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# *The Role of Culture in the Emergence of Language*[1]

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*"Speech is a non-instinctive, acquired, 'cultural' function."* (Sapir 1929, p2)[2]

## 1. Introduction

This chapter examines the idea that language is significantly (though not exclusively) shaped by culture. By this I mean that communicative patterns arise within particular systems of cultural values and that these patterns and values in turn shape the grammatical structure of a language (Enfield (forthcoming) develops these and related ideas in considerable detail). To be clear, to use Chomskyan (Chomsky 1986) terminology, culture affects not only E-languages (the observable corpus) but also I-languages (the mental rules and representations used to generate the E-language).

A caveat and a clarification are needed before beginning. The caveat is that this chapter is about how culture affects language - not about linguistic relativity, how language affects culture (for a comprehensive survey of the latter, see C. Everett (2013)). The clarification is that although I have argued elsewhere that language is not innate in any specific sense, the term "I-language" is still an appropriate term for use here. This is because I understand I-language to refer to the speaker's tacit knowledge of their grammar, a view compatible with non-nativism as well as nativism.

Our discussion is organized as follows. Following this introduction, the next section considers how linguistics has been led away from its traditional concern to understand language as partially constructed by culture, due to a reification of the field that began with Chomsky's earliest work, continuing through to the present state of formal linguistics more broadly.

Section three discusses the nature of cultural knowledge, in order to make the point that the child is learning his or her culture at least as early, perhaps even before, she

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[2] And also, *"Language is primarily a cultural or social product and must be understood as such. Its regularity and formal development rest on considerations of a biological and psychological nature, to be sure. But this regularity and our underlying unconsciousness of its typical forms do not make of linguistics a mere adjunct to either biology or psychology."* (Sapir 1929, p214)

begins to learn his or her language. This non-linguistic cultural learning affects the child in many ways, including his or her conception of how language is used for communication, a conception that can in turn affect her grammar.

In section four we look at two short Pirahã texts as small examples of how culture and language interact at the level of discourse. We move from this to the heart of the paper in section five, namely, how Pirahã culture profoundly affects Pirahã "core grammar" by means of an overarching cultural value, Immediacy of Experience, and the reflex of this value in the evidentiality system of the grammar, through a POTENTIAL EVIDENTIALITY DOMAIN. This Potential Evidentiality Domain is culturally motivated and effectively bars recursion from the morphosyntax entirely.

This is followed in section six by an examination of how Pirahã culture shapes Pirahã's segmental phonology. From the discussion of Pirahã phonology we conclude with a brief section on the methodology of establishing culture-language/grammar connections.

In the conclusion to the paper I offer and defend the formula: COGNITION, CULTURE, AND COMMUNICATION --> GRAMMAR, arguing that Pirahã is not a unique case and that all languages will show culture-language connections if we look. But of course it is hard to find such connections if we do not look for them.

This paper, like every paper in this volume owes an intellectual debt to the pioneers of research on language emergence, e.g. Hopper (1988) and MacWhinney (2006).

## 2. Reification of the Field

Until the 1950s, it was common for linguistics to be treated as a branch of anthropology and housed in anthropology departments. The common idea that language was part of something bigger - culture, society, folklore, and so on, was one of the shared features of language studies on both sides of the Atlantic. Both Sapir (1921; see also his collected works, e.g. Madelbaum(1985)) and, later, Roman Jakobson (see the collection by Waugh and Monville-Burston (1990)), wrote widely about language's various manifestations in discourse, poetry, conversation, sound systems, and so on and thus the symbiotic relationship between language and culture.

But with generative linguistics' turn away from interest in human culture in the late 1950s led to a marked reification, ignoring various intersections of culture and grammar, e.g. discourse structure, idioms, sound symbolism, and field research.

The failure to look at discourse (and culture) in studying sentences is on a par with the now-outdated position of earlier linguists who avoided incorporating morphological phenomena in the analysis of phonemic structures. (See Kenneth Pike (1952).) Though generativists might insist on looking only at sentence-level phenomena, the rest of the (psycho)linguistic enterprise has long moved on from this limitation - precisely because of the desire to better understand both I- and E-languages.

For example, work by Levinson (2006), Enfield (2002), Silverstein (2003) and many others has advanced the earlier traditions and improved on them in many ways. However these works have been seen by some as orthogonal to the enterprise of generative linguistics because they haven't explicitly focused on 'core grammar' or I-language. Therefore, my purpose in the current chapter includes discussion of effects of culture on core grammar.

Pursuing the discussion of such effects, we need to understand how this discussion is framed relative to the model responsible for the notion of core grammar. Mainstream generative studies of core grammar have focused on the forms of sentences, phrases, and words - a continuation of Bloomfieldian structuralism. In this approach, a deductive set of categories is proposed, while subsequent analyses apply and tweak these categories or processes, with the aim of showing that they fit all languages in some way. The main difference with Bloomfieldian structuralism is largely superficial - a purported attention to the mental in Chomsky's work, an area largely (though not exclusively) avoided by Bloomfield (even though the mental is never causally implicated in generative analyses nor vice-versa, Everett (2013b)).

The assumptions that came to dominate thinking about syntax in theoretical linguistics included the following: (i) all grammars are hierarchically organized by recursive procedures; (ii) all grammars involve derivations; (iii) all syntactic structures are formed by combining two units at a time to produce endocentric, binary branching (and hierarchical) structures; (iv) all grammars derive from a genetic endowment common to humans called Universal Grammar; (v) the domain of grammar is the sentence.

Superficially at least many of these points appear to some linguists to have been falsified. Jackendoff and Wittenberg (to appear) have argued that Riau and Pirahã have nonrecursive syntax (see also Piantadosi, et. al. 2012, to appear). Robert Van Valin (2005) and others have argued that derivations are never necessary in any grammar. Frank, Bod, and Christiansen (2012) have even argued that hierarchy and recursion are unnecessary for the proper analysis of *any* natural language. Philip Lieberman (2013) has developed a formidable case to the effect that there is no neurological support for the idea that grammars derive from language-specific innate principles. Culicover and Jackendoff (2005) have argued against (i)-(iii) in their book, Simpler Syntax. And I myself have offered analyses of various languages, especially Pirahã (Everett 2005a) and Wari' (Everett 2005b; Everett 2009a) which appear to falsify (i)-(iv).

