 is an example of indirect speech via parataxis. Example 44 can be interpreted as either direct or indirect speech but is clearly parataxis. There is nothing at all mysterious about these constructions.

And there is further evidence against an analysis of reported speech as embedding or involving a null copula. This comes from (the absence) of scope ambiguities. So contrast the English examples in 45 and 46 with the Pirahã example in 47.

(45) I didn't say it rained.

(46) My not-saying it rained was probably why she didn't take her umbrella.

In 45, *n't* takes scope over the entire utterance, not merely over either *rained* or *say*. It could be the case that I said something, but it is not the case that what I said was that it rained. Example 46 shows the same scope for a nominalized verb plus object in the same phrase. But in 47 the scope is limited to the verb 'speak' in Pirahã.

(47) Ti gai-hiabí-sai. Pii-boi-baaí.
1 speak-NEG-OLD.INFO water-MOVE:DOWN-INTNS
'I did not speak. It rained.'

Unlike English 45 and 46, this example cannot mean that I said something, but that what I said was not that it rained. Rather, the Pirahã example can be paraphrased as: 'I didn't say anything. And, oh, by the way, it rained'. But though the negation does not take scope over the second sentence, 47 can be used to get the speaker 'off the hook' pragmatically, as in 'Don't blame me for the fact that it rained. I didn't say anything'.[10]

I conclude that Pirahã quotatives do not involve embedding or recursion.

2.7. NOMINAL SEQUENCES.

POSSESSION. Finally, let's consider the absence of recursion of possessors in Pirahã. In Everett 2005 I claim that Pirahã lacks recursive possession. Moreover, experiments conducted by Frank, Everett, and Gibson in January 2007 attempted to elicit multiple levels of possession and found that while a single level of possession was universally produced, no speaker produced all three roles in any nonsentential construction; all complete responses were of the form in 49. So there is no way to say 48 in a single sentence.

(48) John's brother's house. Or John's brother's dog's house. Etc.

To get this idea across, one would need to say something like 49 (see Gibson et al. 2009).

(49) Xahaigí kaiíi xáagahá. Xaikáibaí xahaigí xaoxaagá. Xahaigi xaisigíai.
'Brother's house. John has a brother. It is the same one.'

[10] Back in my missionary days, problems of this nature with negative scope caused problems for Bible translation efforts.

Notice that the claim is not merely that there are no recursive PRENOMINAL possessors in Pirahã, but that there is no recursion of possessors at all in the language.

NP&R make the uncontroversial point that the absence of recursion in this position in the German NP seems to follow from syntactic restrictions. They argue that since this similar restriction on the form of prenominal possession in German has a syntactic explanation, constraints on prenominal possession in Pirahã might also have a syntactic explanation, rather than a cultural one. True enough. But there are three problems with their proposal. First, Pirahã seems to lack recursion of possessors both post- and prenominally, whereas German only lacks them prenominally. My cultural explanation targets the apparent absence of recursion from any form of possession in Pirahã, not merely prenominally. Second, I have studied case assignment in Pirahã (Everett 1987) and found no evidence of any syntactic constraint that could account for the lack of recursion of Pirahã possessives. Finally, even if German lacked possessor recursion of any kind, this would be irrelevant to my culture-based analysis because the latter derives the absence of grammatical features from a cultural value. It does not predict in the opposite direction that the absence of those features in another language implicates a cultural value.

NP&R also claim that if my analysis is correct, then possessors ought never to be used in Pirahã because everyone knows everyone. My analysis does not predict anything of the sort. The use of possessors can be important even when everyone knows everyone. And sometimes people come to a village from other villages or from Brazilian culture. In such situations keeping track of possessors is important. At the same time, it would not be surprising by my analysis if possessors are frequently avoided, which in fact they are, as in 50.

(50) Kai koaiíi.
daughter died (no possessor specified, but a possessor assumed)

One can utter sentences like 50 just in case there is in fact an understood possessor. Speakers will usually use such an example if the possessor is known in the particular context. Multiple possessors can be mentioned in periphrastic constructions (e.g. 49), but only to mention independently 'newsworthy' individuals of the text and only as separate sentences, exactly as my hypothesis predicts.

MODIFICATION. We turn now to other potential evidence for recursion in Pirahã provided by Everett 1983, 1986, namely, modifier phrases. In my thesis I presented as grammatical examples like 51.

(51) kabogáohoí biísai xogií hoíhio
barrel red big two
'two big red barrels'

Of course, we can see immediately that I was wrong in labeling *hoíhio* as 'two', since it is now known that Pirahã lacks numerals (Frank et al. 2008). *hoíhio* here means 'slightly larger quantity'. Nevertheless, multiple modifiers like this would seem to suggest that Pirahã has NPs and that they can be formed recursively, adding one modifier to another in a structure along the lines of 52.

(52) a. [[[[barrel] red] big] larger quantity]
or
b. [[barrel] [red] [big] larger quantity]

But these examples are ungrammatical. In fact the only way to have multiple modifiers would be as separate sentences.

(53) Kabogáohoí biísai. Kabogáo xogií píaii. Kabogáohoí hoíhio píaii.
'Red barrel. Barrel is also big. A relatively larger quantity of barrels too.'

I originally gathered these examples by laying out the objects in front of my informants and saying the phrase in 51 above, as I thought it should be said. Informants then either said the equivalent of 'Yes, you can say that'. Or they said it as in 53, in the form of multiple sentences. I took the latter as a form of baby-talk for my benefit. I could get some to repeat the phrase in 51 after me, but most would not. Struggling in a monolingual situation and believing in NPs with multiple modifiers, I assumed that 51 was grammatical. During the years, however, I noticed that nouns followed or preceded by multiple modifiers are not found in natural conversations or texts. When I asked someone years later why they didn't utter sequences like 51, they said 'Pirahãs do not say that'. I replied 'You said I could say that'. I was answered: 'You can say that. You are not Pirahã'. A perfectly reasonable attempt to get examples of modification backfired because of my naivete and the challenges of a monolingual field experience and misled me for years. But this is just not that uncommon in field research.

2.8. ADDITIONAL EVIDENCE AGAINST RECURSION.

NO CONJUNCTION. Pirahã lacks coordination. One cannot say in Pirahã, for example, that 'Don and Phil were the pioneers of close rock harmony'. There is no coordinating particle corresponding to English *and*. Consider the examples in 54–56.

(54) Kóhoi Xabagi hi kahápií.
'(With respect to) Kóhoi, Xabagi left.'

(55) Kóhoi Xabagi hi pío kahápií.
name name 3 simultaneously left
'(With respect to) Kóhoi, Xabagi also left.'

(56) Kóhoi kahápií. Xabagi pío kahápií. *or* Xabagi píaii.
'Kóhoi left. Xabagi also left.'

Examples 54 and 55 are grammatical only if the first noun, *Kóhoi*, is interpreted as 'malefactive/benefactive topic' (e.g. 'To the detriment of/for the benefit of Kóhoi, Xabagi also left') and *Xabagi* is the sole subject. Preceding the verb, *pío* ('now/simultaneous') is given in its nonverbal form. Following the verb, the form *píaii* 'is simultaneous' is given as an independent sentence. See Everett 2010 for details. This type of 'ethical topic' (borrowing the use of 'ethical' from the Romance 'ethical dative') is common in Pirahã and many other languages.

The particle *pío*/*píaii* can be used with objects also, but then, for obvious reasons, the two nouns are discontinuous.

