act (such as insulting others) with high frequency, he will perform other aggressive acts (like hitting or using threat stores) with high frequency. No generality in behavior is assumed, as in the multibehavior unit approach.

The failure of the multibehavior unit approach to yield good predictions of individual or group behavior is still a moot point in some areas of the social sciences. The pattern of evidence seems clear, however: the conception of humans in terms of dimensions, general traits, and so forth, has not been found to have reasonable validity (Hunt 1965; Vernon 1965; Mischel 1968). With respect to culture and personality studies this means that the descriptions of specific high-frequency behaviors said to be typical of a culture are probably useful in accounting for a considerable number of behaviors in that culture; whereas the more abstract descriptions of cultures as Appollonian, or gentle, probably lack validity, in that cultures thus described most likely provide many particular examples of high-frequency, non-Appollonian—or non-gentle—behaviors.

REFERENCES


She contends that the language of the Trobriand lacks terms which posit relations among propositions and claims.

This does not mean that the Trobrianders are incapable of explaining a sequence in terms of cause and effect, but rather that this relationship is of no significance. (1949:407)

Lee's denial of the concept of causal relations leads her to assert, with regard to motivation, that the Trobrianders not only do not interpret acts in terms of intents, but that they do not in fact even have intents. "The Trobriander performs an act because of the act itself, not for its effects" (1949:408). Lee concludes her 1949 paper as follows:

Whether they are given or read into reality by us, temporality, causation, teleology, and relationship in general have neither meaning nor relevance for Trobriand behavior. (1949:415)

Such claims may seem credible when evaluated only in the light of the limited data Lee presents, and, in fact, many anthropologists are impressed by her arguments. For one who has lived in the Trobriands, learned the language, and experienced the complexity of everyday life there, however, these claims are absurd. In this paper I will present an analysis of an example of natural Trobriand discourse. From this analysis, I will draw what I think are some more reasonable conclusions about the nature of Trobriand reasoning. In addition, I will provide an explanation of the source of Lee's mistaken conclusions and consider some issues concerning the conditions under which we are likely to be justified in making inferences about other people's thinking.

The analysis presented here will focus on deduction, the sort of inference which involves the assignment of a degree of likelihood to one proposition on the basis of the likelihoods of other propositions. In our society, the rules of deduction in symbolic logic are exemplary inference forms. In classical symbolic logic, only two degrees of likelihood are considered; a proposition is either true or else it is false. The rules of deduction in this system are a special case of inference as defined above. While they are widely taken as a normative standard, they are not in fact accurate descriptions of how most of us make inferences most of the time. We often think in terms of a continuum of likelihoods, and we make plausible inferences where strong inferences are not available. That is, rather than infer that something is strictly true or false on the basis of some observation, we may instead only be able to infer that it is likely or unlikely. I am making no claims here about the nature of the mechanism by which the adjustment of likelihoods is accomplished. Whether it is Bayesian or otherwise is a topic for another paper. What I am arguing is that even in naturalistic settings, we can observe adjustments of likelihoods, and assess the direction (up or down)—if not the amount—of change in the likelihood of a proposition. A rough model of inference then, contains these elements: (1) a proposition which relates two or more concepts (e.g. P implies Q), (2) a new bit of information, either retrieved from memory or gleaned from the interpretation of the world of experience, concerning the likelihood of one of the concepts related by the first proposition (e.g. P is very likely), and (3) a procedure for determining what impact the new information has on the other concept related in the first proposition (e.g. Q is also very likely).

Some sort of inference must be utilized any time one makes an assertion, or attempts to support an assertion, about the likelihood of an event or state that has not been directly observed. This means that inference is involved in virtually every instance of planning. Much of the apparent richness of our experience derives from our use of inference to fill in and elaborate our representations of the world. Sometimes we use inference to establish the likelihood of events which are technically observable, but which have not actually been observed. Other times inference tells us about events, such as the intents and desires of other social actors, that we can never observe directly.