In any case, if we focus on grammar at the sentence level only, we miss important principles of the formal organization of language above the sentence which is arguably also grammar, but whose principles are more diverse. They include the principles of sentence-grammars as a subset. By way of example, I will consider some coarse-grained features of a couple of small Pirahã texts.[3]

## 3. Cultural Knowledge

A prior question in any study like the present one is how cultural knowledge is acquired. Is it exclusively dependent on language or can some values, skills, knowledge and so on be transmitted without language?

I want to argue here, as I have elsewhere (Everett 2012) that a large amount of cultural knowledge is learned independently of language. In-depth discussion of this for

[3] One vital area of language, cognition, and culture that I will omit from my discussion here is the work on gesture, as represented in McNeill (2012) and many other works. See Everett (in progress b) for more detailed discussion of gesture.

Pirahã is provided in Everett (2014), so I will illustrate this here with a simple example from the Banawás (based on my own field research).

Consider in this regard the non-linguistic aspects of learning of how to make a blowgun. I have witnessed the transmission of this skill in Arawan societies of the from father to son. Sons observe, imitate, and work alongside their fathers. Surprisingly little linguistic instruction takes place in this skill transmission. The wood for the blowgun comes from a narrow range of wood species. The vine used to tie the blowgun and render it airtight is a specific kind found in certain places in the jungle. The needle used for the darts likewise requires highly specific knowledge of local fora. The kind of large jungle vine used to extract the poison (strychine) and the other ingredients of the poison that help it enter the bloodstream more effectively: all of these steps and bits of knowledge, even without language, can be transmitted faithfully or inaccurately - without much language in fact, the son traveling with the father and observing. And the son (or daughter in other domains) learns from independent observation. While learning how to find and gather blowgun components, the son also learns about hiking in the jungle, fortitude, bravery, flora and fauna, and so on, in principle without any of these lessons being addressed by a single word.

At the same time, whether propositional, nonpropositional, linguistic, or nonlinguistic, however, "Cultural transmission, like genetic transmission, is always corrupted in some way, leading to "mutations" (cf. Newson, Richerson, and Boyd (2007)). For example, someone might accidentally use different type of wood. Or tie the blowgun slightly differently. Or use a novel binding agent for the poison. Error or innovation may occur at any step of the transmission process in one father-son pair leading to a divergence from the cultural norm. From the perspective of the culture it doesn't matter whether the deviation was intentional or not. There is a deviation. A potential for mutation - a different type of blowgun or an inferior or superior weapon. Clearly such deviations have occurred because in closely related Arawan languages, blowguns differ (as do the languages themselves) in nontrivial ways. The technology varied and the language varied due to imperfect imitation and innovation.

Everett (2014) provides other examples of cultural values transmitted non-linguistically. Obviously language enriches and accelerates the process of propositional culture learning, via different sorts of cultural institutions, e.g. the family, school, the military, church, and so on. But aspects of culture live on or change without linguistic guidance.

However, there are clear areas of interaction between language and culture that most researchers consider uncontroversial, such as discourse.

## 4. Pirahã culture and discourse

When we study the texts of a given culture, we learn how the culture talks about the world, what it talks about, and how this talk is organized (Silverstein (2003); Sherzer (2002); Quinn (2005), among many others). By way of example, we examine two very brief Pirahã texts in what follows. Both of these examples were collected by Steven Sheldon, a missionary among the Pirahãs, in the mid-1970s. Sheldon speaks Pirahã fluently. Sheldon did the initial transcriptions and most of the translations.

There are several cultural observations one could make about these texts. First, notice that neither has any special introductory nor ending formulaic language. This is

because Pirahã has no phatic language (Everett 2005; 2008). Assuming that special discourse-initiation and discourse-conclusion forms such as "Once upon a time" or "The end" are a type of phatic language, this component of the form of discourses is consonant with the larger culture. Both texts are very brief. Though Pirahã can and do utter much larger narratives, brief texts like these are more common. Both of these texts show thematic recursion. For example, the first text includes three dreams (fat Brazilian woman, papayas, and bananas) as one larger text about dreaming. The second text places sentence-sized questions, answers, asides, and direct address into a single whole.

Another culturally shared assumption of the first text is that dreams and talk about them are worth doing - these are important experiences. The Pirahãs understand dreams as real experiences, though of a different kind, from conscious thought.

1. CASIMIRO DREAMS ABOUT LARGE BRAZILIAN WOMAN, told by **Kaaboíbagí**

(1) **Ti aogií aipipaábahoagaí. Gíxai. hai.**
I Braz.woman began to dream You. Hmm.
'I dreamed about Alfredo's wife (aside to Sheldon, 'you probably know her.').'

(2) **Ti xaí Xaogií ai xaagá. Xapipaábahoagaí.**
I thus. Braz.woman there be began to dream
'I was thus. The Brazilian woman was there. I began to dream.'

(3) **Xao gáxaiaiao. Xapipaába. Xao hi igía abaáti.**
she spoke dreamt Braz.woman she with remain.
'Braz.woman spoke. (Casimiro) dreamt. "Stay with the Brazilian woman".'

(4) **Gíxa hi aoabikoí.**
you him remain.
'You will stay with him!'

(5) **Ti xaigía. Xao ogígió ai hi ahápita.**
I be:thus woman big well she went away
'I was thus. The Big Brazilian woman disappeared.'

(6) **Xapipaá kagahaoogí. Poogíhiai.**
dream papaya. bananas
'I dreamed about papaya. Bananas.'

2. BIGIXISITÍSI DIES, told by **Itaíbigaí**

By way of introduction to the next text, **Bigixisitísi** was a well-liked and well-respected man in the village. He was also one of the best of Sheldon's language teachers. While Steve and Linda Sheldon were gone from the tribe once **Bigixisitísi** became very ill and died. His death was caused by some unknown sickness, and the speaker felt that if Linda had been here perhaps **Bigixisitísi** could have been saved. Several of the details require cultural or implicit contextual knowledge, e.g. the fact that "Linda was not there."

As an American woman who had lived among the Pirahãs and treated their health for years, it would be known to all Pirahãs who this Linda was and why the fact that she was absent is significant to the story of this man's death.

(1) **Bigíxisítisi hi baábi. Kapío xiai.**
Bigíxisítisi he is sick. other is
'Bigixisitis has a different kind of sickness.'