(57) Kagáíhiaii Kóhoi xabáiipi. Xabagi píaii.
'The jaguar got Kóhoi. Xabagi also.' (lit. 'simultaneous')

NO DISJUNCTION. Pirahã lacks disjunction, also predicted by the no-recursion hypothesis. As Everett 1986 points out, there is no way to say 'Bill or John will come', or 'I will marry Peggy or Sue'. There is likewise no way to produce a verb disjunction in a single sentence either: 'He will come or he will go'. To communicate disjunctive meaning in Pirahã the forms in 58 and 59 are most commonly used.

(58) Kohói kahápií. Xabagi kahápií. Xmh. Kosaagá.
'Kóhoi came. Xabagi came. Hmm. (I) don't know.'

(59) Kagáíhiaii Kóhoi xabáiipi. Kagáíhiaii Xabagi xabáiipi. Xmh. Kosaagá.
'The jaguar jumped on Kóhoi. The jaguar jumped on Xabagi. Hmm. I don't know.'

Therefore, in addition to an absence of intentional/intensional verbs, Pirahã also lacks disjunction and conjunction. None of these shows conclusively that it lacks recursion, but they are consistent with and predicted by that hypothesis. The cumulative effect of these facts is to leave us with either a set of strange coincidences or the conclusion that Pirahã lacks recursion.

INTONATION. Let me briefly mention intonation, since some researchers have claimed that whether Pirahã has recursion could be cleared up with intonational data. But the use of intonation in syntactic argumentation is much more complex than such suggestions indicate. Both Everett 1979 and Everett 1986 contain brief studies of Pirahã intonation. Among other things, these studies show that intonational groupings in Pirahã can take many sentences, roughly corresponding to paragraphs, in their scope. These studies also show intonational patterns for smaller, sentence-size groupings, conditionals, and so on. But intonational evidence for sentence structure will likely not be any more straightforward for Pirahã than it is for English, in which there is still plenty of debate as to whether intonation maps directly to sentence structure, semantics, pragmatics, or combinations thereof. Even though there is much work yet to do on Pirahã intonation, what we already know about intonation crosslinguistically leaves little expectation that it will turn out to be the 'smoking gun' of recursion in Pirahã.

MORPHOLOGY. It is plausible to look to Pirahã's complex verb structure for evidence of recursion morphology. There is, however, no evidence for constituent groupings among affixes. As described in Everett 1986, verb morphology in Pirahã has a templatic, beads-on-a-string structure. The ordering of the affixes can be stipulated or derived by affixal subcategorization, along the lines of Fabb 1988 (or some such). Unless we discover subconstituents of morphemes among verbal affixes, there is no evidence for recursion or embedding in verbal morphology.

Now let us consider the issue of compounding. If there were compounding in Pirahã, this would be clear evidence for recursion. In fact, in Everett 1983, 1986, I did analyze several two-noun sequences as compound nouns. So take the example of *piahaogi xisoaípi* 'dolphin nose'. This sequence can literally mean a dolphin's nose, or it can be used to refer to plantains. I provided evidence in earlier work that this was a compound noun based on stress placement and native-speaker reactions to my decomposition of the word. With regard to stress placement, I argued that the sequence is stressed as a single word when it refers to a plaintain and as two words when it is to be interpreted literally as the nose of a dolphin. And I also observed that when I asked native speakers, they found it humorous for me to refer to a plaintain slowly and break it down as a 'dolphin nose'. I took this to mean that for these speakers the literal meaning had been lost in its compound form. These are straightforward and typical arguments. But the second is wrong and the first is more complex than I had originally thought. Let's see why.

Published accounts of Pirahã stress (Everett & Everett 1984, Everett 1986, 1988) have focused on word stress. Everett 1979, however, discusses prosodies, including stress, at the sentence and discourse levels. As in most other languages, prosodies (e.g. stress, tone, and intonation) are different at word and sentence levels.

Now if we consider a word sequence like [pia'haogi xiso'aípi] (where ' = stress on following syllable) as isolated words, the stress will follow the stress rules described in the works above. Across larger units in discourse, however, stress also marks major events and participants of the discourse. This stress, described in Everett 1979:12–34 as

discourse stress, can obscure the syllables, and words following and preceding discourse stress are accelerated and uttered more softly.

In Everett 1988 the data on individual word stress come from words in isolation or single words in contextual frames. But the data on stress in word sequences came from discourse, that is, from their appearance in a wider context. This was done to ensure that it was clear whether the word sequence *piahaogi xisoaípi* referred to a species of banana or only to 'dolphin nose/snout'. In so doing, I overlooked the role of discourse prosody at times. As it turns out, stress is irrelevant to distinguishing the use of a phrase to refer to one object or another. Reference is determined by context, and either referent will be stressed the same as isolated words, varying depending on the larger discourse context just in case their discourse roles are different. But this is not uncommon crosslinguistically (Ladd 1996). NP&R are right to comment on the observed difference in native-speaker reactions to what I once considered the 'compound word' vs. the 'phrase' interpretation of these sequences. I had observed that when 'dolphin nose' was used to describe a plantain, speakers would grin or laugh if I pointed out or asked about the connection between 'plantain' and 'dolphin nose'. I took their reaction to suggest that the sequence used for 'plantain' was a compound whose literal meaning was irrelevant (as a dead metaphor) to its compound use. In fact, the reaction is just as likely a reaction to highlighting what to the Pirahãs is a humorous label that has become nearly a dead metaphor.

Finally, NP&R question the greater complexity of the morphemic glosses of Everett 2005 compared to the glosses in use more than twenty-five years ago by me, Arlo Heinrichs, and Steve Sheldon. I confess that I cannot see what is hard to understand about a linguist learning more about the morphological composition of words in nearly three decades of constant research following his original doctoral research. Perhaps they are mystified because the more complex (and accurate) glosses do not seem to produce idiomatic English translations. But if one spends enough time reading some of the grammars written over the past decades (e.g Heath's (1984) grammar of Nunggubuyu or Young & Morgan 1992 on Diné bizaard, Navajo), one will discover many cases in which the translations of morphemes are difficult to follow when compared to the translations of the whole words they compose. My glosses of Pirahã are my best attempt to analyze the components of Pirahã in a difficult monolingual setting. One identifies morphemes by recurrent patterns, among other things. Initial morpheme breaks and definitions that I inherited from my SIL predecessors among the Pirahãs, Heinrichs and Sheldon, were largely the ones I used (with different definitions in most cases) in Everett 1983, 1986. In the intervening years I have seen that almost all of these morphemes are in fact strings of smaller morphemes and that my original analysis was too coarse-grained.

3. Response to criticisms about claims on numbers, quantification, number.

3.1. Numbers. NP&R, in spite of Frank et al. 2008, claim that Pirahã is not unique because it seems numerically like languages cited in Hammarström 2006, 2008, unless, they say, 'it can be shown that it is special in lacking even a word for ''one'' ' (p. 386).

Now compare this to Frank et al. 2008:819: 'We show that the Pirahã have no linguistic method whatsoever for expressing exact quantity, not even ''one'' '. I do not see how we could have explained our claim more explicitly or clearly for NP&R (and we addressed their counterproposals). The principal contribution of that paper was to show precisely that Pirahã lacks all number words—the lack of 'one' was perhaps its

main point.[11] Even accepting NP&R's criticism of the glosses offered for *hói*, a word that was repeatedly used by multiple speakers to refer to quantities as high as six does not mean 'one'.

By NP&R's own criteria, therefore, Pirahã does not belong in any of Hammarström's groupings. At the same time it would not suprise me at all if other languages in Hammarström's groupings turn out to lack numbers just as Pirahã does. This would neither be here nor there relative to the Pirahã case. Recall, again, that the form of my argument is that an independently needed cultural value of Pirahã explains a number of features of Pirahã linguistic structures rather than the reverse.