That people make inferences is easily demonstrated by pointing to those things we all do that require inference. Specifying just where, how, and on the basis of what information people make inferences is, however, somewhat more difficult. A major problem in the study of inference in natural discourse is that much of discourse is composed of syllogisms in which one or more premises are left unstated. If I say to you, "Socrates is mortal because he is a man," you know what I mean. But it is not necessary for the purposes of communication to explicitly state the missing major premise—vis., that all men are mortal. That premise is implicit in your understanding of what I have said even though it does not appear in the discourse. Given a community of speakers with some shared set of understandings about how the world works, it would be both redundant and tedious for each of them to exhaustively specify all of the premises used in his reasoning when he is communicating that reasoning to his fellows.

The task of identifying inferences in natural discourse, then, must involve a specification of the premises on which the inferences are based. In the following section I will present a brief excerpt of discourse from an important area of Trobriand life. I will also attempt to demonstrate that an ethnographically informed model of the cultural knowledge about the events in this domain can provide the premises missing from the discourse itself, thus permitting us to analyze the inferences that are being made.

CULTURAL PREMISES

Consider an example from the domain of Trobriand land litigation. The cultural premises that underlie reasoning about claims to land concern the conditions under which rights in land can be transferred from one person to another. The full set of premises for this domain is much too large and complex to present here. A small subset of those premises, however, accounts for a large fraction of the inferences made in litigation. A simplified account of that subset will be presented here.

There are two necessary, but not sufficient, conditions for a legitimate
transfer of rights in land. The first is simply that the person who is giving rights in land must, at the time of the transfer, have rights to give. That is, this person must have previously and legitimately acquired the rights, and must not yet have transferred the rights to someone else. When this condition is met, the land is said to be TUPWA, “still remaining” with respect to that person. Once a person has transferred his or her rights in land to someone else, that land is no longer TUPWA; it is said to be KASESILA, “decided upon” or “allocated” with respect to that person. The satisfaction of this first condition is summarized in Trobriand discourse by the term TUPWA.

The second condition is that the person who is to acquire rights must have provided the rights holder with an instance of at least one of several classes of exchange inducements called POKALA. Regardless of the form taken, POKALA as an inducement is given with the hope, but without the guarantee, of a reciprocal presentation. This second condition for legitimate transfer is summarized in discourse by the term POKALA or by any of the more specific terms for its sub-categories.

A basic premise, then, is that a legitimate transfer of rights in land implies both that at the time of transfer the land be TUPWA with respect to the person giving the rights, and that the aspiring rights holder have provided POKALA to the person giving the rights. A second premise is that whenever a legitimate transfer has taken place, the recipient of the rights in land does in fact have those rights. This seems so trivial as to not deserve mention, yet it is an important premise upon which many inferences are based.

A LAND DISPUTE

In July of 1976, two men disputed each other’s claims to rights in a particular piece of garden land. A village court was convened to hear the case. Each man made a presentation to the court in which he gave an account of the sequence of events he believed led to his having rights in the land. The two accounts began with the same historical events, but they diverged with respect to a transfer of rights about thirty years in the past. Both litigants described a POKALA presentation by a third man to a woman who previously held rights in the garden (see Figure 1, t1). The first litigant to make his presentation to the court maintained that this POKALA attempt was unsuccessful; that it was not responded to with a transfer of rights. He claimed that the garden remained TUPWA at this point (t2), and that the woman later gave the garden to him in response to his subsequent POKALA (t3). The second litigant maintained that the rights to the garden were transferred to that third man in response to his POKALA (t3), making the garden KASESILA with respect to the old woman. This litigant claimed that he later acquired rights to the garden, not from the woman, but from that third man who had provided the earlier POKALA (t2-t4).

As stated, the claims of both litigants are plausible. They each describe a possible history of the garden which conforms to the principles of land tenure. In the course of the testimony of witnesses it became clear that the POKALA attempt by the third man some thirty years ago was indeed successful and was followed by the transfer of rights in the garden to him.