(2) **Hi baábioxoi.**
He sick interrogative
'What is his sickness?'

(3) **Hi aigía ko Xápaí. Xí kagi hi xaoabábai.**
He thus hey Xapai her husband He nearly died
'He thus. Hey Xapai. Her husband nearly nearly died.'

(4) **Hi ábahíoxioxoihí.**
3 unknown.sickness interrogative
'Did he have an unknown sickness?'

(5) **Hi aigía. Koaísiaihíai.**
He thus became dead
'Well then. He was dead.'

(6) **Soxóa ti kabáo. Koaíso. Xai Bigíxisítisi**
Already I finished dies (he) did. Bigíxisítisi
'Bigixisitisi is already finished, affecting me. Bigixisitisi died. He did.'

(7) **Xabí Xioitábi**
not there Linda (her name in Pirahã)
'Linda was not there.'

(8) **Hi xabaí.**
she not
'She was not here.'

(9) **Ti xaigía gáxai. Xai. Hi abikaáhaaga.**
I thus speak. (I) do. he not be.
I thus spoke. I did. He is no more

(10) **Hi oaíxi. Pixái.**
He dead now
'He is dead now.'

Merely scratching the surface of these Pirahã texts, we see that they are like texts in any language in that they reveal cultural values, knowledge(s), and require a culturally-based hermeneutics. But as in all of science, the details are where the rubber meets the road. Here I want to review some of the crucial issues in understanding the relationship of language to culture, in particular how culture and language shape each other through their evolved symbiotic relationship.

When I say that these two manifestations of humanity are symbiotically related, I mean first that language is dependent on culture for many of its functions as well as the forms it develops to carry out those functions. But I also mean that culture is codified, regulated, reinforced, and partially formed by language. Thus though language and culture are by this view epistemologically and ontologically distinct, they are not independent of one another in praxis.

This notion of a language-culture symbiosis differs sharply from the idea that either is supervenient on the other. Supervenience is a relationship such that "A set of properties A supervenes upon another set of properties B just in case no two things can differ with respect to A-properties without also differing with respect to their B-properties" (McLaughlin and Bennet 2011).

Language and culture are each causally implicated in and dependent upon the other for its existence at some level of diachronicity. The effects of language and culture are intertwined but there is no one-to-one mapping between them. The failure to distinguish supervenience from symbiosis seems to have occasionally confused Sapir because he wrote apparently contradictory statements about the relationship between language and culture.

At one end of views about the language-culture spectrum there are those who argue that any interaction between the two is trivial, the total range of interactions not moving much farther than a few lexical choices and things such as polite vs. formal address forms, etc. (though this attitude trivializes both the lexicon and the complexity of constraints on address and expression that are often swept under "forms of address" or "politeness", I will take it at face value for the sake of discussion). At the other end are those who think of language as little more than a cultural artifact. As usual, the more interesting idea is a blend of the extremes.

## 5. Culture, Evidentiality, and Recursion

For one example of culture affecting grammar, I want to revisit Pirahã 's (at least apparent) lack of recursion. Most languages use recursive operations in the construction of their syntactic structures. This is so common cross-linguistically in fact that in 2002 Marc Hauser, Noam Chomsky, and Tecumseh Fitch (HCF) made the startling claim that the single innate cognitive component which made humans capable of language - and distinguished Homo sapiens from all other species - was the ability to construct grammars recursively. Unfortunately, this bold claim has since been falsified for being both too weak and too strong. First, the proposal is too weak, because there is abundant data that humans are not the only species that use recursive cognitive or communicative operations (see Corballis (2007); Golani (2012); Pepperberg (1992); and Rey, et. al. (2011))). Second, the proposal is too strong because there are languages that lack recursion (Everett 2005b; Gil 1994; Jackendoff and Wittenberg (2012; in progress). To see what HCF mean by recursion, here is a statement from the original paper:

*"FLN only includes recursion and is the only uniquely human component of the faculty of language."* (reference 9, p1569) *"... In particular, animal communication systems lack the rich expressive and open-ended power of human language (based on humans' capacity for recursion)."* (reference 9, p1570)

There are many potential senses of the term "recursion," so it is vital to understand what HCF had in mind. The paper as written leaves no doubt that they intend a process that applies to its own output without limit. This is clear when they claim that when a language has recursion then *"there is no longest sentence (any candidate sentence can be trumped by, for example, embedding it in 'Mary thinks that . . .'), and* **there is no nonarbitrary upper bound to sentence length**.*"* (reference 9, p1571 [emphasis mine, DLE]).

The quote from HCF above is straightforward, although some syntacticians now claim for it a more esoteric meaning (following my criticisms and empirical work in Everett (2005); Everett (2008); Everett (2012); inter alia). According to this initiate exegesis, recursion means for the authors only a (singleton) subset of recursive operations internal to the program known as Minimalism, what Chomsky (1995) calls 'Merge.' Merge is a function that takes two objects (α and β) and merges them into an unordered set with a label. The label identifies the properties of the phrase. In Minimalism, no phrase structure can be formed without undergoing Merge. Since Merge is by definition a recursive operation, no language can exist without recursion. Q.E.D.

For example: Merge (α, β) → {α, {α, β}}

If α is a verb, e.g. 'eat' and β a noun, e.g. 'eggs', then this will produce a verb phrase (i.e. where alpha is the head of the phrase), 'eat eggs'. The operation Merge incorporates two highly theory-internal assumptions. Both have been seriously challenged in recent literature. The first assumption Merge is based on is that all grammatical structures are binary-branching, since Merge can only produce such outputs. Second, Merge requires that all syntactic structures be endocentric (i.e. headed by a unit of the same category as the containing structure, e.g. a noun heading a noun phrase a verb a verb phrase, etc.). This means that Merge is potentially falsified by any exocentric or 2 +n(ternary, quaternary, etc.)-branching structure, e.g. a structure with flat syntax. Culicover and Jackendoff (2005) have argued, to my mind convincingly, that ternary-structures exist in the syntax of some languages and I (Everett 1988) have argued that non-derivable ternary structures exist in the metrical structure of Pirahã phonology. Further, I (Everett (2005a; 2009)) have argued that the syntax of the Wari' language of Brazil makes widespread use of non-endocentric constructions. Yet even though counterexamples exist, the authors insist that Merge is what they meant by recursion.