3.2. GRAMMATICAL NUMBER. Corbett (2000) makes the case, based on Everett 1986 and Everett 2005, that Pirahã is the only language known without grammatical number. I am not certain that Pirahã is unique in this regard, but, once again, it is irrelevant for the general thesis of Everett 2005 whether Corbett is correct or not. The apparent exceptionality of Pirahã in so many areas is fascinating. But exceptionality per se is never causally implicated in any of my analyses or explanations. Therefore when NP&R (their n. 46) claim that Pirahã could be like several languages discussed by Corbett (2000:10ff.) that have what Corbett refers to as 'general number', this could be correct and yet it would have no bearing on the thesis of Everett 2005. And even though NP&R refer to the Pirahã *xaítiso* 'secondary participant' as a marker of plurality, I argue in §3.4 that it is in fact unrelated to number marking.

3.3. QUANTIFICATION. There are three pieces of evidence that led me to claim that Pirahã lacks quantifiers: (i) truth conditions, (ii) scope conditions, and (iii) binding conditions. Let's get straight on the different kinds of evidence.

(60) TRUTH CONDITIONS: the conditions under which a native speaker will agree that a word is properly and precisely used

So, there is one reading at least where 'All the men left' is true iff all the men in fact left—not just a couple of them, but all of them.

(61) SCOPE: the range of words whose meaning is constrained by the quantifier
Every man kissed some woman.

(62) BINDING: the interaction of quantifiers and pronominals
Everyone$_i$ said he$_{i/j}$ was right.

Let's take these up one at a time.

TRUTH CONDITIONS. Consider first the truth conditions of Pirahã words that are candidates to be quantifiers. Pirahã has two words that can refer to the entirety of entities, *xogió* and *báaiso*, and a form of *xogió*, *xogiáagaó*, can also be used in a way reminiscent of the universal quantifier 'all'. Suppose that we wanted to test the truth conditions of their containing sentences to see if these words were in fact quantifiers. There are many tests available, from showing pictures to enacting situations. I find it more useful in some field settings to act things out because this avoids problems with foreign or unfamiliar objects and it uses three dimensions rather than only two. Hence the anaconda-skin story I provided in Everett 2005.

[11] The word *hói* means 'small' or 'small amount', as in the following examples.

(i) xigihí hói 'baby' *or* 'little man'
(ii) xítiixis hói 'small amount of fish' (can be uttered of two fish if compared to one big fish, for example)

Let's say that you tell someone *I can't believe I ate the whole thing*. But then if they find part of the food you claimed to have eaten still on your plate, they are entitled to tell you that you did not in fact eat the whole thing. You only ate part of it. This is because any native speaker of English knows that *whole* means the object in its entirety (unless of course eater and watcher agreed in advance that this or that part of the object would not be counted in a determination of the whole). Of course, a native speaker of English could reply *I didn't literally mean I ate the* WHOLE *thing. It just felt like it afterwards*. But to this the literal-minded could still insist *Yeah, well, you still shouldn't say 'the whole thing', 'cause you didn't really eat the whole thing*. This use of *didn't really X* is only possible because both speakers do know that there is a literal use of *whole* that means 'the object in its entirety'. But this is exactly the meaning that is lacking in Pirahã. *Báaiso* never refers exclusively to the entirety of an object. It does not, therefore, share the truth conditions of English *whole* or *all*.

Or take an example of selling merchandise, another test I tried with the Pirahãs. They say that they want to buy a piece of cloth. They say that they want to buy *xogió*, which could be translated 'all', as per Everett 1983, 1986, or 'bulk of/bigness of', as per Everett 2005. How can we choose between these two alternative translations? Well, I ran tests like the following. I would take the cloth out and let them see it. I asked do you want it 'all' (*xogió*)? If they said yes, then I would say 'OK, then I will sell you all (*xogió*) of it'. Then I always cut off a smallish piece and gave them the rest. Then I would ask, 'Did you buy *xogió*?'. The answer always was, 'Yes, I bought *xogió*'. In subject after subject this is repeated. It seems highly unlikely, therefore, that *xogió* means 'all' in the universal-quantificational sense. The same holds for *báaiso*.[12]

For *xogiáagaó* 'the bulk/bigness of the individuals', the tests were similar. I would go into the village in the morning after most men had left to fish and ask a woman did *xogiaágaó* of the men leave to fish? I would be sure that a man who had stayed behind was with me when I asked this. The answer would always be '*Xogiáagaó* of the men went fishing'. There is no contradiction between saying *xogiáagaó* and having obvious exceptions. In other words, in these practical applications of the word, there is NEVER a situation in which the word refers to all members of a set.

Of course I realize that in most languages quantifiers can be used sloppily. So if a child says, *But, Mom,* EVERYONE *is going to the party*, they rarely mean that literally everyone is going. However, a parent can get them to agree that not everyone is going by saying *Not everyone is going because* YOU *are not going*. A child is confronted with the literal meaning of the word and recognizes the sarcasm intended because they know the literal meaning as well as the sloppier/metaphorical sense that they were using with their parent.

Therefore, truth conditions provide one source of evidence that Pirahã lacks a universal quantifier (or any interpretation corresponding to universal quantification). And as mentioned in n. 13, the same holds true for other potential quantifiers.

SCOPE AND QUANTIFIERS. Pirahã shows no clear evidence of quantificational scope interactions or ambiguities, except in simple predications.

[12] Neither *xogió* nor *báaiso* can be equated with the quantifier 'most'. Though there is not space in this article to argue against all potential quantifiers in Pirahã, the arguments against 'most' (and 'each', 'every', etc.) include: truth conditions (the words can refer to the entirety of an entity or set, which 'most' cannot); there is no quantifier-binding associated with these (as in the English *Most of the men said they were tired*); and there is no quantifier scope ambiguity with these words (as in the English *Most men said that a woman was not needed*).

(63) Xogiáagaó hi xísi kapáoba.
'The bulk of the people shot animals/meat.'
(i) Many different people individually killed many different kinds of animals.
or
(ii) There were several animals shot by a group of people.

These readings are possible only if *xísi* is given a bare-plural interpretation or a mass-noun interpretation (i.e. 'animal' or 'meat'). Otherwise, if *xísi* is interpreted as a singular count noun, 'animal', the only allowable reading, whether *xísi* is definite or indefinite, is as follows.

(iii) The bulk of the people shot an/the animal. (only one animal)

The lack of scopal ambiguity is predicted if there are no quantifiers. (This is one reason why I have previously used the translation 'bigness' rather than 'all', 'most', 'every', and so on—the words lack scope ambiguity. And the same can be said for other quantifier possibilities, for example, words that could be thought to be translated as 'most', 'few', 'each', etc. though I do not have space to discuss all these here.) Now let's consider quantifier binding, an area in which quantifiers are also known to manifest peculiar properties.

BINDING AS EVIDENCE AGAINST PIRAHÃ QUANTIFIERS. Binding is often a way to identify quantifiers, as in the English *Everyone likes his friend* or *No one likes her friend*. But the ambiguous readings associated with quantifier binding are lacking in Pirahã. Moreover, the descriptive words that seem superficially like quantifiers in Pirahã do not bind pronouns.

(64) Xogiáagaó hi xahaigí xogibaaí.
'The bulk of the people like his/the sibling/friend.' (There is a single friend/sibling liked by the bulk of the people in the context.)

Although example 64 is the closest Pirahã equivalent to the English *Everyone likes his friend*, if quantification were involved in the Pirahã example, we would expect scope ambiguity, corresponding to the two readings available for such a sentence in English (distributional vs. nondistributional). But we only get the nondistributional reading, unless *xahaigí* is interpreted as plural. Then the sentence is vague, however, rather than technically ambiguous.