The following is a translation of an excerpt of the court decision directed to the losing litigant:

With regard to this garden: Well, within the argument, if it had been TUPWA, you all understand. You all know how it is with POKALA and TUPWA. But this garden was not TUPWA. It was already KASESILA, and this is the source of it... . My hearing of it, my unbiased opinion is this: If it had been TUPWA, no one would worry, [the second litigant] would not take it today, it would be your thing. But because it was previously decided upon, fine, I say, let it be KASESILA.

ANALYSIS

The decision begins with a hypothetical condition, “If the garden was TUPWA,” and explicitly invites the listeners to make the appropriate inference, “You all know how it is with POKALA and TUPWA.” What they all know is that POKALA and TUPWA together are the necessary conditions for a transfer of rights. This is, of course, the major underlying premise. The first (losing) litigant’s POKALA to the old woman is not questioned, so that if it were true (at time t3) that the garden was TUPWA, then the necessary conditions for a transfer of rights would have been
met. This permits the plausible inference that the likelihood of the old woman actually transferring rights to this litigant is increased. From the increase in the likelihood that the old woman transferred her rights to this first litigant, it can be inferred from the second underlying premise that the likelihood of his actually having rights in the land is increased.

The opening hypothetical condition is followed by a disjunction to an assertion of fact. "But, this garden was not TUPWA." This is an assertion that the necessary conditions for a transfer of rights to the first litigant were in fact not satisfied. From this, a strong inference can be made that the land was not transferred directly from the old woman to the first litigant. Since the first litigant's claim rests on this transfer, proving it false reduces the likelihood of his holding rights in this garden to zero.

The statement, "It was already KASESILA," refers to the transfer of rights to the third party some thirty years ago. From the assertion of this proposition it can be inferred that the third party did acquire rights to the garden in question. This proposition satisfies one of the necessary conditions for the transfer of rights from that third party to the second litigant. An increase in the likelihood of the second litigant's claim can be plausibly inferred from this proposition.

"If it was TUPWA, no one would worry, (the second litigant) would not take it today." Here we have the hypothetical premise linked directly to a stated conclusion. This conclusion is derived from the hypothetical premise and the implicit premise as follows: from the hypothetical proposition that the garden was TUPWA at the crucial point in time (t3), it can be inferred that the third party did not acquire rights in the garden. That allows the strong inference that the third party could never have transferred his rights to the second litigant. That inference would clearly destroy the second litigant's argument.

"If it had been TUPWA, it would be your thing." This is yet another inference from the counterfactual hypothetical proposition which lies at the center of the first litigant's argument. The inference structure here is precisely as it was in the first statement of the decision. It provides for the plausible inference of the first litigant's claim being true.

Finally there is one more disjunction from the hypothetical to the factual. As shown earlier, the assertion of the garden status KASESILA allows inferences which show the second litigant's claims to be plausible and the first litigant's claims to be impossible.

Understanding this brief fragment of discourse requires a total of twelve inferences. Six are weak plausible inferences, and six are strong deductive inferences. All of the inferences are based on the simplified major premises of land tenure defined earlier in terms of causal and temporal relations among abstract classes of events. The act of either understanding or producing this bit of discourse requires 1) the ability to treat concrete instances as members of abstract event classes, 2) a comprehension of the nature of the causal and temporal relations between abstract event classes, and 3) the ability to determine the truth values of hypothetical concepts in accordance with their logical relations to other concepts whose truth values have already been established.

DISCUSSION

From this analysis, and from many others like it performed on discourse from other domains, I conclude that while Trobrianders' beliefs about the world are, in some domains, very different from our beliefs, it is unwarranted to infer from a difference in content that the way Trobrianders reason about what they believe is substantially different from the way we reason about what we believe.