However, the Merge interpretation has to tear and strain to produce the "no longest sentence" clause of their earlier quotation, since that is a result of the more general notion of recursion. Even Chomsky (2010) allows that Merge itself may be blocked from repeating endlessly by language-specific stipulations. But such stipulations play no part in the mathematical notion of recursion.

There are several reasons why theory-internal reasoning is unhelpful. First, it excludes an important empirical space, namely, the class of languages that lack Merge but have other forms of recursion, such as languages with ternary branching but no longest sentence. Second, it ignores the possibility that some language may lack any form of syntactical recursion, such as Pirahã. Third, it overlooks what is to my mind the most

important consideration in understanding the role of recursion in natural language – natural conversations, narratives, and other discourses.

Lobina and Garcia-Albea (2009) offer a helpful elucidation of various notions of recursion that have been employed in mathematics, computer science, linguistics, and cognitive sciences. As they observe, even Merge need not be a recursive operation, since iteration does not properly fall within the standard mathematical or computational definitions of recursion. However, I will assume here for the sake of discussion that Merge is recursive.

Yet even if Merge is always recursive, not all languages are. And language with non-recursive syntax - such as Riau (Gil 1994) and Pirahã (Everett 2005b) - cannot be written off as "irrelevant" in the mistaken idea that recursion is simply part of the linguistic "toolbox" of Homo sapiens. First it is the *only item* (!) in the toolbox according to Hauser, Chomsky, and Fitch (2002). Second, to say that recursion is the only biological difference between humans and other animals which makes language possible but that not all languages require recursion removes any empirical force it might have. If one language lacks recursion or two, then why not all languages? All languages could be missing the one fundamental biological building block of language. This is a strange proposal indeed if the absence of the singular biological underpinning of language is treated as empirically irrelevant. In fact, calling Riau, Pirahã, and other languages that lack recursion "exceptions" would be like saying that a black swan doesn't falsify the claim that all swans are white.

Ironically, although I have repeatedly argued that Pirahã shows recursion in texts, texts lie outside the sentential syntax that has defined generative theory since its inception, where the "start" symbol (Σ) for all syntactic operations has always been the sentence. See Everett (1994) for more discussion of the "sentential divide" in grammar and cognition.

Linguists have long resisted the idea that culture is causally implicated in the formation of grammars, at least insofar as what Chomsky calls "core grammar" - the state of the language faculty after language-specific parameters have been set. In this section I want to underscore arguments I have made elsewhere (Everett 2005; 2008; 2012). I will do this by looking at the relationship in Pirahã between the morphosemantic notion of evidentiality, Pirahã culture, and Pirahã syntax. I argue that evidentiality is the integument connecting culture and recursion in Pirahã .

Evidentiality - the semantic notion of evidence for an assertion - is found in all languages in one form or another. For example, in English if I say "The man came in here" and do not qualify it in any way, one could argue that the default, culturally shared assumption is that the speaker has direct evidence of some sort for this assertion. Evidentiality is arguably found in the pragmatics every language because it is a value for cultures, helping the hearer distinguish speculation from evidence-based declarations, something that could save a lot of time in deciding where to hunt, build a village, etc. However, for some cultures evidentiality is not only a semantic fact but a morphological fact as well, encoded in some way on words, usually verbs, of the language. At some point in the development of such languages, speaker usage turned this near-universal semantic category into an overt symbol in their grammar. This is to me a cultural development, even if no speaker(s) consciously invented the evidentiality morphemes for their language - a manifestation of the "actuation" problem - how changes spread through

a culture or language (Weinreich, Labov, Herzog (1968)). Moreover, I also take it to be the case that evidentiality, like other categories, can be said to be more or less important to a given language depending in part on its effects in the morphosyntax and in part on its role in the culture. The greater the effects the more important it is, the fewer the less important. These are praxis-based determinations, not the results of votes or conscious manipulation of specific morphemes by speakers (though I do not deny that such might occur). Having introduced evidentiality, we now need to understand how Pirahã evidentiality follows from Pirahã culture.

In Everett (2005), I described several unusual aspects of Pirahã culture and language, many of them never documented for other languages (though I would expect all of them to be so documented in the future). These include: simplest kinship system known, lack of color words, lack of numbers and counting, no perfect tenses, no creation myths, no historical or fiction myths, being monolingual after more than three hundred years of regular contact with Brazilians, and *no recursion*. I proposed to account for all of these facts by a single principle, the IMMEDIACY OF EXPERIENCE PRINCIPLE, IEP. This is a principle found in some degree of strength in many Amazonian languages (see Gonçalves (2005) for a discussion of the pervasiveness of immediacy of experience as a cultural value throughout Amazonia.)

What I want to do in this section is to show how Pirahã culture rules out recursion in Pirahã grammar, beginning by restating an vital, overarching value of Pirahã culture, the "Immediacy of Experience Principle" (Everett 2005b; 2008):

> *Immediacy of Experience Principle* (IEP): Declarative Pirahã utterances contain only assertions related directly to the moment of speech, either experienced (i.e. seen, overheard, deduced, etc. – as per the range of Pirahã evidentials, as in Everett (1986, 289)) by the speaker or as witnessed by someone alive during the lifetime of the speaker).

Due to lack of space I am unable to repeat the arguments of Everett (2005) for the Pirahã IEP here, so the reader is referred to that paper for full argumentation, based on the empirical points mentioned earlier, as well as (among other things) the culturally important notion of **xibipíío** 'experiential liminality', discussed in Everett (2008). This word expresses liminality as an important cultural concept and is used to describe things which go in and out of vision or hearing, from the flickering of a match to the disappearance or appearance of a canoe around a bend in the river. As I have described it (see especially the internet lecture: http://fora.tv/2009/03/20/Daniel_Everett_Endangered_Languages_and_Lost_Knowledge) **xibipíío** is an expression of the value that the Pirahãs place on immediacy of experience.

In many works I have argued that Pirahã lacks recursion. I will, rightly or wrongly, assume this analysis here. The evidence for this analysis is summarized in Everett (2012) as follows:

"First, the lack of recursion correctly predicts that factive and epistemic verbs will be absent (though there is a - crosslinguistically common - use of the verb 'to see' for 'to know'). This prediction is made because if Pirahã lacks recursion, then there is no way to express factive verbs as independent verbs, since these would require a complement clause, requiring embedding and thus, ceteris paribus, a recursive rule in Pirahã syntax.