Needless to say, it is very difficult to get evidence for or against such readings in a monolingual setting. Still, after looking at how such examples are used in texts and asking questions, for example, 'Who likes his friend?', it eventually emerges that the distributional reading is unavailable in any permutation of the sentences.

Perhaps 65 is a bit clearer.

(65) Xogiáagaó xísi kohoáipi.
(i) 'The bulk of the individuals present eats meat.'
or
(ii) 'The bulk of the people eat animals.'

Reading 65(ii) is vague and can lead to a quasi-distributional interpretation where different people ate different amounts or kinds of meat/animals. But this is not technically quantificational.

To conclude this section, there is no strong evidence for quantifiers in Pirahã and reasonably good evidence against them. The explanation that I offer is that this follows from the cultural reasons discussed earlier. Quantifiers are: (i) unnecessary in a society of intimates (where everyone is known and different readings are normally supplied explicitly, for example, a list of names); (ii) quantification violates the IEP because it

involves generalizing in principle beyond immediate experience; and last, but certainly not least, (iii) quantification entails considerations of quantity and set theory, and Frank et al. 2008a shows that Pirahã lacks words for numbers or concepts of cardinality of sets or counting.[13]

3.4. PRONOUNS, PERFECT TENSE, COLOR TERMS.

PRONOUNS. Pronouns are less crucial in a society of intimates, though of course not prohibited. And pronoun usage that involves usage beyond immediate reference (e.g. deixis) is in violation of the IEP.[14]

Interestingly in this regard, Pirahã has the simplest pronoun inventory known. The periphrastic plural forms that NP&R (p. 391) suggest below are not pronouns at all. They say, correctly, that Sheldon (1988:n. 1) gives the pronoun chart in 66.

(66) pronouns in Pirahã (per Sheldon 1988:n. 1)

	SG	PL
1	ti	tixaítiso
2	gí	gíxaítiso
3	hi	hixaítiso

These examples are not translated correctly. Sheldon mistakenly analyzes the *xaítiso* particle as a plural marker, but he agrees with my current analysis, not the analysis above. The particle is accurately glossed in Everett 1986. It marks a secondary discourse participant.

(67) a. Ti xaítiso kahapií. Xabaxáígio.
1 SECOND went alone
'I (though less significant than the person we are talking about in this text) went. Alone.'

b. Kagáíhiai koabáipi. Giopaí xaítiso koabáipi.
jaguar died dog SECOND died
'The jaguar died. The dog died.' (though the dog is not the topic of the discourse)

Notice in 67 that a pronoun is not even required to appear with the independent particle *xaítiso*. This particle is independent of pronouns and marks a secondary discourse participant.

As a final example of the absence of number on pronouns, consider 68.

[13] Interestingly, though it lacks quantifiers, Pirahã does have generics. In Everett 2010, I discuss this in the context of language evolution and what the tasks are that language as a tool must accomplish for human society. I argue that generics, but not quantifiers, are more essential to communication and that they, unlike quantifiers, cannot be eliminated by local cultural constraints. Moreover, generics are unlike quantifiers in not requiring concepts of set theory. This is supported by the work on Pirahã by Frank and colleagues (2008) and independent work by Leslie (2007; see also Leslie 2008):

> Do the Pirahã then possess mental representations of the cardinalities of large sets? We do not believe that our experiments show evidence supporting this hypothesis. (Frank et al. 2008:823)
>
> I . . . consider the question of whether generics are quantificational . . . [and] argue that, despite appearances, generics are in no sense quantificational. . . . [W]hile this is a surprising result from the point of view of philosophy of language, it is to be expected given the role of generics in our psychology. (Leslie 2007:379) There is . . . a strong case to be made for the idea that generics give voice to our most primitive generalizations. (p. 383) [G]enerics . . . do not depend on considerations of quantity, or on any such information easily captured by set-theory. (p. 397)

[14] This may be why, as Everett 1986 notes, Pirahã discourses use proper names much more than pronouns, to refer even to topical participants, contra Givón 1983 and other work on topic continuity.

(68) a. Hiaitíihí hi xob-áaxáí.
Pirahã 3 see-well
(i) 'The Pirahã are really smart.'
(ii) 'The Pirahã is really smart.'
b. Xahaigí hi kahapií.
sibling 3 go
(i) 'The two/three/four/etc. brothers left.'
(ii) 'The siblings left.'

In 68 the pronouns are constant regardless of number. The arguments from NP&R are to the effect that other languages (e.g. Karitiana; see also C. Everett 2006) lack distinctions in their pronouns reminiscent of Pirahã. Therefore Pirahã pronouns cannot be constrained by the cultural values I propose. But this simply repeats the same misunderstanding of the relationship between culture and language that characterizes NP&R's entire article. They believe that since the IEP (apparently) fails to apply to those languages, the similar grammatical facts are a problem for my analysis. We have already seen that this does not follow.

PERFECT TENSE. Pirahã lacks pluperfect and future perfect tenses. There are no interpretations nor formal markings referring to such tenses in the language. There is thus no way to say in Pirahã the types of sentences given in 69.

(69) a. When you arrive, I **will have** eaten. (future perfect)
b. When you arrived, I **had** eaten. (pluperfect/past perfect)[15]

The IEP-based explanation for this is that past and perfect tenses are not defined relative to the moment of utterance but in relation to another event in the past or the future. The present perfect is, however, anchored to the moment of utterance, so it is conceivable that Pirahã could have one; see the discussion below 24 above. See Everett 1993 and Hornstein 1993 for the relevant theory of tense.

COLOR TERMS. Color identification and standardization involves generalizations across the color spectrum that by their very nature go beyond immediate experience (as relating this 'blue' before me to a general concept of blue). Color terms are well known to differ from other adjectives in this respect (see, inter alia, MacLaury et al. 2007, Berlin & Kay 1999, and Hardin & Maffi 1997). The EXPERIENCE OF COLOR is obviously immediate. I do not predict that Pirahãs will lack the ability to describe colors periphrastically, based on perceptions of other concrete objects, only that they will lack morphologically simple color words. But the NAMING OF COLORS via constant terms is a type of generalization that ranges beyond other adjectives.

4. RESPONSE TO CRITICISMS ABOUT CLAIMS ON PIRAHÃ CULTURE.

4.1. MONOLINGUALISM. I have claimed that the Pirahãs are monolingual. At the same time I have also claimed that several men know some Portuguese and that most men understand and use words and phrases from Nheengatu. Several readers, including NP&R, have mistakenly perceived a contradiction here. But there is none. 'Monolingual' is, like 'bilingual', a gradient notion. No Pirahã man can understand a native speaker of Portuguese speaking at a normal rate, using only a moderate vocabulary. But many Pirahãs can understand Brazilians when they speak slowly about a LIMITED RANGE OF TOPICS, especially when they use the local pidgin, itself very limited and based on Nheengatu, a creole that was once spoken throughout the Amazon. Sakel (2010) provides a detailed study of this fascinating contact situation.

[15] Example 24 above is reminiscent of a present perfect reading, with the double use of *-ao*. I am not sure that this is what it is, though a present perfect would be compatible with the IEP.

The point I made about the Pirahãs being monolingual was twofold: (i) linguistics research cannot take place without the linguist learning Pirahã, even using this (extremely limited) pidgin; (ii) the Pirahãs' inability to function in Portuguese is highly unusual for all Amazonian groups, especially for groups in their area or groups with anything approaching the amount of contact with Portuguese speakers that the Pirahãs have had.