If that is the case, why is it that Lee arrived at such a different conclusion about the nature of Trobriand reasoning? The answer to this question lies not in the nature of Trobriand reasoning, but in the nature of our procedures for knowing about reasoning. Lee based her conclusions on her analysis of Malinowski's published materials. Even if we ignore the problems Lee faced in working on linguistic data without a knowledge of the language in which it is expressed, Malinowski's materials contain some important artifacts with respect to reasoning. Virtually all of Malinowski's verbatim transcriptions of "native" discourse are traditional narratives and magical spells. The reason for this is quite simple. Malinowski was limited to a paper and pencil technology in data collection. Spontaneous discourse passes much too quickly to be captured in full by simultaneous transcription. Narratives and magic, on the other hand, being memorized formulas, can be recited for the note-taking ethnographer at a pace with which he or she can cope. But narratives and magic are generally poor in inference. The comprehension of narrative discourse requires inferences, but the inferences are not themselves made explicit in the discourse. Magical spells, it turns out, are like telegraphic speech, so devoid of overt specification of relations that they often seem cryptic even to Trobrianders. Litigation, and other speech contexts which require explicit explanations of the relations among events, are much richer in inference than these other domains. I cannot help but think that some opinions about Trobriand thought are in part an artifact of the preponderance of magic and narrative and the dearth of natural conversation in Malinowski's published texts. Malinowski is, of course, not to blame. Natural conversation is virtually impossible to capture without the help of a tape recorder. It strikes me as a bit ironic, however, that our opinion of their intellectual abilities may have been in some way dependent upon the state of our own technology.

Goody (1977) has argued that the development of logic:

seemed to be a function of writing, since it was the setting down of speech that enabled man to clearly separate words, to manipulate their order, and to develop syllogistic forms of reasoning; . . . (1977:11)

Goody is right that it is the setting down of speech that enables man to separate words and manipulate their order. The notion of syllogistic reasoning as a thing to be described is a meta-linguistic concept, and language must be objectified for the development of meta-linguistic concepts. This is the key to Lee's problem. In analyzing Malinowski's material
Lee was unable to find syllogistic reasoning for at least two reasons. First, Malinowski was unable to set down a written record of the sorts of speech in which syllogistic reasoning is made explicit, and second, having never lived in the Trobriands, Lee had no access to, and thus could not make explicit, the implicit premises underlying the discourse which was recorded.

But if Goody means that the ability to do syllogistic reasoning depends on writing, then he is also wrong, because he has confused the technology required of the analyst for a description of reasoning (setting down a written record) with the technology required for the performance of reasoning. Just as writing is required for a description of the syntax of a language, but not for the performance of grammatical speech, writing is necessary only for the description, not for the production of syllogistic reasoning.

The failure of non-literate peoples to solve experimenter-posed syllogistic tasks is not indicative of an inability to do syllogistic reasoning, but of the failure to conceive of syllogistic reasoning meta-linguistically as a “structure” of reasoning which can be applied in abstraction to novel as well as familiar situations. In this paper I have argued, I hope successfully, that when reasoning in a domain which is structured by a set of meaningful cultural premises, non-literate peoples do employ syllogistic forms of reasoning which are formally indistinguishable from the everyday reasoning of Western man.

NOTES

1. The research reported here was conducted by the author in Milne Bay Province of Papua New Guinea in 1975 and 1976 under a dissertation research grant from the Social Science Research Council. The analysis in this paper is taken from my doctoral dissertation, Hutchins (1978). My thanks to Michael Cole for his criticism and advice on this version of the material.

2. Malinowski published seven books and several articles on the Trobriands between 1922 and 1935. The most important of these for this paper are (1922, 1929, 1935a, 1935b).

3. See Polya (1954) and Collins and Larkin (1977) for two views of plausible inference.

4. The recent literature of discourse comprehension is rich in demonstrations of the importance of inference to fill out interpretations (cf. Bobrow & Norman, 1975; Schank & Abelson, 1977).


6. The text reported is a translation by the author of a case excerpt which was originally recorded on stereo tape. The transcription prior to translation was made by the author and checked with informants. The relational terms are given the same translations as those used by Malinowski (contra Lee).

REFERENCES