Pirahã expresses such notions via verbal suffixes, consistent with the 'no recursion' hypothesis, not with complement clauses.

Second, Pirahã has no marker of subordination. This is also predicted by my hypothesis, because if Pirahã lacks recursion, there is no subordination to mark.

Third, Pirahã has no coordinating disjunctive particles (e.g. 'or'). The absence of explicit markers of disjunction is predicted by my hypothesis, since disjunction entails recursion.

Fourth, Pirahã has no coordinating conjunctive particle (e.g. 'and'). There is only a more general particle, **píaii**, which may appear preverbal or sentence final and which means 'is thus/simultaneous' (vague meaning), which never works like proper conjunction, but only supplies the information that these two things were simultaneous (it is related to pixai, now). Again, this is predicted by my analysis, since coordination also entails recursion.

Fifth, Pirahã has no syntactic complement clauses. If Pirahã has recursion, where is the unambiguous data? I have claimed that it lacks embedded clauses. Others claim that it has them (Nevins, Pesetsky, and Rodrigues 2009), but they only show that quotatives *could* be embedding. No work has ever shown that there are multiple levels of embedding, which certainly would be expected if Pirahã has recursion (modulo Chomsky's (in press) recent ancillary constraint on Merge, discussed earlier).

Sixth, Pirahã does not allow recursive possession. The point of Pirahã possessives that I have made is not simply that it lacks prenominal possessor recursion, but that it lacks recursion of possessors *anywhere* in the noun phrase. Nevins, Pesetsky, and Rodrigues (2009) might be correct to suggest that German, like Pirahã, lacks prenominal possessor recursion. But German *does* have postnominal possessor recursion, while Pirahã has *none*. This is predicted by my analysis.

Seventh, Pirahã prohibits multiple modification in the same phrase. As I have discussed above and in Everett (2008) and (2009), there can at most be one modifier per word. You cannot say in Pirahã 'many big dirty Brazil-nuts'. You'd need to say 'There are big Brazil-nuts. There are many. They are dirty.' This paratactic strategy is predicted by my analysis since multiple adjectives, as in English, entails recursion, but the paratactic strategy does not.

Eighth, Pirahã semantics shows no scope from one clause into another, e.g. no "Neg-raising." Pirahã lacks examples such as 'John does not believe you left' (where 'not' can negate 'believe' or 'left', as in 'It is not the case that John believes that you left' vs. 'It is the case that John believes that you did not leave'). In this example 'not' can take scope over 'believe' or 'left'. That is not possible without recursion, so my analysis predicts the absence of such scope relations. This is also predicted, correctly, to be impossible in Pirahã under my account, since it would entail recursion.

Ninth, Pirahã shows no long-distance dependencies except between independent sentences, i.e. discourse. The kinds of examples that are standardly adduced for long-distance dependencies include:

'Who do you think John believes __ (that Bill saw__)?'

'Ann, I think he told me he tried to like ___'"

We have stated the IEP and rehearsed the evidence against syntactic recursion in Pirahã . It remains now to show how these fit together causally.

Pirahã, like many other languages (see, inter alia, Aikhenvald (2003); Faller (2007)), encodes evidential markers in its verbal morphology as affixes: **-híai** 'hearsay;' **-sibiga** 'deduction;' **-ha** 'complete certainty;' and **-0** (zero affix) 'assumption of direct knowledge.' The Pirahã IEP in conjunction with its requirement that evidence be provided for all assertions, produces a narrow domain in which assertions and their constituents need to be warranted. Reminiscent of the "Potential Focus Domain" developed by Van Valin (2005, 70ff), I label this domain in Pirahã (and presumably some version of this will exist in all languages, at least those with evidentiality morphology) the "Potential Evidentiality Domain (PED)," i.e. the range of structures where the actual evidentiality domain could in principle fall. The actual domain of evidentiality in a given utterance will be as follows:

**Evidentiality Domain**: *The syntactic domain in a sentence which expresses the evidentiality component of the pragmatically structured proposition.*

The PED in Pirahã is limited to the lexical frame of the verb, i.e. the verb and its arguments (more technically, the phrasal nuclei of the predicate and its arguments in Van Valin's Role and Reference Grammar terminology)[4]. Let's assume that the IEP is one of the reasons that Pirahã has evidentiality markers and that it dramatically strengthens their effect by narrowing their scope to the PED just mentioned.

The PED then rules out syntactic recursion in Pirahã. As stated, the PED clearly depends on the main verb as the core of the speech act. The PED will include only nuclei (semantic-syntactic heads, not heads in the X-bar sense) directly licensed by the predicate (its semantic frame). No nuclei are allowed outside the PED of a containing sentence.

By the PED there are no possessors; no embedded predicates – only arguments licensed by the main predicate. For example, in a noun phrase like “John’s house”, “house” is the nucleus - the semantic core, what this phrase is about. John is the possessor, a type of modifier of the nucleus house - the possessor tells us which house we are talking about. On the other hand, in a larger noun phrase such as “John’s brother’s house”, “house” and “brother” are each a nucleus of a separate containing phrase. “House” is the nucleus of the phrase “brother’s house” and “brother” is the nucleus of the phrase “John’s brother.” “John” is not a nucleus of any phrase. This means that 'John,' not being the possessor of an argument of the main verb (it is a nucleus of 'John's brother' but 'brother' is not a nucleus of the verb) is unwarranted in the PED and the sentence is disallowed. An embedded predicate would contain arguments not licensed by main predicate. Therefore, there can be no phrases within phrases and no sentences within sentences in Pirahã. There can also be no productive compounding in the morphology. Such apparent compounds as are found are in fact synchronic or diachronic phrases.