Marco Antônio Gonçalves and Adelia de Oliveira, two Brazilian anthropologists who have worked with the Pirahãs in the past, know this very well and do not dispute it. Regarding Gonçalves, see the quote in §4.2 above. Regarding de Oliveira, she used the same combination of simple Portuguese, Pirahã, and Nheengatu-based pidgin that Gonçalves mentions in the quote below, and she frequently consulted Sheldon for help understanding the Pirahãs. No one has communicated successfully with the Pirahãs using normally spoken Portuguese.[16]

4.2. TEXTS AND BELIEFS. In Everett 2005 I claim that the Pirahãs lack myths. In an attempt to contradict my claim on this, NP&R show a rush to judgment and lack of care in their handling of the data.

NP&R contradict Everett 2005 by baldly claiming that Pirahã does have 'narratives about the mythic past' (p. 392). They even believe that they cite one in their article. But the evidence that they provide is based on a deep misunderstanding of the source they are citing.

I was puzzled by the text they cite in their article, since there is in fact no text like it in Pirahã. Therefore, I wrote to the person they credit with collecting the text, Dr. Marco Antônio Gonçalves. As his reply to me makes clear, this is not a text at all, but a piecing together of various ideas by Gonçalves himself, based on his own understanding of Pirahã beliefs. No Pirahã ever uttered such a discourse. Here is what he says about it:[17]

[16] The current FUNAI (Federal Indian Bureau) representative among the Pirahãs, Jose Augusto Pirahã ('Verão'—named after the Instituto Lingüístico de Verão, SIL) is the son of a Pirahã man (Toíbaiti) and a Diarroi-Apurina woman (Raimunda). He speaks fluent Portuguese, but only a very rudimentary Pirahã, insufficient to discuss anything in depth or to be useful as a linguistic or anthropological informant. He is sometimes cited as a bilingual Pirahã but he is not. He was raised outside the Pirahã villages among the Apurinãs discussed in Everett 2008.

[17] This is the original Portuguese:

> O texto que eles citam deve ser, provavelmente, uma tradução do português para o inglês, em nenhum de meus trabalhos eu cito textos em Pirahã, a não ser frases, palavras e conceitos, mas não um texto completo. Eu esclareço na minha tese e no meu livro que nunca coletei um mito de origem sobre os Pirahã como uma narrativa mitica, na verdade trata-se de fragmentos, pedaços de historias que foram coletadas a partir de uma conversa, de perguntas e respostas e não um texto mítico como os que se encontram na maioria das culturas amazônicas. E digo também que eu estabeleci o texto chamado 'mítico' porque essencialmente é bastante amazônico tendo uma ampla peneteração e difusão em toda a região. Digo ainda, sempre disse, que havia muita dificuldade em coletar mitos entre os pirahã e que os mitos não são importantes para eles, e por isso os discursos mais elaborados sobre o cosmos que encontrei são os sonhos e discurso produzidos nas sessões rituais, momentos em que a cosmologia é atualizada por uma lógica da ação no mundo, pois tanto o ritual quanto o sonho são verdadeiras experiências no mundo, em que estes seres de outros patamares (migi) são conectados através de relações particulares com os pirahã. E numa cultura como a dos pirahã que valoriza a experiência no mundo, que valoriza a ação, o discurso mítico aparece de quando em quando através de pequenos fragmentos que parecem ser muito mais amazônicos em geral do que propriamente Pirahã. E por isso acho que toda a elaboração sobre o mundo, onde as idéias dos pirahã sobre o cosmos ganham consistência é no ritual e nos sonhos que são de fato experiências vivenciadas. E este pensamento que elaboram via o discurso ritual e os sonhos é que seria o equivalente dos mitos em outras culturas amazônicas.
>
> Mas um fato inelutável é que os Pirahã não tem um discurso mitico elaborado, evidentemente não tem porque não precisam dos mitos e funcionam muito bem sem eles, istoé, podem construir uma cosmologia sem uma mitologia.

> The text they cite is a translation from Portuguese to English. In none of my works do I cite texts in Pirahã, but only phrases, words, and concepts, but never a complete text. I make it clear in my thesis and in my book that I never collected an origin myth as a mythic narrative. In reality these [the 'text' that NP&R present on Xigagai] are just fragments, pieces of stories that were collected from conversation, from questions and responses and not a mythic text like you find in the majority of Amazonian cultures. I also say that I established the text called 'mythic' because it is essentially very Amazonian, with a wide penetration and diffusion throughout the entire region. I also say, and always said, that it was very difficult to collect myths among the Pirahãs and that the myths are not important to them, and for this reason the most elaborate discourses are from dreams and discourses produced in spirit sessions, moments when the cosmology is made real by a logic of action in the world, because the ritual and the dreams are real experiences in the world in which these beings from other levels of the universe are connected by individual relations with the Pirahãs. And in a culture like the Pirahãs' that values world experience and that values action, the mythic discourse appears from time to time through small fragments that seem more Amazonian in a general sense than Pirahã. And because of this I believe that all the discourse about the world, where the ideas of the Pirahãs about the cosmos gain consistency is in ritual and THE DREAMS THAT ARE IN FACT LIVED EXPERIENCES [emphasis mine—*DLE*]. It is this thinking that they elaborate via ritual discourse and dreams that would be the equivalent of myths in other Amazonian cultures. But an ineluctable fact is that the Pirahãs have no elaborate mythic discourses evidently because they do not need myths and function very well without them. That is, they construct a cosmology without myths.

Gonçalves and I are in complete agreement here about the absence of myths. The text NP&R cite is not a text at all (and Gonçalves never claims that it is), but is rather a summary of his theory of Pirahã culture, piecing together bits he heard over the eighteen months he was there from the mix of pidgin-Portuguese-Pirahã that he was able to acquire. He admits that he does not speak Pirahã. What he says is by no means implausible. In fact, I too thought at one time that the Pirahãs had these beliefs. But they never emerge in their texts or in their conversations, EXCEPT when they are speaking to outsiders in the local pidgin (a mixture of Nheengatu and Portuguese). My conclusion is that the Pirahãs are repeating back amalgams of many of the stories that THEY have 'pieced together' over the years from caboclo traders who share in the myths that pervade almost all Amazonian societies. These are not indigenous. When Gonçalves talks about their spiritual practices and dreams, however, he is exactly right that whatever the Pirahãs say at this time is 'lived experience', what I call 'immediate experience'. So there is absolutely no contradiction here and, overall, Gonçalves and I are saying nearly the same thing.

This brings us to the issue of 'spirits' and the IEP. The Pirahãs do indeed claim to have immediate experiences of spirits. 'Spirit' is a term that I have used for want of a better term in English. To the Pirahãs these are beings with capacities different in some respects from ours (and Americans are in fact a kind of spirit to at least some Pirahãs) but broadly human, a different species of jungle hominid. (One very interesting example of Pirahã contact with spirits that I observed early on in my career is found in Everett 2008:xv–xviii.)

Let me offer one last remark on culture, concerning Pirahã art. NP&R also seem puzzled by my remarks on the IEP and the absence of art in Pirahã. But my claim is simple: the Pirahãs avoid permanent, generalizing representations, due to the IEP. They draw only things that they have just seen and then only for an immediate purpose. (When given pencil and paper to draw, they almost always try to imitate my note-taking, drawing small, consecutive circles across the page, staying usually within the lines. They will then read their writing back to me, to show me that they are writing just like I am.) This includes airplane models, as in the *New Yorker* example NP&R cite.

5. RESPONSE TO THEORETICAL CRITICISM.

5.1. CULTURE GENERALLY. The general concept of 'culture', like the abstract notion of 'language' in linguistics, is too coarse-grained to be particularly useful in anthropology. It is more effective to identify individual cultural values, beliefs, behaviors, and concepts and then study the interconnections between them, including, where relevant, their relative ranking in a single society. To illustrate what I have in mind, consider the following hypothetical situation. Members of society X and society Y both value tasty food. And the members of both societies, let us say, also value being hard and tough. Now let us say that members of society X value eating over toughness, while members of society Y value toughness over eating. This might produce differences in the relative fitness of the members of each society, other things being equal, in this artificial example.