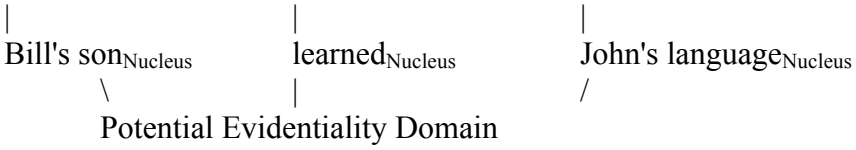
This is exemplified below, in a theory-neutral representation:

SENTENCE

|

$Argument_1$ Verb $Argument_2$

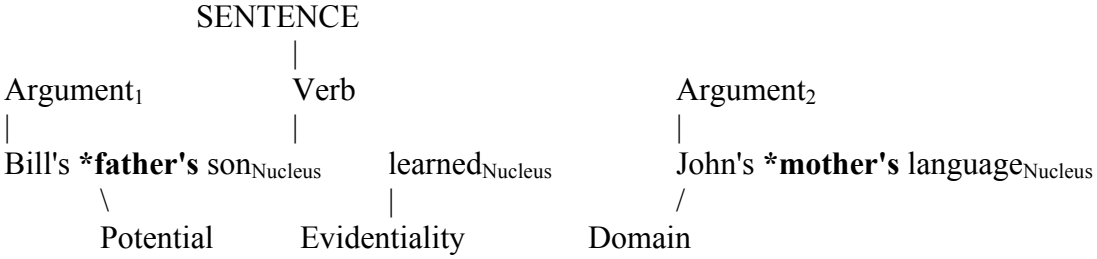
[4] I use Role and Reference Grammar here because to my mind it more effectively blends structural and functional-semantic principles into a theory of grammar. Nothing crucial hangs on this, however, and other theories might be compatible with the analysis offered here.




This example is allowed because each Nucleus is found in the semantic frame of the verb, represented along the lines of the following lexical representation: [BECOME **know** (son, language)]

This is a very strict evidentiality requirement. It predicts that the number of arguments in a sentence cannot exceed the number allowed by a standard (e.g. RRG) verbal frame. It rules out all embedding and all syntactic recursion.

The lexical representation of the accomplishment verb 'learn' ([BECOME **know**] indicates the change of state of knowledge) projects three nuclei to the syntax - the verb 'learn,' and the nominal nuclei/arguments 'son' and 'language.' Each of the nominal nuclei is possessed by a non-nuclear nominal. So the requirements of the PED are met. However, in the example below, there are two non-warranted nuclei, i.e. appearing in the PED without being found in the lexical representation:




This sentence would therefore be ungrammatical in Pirahã , though it is fine in English.

This analysis then claims that the PED, evidentials, and the lack of recursion are all reflexes of the cultural value IEP in Pirahã grammar.

Although the PED (forced by the IEP) rules out recursion in Pirahã, this analysis does not predict that another language, e.g. Riau, derives the absence of recursion in the same way. Recursion serves several purposes (Everett 2012) and thus there are many different reasons why a language might lack recursion. For example, Riau might simply rank the value of slower information rate above the value of recursive sentences in its language. Many oral traditions use repetition and slower information rate as aids to communication in the noisy environments of human speech.

Let's turn now to the cultural effects on the emergence of Pirahã phonology.

## 7. Culture and Segmental Phonology

Though I have discussed these data elsewhere (Everett 1985; 2008) it is worth reviewing them here to round out our picture of the effects of culture on grammar more generally. As pointed out in Everett (1982) Pirahã phonology cannot be fully described or understood without a knowledge of how it interacts with culture. There are other examples from Pirahã phonology. Let me present two of the strongest, in ascending order of importance for coherence.

Imagine that a language could have various systems/modalities of sound structure, beyond its phonetics and phonology. And then consider the possibility that one modality can affect another, but not necessarily via constraint-rankings or rules, the standard devices of phonological theory proper. If so, then to understand the sound system of language, **L**, at any level (e.g. 'what happens' or 'what native speakers know when they know the sound system of their language') we must look carefully at the modalities of expression made available via an ethnography of communication and not merely at a supposed universal formal apparatus. Corollaries of this scenario might include, e.g. the appearance of new roles for old constraints (e.g. mode-faithfulness of segments being highly ranked to mark syllable types; syllables are maintained, a form of prosodic faithfulness, in order to parse the larger speech stream, not merely to enhance the perception of segments; and thus arguments for syllables may go beyond phonotactics and segmental enhancement and the syllable may have roles not envisioned by the so-called 'phonological hierarchy'). If this were true, then coherent fieldwork (Everett 2004) would evolve from a curiousity or desideratum to an imperative. Is there such a case? Indeed. Consider the following facts about Pirahã phonology, beginning with its phonemes.

Table One
Pirahã Phonemes

**Consonants () = missing from women's speech**

| | | | |
|---|---|---|---|
| p | t | k | ? |
| b | | g | |
| | **(s)** | | h |

**Vowels**

i

o

a

Pirahã 's segmental inventory is one of the smallest in the world (the only two other languages with inventories of this size are Rotokas and Hawaiian - though they lack tones). It is also worth noting that the /s/ is in ()s because it is not found in women's speech, but only in men's (women use /h/ where men use /s/ and /h/).

Though this is one of the simplest segmental phonemic inventories in the world (the women's inventory does seem to be the simplest known), we should juxtapose alongside this simplicity, the complexity of Pirahã's prosodies. Pirahã's stress rule is a good place to begin, since it is well-known.

This rule, from Everett & Everett (1984), is considered one of the more complex and unusual stress rules in the literature, mainly for its phonological consequences (rather than, say, any difficulty in stating or recognizing it):

**Pirahã stress rule**: stress the rightmost token of the heaviest syllable type in the last three syllables of the word.

The phonetic basis of 'heaviness' in (1) is just this: Voiceless consonants are always longer than voiced consonants and there are five syllable weights based partially on this contrast:

Pirahã 's five syllable weights: CVV>GVV>VV>CV>GV

Pirahã is a tonal language, as well. But stress, tone, and syllable weight vary independently in the language. To see this, I will just review the simple set of examples below. In these examples tone is independent of stress. ´ = high tone; no mark over vowel = low tone. The stressed syllable is marked by **!.** There are no secondary stresses.

(1) a. **!**tígí 'small parrot'
b. **!**pìgì 'swift'
c. **!**sàbí 'mean, wild'
d. **!ʔ**ábì 'to stay'
e. tíí**!**híí 'bamboo'
f. **ʔ**ì**!**tì 'forehead'
g. tì**!ʔ**í 'honey bee'
h. tí**!**hì 'tobacco'

Thus alongside Pirahã's extremely simple segmental phonology, it manifests a rich set of prosodies. This leads us to ask a reasonable question, namely, does the language exploit this differential complexity in any way? Indeed, as Everett (1985) describes it, Pirahã communication makes crucial use of the CHANNELS in (4), below, where Hymes (1974) defines a channel as 'sociolinguistically constrained physical medium used to carry the message from the source to the receiver'. The four principal modalities or channels in Pirahã after 'normal' speech are:

| *CHANNEL* | *FUNCTIONS* |
|---|---|
| a. **HUM SPEECH** | Disguise<br>Privacy<br>Intimacy<br>Talk when mouth is full<br>Caregiver-child communication |
| b. **YELL SPEECH** | Long distance<br>Rainy days<br>Most frequent use – between huts & across river |
| c. **MUSICAL SPEECH** ('big jaw') | New information<br>Spiritual communication<br>Dancing, flirtation<br>Women produce this in language teacher sessions more naturally than men. Women's musical speech shows much greater separation of high and low tones, greater volume. |
| d. **WHISTLE SPEECH** (sour or 'pucker' mouth' – same root as 'to kiss' or shape of mouth after eating lemon) | Hunting<br>Men-only<br><br>One unusual melody used for aggressive play |

The Example below illustrates how prosodic information in Pirahã is exploited to create these channels. The inventory in Table One above, also partially shows how little the segments contribute to the total set of phonological information in a given Pirahã word. We see that the phrase 'There is a paca there' has a quasi-musical representation, the basis for the channels just summarized.

(2) a. **kái/ihí/ao -/aagá gáihí**
paca poss/exist-be there
'There is a paca there.'

b. 

All channels must include the information above, though only the consonant and vowel channel needs to include the information in (a). The notes represent syllables, with 'ties' indicating unbroken falls/rises in whistle speech.

In the musical form there is a falling tone, followed by a short low, with a preceding break in the whistle (where the glottal stop would have been in **kai*ʔi*hi**),

followed by another short break (where the **h** would be) and a short high tone, and so on. Thus, the syllable boundaries are clearly present in whistle (humming, and yelling) channels, even though the segments themselves are missing. The syllable in this case indicates length, offers an abstract context for tone placement, and the overall word is stressed according to syllable weight (see Everett (1988) for details). The syllable in these cases is vital to communication in differing channels, primarily in parsing the input.

But does the discovery of channels like this imply any causal interaction between culture and grammar? Or are these channels outside the grammar proper? Notice that these channels rely crucially on the syllable weights and stress rule above. So, if nothing else, they help account for what is otherwise an anomalous level of complexity in the stress rule. Yet the facts cut deeper than this. Consider the following example of what Everett (1985) calls the 'sloppy phoneme effect' :

**tí píai ~ kí píai ~ kí kíai ~ pí píai ~ ʔí píai ~ ʔí /íai ~ tí píai, etc. (*tí tíai, * gí gíai**, ***bí bíai**) 'me too'(4) **ʔapapaí ~ kapapaí ~ papapaí ~ ʔaʔaʔaí ~kakakaí ~(*tapapaí, * tatataí, * bababaí, * gagagaí**) 'head'

**ʔísiihoái ~ kísiihoái ~ písiihoái ~píhiihoái ~kíhiihoái ~** 'liquid fuel' [5]

Pirahã allows a tremendous amount of variation among consonants, though not for the features [continuant] or [voice]. This can be accounted for, but only if we refer to Pirahã's channels. The ungrammatical examples above show that the features [continuant] and [voice] are linked in the sense that they may never vary in the effect. Only place features may vary. With no reference to channels this is without explanation. But in light of the channels this follows because [continuant] and [voice] are necessary for stress placement (Everett (1988)) which in turn must be preserved in every discourse channel, or the constraint below is violated:

*Constraint on functional load and necessary contrast* (Everett (1985)):

a. Greater Dependence on the Channel → Greater Contrast Required

b. Lesser Dependence on the Channel → Less Constrast Required

Notice that I am not claiming that the absence of variation for different values of [continuant] is predicted by 'channels' alone. This case in fact demands that we further investigate the connection between [continuant] [voice]. There is no claim that ethnography replaces phonology! But I am claiming that without the study of channels and their role in Pirahã culture, even an understanding of Pirahã's segmental phonology is impossible.

The lesson for the field researcher and theoretical linguist to be drawn from these examples is just this: first, language and culture should be studied together; second, as a modality-dependent channel, phonology may be subject to constraints that are (i) language specific and (ii) grounded not only in the physical properties of the instantiating modality (the phonetics) but also or alternatively on the culture-specific channels of discourse employed. This is a very important result because it shows that the 'interface conditions' of the HUMAN COMPUTATIONAL SYSTEM, in Chomsky's (1995) terms, may range beyond PF and LF, if we define an interface system as a system setting bounds on interpretability for $HC_L$. Such examples also show how coherent fieldwork can be useful for theory. Thus not only the fieldworker, but also the phonologist must engage the

[5] Alternations with /t/s or involving different values for [continuant] or [voicing] are unattested.

language as forming a coherent whole with culture. And this in turn entails more culturally informed fieldwork.

8. Towards Ethnogrammar

This section attempts to develop a methodology for ethnogrammatical studies, building on suggestions by Saville-Troike (1982, 108ff) among others. Saville-Troike suggests the following:

Beginning steps for the ethnography of communication:

a. identify recurrent events

b. analyze these events, examing their function, form, and relationships between different constituents.

c. examine the relationship between these events to other speech events and to the society and culture in which they occur.

For example, one might study the use of whistle speech on the Canary Islands. One variety, Silbo Gomero is used in and around La Gomera. In relation to (a), each use of whistle speech is thus an event. Some questions that might be asked about these events are: When is it used? Who uses it? What are the constraints on its intelligibility? (e.g. Can two people understand Silbo under any circumstances or does a topic of conversation need to be established first to provide context?) How many other channels of discourse are there among speakers who use Silbo? Are there contents or types of discourse in which the people prefer to use Silbo? Are the contents or types of discourse in which the people prefer not to use Silbo? What are the phonetic details of Silbo and how is it possible (since the language it is based on is not tonal, does it use inherent segmental frequencies as a basis, intonation, etc.)? How does it relate to the consonant and vowel channel (i.e. normal speech)?

Beyond these suggestions there are further methodological preliminaries for investigating the culture-language connection. These preliminaries include at least the following:

a. Are there irregularities that have no obvious structural explanation?

b. Are there examples 'free variation', i.e. where there are choices between two structures which are not constrained 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 or phenomena that at any level look similar to principles operative in the grammar?