No single cultural value can be understood in isolation from other values any more than individual phonemes or grammatical constructions can be understood independently of a particular system of phonology. In this sense, the immediacy of experience principle, proposed in Everett 2005 and developed in more detail in Everett 2008, can only be understood within the culture it emerges from. Some anthropologists believe (e.g. Gonçalves 2005), and I agree with them, that immediacy of experience is a widespread value among Amazonian peoples, both caboclos and indigenous (Everett 2008:159–76). And yet this does not mean that, say, the Parintintins, the Pirahãs' closest neighbors, interpret or rank this value in exactly or even roughly the same way as the Pirahãs, even though they live in a nearly identical physical environment and immediacy of experience is in some sense important to them. Just as we might find the high central vowel [ɨ] in various Amazonian languages, its phonological status can vary significantly from language to language—an allophone in some, a phoneme in others, and so on. Again, my argument is that the IEP has the effect that it has in Pirahã because it is especially valued in Pirahã relative to any other Amazonian language that might have it.

There are two differences between my work on Pirahã and the majority of the work in the ethnosyntax tradition, both minor. First, though I do not believe that Pirahã is the only language lacking evidence for recursion, mine is the first for which the claim has been made explicitly, so far as I can tell. Second, while most studies of ethnosyntax have tried to suggest that the presence of a certain cultural value tends to favor the emergence and survival of some grammatical characteristic, my view has been that in this case the presence of a certain cultural value tends to favor the absence of a grammatical characteristic.

It is these differences that make Pirahã stand out for now, though it is unlikely that Pirahã would be the only exemplar of either. Once again, the 'exceptionality' of Pirahã is a nonissue. If it should turn out that any number of other languages lack some properties that Pirahã lacks, this would be interesting, but largely orthogonal to my analysis.

NP&R also criticize the IEP because they see no linkage between it and Pirahã grammar. The IEP in a theory of the interaction of culture and grammar in Pirahã arises from two basic claims. First, Pirahã language and culture manifest the hallmarks of 'esoteric language' (a language in which events and participants are all well known to all members of the society; see below) in a SOCIETY OF INTIMATES (Givón 2002:303–33, 2009:36). Second, the IEP is ranked higher among Pirahã values than it is in neighboring societies that also highly value immediacy. Let's consider the broader issue of esoteric communication first.

5.2. SOCIETY OF INTIMATES. Esoteric communication (Wray & Grace 2007) is found in small groups wherein everyone in the group knows (roughly) everyone else in the group and all share expectations of culturally acceptable events.

Givón (2002:303–33) situates the notion of a society of intimates, which is closely related to esoteric communication, within a theory of the evolution of language. The point of relevance for our current concerns is that the informational stability and homogeneity in such societies affects the grammars and discourses because little elaboration is required and information flow is slower and less in need of management via recursive structures (see §6.2 below for functional perspectives on recursion and how this device is less likely to emerge in certain societies). This does not prohibit complexity from arising. But it does reduce the benefits of added complexity.

5.3. LINKING CULTURE AND GRAMMAR. Of course, it is one thing to talk about cultural influences and another to show them. We need to discuss the methodology and mechanisms for linking culture and grammar, as NP&R rightly demand of ethnogrammatical research. We want to know how it is that a specific principle like the IEP can exert an architectonic, or indeed any, effect on a grammar.

Evans (2003:15) introduces the general problem, when he argues that 'language structure is seen to emerge as an unintentional product of intentional communicative acts . . . they arise as invisible hand processes operating on what speakers produce as they strive to achieve other goals'.

Discovering this 'invisible hand' requires some effort. In Everett & Sakel 2010, we offer suggestions toward a methodology for ethnogrammatical research.

(70) premethodological ethnogrammatical questions
  a. Are there irregularities of meaning or form that have no obvious structural explanation?
  b. Are there examples of 'free variation', that is, where there are choices between two structures that are not determined by the structures or the grammar, in so far as can be determined?
  c. Are there unusual facts about the cultural events, values, or explanations that involve principles reminiscent of principles operative in the grammar?

Before turning to what Enfield (2002:13) labels 'linkage'—connections between culture and grammar—however, I want to point out what may be the biggest lacuna in the study of ethnogrammar to date, namely, the effect of values, for example cultural taboos, in restricting both culture and grammar. Most previous studies focus mainly on isolated connections between culture, explicit syntactic forms, and meaning. But many fail to consider cultural prohibitions and global effects across both culture and language. The Pirahã example is evidence that such values should also be considered in ethnogrammatical studies. But before we can draw any conclusions at all about ethnogrammar in a given language, we need, again, to ask how we can effectively argue that property *p* of culture *C* causally determines feature *f* of grammar *G*. According to Clark and Malt (1984), cited by Enfield (2002:18ff.), there are four prerequisites to establishing linkage between culture and language.

(71) culture-grammar linkage prerequisites
  a. empirical grounding
  b. structure independence
  c. theoretical coherence
  and the caveat to:
  d. avoid circularity

That is, we need to provide evidence for the values and structures we are discussing (71a); show that the proposed linkage follows from a theory of the culture-grammar interface (71c); establish that the cultural values are independent of the structure in question (71b); and (71d) avoid claiming that a particular linguistic feature is determined by an aspect of culture while simultaneously using it as evidence for that aspect of culture (so, for example, 'The language has evidentials because the culture values empirically based reasoning', and then 'We know that the culture values empirically based reasoning because it has evidentials'). The way to avoid this is to first establish, using nonlinguistic evidence, particular values or meanings in a certain culture. Next, using noncultural evidence, establish the meaning and structure of the relevant linguistic examples. Finally, show how linking the two is conceptually and empirically superior to proposing that they are unconnected (in terms of predictions where possible, or in independent empirical domains such as diachrony). This is what Everett 2005 and the current article attempt to do.

5.4. THE IMMEDIACY OF EXPERIENCE PRINCIPLE. The Pirahã people and their language are very interesting anthropologically and linguistically. Although some aspects of their language and culture may be shared with other culture groups, no one group seems to have all of the interesting features that Pirahã has. These properties intuitively seem like they have something in common: they all seem to be on the side of being simpler in some way than other systems. If this pattern is true, it deserves some attempt at explanation. All of these issues have simultaneously seemed related and yet puzzled me for over a decade. It was something I long felt was on the tip of my tongue but was not quite able to articulate. The IEP is the articulation of what seemed to me to be the best explanation of the facts. But the IEP was never intended to be a hard and fast deductive explanation. This makes it admittedly difficult to test, though not impossible. And tests have been conducted and more are being planned. Let's begin by restating the IEP.

(72) IMMEDIACY OF EXPERIENCE PRINCIPLE FOR PIRAHÃ: Declarative Pirahã utterances contain only assertions directly related to the moment of speech, either experienced (i.e. seen, overheard, deduced, etc.—as per the range of Pirahã evidentials, as in Everett 1986:289) by the speaker or as witnessed by someone alive during the lifetime of the speaker.