As to the methodology that follows from such questions, Enfield (2002, 14ff) offers some cogent and very important considerations and suggestions for the study of ethnogrammar. First, he recommends that the fieldworker "Examine specific morphosyntactic structures and/or resources and make explicit hypotheses as to their meaning." Second, following development of this and related methodological considerations, he raises the crucial issue of 'linkage', namely, how can we establish a causal connection between facts of culture and facts of grammar? I turn to this directly. Before doing this, however, I want to point out what seems to be the biggest lacuna in the study of ethnogrammar, whethere in the studies in Enfield (2002) or elsewhere. This is the effect of values, especially cultural taboos like the IEP above, in restricting both culture and grammar. That is, previous studies, like those in Enfield (2002), while

reasonably focusing on meaning, which is after all a principal contribution of culture (i.e. guiding its members in finding meaning in the world), fail to consider cultural prohibitions or injunctions, however deeply or shallowly embedded in the community system of values. The Pirahã example of this section is evidence that such values should also be considered in ethnophonological, as well as ethnosyntactic studies - hence "ethnogrammar." However, before we can draw any conclusions at all about ethnogrammar in a given language, we need to consider the vital issue that Enfield refers to as 'linkage', i.e. the establishment of a causal connection between culture and language. That is, how can we convince someone or, at least, effectively argue that property ***p*** of culture **C** causally determines feature ***f*** of grammar **G**? According to Clark & Malt (1984), cited by Enfield (2002, 18ff) there are four prerequisites to establishing linkage between culture and language:

**Culture – grammar linkage prerequisites**

a. Empirical grounding - Are the phenomena clear and well-established?

b. Structure independence - Are the cultural and grammatical structures or principles independently needed in the grammar?

c. Theoretical coherence - Does the analysis follow from a clear theory?

And also, crucially: avoid circularity. A circular argument in ethnogrammatical studies would be to claim that a particular linguistic feature is simultaneously determined by an aspect of culture and 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-valued 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 (e.g. the Immediacy of Experience Principle, where evidence comes from numeracy, kinship, color terms, monolingualism, discourse topics, among others (Everett 2005). Next, using *noncultural evidence*, establish the meaning and structure of the relevant linguistic examples (examples would include standard arguments for constituency, displaced constituents, and so on). Finally, show how linking the two provides a conceptually and empirically (in terms of predictions where possible, or explaining independent domains such as historical change) superior account of the facts that leaving them unconnected.

Ethnogrammatical studies thus range from showing that, say, a language has honorifics because of a severe social structure, or a particular set of kinship terms because of its restrictions on marriage, to (what most researchers have overlooked), the kinds of global, architectonic constraints on grammar from, e.g. *taboos* like the IEP.

Another issue is whether in all the talk about meanings and their relationship to culture the researcher can successfully get the semantics right. The so-called 'translation fallacy' is well-known, but field linguists in particular must be ever-vigilant not to be confused by it. Roughly it is the supposition that there is only one human reality to which all 'narratives 'must in effect conform – be they fiction or linguistic theories, say. Throughout this paper, I will urge the reader to be on guard against this – the mistake of concluding that language x shares a category with language y if the categories overlap in reference.

Part of the conclusion of this paper, agreeing with Gordon (2004), is that much of Pirahã is largely incommensurate with English and so translation is simply a poor approximation of Pirahã intentions and meaning, but we do as well as we can do.

9. Conclusion: Culture, Community, and Communication

Cultural learning is discussed in a multitude of studies (e.g. the entire field of cultural psychology, neuroanthropology, etc). But perhaps the two most important mechanisms are (i) what Everett (2012a), going back to Aristotle, refers to as "the social instinct" and (ii) general cognition. Another way of referring to the social instinct is as the "interactional instinct" (Lee, et. al. (2009); Levinson (2006). By general cognition I refer in particular to the general ability of the human brain to generalize and recognize patterns.

What might be the evolutionary utility of a social or interactional instinct? The social instinct (however it is ultimately characterized) is the presumably unlearned need for humans to communicate, to interact with one another. Levinson (2006) makes a convincing case for the independence of interaction from language. The need to interact and the ability to interact are prior to language. The appeal of such an instinct is that it is a simple reflex that requires no learning curve (such as is required for the so-called "language instinct", for example). The instinct is not the final product of course, but it triggers movement in that direction and is arguably what distinguishes humans from other species that lack this social or internactional instinct. The social instinct is the "initiator" in that it provides the problem while language and society provide the solutions. In this sense, language is the principal tool for building social cohesion through interaction.

Many researchers (e.g. Tomasello 2001) have made a case for qualitative differences between the interactions and social organizations of humans vs. other species. Clearly, though, since humans have bigger brains, an interactive instinct and a transmitted linguistic history (passing along to subsequent generations both the content and the form, i.e. grammar). The idea of general learning (including such things as memory, motivation, emotion, heuristics, categorization, perception, reasoning, and so on), heavily dependent as this is on the keen human ability to make tacit statistical generalizations, as a key to language differences between humans and other creatures has been defended many times in the literature. Kurzweil (2012) makes this case to a popular audience. But many researchers in Bayesian approaches to learning (e.g. Pearl (); Perfors, et. al. (), MacWhinney (), and many others) present much more technical and nuanced evidence, backed by extensive experimentation. Such claims in fact go far back, with a form of the argument to be found in Benedict (1934), at least implicitly.

The effects of culture on the lexicon take on a greater significance these days when many linguists deny a strong bifurcation between syntax or grammar and the lexicon. In fact, if constructions (see Goldberg (1995)) are lexical items that produce families of syntactic constructions, then the culture can affect the syntax of constructions just as all linguists now agree it can affect the lexical items of any language.

This paper is not intended as a list of noncontroversial results. It does, however, provide evidence that culture profoundly affects grammar and that understanding and studying this relationship between culture and grammar is not beyond our grasp.

Finally, the considerations above lead to the proposal of a simple formula for the development of grammar in our species:

COGNITION, CULTURE, AND COMMUNICATION --> GRAMMAR

In other words, given human cognitive abilities, cultural/community shared experiences and the interactional instinct, grammar emerges as a solution to the latter problem facilitated by the first two abilities.

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