Again, the IEP is a first pass at an explanation. The claim is that the values of the IEP are causally implicated in the grammar of Pirahã.[18]

One way of interpreting how the IEP might affect language revolves around the form of individual sentences and the relation of that form to discourse structures and Pirahã conversations. Each sentence will take the form of an assertion (in principle providing new information). This allows the interpretation of the unit within the discourse to be directly subject to discursive principles (old information, new information, etc.), itself centered around the moment of utterance. Information flow is maximally constrained by the dynamic discourse perspective and minimally constrained by static syntactic rules, for example, phrase-structure rules or recursion. By making each sentence take

[18] I began thinking of the connection between culture and grammar early on in my career with the Pirahã, writing my first paper on this topic while a Visiting Scholar at MIT, in 1984, eventually published as Everett 1985. That paper (and Everett 2008:177–92) focused on the connection between Pirahã culture and phonology, but the general principles are quite similar.

the form of an assertion, there can be no embedded clauses (Cristofaro 2005) because these by and large transmit old information and not assertions.[19] In addition, an embedded clause will have a more restricted range of meanings than an independent assertion. So the sentences' meanings are less subject to the immediate and freer discursive control of speakers and more highly constrained by the syntax. Since the IEP anchors events to the moment of utterance, only simple past, present, and future tense interpretations are available. Keeping the units under the control of the discourse rather than syntax proper severely limits the role of recursion and reduces the role of syntactic devices more generally (see §6 below). This gets us part of the way to the Pirahã case, though there is still work to do to understand how recursion can be kept out of the grammar by the IEP.

What kind of formal account we give this depends on several factors. If, for example, one believed in X′-theory, then one could propose that the grammar of Pirahã simply prohibits rules of the form $X^n \rightarrow Y \ldots X^n \ldots Z$. By contrast, if one believed that recursion were an information-management tool and that this tool is unnecessary in Pirahã, then no recursive rule would be found in the grammar. No rule of the form above would ever enter the grammar. Alternatively, Pirahã might have no phrase structure at all, leaving interpretations up to the lexicon and the discourse. If so, then, a fortiori, it would lack recursion. Under the latter hypothesis, its syntax would consist of little more than rules of linear precedence plus semantic linking (Gazdar et al. 1985, Van Valin 2005).

The IEP does not exhaust the range of or explanations for Pirahã culture-syntax connections. This principle has the effects it does in part because it holds within a particular society of intimates. A similar principle could have different effects in a different kind of society.

Independent evidence for the IEP comes from a variety of sources, most discussed in Everett 2005. One source of evidence is cultural values, for example, the absence of creation myths, the focus on the immediate of Pirahã texts, and so forth, as I discussed in Everett 2005. A second source is a lexical item representing an important concept in Pirahã culture, *xibipíío*. This word provides evidence that immediacy of experience is treated differently in Pirahã from in other Amazonian societies (since I am not aware of any similar lexical item elsewhere in Amazonia). I describe this at length in Everett 2008:129–32. *Xibipíío* refers to 'experiential liminality', from the visible appearance of an airplane to flickers of a flame. It describes the act of traversing the boundaries of immediate experience.

These kinds of data were vital to me in originally formulating the IEP. But another source was the most important evidence in formulating the IEP—Pirahã texts. All texts that I have ever heard, whether collected by Keren Everett, Heinrichs, Sheldon, or me (no one else has ever translated Pirahã texts) have dealt exclusively with everyday events witnessed by the person speaking the text. Below I give a typical example. This was collected, transcribed, and translated by Steve Sheldon (the speaker in this text was Kaboibagi Pirahã).

(73) Casimiro dreams

a. Ti xaogií xaipipa-áb-a-hoagái-híai kai.
1 Brazilian:woman dream-DUR-REM-INCHO-HEAR daughter
'I dreamed about his wife's daughter.'

[19] NP&R miss this point of my revision of the IEP, continuing to talk about 'events', rather than 'assertions'.

b. Ti xaí xaogií xai-xaagá. Ti xaipipaábahoagaí.
1 then Brazilian:woman there-was 1 came.to.dream.
'I then dreamed about the Brazilian woman.'

c. Xao gá-xai-a-ao. Xapipa-áb-a. Xao hi gía
foreigner speak-do-CONN-CMPL dream-DUR-REM foreigner 3 there
xab-aáti.
stay-UNCERT
'She spoke. I dreamed. You will stay with the Brazilian man.'

d. Gíxa hi xao ab-i-koí.
2 3 foreigner remain-CONN-EMPH
'You will stay with him.'

e. Ti xaigía xao xogígió ai hi xahá-p-i-ta.
1 TEMP/LOGIC.PROG foreigner big then 3 left-VERT.UP-CONN-ITER
'With respect to me therefore the big Brazilian woman went away again.'

f. Xaipipaá. Kagahoaogí poogáíhiái.[20]
dream papaya bananas
'I dreamed. Papayas, bananas . . .'

There is little that is unusual about this text per se. Any number of languages could provide similar texts. It merely recounts some experiences, including dreaming. The Pirahãs do not confuse dreaming with daily activities. But they classify the two roughly the same—just types of experiences that we have and witness daily (see also the remarks by Gonçalves in §4.2 above). This text gives evidence for recursive groupings in Pirahã, but of ideas rather than sentences. What is important is that (i) this text is typical—no Pirahã text is about anything other than immediate experience, and (ii) it shows groupings of sentences that are not grammatical constituents. They are cognitive (or thematic—the choice is irrelevant for now), as opposed to linguistic, constituents. We can see this in the change of subject in line 73f. Though there is no formal device for marking constituents, in this text, the change of subject reflects the fact that lines 73a–e form one cognitive/thematic constituent and line 73f another.

There are no other Amazonian groups among the nearly two dozen I have done field research on, nor any I have read about, where texts are so exclusively geared to immediacy of experience. This observation is reinforced by comments from Marco Antônio Gonçalves in §4.2. This difference shows why we cannot simply identify a value, for example, the IEP, decontextualize it, and then claim that it is also found in this or that culture. Nor can we claim that it ought to have the same effect in this or that culture, even when correctly identified. ALL CULTURES ARE UNIQUE IN THEIR PRECISE MIX OF VALUES.

6. THEORETICAL ALTERNATIVES TO EVERETT 2005.

6.1. HALE'S PROPOSAL ON GAPS IN GRAMMAR AND CULTURE. Before proceeding to reply to NP&R on the theoretical significance of the gaps in Pirahã culture and language, it is worth considering Hale's (1975) alternative perspective, urged upon us by NP&R. Hale's idea is that although there may be gaps in the manifestation of linguistic universals, these gaps are mostly superficial. Concepts and structures missing in one language

[20] The Pirahãs do give small lists occasionally. Such lists involve no external marking and are always found at the end of sentences. There is a pause between listed elements roughly equal to that between sentences. One usually gets the impression that they are thinking of things to add as they go.

are 'universally available' in some way to all humans. NP&R (p. 396) thus conclude that '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'' (Hale 1975:312)'.

While Hale's hypothesis does make some sense if interpreted in terms of human intelligence, I believe that his specific conclusions and posing of the problem are not always helpful. Although Hale raises the interesting idea of cognitive universals, of which there may be many, he does not distinguish between what can be learned by all humans and what is universal because it is innate (e.g. having two arms).[21]

For example, Hale showed that although the Warlpiri lack number words, they have an understanding of counting. He also showed that although the Warlpiri lexicon contains only two morphologically simple color terms, their patterning of morphologically complex color descriptions reflects the same Berlin-Kay color hierarchy that otherwise restricts the lexicon more directly (and I showed the same thing for Pirahã in Everett 2005). So Hale concluded that 'gaps in explicit instantiation are merely gaps in the conventionalized use of what is universally available' (Hale 1975:308).

But this conjecture is too strong, since it does not apply to all gaps. Compare, for example, the classification of colors and counting. As Frank and colleagues (2008) show, the Pirahãs do not have concepts of either numbers or counting (see also Gordon 2004). Yet Pirahã raised with Brazilians outside of Pirahã villages have learned to count, that is, when they are brought up with different cultural values. So counting is not universal, not even the concept of it, yet people can learn it quickly enough (from other cultures at least) when needed. At the same time, although Pirahã lacks color terms, the various phrases they use (and there is considerable variation) to describe colors in fact correspond to the Berlin and Kay scheme for four-color systems. This is fascinating because it shows a cognitive, rather than a linguistic, generalization manifesting itself directly in language. And it is in line with Hale's proposal. Nevertheless, Hale's proposal underestimates many gaps. Some are profound. The difference is a matter of research.

6.2. MERGE DOES NOT AVOID THE PIRAHÃ ISSUES. NP&R try to remove the force of my criticisms of Hauser, Chomsky, and Fitch's (2002) proposal on recursion by arguing that what HC&F meant was not the very specific definition of recursion that I offer, but 'Merge', a minimalism-internal subtype of recursion. They argue that because I missed this, my criticisms do not go through. But whether HC&F meant Merge is immaterial to my criticism of their proposal. Merge fares no better nor worse in relation to the facts of Pirahã than recursion more generally.[22]

NP&R would have the reader believe that if there is no Merge in Pirahã then Pirahã sentences can have no more than two words. This does not follow. There are alternative approaches to syntax that do not make such predictions nor require the auxiliary con-

[21] Although I am sympathetic to the idea of cognitive universals, Hale's allusions to linguistic universals resonate less strongly. I find the argumentation of Croft (2001) and Evans and Levinson (2009) to the effect that there are no linguistic universals more convincing. Paraphrasing Croft's thesis, the only universals applicable to the study of language are cognitive.

[22] Ray Jackendoff (p.c.) suggests that Merge can get around the problems raised by the Pirahã data if UNBOUNDED Merge is abandoned for BOUNDED Merge. But a tightly bound form of Merge is little more than just a way of saying 'put words in a sentence' so far as I can see.

straints that Merge would require to handle the Pirahã data. Simply put, Merge is unnecessary in Pirahã, just as recursion is. Moreover, it makes the wrong predictions, in spite of NP&R's claims to the contrary. There are both recursive and nonrecursive alternatives to Merge for any grammar. One example would be an old-fashioned transformational generative grammar (see Culicover & Jackendoff 2005). Another would be linear-precedence rules (Gazdar et al. 1985) with semantic linking rules. Another would be a construction-grammar approach (Goldberg 1995, 2006). It is an illusion to think of Merge as being any more necessary than any other approach to phrase structure.

In fact, other researchers have argued that recursion (including, a fortiori, Merge) seems primarily to function as a manager of information flow in complex cultural exchanges. Researchers as diverse as Mithun (2009) and Hollebrandse and Roeper (2009) are converging on clearer understandings of the role of recursion in human speech:

> Recursive structures are in a sense epiphenomenal, the products of a host of cognitive abilities . . . It is . . . the continually evolving product of human cognitive abilities. (Mithun 2009)

> We argue that recursion imposes constraints on our interpretations just like the Necker Cubes . . . Language, via constrained recursion, allows focusing on one single logical sequence. This constrained form of recursion belongs to the core of grammars for natural languages . . . it is conceivable that other languages have anaphoric elements that allow multiple embedding at a discourse level. Those languages might apply the restrictions we discuss in this paper for syntax at a discourse level. In those languages syntactic recursion is likely to be infrequent, or even lacking, such as in Pirahã (Everett, 2005) and Teiwa (Klamer, forthcoming). We expect those languages to show recursion at other levels than syntax. (Hollebrandse & Roeper 2009)

6.3. PIRAHÃ AND UNIVERSAL GRAMMAR. I argue in this section that one may distinguish between two hypotheses about universal grammar, UG-1 and UG-2. UG-1 is UG with falsifiable predictions, as in HC&F. In particular the HC&F version of UG-1, that recursion is crucial to human language, is falsified by the Pirahã data, if I am correct. Then there is UG-2. I argue below that this version can neither be supported nor criticized by facts because it is definitional.

In the context of these two types of UG, NP&R claim that even if I were correct about all of the facts of Pirahã, this still would have no bearing on any claims of universal grammar because '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' (p. 358). They are right if we are talking about UG-2, but incorrect if UG-1 is the focus of our discussion. Everett 2005 failed to draw this distinction clearly, so let me underscore that Everett 2005 claims to falsify HC&F's UG-1, not UG-2 in general (though UG-2 does not emerge unscathed from this overall discussion).

NP&R are wrong regarding UG-1 and the Pirahã data because HC&F do make a prediction regarding the narrow faculty of language (FLN) and thereby regarding UG itself, namely, that recursion is essential to human language. We thus expect it to be found in all languages. And this prediction is falsified by my account of the Pirahã data. Now, HC&F cannot say that recursion is the essential property of human language(s) but that it is also optional. They could say that it is merely useful or important. But they cannot claim that it is the core property distinguishing human language from animal communication, but that it does not actually have to be found in human languages. I discuss this further directly.

It is crucial to keep such predictions separate from UG-2, however, since UG-2 has no empirical content. Consider what Chomsky says in this regard: 'Asking what UG predicts is like asking what biology predicts. There can't be any answer, by definition. UG is the true theory of the genetic component that underlies acquisition and use of language' (Chomsky, p.c., email April 2007). This reduces UG-2 to a tautology: only humans speak because only humans are humans.

It is very important to understand this distinction between the empirical UG-1 and the tautological UG-2. One helpful example showing the detachment that Chomsky sees between UG and empirical research is found in a statement of his in the February 1, 2009, edition of the *Folha de São Paulo*. Chomsky told the newspaper that he believes that I purposely mislead people about it. The form of his criticism of me is quite interesting:

> Everett hopes that the readers do not understand the difference between UG in the technical sense (the theory of the genetic component of human language) and the informal sense, which concerns properties common to all languages. The speakers of Pirahã have all the same genetic components as us, so Pirahã children can create a normal language. Suppose that Pirahã doesn't permit this. It would be the same as discovering a community that crawls but doesn't walk, so that children that grow there only crawl and never walk. The implications of this for human genetics would be null.

Chomsky's remarks deserve close scrutiny here because of their relevance to the demand by NP&R that I demonstrate how my claims falsify UG and because they show the difference between HC&F's UG-1 and UG-2. (Thanks to Paul Postal for suggesting some of the remarks that follow.) Again, we see that UG-2 not only makes no predictions, but also has little if any connection to linguistic data. Chomsky allows in this latter quote that Pirahã could be as I describe it. Nothing in UG precludes this, he says. But then, of course, nothing in UG prevents a third, a half, or even all languages being like Pirahã, lacking recursion, and so forth. This means that there is no language nor any collection of languages that could possibly disconfirm UG in the 'technical sense'. (Interestingly, if languages cannot disconfirm Chomsky's view, then they also cannot support it.)

Chomsky thus makes it clear that NP&R's statement that nothing about Pirahã does or even could falsify UG refers to UG-2. This is because UG-2 is definitional and therefore not falsifiable. But UG-1 is an empirical hypothesis, the core of language is recursion, and that is falsified if it is understood as HC&F intend it, namely, as a hypothesis about language rather than cognition more broadly.

7. CONCLUSION. In the preceding discussion I have shown that the evidence to date is consistent with the hypotheses of Everett 2005 on the structure of Pirahã grammar, especially that it lacks recursion, and inconsistent with any of NP&R's alternative analyses. More research on Pirahã and many other languages is needed, however, including experimental elicitations and quantitive or computational analysis of large amounts of linguistic data. Moreover, I have tried to show how my claims about Pirahã culture are supported by the data I presented. While the IEP is only a first proposal for a unifying description of the pattern of differences in Pirahã, I strongly believe that this pattern deserves to be explained and that the hypotheses we consider should be cultural as well as linguistic.

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